3.2.1 Number of papers published per Teacher in the Journals notified on UGC website during the AY 2023-24

Sl. No.	Title of paper	Name of the author/s	Department of the teacher	Name of journal	ISSN number	Page No.
1	Regeneration of Scratched Images using Deep Learning	**Dr. Dinesha L**, Harsh Shetty, Mandira Hegde, Nesara G S, Anusha	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2319-5940	1
2	Breast Tumor Segmentation and Classification Using Ultrasound Images	**Dr. Dinesha L**, Deeksha Prabhu, Deepika, Vaibhav R Jadhav, Mohammad Shihabul Faiez	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2319-5940	2
3	Detection of Breast Cancer using Deep Learning Techniques	**Dr. Dinesha L**, Dr. Sreeja Rajesh	CSE	Gradiva Review Journal	0363-8057	3
4	Early Diagnosis of Cervical Cancer using Colposcopic Images	**Dr. Dinesha L**, Sinchana Shetty, Swati Metri,, Adarsh J, Kavyanjali Kadlibalu	CSE	International Journal of Creative Research Thoughts	2320-2882	4
5	Deep Learing-Based Kidney Health Diagnosis From CT Scans	**Dr Dinesha L**, Krithi D S, Kruthi Shettigar, Kunjoor Tushar Raj, Leston Aaron Salis	CSE	International Journal of Creative Research Thoughts	2320-2882	5

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6	Flood Monitoring and life detection in submerged areas using computer vision techniques	**Dr. Dinesha L**, Asha U Nayak, Ashwini, Avantika Ajay Poduval, Bhayalakshmee	CSE	Journal of Emerging Technologies and Innovative Research	2349-5162	6
7	Recognition and Classification of Paddy Leaf Disease using CNN	**Amrutha**, Divyata, Harshitha, Likhitha, Pavana	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2319-5940	7
8	Automatic Music Transcription To Music Notes Using Artificial Intelligence	**Amrutha**, Harshitha, Prabhanjan Hippargi, Shobith R Acharyal, Shreya S Poojary	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2319-5940	8
9	Effective Milk Grading and Billing Solution for Dairy Industry	**Amrutha**, Shivaraj Shetty, Ranjith Shetty, Rao Suraj Nagesh, Shiva Patankar	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2319-5941	9
10	Optimized Milk Quality Assessment and Billing System for the Dairy Industry	**Amrutha**, Shivaraj Shetty	CSE	Gradiva Review journal	0363-8057	10
11	Hybrid Machine Learning Models for Enhanced Fake News Detection	**Amrutha**, Shwetha Kamath, Shivaraj B G, Chandana S, Keerthan	CSE	Journal of Intelligent Data Analysis and Computational Statistics	3048-7080	11

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12	Smart Calorie Burn Analyzer	**Amrutha**, Sanjitha S Poojari, Sanya R Poojari, Smrithi Nayak, Sparshitha S	CSE	Gradiva Review journal	0363-8057	12
13	Pulmonary Nodule Detection in Computed Tomography using Deep Learning	**Amrutha**, Krishnaraj Sadashiva Prabhu, Krishnaraja V, M Manavi Jain, Mahesh Nayak	CSE	Gradiva Review journal	0363-8058	13
14	Enhancing Speech Clarity And Pain Detection In Individuals With Cerebral Palsy	**Amrutha**, Chandana S, Dwithi Shetty, Dhwani Sagar, Bhagyashree K S	CSE	Gradiva Review Journal	0363-8059	14
15	Kannada Text Summarization Through Keyword Extraction	**Shwetha Kamath, Amrutha, Shivaraj B G**	CSE	Gradiva Review Journal	0363-8059	15
16	Performance Optimization of K-Means Clustering using multiple k-Values:A Hands-On	**Shivaraj B G, Amrutha,Shwetha Kamath**	CSE	IRE Journals	2456-8880	16
17	Drug consumption detection using machine learning	**Dr Babu Rao K**, Ajay Shetty, Chirag V, Darshan U , Disha P	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2319-5940	17

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18	Detection of Polycystic ovary syndrome using deep learning	**Dr Babu Rao K**, Gowri N, Jani Kalianpur, Shravya, Thanmayee N Shetty	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2319-5940	18
19	Osteoporosis Risk Detection With Assistant	**Dr Babu Rao K**, Mohammed Ibrahim Nihal, Nihaal Ahammed, Nireeksha S and Nisarga Suresh	CSE	International Journal of Creative Research Thoughts	2320-2882	19
20	Smartdoc AI : Seamless Document Search and AI Query Tool	**Dr. Babu Rao K**, Samprith Jain D, Shreesha Nayak, Shriharish S, Shwetha	CSE	Gradiva Review journal	0363-8057	20
21	Liver Tumor Detection and Analysis Using CNN	Joyston Monteiro, Allan Vernon Mathias, Amrutha G Bangera, Akhil T, **Dr Babu Rao K**	CSE	Gradiva Review journal	0363-8057	21
22	Sleep Apnea Detection Based on ECG Signals Classification Using CNN Approach	**Pradeep B S**, Advith Pai B, Akash Shetty, Akash V Poojary, Karthik	CSE	Computer Research and Development Journal	1000-1239	22

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23	Detection of Ischemic Stroke using Deep learning approach Technique-	**Pradeep B S**, Hegde Sumanth Shyam, Pushpa Mangal Gond, Rathan S R, Ruchitha R	CSE	Gradiva Review journal	0363-8057	23
24	A Deep learning approach to detect Rheumatoid arthritis using medical images and blood samples-	**Pradeep B S**, Shreyas S Tantri, Shreyas shetty B, Sourabh P, Vinayak Nayak N	CSE	International Journal of Innovative Research in Advanced Engineering	2349-2163	24
25	Realtime conversation system for people with hearing and speech impairment	Ashlesh Shenoy, Shawn Castelino, Shetty Sushank Mohandas Vaibhav Nayak, **Suma K**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2319-5940	25
26	Human Face and Action Recognition Through CCTV Surveillance	Anusha Nayak, Dhruthi B S, , Santhrapthi R, Shravan V Suvarna, **Suma K**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2319-5940	26
27	A Survey on Dentes Condition Detection System Using Machine Learning	Guruprasad, Gururaj, Jeevan J, Mahalaxmi, **Suma K**	CSE	International Journal of Scientific Research in Engineering and Management	2582-3030	27

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28	Motion Tutor: Animated Motion Using Deep Learning	**Annappa Swamy D.R**, Akshira, Arghyashree, Ashvitha Shetty, Gajesh Naik	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2319-5940	28
29	Image-Based Object Classification and Distance Measurement for the visually Impaired	Ananya B Hegde, Gautham Jain, Karthik A, Kartik Mehta, **Annappa Swamy D.R**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2319-5940	29
30	INTELLIMEETS: Remote Collaboration Platform Integrated with Automated Documentation	**Annappa Swamy D R**, Ajay Kumar Yadav, Gahana Kumari, Jataniya Mihir, Joel Grover	CSE	Gradiva Review journal	0363-8057	30
31	AI Based Picture Translation	**Annappa Swamy D R**, Nishitha, Pradeep L K, Rajatesh M D, Sahithi Rai	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2320-2882	31

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32	AI-Driven Classification System for Human vs Machine-Generated Audio Detection	**Annappa Swamy D R**, Harshit Naik, Pratham Naik, Manish Kulal, Shreeganesh	CSE	Gradiva Review journal	0363-8057	32
33	Oral Squamous Cell Carcinoma Detection Using Deep Learning On Histopathological Images	**Ravinarayana B**, Ananya, Aparna P, Divija, Eeksha Jain	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	33
34	Semantic Conversational Content Moderation	**Ravinarayana B**, Ansar Ul Haq, Anush Shetty, Ankush Shenoy, Deepansh	CSE	International Journal of Scientific Research in Engineering and Management	2582-3930	34
35	Resume Ranker and Parser with LinkedIn Data Extraction: Revolutionizing Recruitment Using AI	Manish, Prapthi J, Pratham B, Rashmi R D, **Ravinarayana B**	CSE	Gradiva Review Journal	0363-8057	35
36	CNN-Based Model For Osteoporosis Detection Using Medical Imaging	Albin Reji, Achal M Jain, Ashay K A, Chintha Jathin Reddy, **Ravinarayana B**	CSE	Gradiva Review Journal	0363-8057	36
37	Dermapaws: A Deep Learning System for classification and detection of canine skin diseases from Dermatological images	**Shwetha Kamath**, Krishnendhu P, M Shalini, Manisha Manjunath Shetty, Mohammed Yaseen	CSE	Gradiva Review journal	0363-8057	37

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38	Real-Time Stock Market Prediction Using Deep Learning	**Shwetha Kamath**, Praveen Aladakatti, Sathwik Kulal, Vishal Singh, Vishal Teggi	CSE	International Journal of Creative Research Thoughts	2320-2882	38
39	Deep learning based white blood cancer detection in bone marrow using histopathological images	**Sunitha N V**, Pranav Joshi, Rakesh Kumar, Raksha S Shetty, Raksha M Suvarna	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	39
40	Insect pest image recognition and maturity stages classification uisng Few-shot machine learning approach	Birajdar Siddanna Gurabala, Saloni, Shreya Shetty, Varshitha G V, **Sunitha N V**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	40
41	Male fertility detection using Detectron2 and CSR-DCF	Amod Kumar, Dhanush, Elvin D'sa, Shivaraj, **Sunitha N V**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	41
42	Lip Reading Using Machine Learning and Neural Networks	**Shivaraj BG**, Akash, Abhishek Ashokan Nambiar, Harith Harish, Shamir L C	CSE	International Journal of Scientific Research in Engineering and Management	2582-3930	42
43	Lumpy Skin Disease Detection	**Shivaraj BG**, Anusha RM, Neha CS, Poornima, Skashi PB	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	43

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45	AI Powered Virtual Try-On	**Shivaraj B G**, Vivek C, Shetty Ananya Chandrashekar ,Shetty Aneesh Dayanath , U A Afil	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	45
46	Resumatch: Intelligent Resume Generator	**Shivaraj B G**, Vineeth Shettigar, Tejas kanakaverma Jain, Uttam, Vaibhav Gosavi	CSE	Gradiva Review journal	0363-8057	46
47	An AI-Powered Companion for Deaf and Mute Communication	**Shivaraj B G**, Adhya K S, Chinthan M M, Goutam Varma, Puneeth Kumar K N	CSE	Gradiva Review journal	0363-8057	47
48	Epileptic Seizure Recognition using Machine Learning	**Ashwin Kumar M**, Arpitha G Rao , Sahana , V Vignesh , Vaishnavi V	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	48

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50	A Deep Learning Approach to Detect Cancer in Cirrhotic Liver	Raksha Nayak, Sankalp S Naik, Sannidhi B M, Tejaswini Peeru Gouda, **Vijayananda V Madlur**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	50
51	SecQRMark:Fake Product Detection using Blockchain	**Vijayananda V Madlur**, Adheesh Jain, Ashish K J, D Sinchan , Elroy Monis	CSE	International Journal of Scientific Research in Engineering and Management	2582-3930	51
52	Using ML Models and IOT to Secure Smart Vehicles from Relay Attacks	Kumar Madar, Sweedal Flora Dmello, Yashwanth S, Anusha, **Vijayananda V Madlur**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	52
53	Predictive System for Students Stress Health Using Machine Learning	Sushmitha, Shantika Subhash Naik, Suveeksha Shetty, Yamuna S T, **Vijayananda V Madlur**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	53
54	AI-Based Research Paper Summarization and Translation Application	**Vijayananda V Madlur**, Aravind Vinodan, Aadil Shihab, Abdul Ahad and Haseeb Imtiyaz	CSE	Gradiva Review journal	0363-8057	54

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56	Survey and Analysis on Automated Speech Reading Techniques on Various Languages using Deep Learning	Divya, Dr.Suresha , Dr. Sanjeev Kulkarni, Navya Rai, **Jyothi Prasad**	CSE	Migration Letters	1741-8984	56
57	Adaptive Semi-Active Suspension System	Sagar Srivastava , Saransh Ramaiya , Shelvin J Bandi, Vinod Sharma, **Jyoti V Prasad**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	57
58	Chronic Kidney Disease Prediction usingMachine Learning	Ananya Harish Shetty, **Jyothi Prasad**, Manisha , Nishmitha S Shetty, Pavithra	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	58
59	Wellwise: Advanced Nutrition Monitoring System	Krishnaraj S, Prashanth D, Prasiddhi Nayak, Sathwik Rao K, **Jyothi V Prasad**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	59
60	Detection of Glaucoma Eye Disease using Retinal Fundus Images	Akash Ashok Nayak, A Ashitha, Akshatha, Alan Raji Mani, **Dr. Ravinarayana B, Shreejith K B**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	60

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61	Ingredient Detection and Recipe Recommendation Using Deep Learning	Hency Jostan Dsouza, K Sthuthi Nayak, Krishii Kirti Karkera, Melan Varghese, **Shreejith K B**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	61
62	A Deep Learning Approach to Detect Skin Cancer using Dermoscopic Images	Aishwarya Tamse, Annapoorna Pai, Arundhathi Nayak, Mithali Prashanth Rao, **Shreejith K B**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	62
63	Detection of Pathological Myopia using Deep Learning	Anusha, Anusha Sadashiva Lokeshwar, Arpita Sanyal, Deekshitha, **Rejeesh Rayaroth**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	63
64	Detection and Risk assessment of Parkinson's disease : A Machine Learning Approach	Shikha Ballal, Sourabha Jain, Sweedle Suares, Gururaj, **Rejeesh Rayaroth**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	64
65	Lumpy Skin Disease Detection in cattle	Scarlet Dsouza, Suma, Valluru Narendra, Prithvi Patil, **Rejeesh Rayaroth**	CSE	International Journal of Advanced Research in Computer and Communication Engineering	0363-8057	65

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66	Machine Learning-Based Early Detection of Autism in Children	**Rejeesh Rayaroth**, Miliyana Reena Dsouza, Samruddhi H R, Sanyuktha Satish Shetty, Shraddha Singh	CSE	Gradiva Review journal	0363-8057	66
67	Audio, Text, and Image Steganography: A Comprehensive Study	**Amrutha**, Shwetha Kamath, **Shivaraj B G**, Chandana S, Keerthan	CSE	Gradiva Review journal	0363-8057	67
68	Creation and Annotation of a Code-mixed Kannada English Dataset with accurate labels for Detecting Depression and Major Depressive Disorder Categories	**Shwetha Kamath, Amrutha, Shivaraj B G**	CSE	Gradiva Review journal	2631-8695	68
69	Analysis Of Whatsapp Chat Using Nlp Models	**Shwetha Kamath**, Krishnendhu P, M Shalini, Manisha Manjunath Shetty, Mohammed Yaseen	CSE	Engineering Research Express	0363-8057	69
70	Brain Tumour Detection in Foetus and Infant using Deep Learning technique	**Pradeep B S**, Shravya S Devadiga, Shreyas S Kotian, Shubhashree, Srivatsa J Bhat	CSE	Dastavej Research Journal	2348-7763	70

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72	Pneumonia detection using Machine Learning	**T. Shreekumar**, Akash Suvarna, Anirudh SP, Ankita, Diya S Suvarna	CSE	Gradiva Review journal	0363-8057	72
73	IoT based technological support for moisture stress experimental study on plants with stress prediction using deep learning	**Sunil Kumar S**, Venkatramana Bhat P	AIML	Gradiva Review journal	1875-8967	73
74	Detection of AI - Generated images using machine learning and deep learning models	Akshatha Nayak, Harsha, Prajeet Chendekar, Shreevatsan A, **Sunil Kumar S**	AIML	Journal of Intelligent & Fuzzy Systems	2278-1021 (Online) 2319-5940 (Print)	74
75	STUDS, Speech Therapy utility and for detection and analysis stuttering	Hemanth Range Gowda, M Chinmaya Rao, Nishanth S Raj, Rakshitha Jain, **Amruth Ashok Gadag, Sunil Kumar**, Dr. Rakesh C, Dr. Shubhaganga, Dr. Santosh	AIML	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021 (Online) 2319-5940 (Print)	75

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76	Cervical Abnormality Detection with Deep Learning Powered Colposcopy Analysis	Karthik Pai, Athmika C Jain, Chirag, Greeshma Jain, **Maryjo M George**	AIML	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021 (Online) 2319-5940 (Print)	76
77	Frame Interpolation Using FILM	Dhruva Kumar Shetty, Pramith A Naiga, Sidhvin P Shetty, Yash Karunakar Shetty, **Maryjo M George**	AIML	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021 (Online) 2319-5940 (Print)	77
78	Text Extractor: OCR-NER Form Filling Automation	Prajwal U, Shodhan Kumar Shetty, Sujan J Acharya, Swapnil Shetty, **Maryjo M George**	AIML	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021 (Online) 2319-5940 (Print)	78
79	Anomaly Detection in Time series Data for IoT Environment	Shibzan Shahanas, Afnaj Akthar, Rakshitha, Sanaa Anand, **M Amirtavalli**	AIML	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021 (Online) 2319-5940 (Print)	79
80	Deep Fuzzy Neural Network for IDS	Vignesh Palan, Prashanth Rathika, Ramesh Gaunskar, Pruthviraj, **M Amirtavalli**	AIML	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021 (Online) 2319-5940 (Print)	80

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81	Brain Stroke Prediction using Deep Learning	Nandu Krishna G, Neha Mashoora, Nisar Ahmed, **M Amirtavalli**	AIML	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021 (Online) 2319-5940 (Print)	81
82	AI CHEF: An Intelligent Culinary Expert Using Deep Learning	Hitha U Karkera, Sripada Adiga, Subramanya K, Srujana J, **Radha E G**	AIML	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021 (Online) 2319-5940 (Print)	82
83	Enhanced Driver Vigilance System	Tejas Rao, Aajna Shyam, Brijesh J S, Yashvi D, **Radha E G**	AIML	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021 (Online) 2319-5940 (Print)	83

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85	Deepfake audion using Deep learning	Ankit Shetty, Hanzala Karani, Raheza Khan, Shreya, **Amruth AG**	AIML	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021 (Online) 2319-5940 (Print)	85
86	Implications of end cooling rates on the Mechanical, Viscoelastic, and interlaminar fracture properties of the unidirectional glass Fiber/Epoxy composites	Manzoore Elahi M Soudagar, MA Umarfarooq, **PS Shivakumar Gouda**, NR Banapurmath, NA Abu Osman, S Ramesh, Ashok M Sajjan, Hua-Rong Wei, Yasser Fouad	Robotics AI	Disability and Rehabilitation: Assistive Technology	1748-3107	86
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89	Integration of AI And Robotics in Precision Agriculture: Enhancing Crop Yield and Resource Efficiency	Dr. K. Parameswari, Dr. Ms. Nilofar Mulla, Dr. Moiz Abdul Hussain, **Dr. Sujesh Kumar**, Srinu. B, L Subha	AE	Nanotechnology Perceptions	1660-6795	89
90	Design and Analysis of Horizontal Axis Small Wind Turbine for Low Wind Velocity Using Qblade	**Ajith Kumar**, Tahasildar, A. R., Naidu, A. S., Suhail, M. and Sharun Divakar, P.	AE	Journal of Mines, Metals and Fuels	1660-6795	90
91	Power Generation by Moving Vehicles on Speed Breaker Using Bicycle Pedal Mechanism	**Ajith Kumar,** Rishma M G, **Ranjith H D, G Ezhilmaran , Sujesh Kumar, Vishwaretha K R** and **Suraj M Shet**	AE	Journal Of Technology	2554-2560	91

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93	Fabrication and Flexural Performance of Self-Healing Composites with Micro-Vascular Channels	**Vishwaretha K R**, **Ajith Kumar**, Augustin DSouza, Amar G S, Prashant, Y Shriraj Rao	AE	TANZ Journal	1869-7720	93
94	Experimental Evaluation Of Quasi-Static Strength Of Composite	Md Fazle Rabbi, G Balaji, J Jensin Joshua, Dalbir Singh, **V Madhanraj, G Ezhilmaran** and Shabahat Hasnain Qamar	AE	Library Progress International	0970-1052	94
95	Design and Analysis of G+3 Commercial Building at Munnur Gram Panchayat,Mangalore	**Suraj Shet**, Anusha Jain, Ravikiran Shetty, Eican Ibrahim, Sangeeta P, Parthasarathi G	CV	International Journal of Research and Analytical Reviews	2348-1269 (Online) 2349-5138 (Print)	95

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97	Automation in Steel quantity takeoff in Building	Vaishnavi S Gowda, Prajiwith P, **Umesh S S**, Prathiksha G, **Swapna S A**	CV	International Journal of Research and Analytical Reviews	2348-1269 (Online) 2349-5138 (Print)	97
98	Air Pollution Control of Fish Meal & Oil Industry Using Bio-Filters	Vishnu, Preetham Naik M, **Jayaprakash M C** and **Vineetha Telma D'Souza**	CV	International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering	2321-2004 (Online) 2321-5526 (Print)	98
99	Modified prefabricated fencing wall panels	Mohammed Armaan Boss M, Mohammed Anwar M M, Kaushik A Hegde, **Akshay Krishna Bagli**, Uday Kiran	CV	International Journal of Research and Analytical Reviews	2348-1269 (Online) 2349-5138 (Print)	99
100	Prelithiation of electrodes in lithium-ion capacitors: A review	Aston Sam D'Silva, Eldho M P, Lekha. K, Anushree. J, **Vinayambika S Bhat, Raghavendra Sagar**	ECE	Mechanical Engineering Advances	3029-1232	100

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102	Aquasafe: A portable water quality monitoring and pathogen detection system - A Review	Dhanush Poojary, Alzuha, Meghana Naik, **Sathisha**	ECE	International Journal of All Research Education & Scientific Methods	2455-6211	102
103	Design and Fabrication of Patch Antenna for Wi-Fi Applications	Gauri Hanumant Nayak, Prem R Shetty, Nishma, **Sruthi Dinesh**	ECE	International Journal of All Research Education & Scientific Methods	2455-6211	103
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Preamble

The vision of MITE in the next decade is to be a pioneer in Research & Development. MITE encourages and provides enormous opportunities for high-quality research. The integration of science and engineering at MITE has resulted in a rise in research activities, more of which are application-based—a hallmark of true engineering! The program delivery here is distinctive and more application-oriented because of the faculty's research skills and experience working on coveted projects with grants from reputable organizations. As a result, students develop a research mindset, which benefits the Institute, society, and the nation as a whole. There have been 193 research publications published by our faculty members in journals notified on the UGC website during the academic year 2023-24.

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Regeneration Of Scratched Images Using Deep Learning

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Abstract: The project targets flaws including blur, haze, scratches, color fading, and absence of color in an effort to recover old and damaged photos using a deep learning paradigm. The three GAN frameworks are integrated in a certain order to enable complicated regeneration. After patching or restoring scratches, a partial image is restored using an inpainting technique based on OpenCV. By using effective deep learning techniques, the ultimate objective is to improve the quality and accessibility of restored photos. By using deep learning and cutting-edge approaches to solve issues including blur, haze, scratches, color fading, and lack of color, the project seeks to restore old and damaged images.

Three separate GAN frameworks, each with a unique function in the restoration process, are sequentially integrated to enable complicated regeneration. After scratch patching, a OpenCV-based inpainting method is used to fill in the gaps in the image and restore a portion of it. Furthermore, certain GAN frameworks are used to manage the rest of the restoration process, making use of their individual advantages in image creation and enhancement. In the meantime, thorough restoration is ensured by the efficient detection and identification of scratches. The initiative hopes to increase the quality of recovered pictures and make them more accessible for a greater variety of uses by utilizing these advanced deep learning techniques.

Keywords: Generative Adversarial Networks (GAN), Artificial intelligence, Deep learning, OpenCV, Convolutional Neural Networks (CNNs).

I. INTRODUCTION

A basic technique called image restoration is used to restore digital photos that have been harmed or deteriorated. In order to achieve this restoration, a number of undesirable effects, including noise, blur, compression artifacts, scratches, colour fading, and absence of colour, must be reduced or eliminated.

The interpretability and utility of images can be greatly impacted by such flaws, especially in domains like computer vision, forensics, surveillance, and medical imaging. In the past, image restoration has depended on mathematical models and algorithms created to handle particular kinds of degeneration. These approaches frequently involve the use of complex mathematical algorithms or noise-smoothing filters that are specifically designed to identify and address certain problems. Although these conventional methods have demonstrated some efficacy, they may not be able to handle more intricate flaws that are frequently found in real-world situations.

Deep learning techniques have become a viable substitute for picture restoration tasks in recent years. Restoring old and damaged photos has proven to be a surprising ability of deep learning frameworks like Generative Adversarial Networks (GAN). These frameworks effectively repair and enhance photos with varied flaws by utilizing neural network's ability to learn intricate patterns and correlations inside image data.

The suggested fix in the references given is an excellent example of how deep learning may be used for image restoration. Three different current GAN frameworks are combined in this method to tackle difficult regeneration jobs and produce restored photos with better quality. There are several steps to the restoration process, with a particular emphasis on face enhancement. These stages include scratch detection, mask superimposition, quality enhancement. With this multi-phase method, different faults may be addressed methodically and photos can be fully restored.

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Breast Tumor Segmentation and Classification Using Ultrasound Images

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Abstract: Breast cancer is one of the leading causes of death among women. Early detection is crucial for successful treatment and better patient outcomes. Although they have benefits, mammograms and other traditional methods have disadvantages. Even though it could be challenging to tell benign from malignant tumors, ultrasonography offers an extra technique. This work explores a new method for detecting breast cancer based on ultrasound images. It makes use of machine learning techniques, particularly deep learning, to analyze these images. This method consists of two steps: segmentation and classification. Classification determines whether the tumor is benign or malignant, while segmentation helps to focus the image's suspected tumor to a specific area.

Keywords: Ultrasonic imaging, Deep learning, Machine learning techniques, Segmentation, Classification, Early diagnosis, Successful therapy, Breast tumour

I. INTRODUCTION

Breast tumour is an extremely common and potentially fatal illness that affects millions of women worldwide. Initiating successful treatment options and improving patient prognosis are contingent upon the timely and accurate diagnosis of breast tumours. Because it provides a non-invasive, radiation-free method of viewing breast tissue, ultrasonic imaging has become a powerful diagnostic tool for evaluating breast tumour. Because ultrasonic imaging can be done in real-time, unlike other imaging modalities like mammography, it is especially helpful for assessing breast lesions in younger or more densely breasted women.

Accurately segmenting and classifying tumours in ultrasound imaging is still a difficult task, despite its benefits. Tumour morphology and textural changes, tissue heterogeneity, and speckle noise are just a few of the intrinsic complexity and variability seen in ultrasound pictures. These elements may make it more difficult to interpret ultrasonography pictures and make it more difficult to precisely define tumour boundaries. Moreover, the subjective character of radiologists' manual segmentation process adds unpredictability and could result in inconsistent tumour delineation.

To overcome these obstacles, scientists have been investigating sophisticated image processing methods and machine learning algorithms to enhance the precision and effectiveness of tumour identification and categorization in ultrasound pictures. By automating the segmentation process, these methods hope to decrease the need for human interpretation and maybe increase the precision of the diagnosis. Using machine learning algorithms, such as support vector machines (SVMs) or convolutional neural networks (CNNs), scientists may train models to extract discriminative features from ultrasound pictures and make the very accurate distinction between benign and malignant tumours. Even with the continuous progress in image analysis methods, there are still several issues that need to be resolved. Large and varied datasets are required for the training of strong machine learning models; clinical data must be integrated to improve classification accuracy; and suggested algorithms must be validated in actual clinical situations. Furthermore, winning the trust of healthcare providers and promoting the implementation of these technologies in clinical practice depend heavily on the interpretability and reproducibility of automated segmentation and classification outcomes.

In conclusion, precise tumour segmentation and classification remain a difficulty even though ultrasound imaging shows promise as a useful tool for breast cancer diagnosis. These obstacles can be addressed and dependable and therapeutically valuable algorithms for breast tumour identification and characterization in ultrasound pictures can be developed with sustained research and cooperation between engineers, physicians, and researchers. Thus, there may be a global decrease in the morbidity and death rate from breast cancer as a result of earlier identification and better patient outcomes.

Detection of Breast Cancer using Deep Learning Techniques

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Abstract: *Breast cancer remains a significant threat to women's health worldwide, necessitating early detection for successful treatment and improved patient outcomes. While traditional methods like mammograms have their benefits, they also come with disadvantages. Additionally, distinguishing between benign and malignant cancers can be challenging. This research proposes a novel method leveraging ultrasound images for breast cancer detection, integrating machine learning techniques, particularly deep learning, for analysis.*

The proposed method comprises two key steps: segmentation and classification. Segmentation enables the isolation of suspected tumors within ultrasound images, refining focus to specific areas of interest. This process enhances the accuracy of subsequent analysis by reducing noise and extraneous data. Classification, on the other hand, utilizes deep learning algorithms to determine the nature of detected cancers, distinguishing between benign and malignant growths.

By employing deep learning techniques, the proposed method aims to enhance the accuracy and efficiency of breast cancer detection using ultrasound images. The utilization of machine learning enables automated analysis, potentially reducing dependence on human interpretation and enhancing scalability across healthcare settings. Furthermore, the integration of segmentation and classification stages optimizes the diagnostic process, facilitating more precise and timely interventions.

This research contributes to the ongoing efforts in advancing breast cancer detection methodologies, particularly in leveraging emerging technologies like deep learning and ultrasound imaging. The proposed approach holds promise for improving early detection rates and subsequently enhancing patient outcomes by enabling timely interventions and personalized treatment strategies. Further validation and refinement of the method through clinical trials and real-world implementation will be crucial for its adoption and integration into routine clinical practice.

Keywords: Deep learning, Machine learning techniques, Segmentation, Classification, Early diagnosis, Successful therapy, Breast Cancer, Ultrasound images.

1. Introduction

Breast tumor, a prevalent and life-threatening disease, poses a significant health concern affecting millions of women globally. Timely and precise detection of breast tumors is paramount for initiating effective treatment strategies and enhancing patient prognosis. In this regard, ultrasound imaging has emerged as a valuable diagnostic modality for breast cancer assessment, offering a non-invasive and radiation-free approach to visualize breast tissue. Unlike other imaging techniques such as mammography, ultrasound imaging provides real-time imaging capabilities, making it particularly useful for evaluating breast lesions in younger women or those with dense breast tissue. However, despite its advantages, the accurate segmentation and classification of tumors in ultrasound images remain challenging tasks. Ultrasound images exhibit inherent complexities and variability, including speckle noise, tissue heterogeneity, and variations in tumor morphology and texture. These factors can complicate the interpretation of ultrasound images and hinder the precise delineation of tumor boundaries. Furthermore, the subjective nature of manual segmentation by radiologists introduces variability and may lead to inconsistencies in tumor delineation.

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Early Diagnosis Of Cervical Cancer Using Colposcopic Images

An Overview of Deep Learning for Cervical Cancer Diagnosis

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Abstract: Cervical cancer is the fourth leading cause of cancer in women worldwide. Early detection of cervical intraepithelial neoplasia (CIN) can improve patient survival .This paper proposes a deep learning-based technique for determining whether a cervical cancer diagnosis is good or bad. By harnessing the power of transfer learning, the framework combines the benefits of pre-trained models like ResNet50, MobileNet, and DenseNet with the capabilities of CNNs. Our architecture is trained on a comprehensive database of cervical cancer images, comprising both online sources and magnification data-generated images. Using this model, our body can identify cervical cancer as positive or negative, which shows the effectiveness of CNNs and changes the study by checking medical images.

Index Terms **- Cervical Cancer, Deep Learning, CNN, Transfer Learning, ResNet50, MobileNet, DenseNet**

I. INTRODUCTION

Worldwide, cervical cancer remains a critical women's health issue, with high incidence and mortality rates, and is currently the fourth leading cause of cancer. Early diagnosis of cervical intraepithelial neoplasia (CIN), the precursor to cervical cancer, increases the chance of survival. Manual searches for cancer diagnosis are often hampered by their labor-intensive nature, susceptibility to human error, and need for expert knowledge. Thankfully, the rapid progress in deep learning and computer vision has led to the development of innovative tools for more accurate and efficient cancer detection and diagnosis. The project focuses on using deep learning to classify clinical images as positive or negative, creating a strong foundation for cancer diagnosis. Our algorithm builds upon the foundations laid by ResNet50, MobileNet, and DenseNet, incorporating their learning capabilities to achieve state-of-the-art image classification results. By combining our model with a CNN, we achieve improved diagnostic precision in cancer detection.

To improve data quality and model performance, We augment our dataset by leveraging publicly accessible cancer image repositories, leveraging their value in our data development. Transfer learning facilitates the correction of errors in these models by leveraging cervical cancer data, allowing them to improve their detection performance with reduced data requirements.. The system aims to work on the diagnostic process, helping doctors with early diagnosis, reducing the burden of manual examinations, and potentially improving the outcome of a person's pain. This research illustrates the benefits of merging CNN and transfer learning techniques in clinical image analysis, paving the way for enhanced cancer diagnosis in clinical practice.

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DEEP LEARNING-BASED KIDNEY HEALTH DIAGNOSIS FROM CT SCANS

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Abstract: Tumors, cysts, and stones of the kidneys are among the serious problems in public health. It is critical to diagnose them early and accurately to achieve successful treatment. The current work aims to produce a web-based application for analyzing kidney CT scans by using deep learning techniques, based on a method known as CNN, in which the classification between Tumor, Cyst, Stone, or Normal occurs. The system makes further classification of renal cell images into predefined five classes in order to identify the malignancy level when a tumor is detected. The CNN model is trained based on a dataset 1 created from kidney CT scans sourced from Kaggle. The system designed by this approach offers an upload interface for images and provides diagnostic results in a very user-friendly manner. This project helps in diagnosing earlier and aids doctors to devise treatment planning which improves the management of kidney health care and the care of patients.

Index Terms - Kidney disease diagnosis, Convolutional Neural Network, CT scans, Deep Learning, Tumor classification, Kidney health management.

I. INTRODUCTION

The main contributing cause of serious health disorders in the general population is kidneyrelated health problems such as tumors, cysts, and stones. Early diagnosis and classification of such conditions become crucial factors in providing timely treatment and avoiding further complications. Kidney tumors, in particular renal cell carcinomas, pose great challenges due to the fact that early detection often occurs at advanced stages, with accompanying reduced survival rates. The proposed project addresses this problem statement through developing a system based on analyzing kidney CT scans using a class of deep learning models, known as Convolutional Neural Networks (CNNs), significantly proven to be of effective usage for applications involving image processing. It could classify the CT scans into four classes: Tumor, Cyst, Stone, or Normal. Additionally, it applies further classification techniques to analyze the renal cell images contained in scans with tumors into one of five classes that evaluate malignancy. This two-layered method ensures an elaborate diagnostic process. The system contains a web-based interface, through which users upload images from the CT scan and receive immediate online diagnostic results. Designing the application user friendly will make it more accessible both to medical practitioners and individuals to engage more in kidney health management.

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FLOOD MONITORING AND LIFE DETECTION IN SUBMERGED AREAS USING COMPUTER VISION TECHNIQUES

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Abstract : One of the most destructive natural calamities, floods pose serious risks to both human life and property. Reducing the number of fatalities and financial losses requires prompt detection and rescue efforts. Through the detection and localization of live forms in submerged areas during floods, this research proposes a novel method that uses computer vision techniques to improve disaster response operations. In difficult flood situations, the suggested method accurately and efficiently identifies life forms by combining two cutting-edge deep learning models: YOLOv8 for object detection and U-Net for semantic segmentation. Segmentation and detection are the two primary parts of the strategy. In order to identify flooded areas and retrieve crucial spatial data for accurate analysis, the segmentation step uses U-Net. YOLOv8 is used in the detection phase to locate and identify live forms in the areas that have been segmented. The technology guarantees precise localization and contextual understanding by integrating the advantages of both models, which makes rescue operations more efficient. The system is a useful tool for emergency response teams because it is made to function in real-time. Through thorough preprocessing and model improvement, it also tackles important issues in disaster scenarios, like ambient noise and fluctuating illumination conditions. In addition to improving detection accuracy, the combination of segmentation and detection operations guarantees computational efficiency. By presenting an AI-powered approach that can greatly enhance rescue results during floods, this research aids in disaster management. In order to increase the system's scalability and accessibility in practical situations, future research will concentrate on adding multi-modal inputs, lightweight structures, and drone-based deployments.

Index Terms **- Flood detection, Computer vision, Deep learning, U-Net, YOLOv8, Semantic segmentation, Object detection, Disaster management.**

I. INTRODUCTION

One of the most destructive natural disasters, floods seriously harm ecosystems, infrastructure, and human life. These disasters, which are brought on by intense rains, cyclones, or dam failures, flood large regions, trapping people and animals in inhospitable places. A quick and dependable disaster response system is essential in areas that frequently flood in order to minimize fatalities and guarantee rescue efforts in a timely manner. Every flood event emphasizes how critical it is to find and save people and animals stranded in underwater areas. Prolonged suffering and avoidable deaths are frequently the results of diagnosis delays. Conventional techniques, which depend on manual reconnaissance or equipment like boats and helicopters, are usually hampered by large flood areas, limited visibility, and unfavourable weather. These restrictions lengthen response times, waste resources, and increase the risk to rescuers and victims. Similar vulnerabilities affect animals, which are frequently disregarded in disaster management. Rescue is necessary to assure both emotional and financial recovery for livestock, which are vital to rural economies, and pets, which are essential to households. In order to lessen the long-term effects of floods, like economic instability and interrupted livelihoods, their survival is crucial. Understanding these difficulties, our initiative makes use of state-of-the-art technologies to improve the accuracy and speed of catastrophe response. Our goal is to create a system that can reliably identify stranded people and animals in flood-affected areas by utilizing cutting-edge artificial intelligence (AI) and computer vision capabilities. With speedier detection, increased dependability, and the capacity to function in difficult environments, this technology is a major improvement over traditional techniques.

Our research seeks to address the following key objectives:

1. Implementing precise segmentation of objects using UNet.
2. Implementing object detection, improving accuracy and efficiency in detecting multiple objects using YOLOv8.
3. Develop a system to detect and locate humans and animals in submerged flood areas with high accuracy.

By focusing on these objectives, this initiative highlights the transformative potential of AI-driven solutions in disaster management. By integrating real-time data analysis and intelligent decision-making, the proposed framework sets a new standard for flood response, ensuring that no life—human or animal—is left behind. It paves the way for a safer and more resilient future in flood prone regions.

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Recognition and Classification of Paddy Leaf Disease using CNN

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Abstract: Paddy leaf diseases pose a significant threat to global rice production, impacting food security and economic stability. This study explores the application of machine learning, specifically convolutional neural networks (CNNs), for the automated recognition and classification of paddy leaf diseases. The proposed CNN model analyzes leaf images to detect common diseases such as brown spot, leaf blast, and leaf blight. Leveraging advanced image processing techniques, the system achieves high accuracy in disease identification, enabling timely interventions to mitigate crop losses. Key aspects of the project include dataset preparation, model training, and performance evaluation. Through this research, we contribute to the advancement of precision agriculture and sustainable crop management practices.

Keywords: Paddy leaf diseases, Machine learning, Convolutional neural networks, Automated recognition, Crop management.

I. INTRODUCTION

This project revolves around the creation of a machine learning system designed to swiftly and accurately identify and categorize paddy leaf diseases within rice crops. Paddy leaf diseases, caused by a spectrum of pathogens, have long been a recurring menace to rice crop health. The repercussions of these diseases extend beyond mere agricultural concerns, impacting global food security and the livelihoods of countless farmers.

In today's rapidly evolving technological landscape, the development of robust machine learning solutions holds the promise of addressing critical challenges across various domains. This project is poised to contribute to the field of agriculture by harnessing the power of advanced technology to enable the accurate detection and classification of paddy leaf diseases.

At the core of this endeavor lies the utilization of Convolutional Neural Networks (CNNs). CNNs are a class of deep learning models that excel in image recognition and classification tasks. By harnessing the capabilities of CNNs, our project aims to provide a precise and efficient solution for the diagnosis of various paddy leaf diseases. This technology empowers us to unlock new possibilities in the realm of agricultural disease management.

The proposed system will be trained on a large dataset of paddy leaf images. The network will learn to extract meaningful features from the images and categorize them to different diseases through a series of convolutional and pooling layers. Additionally, techniques like data augmentation and transfer learning may be employed to enhance the model's generalization capabilities and overcome data scarcity issues.

II. OBJECTIVE

The main purpose of this project is to develop an efficient system for the early detection and management of paddy leaf diseases using Convolutional Neural Networks (CNNs). By leveraging CNNs, we aim to automate the process of disease recognition and classification to save time and effort for farmers. This automation will facilitate prompt identification of disease symptoms in paddy leaves, enabling timely interventions to prevent the spread of diseases and minimize crop losses. Through the development of a user-friendly interface, we strive to ensure accessibility and ease of use for farmers and agricultural stakeholders, promoting seamless integration into existing agricultural workflows.

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Automatic Music Transcription To Music Notes Using Artificial Intelligence

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Abstract: The art of music transcription, transforming fleeting audio recordings into the permanence of sheet music, holds immense potential for musicians, educators, and historical preservationists. This project embarks on an exploration of Recurrent Neural Networks (RNNs) as a powerful tool for automated music transcription. The focus here is on meticulously converting MP3 audio files into MIDI files, subsequently translating them into comprehensive and expressive musical notations.

The proposed RNN model aspires to achieve groundbreaking accuracy in capturing the very essence of music – pitch, rhythm, and duration – directly from audio recordings. This feat, if achieved, would transcend mere note recognition and delve into the heart of what makes music so captivating. By effectively translating the intricate language of audio into the symbolic language of musical notation, the model paves the way for a more profound understanding and appreciation of music.

Keywords: Music notes classification,Artificial intelligence,Deep learning,Musical Transcription ,Frequency based analysis, Machine learning,Pitch identification.

I. INTRODUCTION

From the echoing music of ancient flutes to the complex symphonies of modern orchestras, music has become a universal language that transcends culture and time. The tradition, knowledge and beauty of music have been carefully preserved in the form of music, carefully written by hand, and passed on from generation to generation. However, the process of capturing the essence of music in writing requires a lot of time and skill, especially for the harmonious playing of complex works containing music.

The digital age has changed the way music is used and recording has become indispensable. Format is important. This puts music at your fingertips with unprecedented ease. We began exploring automated music, a technology that has the potential to revolutionize the way we interact with music. Our vision is to create a system that overcomes the limitations of traditional systems by reducing recorded data.

The system is not limited to decoding simple music. He will have the unique ability to decipher complex music by playing multiple instruments simultaneously; this is a feat currently achieved only by talented musicians with dedication and practice in later years. The applications of the project can extend far beyond the simple. Think of the musician who wants to learn the composition by examining the score obtained from the recording. Teachers can create a more immersive learning experience by connecting sounds and music to deepen musical patterns and compositional ideas. Moreover, this machine can also play an important role in preserving our musical instruments. By automatically recording rare or endangered music, we can preserve this valuable asset for future generations.

Finally, this project not only seeks to bridge the gap between music and musical form, but also aims to encourage musicians, improve music education, and encourage appreciation of the power of music. We imagine a future where the timeless magic of music can be accessed quickly and easily with the permanent notes created by this new technology. This will not only provide free access to musical knowledge, but also ensure the transfer of cultural assets to future generations.

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Effective Milk Grading and Billing Solution for Dairy Industry

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Abstract: The dairy industry faces persistent challenges in evaluating milk quality due to labor intensive and subjective processes. This project proposes a transformative solution integrating hardware and software technologies to revolutionize milk quality assessment and management. The system employs advanced sensors including pH, temperature, color and fat content sensors seamlessly integrated into a cost-effective device tailored for dairy farmers. This device facilitates real time monitoring of milk quality, empowering farmers to make data-driven decisions and optimize production efficiency. Complementing the hardware, an intuitive mobile application provides farmers with instant access to milk quality data, enabling proactive management of dairy operations. Transparent billing mechanisms ensure fairness and accountability in the dairy supply chain, generating precise invoices based based on objective milk quality metrics using a machine learning model. By enhancing transparency and efficiency, this solution promises to elevate milk quality standards and foster trust among consumers, thereby strengthening the dairy industry's competitiveness and sustainability.

Keywords: IOT, Microcontroller, Transparency in billing, Machine Learning, Model Integration, Application development.

I. INTRODUCTION

The dairy industry is a vital sector of agriculture, providing essential dairy products to consumers around the world. The traditional methods of evaluating milk quality have long been mired in labour intensive subjective processes often prone to human error and inconsistency. In response to these challenges, this project presents a solution aimed at transforming milk quality assessment and management through the integration of hardware and software technologies. The proposed system offers a comprehensive and automated and automated approach to monitor milk quality in real-time, enhance billing transparency and provide insights for optimizing production efficiency.

The proposed solution consists of advanced sensors including pH, color, temperature and fat content sensors meticulously integrated into a cost-effective device tailored specifically for dairy farmers. This device not only ensures accessibility but also delivers reliable and standardized data, empowering farmers to make data driven decisions regarding milk production and quality assurance. Augmenting the hardware components is an intuitive mobile application, granting farmers and dairy owners instantaneous access to real-time milk quality data. Through this mobile application users can effortlessly monitor and manage their dairy operations, identifying trends, detecting deviations and implementing proactive measures to uphold milk quality standards.

The proposed solution incorporates transparent billing mechanisms, fostering trust and accountability across the dairy supply chain. By generating precise invoices based on objective milk quality metrics, this feature promotes equitable compensation for farmers while instilling confidence in consumers regarding the integrity of products they purchase.

II. LITERATURE SURVEY

In [1], This Paper, the authors discussed for assessing and preventing milk with a high microbiological index from migrating farther downstream in a dairy supply chain, existing research takes a reactive stance. They contend that if the goal is to optimize milk life in terms of quality, such an approach is not the best course of action. They suggest a proactive strategy that keeps an eye on the parameters of temperature and level, which serve as the building blocks of the bacteria in milk.

Optimized Milk Quality Assessment and Billing System for the Dairy Industry

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Abstract: The assessment of milk quality in the dairy industry is hampered by ongoing challenges related to labor-intensive and subjective processes. This project seeks to introduce an innovative solution that combines hardware and software technologies to transform the evaluation and management of milk quality. The system utilizes advanced sensors such as pH, temperature, color, and fat content sensors, which are seamlessly integrated into a cost-effective device designed specifically for dairy farmers. This device allows for real-time monitoring of milk quality, empowering farmers to make decisions based on data and optimize production efficiency. In addition to the hardware, a user-friendly mobile application offers farmers immediate access to milk quality data, enabling proactive management of dairy operations. In the dairy supply chain, fairness and accountability are maintained through transparent billing mechanisms, which generate accurate invoices by utilizing a machine learning model to assess objective milk quality metrics. This solution aims to improve milk quality standards and build consumer trust by enhancing transparency and efficiency, ultimately bolstering the competitiveness and sustainability of the dairy industry.

Keywords: Microcontroller**,** IOT, Billing, Machine learning, Model Integration, Application development, Milk

I. INTRODUCTION

Dairy commerce is a essential sector of agriculture, providing vital dairy outcomes to buyers around the world. The customary methods of assessing milk condition have long been mired in labour thorough subjective processes often prone to human error and variation. This project aims to address these challenges by offering a solution that integrates hardware and software technologies to transform milk quality assessment and management. The system we propose provides a comprehensive and automated approach to monitoring milk quality in real-time, improving billing transparency, and generating insights to optimize production efficiency.

The advanced solution includes pH, color, temperature, and fat content sensors closely integrated into an affordable device designed for dairy farmers. This device provides accessibility and provides consistent and reliable data, enabling farmers to make informed decisions about milk production and quality control. A mobile application that is easy to use enhances the hardware components, allowing farmers and dairy owners to access real-time milk quality data instantly. Users can easily monitor and control their dairy operations, recognizing patterns, identifying variations, and taking proactive steps to maintain milk quality standards through this mobile application.

The solution being proposed includes transparent billing methods that promote trust and accountability throughout the dairy supply chain. By creating accurate invoices using unbiased milk quality measurements, this aspect ensures that farmers receive fair compensation and gives consumers assurance about the authenticity of the products they buy. This mobile app allows users to easily oversee and control their dairy activities, spot patterns, identify variances, and take proactive steps to maintain milk quality standards.

II. LITERATURE SURVEY

In [1], The authors examined for considering and avoiding milk with a high microbiological index from migrating further downstream in a dairy trade chain, existing research takes a sensitive stance. They contend that if the goal is to optimize milk life in conditions of quality, such a methodology is not the expert course of action. They suggest a proactivestrategy that keeps an eye on the parameters of temperature and level, which serve as the constructing blocks of the bacteriain milk.

Hybrid Machine Learning Models for Enhanced Fake News Detection

Amrutha

Shwetha Kamath

Shivaraj B G

Chandana S

Keerthan

Keywords: Decision tree, Fake news, Gradient boosting, Logistic regression, Machine learning, Random forest, TF-IDF vectorization

Abstract

This paper states a comprehensive approach to developing a robust fake news recognition system by leveraging advanced machine learning techniques. The increasing proliferation of fake news on digital platforms has made it essential to create systems that can automatically and accurately distinguish between factual and fabricated news articles. Our proposed system focuses on classifying news articles as fake or real based on their textual content, employing a category of machine learning classifiers such as Logistic Regression, Decision Trees, Gradient Boosting, and Random Forests. To extract meaningful features from the text, we utilized Term Frequency-Inverse Document Frequency vectorization, which converts textual data into numerical vectors suitable for analysis. The classifiers were trained and rigorously evaluated on a labeled dataset of fake and real news articles, and the results demonstrated significant accuracy across all models. Moreover, the system includes a manual testing function that enables real-time input and classification of news articles, showcasing its practical application in identifying fake news with high reliability. This paper highlights the effectiveness of traditional machine learning models and demonstrates the importance of combining them with feature engineering techniques to combat misinformation in the digital age.

SMART CALORIE BURN ANALYZER

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Abstract:

In this paper, a complete approach of building a web application to predict calories burnt during a physical activity with the help of machine learning techniques. The predictive models were developed using a dataset containing features including age, gender, height, weight, heart rate, body temperature and activity duration from 15,000 records. We tried multiple models such as Random forest, Linear regression to check their capability in calorie burn prediction. We find that Random Forest gives us the best results in prediction accuracy and mean absolute error. As a result, we created a web app that allows a user to enter information about their physical activity routine, and gives them the projected calorie burn in real time. This is a small step towards the field of machine learning applied in health and fitness enabling a personalized device for wellness tracking and health coaching.

Key words: Machine Learning, Calorie Prediction, Random Forest, Linear Regression, Model Evaluation.

1. Introduction:

Calorie is the unit of measurement for the energy in food. Like it or bad, your physical structure requires calories to execute its functions like breathing, blood flowing and exercise. Wearable devices and digital health platforms have been evolving by leaps and bounds to help individuals track and work towards health and fitness objectives, whether they are maintaining their overall well-being or preparing for a specific event. One of such advancements that surfaced as a prominent tool of health analytics is real-time calorie burning tracking.

This increases the dynamic aspect of the calculation, but conventional calorie burn calculation methods still using manual input and static form model algorithms to calculation calorie consumption, while the human body metabolism of dynamic nature has not received any calculation. With the improved knowledge of health comes the need for accuracy in the measurement of calories and their analysis in relation to calories burned, in what should be recognized, as accuracy will play a very important impact on the ability to stick and follow through with fitness regimes, weight management systems, and lifestyle changes as a whole.

An inaccurate estimation of calories burned can result in poorly devised strategies, false ideas about progress, and sometimes, health risks. This creates a demand for a mechanism that is automatable, personalized, adaptable, and capable of reliable inference for a person's calorie

Pulmonary Nodule Detection in Computed Tomography using Deep Learning

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Abstract: *A pulmonary nodule is a small growth within the lung tissue, typically less than 3 centimeters in diameter, which may be either benign or malignant. Nodules within the lungs are caused by infections, inflammation or lung cancer. Detection of nodules in the lungs is very crucial for the survival rate in instances which helps to improve in later stages. Hence, this research develops an innovative approach for pulmonary nodule detection by making use of deep learning algorithms and computational techniques. A U-Net based CNN model is proposed, which leverages the superiority of CT scans in detection of nodules in the lungs, overcoming the variation of traditional imaging methods and even their limitations. The model processes CT scans and classifies the images to identify the presence or absence of nodules. The proposed system aims to be useful in early diagnosis and effective treatment which helps in saving patient from suffering. This paper highlights the role of deep learning in medical images towards better healthcare outcomes.*

Keywords: *CT scans, U-Net, CNN, nodules, dice-coefficient, pulmonary, preprocessing, medical*

INTRODUCTION

Lung cancer is a global health issue and is one of the most significant causes of cancer-related deaths, killing millions of people every year. Its mortality rate is often attributes at the later stage diagnosis because early symptoms are often missed and are very subtle. Although the CT scans improve detection, the actual process of interpreting these images is solely based on the judgement of the radiologists. These further burdens the healthcare professionals with more workload and introduces the possibility of error and delays in the determination of cancer prognosis, which becomes a critical issue. In addition, manual interpretation of image is subjective and, consequently, in terms of the variable of diagnosis, the methods need to be more reliable and consistent. AI and its applications have recently portrayed tremendous potential for the transformations of medical diagnosis. There exists some of the recent changes in deep learning models mostly U-Net based CNNs, being presented as powerful tools for detection and segmentation purposes.

With intricate patterns and textures in place, these models are effective and hence a perfect suit for the detection of lung nodules serves to be early markers of cancer. Hence, we aim to build a U-Net based CNNs, which would have to the ability to create a detection system used to identify the presence or absence of nodules in the lungs. The aim is to integrate modern AI

ENHANCING SPEECH CLARITY AND PAIN DETECTION IN INDIVIDUALS WITH CEREBRAL PALSY

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Abstract

The proposed system should use machine learning algorithms to optimize speech intelligibility and classify speech as containing pain. Techniques like extraction of Mel-Frequency Cepstral Coefficients (MFCC) characterize all significant acoustic properties of speech while the K-Nearest Neighbors (KNN) algorithm will classify whether a speech utterance is intelligible or not. This approach can provide immediate feed-back to the user regarding clarity, allowing them to change their speech habits straight away. The system uses the Inception V3 deep learning model to detect pain, looking into real-time facial expressions and nuanced signals to determine indications of distress. It integrates speech clarity improvement with pain detection for a holistic approach in providing efficient communication and on-time pain management for patients with cerebral palsy.

Keywords:

Cerebral palsy, speech clarity enhancement, pain detection, assistive technology, machine learning, real-time feedback, Mel-Frequency Cepstral Coefficients (MFCCs), K-Nearest Neighbours (KNN), facial recognition, physiological signal analysis

Introduction

Individuals with cerebral palsy (CP) often face significant challenges related to speech impairments and pain detection, which greatly impact their daily interactions, self-expression, and overall quality of life. Speech impairments in CP result from neuromuscular difficulties that affect the control and coordination of the muscles involved in articulation, breathing, and phonation. These challenges make communication difficult, hindering meaningful interactions with caregivers, peers, and the wider community. Additionally, many individuals with CP experience chronic pain due to musculoskeletal issues, yet their ability to communicate or express this pain effectively is often limited, complicating pain management. Together, these obstacles reduce social engagement and educational participation, leading to feelings of isolation and frustration.

Kannada Text Summarization Through Keyword Extraction

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Abstract: *Summarization involves reducing a text to a shorter version that maintains its core ideas, making it easier to understand the primary message quickly. Extractive summarization methods work by selecting key sentences directly from the text, focusing on those that contain essential information. Most of these techniques aim to identify keywords, with sentences that include more of these keywords standing out as important. The central principle is that terms appearing frequently are often more relevant and serve as effective keywords. In our proposed system, we applied the Term Frequency (TF) model along with GSS coefficients to extract these keywords, aiding in text ranking. Our study specifically introduces an automatic method for extracting keywords from Kannada language datasets, which are then used to produce concise summaries of the text.*

Keywords: **Automatic Summarization, Extractive Summarization, Term Frequency (TF), GSS Coefficient, ROUGE Metric, Kannada Language Processing.**

1. INTRODUCTION

As the global volume of data continues to surge, interest in automated summary generation has significantly increased. Text summarization entails compressing a lengthy document into a concise sentence or paragraph that conveys the main ideas. Automatically generating summaries of lengthy documents can be advantageous, particularly when users need to quickly understand essential information from large text files. Text summarization techniques fall into two main types: extractive and abstractive. Extractive summarization involves selecting key phrases, sentences, or sections from the source text and merging them to form a condensed version. This approach relies on linguistic and statistical properties to assess the significance of sentences, extracting phrases and paragraphs that encapsulate the document's core message. Conversely, abstractive summarization generates summaries by constructing an internal semantic structure, which allows for the generation of new terms not present in the original text. This technique produces summaries more akin to human-created summaries by understanding and rephrasing the content.

Keyword-driven text summarization is an approach in natural language processing that focuses on identifying and extracting significant words or phrases to create concise summaries that convey the essential points of a text. This technique is particularly valuable in languages like Kannada, where unique grammatical and syntactical structures present challenges for traditional summarization methods. By isolating keywords that encapsulate the main ideas, this approach enables efficient content summarization, making it especially useful for processing large volumes of digital Kannada text in fields such as news aggregation, educational content, and online documentation. In Kannada, where digital language resources are still growing, keyword-driven summarization provides an accessible means of condensing text. This approach selects the most relevant words based on frequency or semantic weight, then extracts sentences containing these keywords to form a coherent summary. As regional language processing continues to expand, keyword-based

Performance Optimization of K-Means Clustering using multiple k-Values:A Hands-On

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Abstract- ***Optimizing the performance of K-means clustering involves several techniques and strategies that can help speed up the computation and improve the clustering quality. Distortion and inertia are key metrics used to evaluate the quality, assess the clustering performance, and determine the optimal number of clusters of K-means clustering. Using the Elbow Method, we can plot Distortion and Inertia metrics against different values of k to determine the optimal number of clusters. This approach helps achieve better clustering results by ensuring that data points are grouped most meaningfully.***

Indexed Terms- ***K-Means Clustering, Distortion, Inertia, Elbow Method.***

I. INTRODUCTION

K-means clustering widely used unsupervised machine learning algorithm for grouping data points into clusters based on their similarity. To train the model, there is no need for labeled data. The data patterns are identified and grouped into data points based on their inbuilt characteristics and partition a dataset into a pre-defined number of clusters denoted by ‘k’. K-means clustering uses the concept of distance and aims to minimize the distance between data points within the same cluster while maximizing the distance between clusters. Using distortion and inertia, effectively evaluate the quality of K-means clustering. The Elbow Method provides a visual representation and instinctive way to determine the optimal number of clusters, ensuring superior clustering results and more significant data distribution which helps Data Exploration, Data Segmentation, Anomaly Detection, and Image Segmentation.

II. LITERATURE REVIEW

[1] K-means Clustering Algorithms: A Comprehensive Review, Variants Analysis, and Advances in the Era of Big Data": This paper discusses the original K-means algorithm and its variants, addressing improvements like k-means++, scalable approaches, and hybrid models with other algorithms. It also covers the algorithm's limitations and solutions proposed in recent studies to enhance clustering performance and efficiency.

[2] "The K-means Algorithm: A Comprehensive Survey and Performance Evaluation": This survey highlights the challenges of random centroid initialization and the requirement to predefine the number of clusters. It evaluates several variants of the K-means algorithm, emphasizing experimental analyses on diverse datasets to compare their performance and effectiveness.

[3] "Optimizing K-means for Big Data: A Comparative Study": The focus is on optimizing K-means for large datasets through parallel processing, distributed computing, and the use of advanced initialization techniques. The study also explores the integration of K-means with big data frameworks like Hadoop and Spark to improve scalability and processing speed.

[4] "Boosting K-means Clustering with Symbiotic Organisms Search for Better Performance": This paper explores the hybridization of K-means with nature-inspired metaheuristic algorithms, such as the Symbiotic Organisms Search (SOS), to overcome issues like local optima and slow convergence. The results show significant improvements in clustering quality and computational efficiency.

[5] "A Comprehensive Survey of Clustering Algorithms: State-of-the-Art Analysis and Emerging Trends": It provides a broad overview of clustering techniques, with a detailed comparison of K-means

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DRUG CONSUMPTION DETECTION USING MACHINE LEARNING

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Abstract: Diagnosing and monitoring drug use creates important challenges in the medical and social fields. Traditional methods have relied heavily on self-reports, which can be unreliable due to various factors such as social bias and memory bias. In recent years, there has been a growing interest in using machine learning techniques to augment or replace traditional approaches to drug detection. This paper provides a comprehensive overview of the current state of the art in machine learning-based drug use diagnosis.

Describes common preprocessing steps for cleaning and preparing data for analysis, including feature extraction and dimensionality reduction techniques. We then take a closer look at various machine learning algorithms and models used for drug detection, including random forests, deep learning architectures, and ensemble techniques. We discuss the strengths and weaknesses of each approach and highlight recent advances and challenges.

Additionally, we discuss ethical considerations for using machine learning in this context, including privacy concerns, algorithmic bias, and the impact of false positives and negatives.

Finally, we identify potential avenues for future research, including developing more robust and interpretable models, integrating multiple data methods to improve accuracy, and exploring real-time monitoring systems.
Overall, this review highlights the potential of machine learning to revolutionize drug use diagnosis and highlights the importance of interdisciplinary collaboration to address the complex challenges inherent in this field.

I. INTRODUCTION

The rapid development and spread of new drugs, including illicit substances, poses a significant challenge to public health and safety. Accurate and efficient drug detection methods are crucial in a variety of settings such as forensics, clinical toxicology, and drug abuse monitoring. Traditional drug detection techniques, such as immunoassays, often rely on targeting specific classes of drugs and can suffer from limitations such as false positives and the inability to identify novel drugs. Mass spectrometry (MS) has emerged as a powerful tool for drug analysis due to its high sensitivity, specificity, and ability to identify unknown compounds. MS analyzes the mass-to-charge (m/z) ratio of molecules and provides a unique fingerprint for each compound. This fingerprint enables identification and quantification of the drugs present in the sample. However, analyzing raw MS data for drug detection can be complex and requires specialized expertise. Machine learning (ML) offers a promising approach to automate drug identification from RS data. ML algorithms can be trained on a dataset of known illegal drugs and their corresponding RS properties. The trained model can then predict the presence or absence of illegal drugs in an unknown sample based on its RS profile. This project explores the application of machine learning (ML), specifically the Random Forest classifier, in conjunction with RS to automate drug identification from mzML files. MzML is a standard MS data storage format that ensures compatibility with various software tools. Machine learning offers an efficient approach to solving problems such as spectral complexity, data volume, specificity, etc. Supervised learning algorithms can be trained on a dataset of corresponding mzML files. to various drugs. These training datasets include the M (mass) and M+proton values associated with each drug, allowing the model to learn the unique spectral signatures of different compounds. Once trained, the model can be used to analyze mzML files from unknown samples and predict the presence and identity of the drug(s).

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DETECTION OF POLYCYSTIC OVARY SYNDROME USING DEEP LEARNING

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Abstract: Polycystic Ovary Syndrome (PCOS) is a prevalent endocrine disorder affecting many women, characterized by various symptoms and ovarian irregularities. Accurate and timely diagnosis is crucial for appropriate treatment and management. This project proposes an innovative approach to PCOS detection that leverages both manual input data and advanced medical imaging techniques. The primary objective of this project is to develop an automated system for PCOS detection, enhancing diagnostic accuracy and streamlining the process. This approach combines manual input of some key features associated with PCOS, with the use of ultrasound imaging of the ovaries. It takes a patient-centered approach, ensuring that individuals suspected of having PCOS are provided with an accurate and efficient diagnosis. The process begins with the collection and preprocessing of patient data. Manual input data is collected, and based on predefined criteria, a decision is made to proceed with an ultrasound scan. If indicated, high-quality ultrasound images of the ovaries are obtained, which serve as input to a specialized Convolutional Neural Network (CNN). The CNN is trained on a labeled dataset of ultrasound images, enabling it to detect specific patterns associated with PCOS. By analyzing the ultrasound image, the CNN provides an assessment of the likelihood of PCOS.

Keywords: PCOS detection, Manual data analysis [physical symptoms], Image based analysis[ultrasound Image], Random Forest, Convolutional Neural Network.

I. INTRODUCTION

PCOS is a hormonal condition in women of reproductive age, often starting in adolescence. Difficulty in becoming pregnant may arise due to irregular ovulation. Symptoms can vary over time. PCOS is a leading cause of infertility. Ovaries are an important part of the female reproductive system, they're located in the lower belly on either side of the uterus. Women have 2 ovaries that grow eggs and secrete the hormones estrogen and progesterone. During the menstrual cycle, an egg grows in a sac called a follicle within the ovaries. Normally, the follicle breaks open to release the egg, but if it doesn't, fluid can accumulate, forming a cyst.

This condition, when it occurs frequently, is linked with hormonal imbalances and is known as polycystic ovary syndrome (PCOS). PCOS can lead to various symptoms like irregular periods, Hirsutism, acne, hair loss, skin darkening and excess androgens. Many women with PCOS may develop these ovarian cysts due to the follicles not rupturing properly. PCOS diagnosis relies on a comprehensive approach, integrating physical examination, blood tests, and ultrasound scanning. Depending solely on any single test is not advisable.

Therefore, we propose a system that combines the results of physical examination and ultrasound scanning of ovarian images to enhance diagnostic accuracy. This integrated approach ensures a more reliable diagnosis, leading to better management and treatment outcomes for individuals with PCOS.

II. LITERATURE SURVEY

[1] This research enhances follicle segmentation by coupling different segmentation strategies and employing a Logistic Regression classifier for identifying follicular features. An upgraded sampling technique incorporating oversampling and under sampling addresses class imbalance in medical datasets. Statistically significant features characterizing PCOS are selected using an Extreme Gradient Boosting model. Integration with a CNN model and hyperparameter tuning further boosts performance, as demonstrated through rigorous testing on benchmark datasets..

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OSTEOPOROSIS RISK DETECTION WITH ASSISTANT

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Abstract: Osteoporosis is a commonly occurring bone disease among the aging population, which leads to the loss of mass in bone and increased fracture risks. This study aims to develop a model using machine learning, which detects osteoporosis risk and the percentage of risk affected to the person using demographic, lifestyle, and clinical factors. The features of this project include age, race, body weight category, gender, family history, medical conditions, and hormonal changes. In addition, an AI-driven chatbot is implemented to answer bone health-related queries for the users. From the evaluated models, such as Decision Tree, Logistic Regression, Random Forest, Support Vector Machines (SVM), and Neural Network, the Random Forest classifier got the highest accuracy of 85.20%. This proposed system provides early diagnosis and information about osteoporosis risk management.

Index Terms - Osteoporosis risk detection, Machine learning, Data Analytics, AI chatbot, Random Forest, Risk management.

I. INTRODUCTION

Osteoporosis is a bone disease associated with aging that causes bones to become weak and brittle. This condition affects both women and men, particularly older adults. Postmenopausal women are particularly affected, which decreases quality of life. As Osteoporosis is the “silent” disease, typically symptoms are less, and early detection is possibly less. One may not even know until the break of a bone. Preventive measures are following the healthy lifestyles implemented before the diseases reach advanced stages.

This study proposes a detective model that assesses osteoporosis risk based on various characteristics such as age, body weight category, gender, family history, race, medical conditions, and hormonal changes. By taking a variety of lifestyle and health factors, the model gives the users the percentage of risk he/she is affected by the osteoporosis. To know the weight category, BMI calculator is embedded. In addition to the osteoporosis risk prediction and detection, this research integrates an AI-driven chatbot to serve as a virtual health assistant. The chatbot is designed to address user queries on bone health, provide recommendations, and guide users through the diagnostic process. The integration of chatbot adds a user-friendly component that guides users with bone health information and support, promoting health management and care.

SMARTDOC AI : SEAMLESS DOCUMENT SEARCH AND AI QUERY TOOL

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Abstract: *Document grounded systems frequently bear druggies to manually search through large textbook collections to find applicable information. This approach is hamstrung and time consuming. The SmartDocAI design aims to automate the question- answering process by enabling druggies to upload documents, similar as PDFs or scrutinized images, and admit precise answers grounded on the document's content. By using advanced technologies like Optical Character Recognition(OCR), Natural Language Processing(NLP), and Vector Search Machines(Pinecone), the system facilitates quick reclamation of applicable information. The system supports multiple documents, table and image birth, and automatic summarization, perfecting overall stoner experience. This not only simplifies document running but also enhances productivity across sectors like education, exploration, and commercial surroundings.*

Keywords: *Streamlit, Pinecone, Langchain, SentenceTransformer, TextSplitter, openai ChatCompletion, Embedding, Query Refinement, Chunking, API Key, ServerlessSpec, upsert, chat history, metadata*

1. Introduction

The proliferation of online services and digital platforms has led to a growing reliance on conversational agents, or chatbots, to grease real- time relations and give automated client support across colorful disciplines. These AI- driven systems have come integral to perfecting stoner experience by offering quick, effective, and substantiated responses. As the need for further intelligent and adaptive chatbots increases, there's a critical demand for technologies that can give environment-apprehensive, accurate, and applicable responses in real time.

Traditional chatbots, frequently grounded on rule- grounded approaches, have limitations in handling complex queries and understanding the nuances of mortal language. While effective for simple, predefined tasks, these systems struggle to acclimatize to dynamic discussion overflows and evolving stoner requirements. In discrepancy, machine literacy- grounded chatbots, especially those powered by large language models like OpenAI's ChatGPT, have demonstrated remarkable capabilities in understanding and generating mortal- suchlike responses. still, despite their sophisticated language generation capacities, these models frequently bear fresh structure to recoup applicable information from large, unshaped data sources and to maintain scalable performance in real- time operations.

This exploration aims to bridge these gaps by developing an advanced interactive chatbot that combines several state- of- the- art technologies LangChain, ChatGPT, Pinecone, and Streamlit. These

LIVER TUMOR DETECTION AND ANALYSIS USING CNN

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Abstract

Global occurrence of liver tumors brings out the importance of early detection as timely diagnosis can help in effective treatment. Conventional methods of tumor detection rely on manual analysis which takes time and also requires high expertise and may lead to errors. This study addresses these challenges by developing a system for detecting and classifying liver tumors using CNN approach. It begins with image processing techniques to enhance the CT scan images. The model is trained on the dataset, with data augmentation applied to prevent overfitting and to increase adaptability. The model's performance is evaluated using metrics such as Dice coefficient and loss calculation. The system focuses on tumor segmentation, size and stage classification. The system aims to assist the expertise by providing faster and precise detection.

Keywords:
Liver Tumor Detection, Image Processing, Convolutional Neural Network, Tumor Segmentation, Tumor Classification, Data Augmentation.

1. Introduction

The count of liver tumor cases is rising year by year, which makes it a global health issue. The important thing is finding out the presence of this disease in its early stages. Considering all the imaging techniques, a Computed Tomography scan stands out the most for its ability to produce the detailed output. It involves a very important role in the detection of certain health problems like cardiovascular diseases, trauma and cancer. Here, the major challenge is to analyze the CT scan image, which requires high skills and time. The manual process of liver tumors will take longer period of time and require expertise which makes it a task that needs heavy resources. This manual process can also give incorrect results or delayed treatment. Due to the fast growth and quick spreading of the liver tumor, it is more crucial to have a system that will help the doctors to detect and classify them properly and accurately.

In these years, many improvements in the field of artificial intelligence have helped in improving the diagnostic accuracy. Because of the machine learning technologies and image processing technologies, CNN which is a deep learning model, has given better opportunities to bring improvements in liver tumor detection and classification. Deep Learning, which is a part of AI has brought sensational success in analyzing the images and enhancing the detection of the tumor in CT scan image.

The project aims to develop a system to detect and classify tumors in the provided CT scanned image by utilizing the image processing techniques along with deep learning. The project includes many image processing techniques that includes Thresholding, Connected Component Labeling, Normalization, Color Mapping so that the CT scan image is ready for the analysis. A CNN model is then trained so that it can identify and classify tumors based on their size, shape and location.

Sleep Apnea Detection Based on ECG Signals Classification Using CNN Approach

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Abstract: Sleep apnea, one of the most common sleep disorders, also impacts health worldwide by producing complications such as cardiovascular disease, hypertension, and many more affecting the patients. Early detection and diagnosis are necessary to avert most of these complications. Traditional methods of diagnosis such as polysomnography are costly, time-consuming, and extensively require sophisticated techniques, as well as expert knowledge resultantly, its access is limited. Considering that the phenomenon occurs, its increase is becoming widespread; thus, the need for its detection is trending toward an efficient, cost-effective non-invasive modality. This research presents a new approach based on Convolutional Neural Networks (CNN) for sleep apnea detection through Electrocardiogram (ECG) signals. The novel idea uses deep learning algorithms with the intent to identify an apnea event by ECG analysis to reveal its complex patterns in data. It is supposed to deal with the various datasets and extract some key features from the signals that cannot be detected very easily by human experts. Thus, it would provide a quick, accurate, and scalable tool for the early prediction of sleep apnea perfectly embedded into routine healthcare practices. The relevance of this research lies in its ability to transform how patients are diagnosed with sleep apnea by leading to reduced time-to-diagnosis and early intervention opportunities. Thus, it would build a potential case towards enhanced diagnostic accuracy and accessibility because it can transform the outcomes of patients, reducing the long-term health impacts of untreated sleep apnea, and also offer a better alternative to a majority of the traditional diagnostics.

Keywords: Sleep apnea, Sleep disorders, Convolutional Neural Networks, Deep learning.

I. INTRODUCTION

Sleep apnea is one of the most major health problems affecting the nations worldwide today. This sleeping disorder is characterized by repeated re-interpretations in breathing while sleeping causing damage to the body systems such as cardiovascular and hypertensive effects, diabetes, and many others. Timely detection and diagnosis allow intervention in sleep apnea before it causes long term effects on the health that may be irreversible. Detection of sleep apnea is, however, difficult in the early symptoms of the disease, which are mostly mild, during which patients often ignore the symptoms and pass them off as some form of weakness or tiredness. Many patients will miss out entirely on necessary intervention when required, and this can further deteriorate the condition. Among the common treatments, Continuous Positive Airway Pressure (CPAP) device efficacy is well established, but little use has been reported among patients because of discomfort and inconvenience while using it. It is paramount to havea fast, cheap, and non-invasive diagnostic at the health-filling gaps.

In recent years, the advancements in artificial intelligence have helped a lot in improving the diagnostic accuracy. Machine Learning and Image processing, particularly Convolutional Neural Network (CNNs) have been used for the identifying and classify the sleep apnea events. This approach has achieved success in improving detection accuracy and supporting timely treatment. This project aims to develop a CNN based diagnostic tool that will analyse the ECG signals to detect classify sleep apnea. The system will support advanced processing techniques which includes noise reduction, feature extraction and segmentation to prepare the ECG data for analysis. The system automates the diagnostic process and improves the early detection, reduces the amount spent in diagnostic tests, and hence enables prompt decisions for treatment while improving the health care outcome for a patient in general.

Detection of Ischemic Stroke using Deep Learning Technique

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Abstract: *Stroke is a significant global health concern, ranking as the second leading cause of death and the leading cause of adult disability worldwide. According to the Stroke Forum, there are over 13.7 million new strokes of all types every year.Ischemic stroke accounts for 88% of all strokes and has a high risk of long-term recurrence. Hence, Ischemic stroke remains a leading cause of morbidity and mortality worldwide, making it necessary for swift and accurate diagnosis for effective intervention. Current ischemic stroke diagnosis methods are not only time-consuming and reliant on specialized expertise but also are subject to inconsistent local expertise, time delays, and varies between institutions. Despite stroke system-optimization efforts, there remains an unmet need for more immediate and real-time stroke detection and triage. Artificial intelligence (AI) is proposed as a tool to deal with this need.*

This research introduces an innovative approach for Ischemic stroke detection through the application of Artificial Intelligence and Machine Learning, making use of Deep Learning algorithms and computational techniques. Leveraging these complex models on diverse medical imaging datasets such as Computed Tomography (CT) scans, the system is able to learn complex patterns in medical images that may be difficult for human radiologists to detect. The proposed system aims to enhance diagnostic precision while ensuring seamless integration into existing clinical workflows. The significance of this endeavour lies in its potential to revolutionize stroke diagnosis, offering a rapid and accurate tool for healthcare professionals. By reducing time-to-diagnosis and enhancing sensitivity, the proposed system aims to contribute to timely interventions, ultimately reducing time-to-diagnosis and minimizing the impact of ischemic stroke.

Keywords: Ischemic Stroke Detection, Computed Tomography Image Processing, Deep Learning Framework, Ischemic Stroke Segmentation.

1. Introduction

Ischemic stroke is a medical condition characterized by a sudden loss of blood supply to a part of the brain due to the blockage or occlusion of a blood vessel that supplies blood to the brain. This results in a disruption of oxygen and nutrient delivery to brain tissue. Acute ischemic strokes are caused by large vessel occlusions (LVOs). Stroke is a significant global health concern, ranking as the second leading cause of death and the leading cause of adult disability worldwide. According to the Stroke Forum, there are over 13.7 million new strokes of all types every year. Studies have also pointed out that every fourth person aged more than 25 years will suffer a stroke in their lifetime across the world. Developing countries account for 85% of global stroke deaths. The burden of brain stroke has alarmingly increased in India over the years. Between 1996 and 2019, there was a 100% increase in cases in India. Nearly 700,000 people in India died because of stroke in 2019, which was 7.4% of the total deaths in the country that year. Ischemic stroke

A DEEP LEARNING APPROACH TO DETECT RHEUMATOID ARTHRITIS USING X-RAY IMAGES AND BIO-MARKERS

Project Reference No.: *47S_BE_0909*

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Guide(s) **:** Dr. Pradeep B S
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Mr. Shreyas Shetty B
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Mr. Vinayak Nayak N

Keywords:

Rheumatoid Arthritis, ACR/EULAR 2010 criteria, Deep Learning, Ensemble, Healthcare.

Introduction:

Rheumatoid arthritis (RA) is a chronic autoimmune condition that primarily affects joints, where the immune system mistakenly attacks healthy tissues, leading to symptoms like joint pain, swelling, stiffness, and impaired function. RA presents significant clinical challenges due to its persistent nature, potential for joint deformities, and systemic complications. Traditional diagnostic methods often lack accuracy and timeliness, prompting the need for innovative approaches.

To address these challenges, a novel system integrates deep learning techniques with multi-modal data, including blood biomarkers and therapeutic images of affected hand joints, aiming to revolutionize RA diagnosis and severity assessment. Leveraging a comprehensive dataset and considering symptom duration, this approach surpasses existing methods' limitations, offering superior diagnostic accuracy and early detection capabilities. Through rigorous evaluation, the system demonstrates reduced false positives and false negatives, improving patient outcomes and minimizing long-term joint damage. Additionally, this innovative system contributes to advancing the understanding of RA pathophysiology and treatment effectiveness by fostering scientific advancements through dataset development.

Objectives of the project:

The objectives of the project are to

- Design and implement a seamless fusion mechanism integrating X-ray images with

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Realtime conversation system for people with hearing and speech impairments

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Abstract: Communication barriers significantly hinder interaction between the deaf community and the wider world. This paper investigates an automatic system for Indian Sign Language (ISL) detection using MobileNetV2, a transfer learning architecture known for its efficiency. We leverage transfer learning from pre-trained MobileNetV2 weights to extract features from ISL images. To improve model performance for ISL detection, we incorporate linear bottleneck layers and squeeze-and-excitation blocks within the network. Additionally, separable convolutions are used to maintain accuracy while reducing computational complexity. This optimized MobileNetV2 architecture is then fine-tuned on a prepared ISL dataset for robust sign recognition. While limitations exist, this research paves the way for advancements in communication accessibility for the deaf community.

Keywords: Indian Sign Language (ISL),Sign Language Detection ,Deep Learning,MobileNetV2,Transfer Learning ,Linear Bottleneck Layers ,Squeeze-and-Excitation Block ,Communication Accessibility ,Deaf Community.

I. INTRODUCTION

Sign language serves as a vibrant and vital form of communication for millions of deaf and hard-of-hearing individuals globally. Unfortunately, communication barriers often hinder interaction between the deaf community and the wider world. These disparities can limit social inclusion, educational opportunities, and overall well-being. Automatic sign language detection systems offer a promising solution to bridge this communication gap.

This paper delves into the application of deep learning for Indian Sign Language (ISL) detection. ISL, a rich and complex language with its own grammar and syntax, utilizes hand gestures, facial expressions, and body posture to convey meaning. Automatic detection systems aim to recognize these visual cues and translate them into spoken language or text.

Our research focuses on employing MobileNetV2, a deep learning architecture known for its efficiency, for ISL detection. This approach leverages transfer learning, where pre-trained weights from a well-established model like MobileNetV2 are utilized as a starting point. This not only reduces training time but also allows the model to learn essential feature extraction capabilities from a vast dataset of images.

Furthermore, we optimize the MobileNetV2 architecture by incorporating specific techniques. Linear bottleneck layers and squeeze-and-excitation blocks are employed to enhance the model's ability to represent the unique features present in ISL signs. Additionally, depth-wise separable convolutions are implemented to maintain accuracy while reducing computational complexity during training. This optimized architecture is then fine-tuned on a specifically prepared ISL dataset to achieve robust sign language detection.

By exploring this approach, we aim to contribute to advancements in communication accessibility for the deaf community. This paper will delve deeper into the technical details of MobileNetV2 optimization and its application for ISL detection. We will also discuss the limitations of current systems and explore potential areas for future research. Overall, this research emphasizes the transformative role that automatic sign language detection systems, particularly those leveraging optimized deep learning architectures, can play in fostering a more inclusive and accessible communication landscape.

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Human Face and Action Recognition Through CCTV Surveillance

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Abstract: This project focuses on developing a system for human face and action recognition through CCTV surveillance, leveraging deep learning algorithms. By uploading CCTV footage videos and individual photos of persons of interest, the system aims to detect, track, and recognize faces and actions in real-time. The output provides the identified person's face, recognized actions, and a unique identifier along with timestamps indicating when the action occurred. Key components of the system include the YOLO v8 algorithm for object detection, Deep SORT algorithm for object tracking, and FaceSDK for face detection and recognition. The integration of these advanced technologies aims to provide a comprehensive solution for enhancing security measures and facilitating forensic analysis in surveillance environments. Through the utilization of deep learning techniques, the project contributes to advancing the capabilities of CCTV surveillance systems in recognizing and analysing human activities effectively.

Keywords: Human face recognition, Action recognition, CCTV surveillance, Deep learning, YOLO v8, Object detection, Deep SORT, Object tracking, FaceSDK, Forensic analysis, Security measures, Timestamp, Facial detection.

I. INTRODUCTION

This project Human face and action recognition through CCTV surveillance aims to improve how we recognize people and their actions in CCTV videos using deep learning. We upload both CCTV videos and photos of people. The system then looks for and follows faces in the videos and figures out what actions those people are doing. It gives us useful details like whose face it found, what action they're doing, and a special code just for them. Plus, it tells us exactly when each action started and stopped with timestamps. It uses three main tools: one for finding objects accurately, another for tracking them effectively, and one more for spotting faces efficiently. By putting these tools together, the project helps make CCTV surveillance better at spotting people and what they're up to, making things safer and aiding investigations. Ultimately, it's about making the most of deep learning to keep our environments secure.
The project relies on three primary tools to accomplish its objectives: YOLO v8 for accurate object detection, Deep SORT for efficient object tracking, and FaceSDK for reliable face detection and recognition. By integrating these cutting-edge technologies, the project establishes a robust foundation for effectively recognizing human faces and actions within CCTV footage. This integration is crucial in meeting the evolving demands of modern surveillance systems, which require precise and efficient methods for identifying individuals and their behaviours.

Ultimately, the overarching goal of the project is to deliver a dependable and practical solution tailored to real-world surveillance scenarios. By accurately identifying individuals and their actions, the system enhances security measures and facilitates forensic analysis efforts. Moreover, by advancing the utilization of deep learning techniques in surveillance applications, the project aims to contribute to the creation of safer environments on a global scale. This endeavour signifies a significant step forward in leveraging advanced technologies to bolster security infrastructure and protect communities worldwide By combining state-of-the-art algorithms and tools, it offers a reliable solution for identifying individuals and their behaviours in CCTV footage. The project's success underscores the potential of deep learning in improving security measures and aiding forensic investigation.

II. LITERATURE SURVEY

In [1] 2nd international Conference on image vision and computing(2019) Proposed a method for face recognition by network fine tunning a viola jones algorithm with the testing dataset collected from the campus surveillance system, the network fine-tuning achieves accuracy of 87.1 %.

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A Survey on Dentes Condition Detection System Using Machine Learning

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Abstract - For dental health to be maintained and consequences to be avoided, early diagnosis of diseases connected to dentes is essential. Missed treatment possibilities arise from dentists' frequent inability to visually identify these problems. In response, a real-time X-ray analysis model has been created to quickly and precisely identify dental issues. This invention improves patient care by accelerating treatment planning and reducing the possibility of misdiagnosis. The concept saves time and dollars by streamlining diagnostics through the use of cutting-edge imaging technology. It increases the efficiency of dental care by doing away with time-consuming manual examinations. This model allows for early intervention in diseases connected to dentes, which represents a significant development in dental diagnosis.

1. INTRODUCTION

X-rays and other forms of medical imaging have revolutionized diagnosis in all fields of medicine, including dentistry. This technology is being used by a new area called dental informatics to create large datasets from high-resolution sensors. Treatment planning and decision-making can be enhanced by this data in conjunction with dentist competence. By sending radiation through the mouth, X-rays are able to create a two-dimensional image of the interior structures. There are two primary varieties: extraoral (patient positioned between X-ray source and film) and intraoral (film placed within mouth). A frequent extraoral type of X-ray that gives a broad view of the mouth, jaws, and head is the panoramic variety. Although these X-rays are typically manually interpreted by dentists, imprecise images can result in incorrect diagnosis. This system uses the extraoral type of x-ray in order to detect the condition of tooth and to avoid incorrect diagnosis.

2. FEATURES

A novel machine learning-based dental X-ray analysis system has multiple characteristics to enhance diagnosis. It provides instantaneous findings, indicating possible dental cavities, decrease of bone density, and other problems. The algorithm, which has been trained on large datasets, may be more accurate than conventional techniques, which could lead to fewer missed diagnoses. Workflows are streamlined by automation, giving dentists more time to treat patients. Standardized analysis also provides faster identification, which guarantees consistency and may lead to earlier interventions. With its intuitive interfaces and configurable features, this technology has the potential to completely transform dental care by improving diagnosis times, accuracy, and reduction of human error.

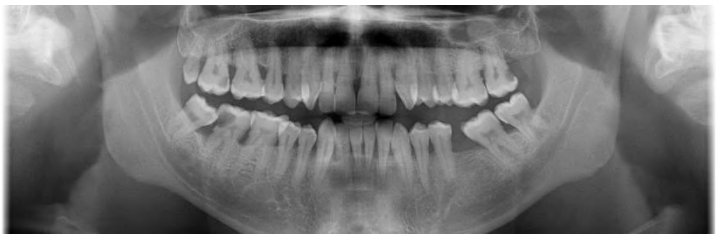

Fig -1: Panoramic X-ray Image

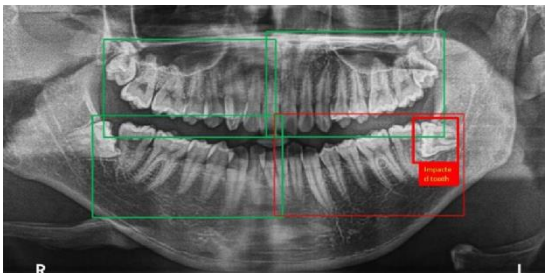

Fig- 2: Detected diseases

this advanced system offers scalability, adapting to diverse clinic settings and patient populations. Its ability to integrate seamlessly with existing dental software enhances workflow efficiency. Continuous updates and refinements ensure ongoing improvement in diagnostic accuracy and capability. By empowering dentists with comprehensive insights, it facilitates personalized treatment plans tailored to each patient's needs. Ultimately, this innovation heralds a new era in dental healthcare, promising enhanced outcomes and patient satisfaction.

3. LITERATURE REVIEW

The field of dentistry is embracing machine learning for automatic detection of cavities in X-rays. In the paper "Automatic diagnosis and detection of dental caries in bitewing radiographs using pervasive deep gradient based LeNet classifier model," G. Vimalarani and Uppu Ramachandraiah propose a system for bitewing X-rays (show both upper and lower teeth). Their system combines image processing techniques with a deep learning model called LeNet. The system first identifies the relevant tooth area and any dark spots that might indicate cavities. Then, it extracts key details from the image, such as tooth shapes, textures, and bone density variations. Finally, the LeNet model classifies the entire X-ray as normal or abnormal and pinpoints the location of any potential cavities.

Another study, "Deep learning convolutional neural network

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MOTION TUTOR: ANIMATED MOTION USING DEEP LEARNING

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Abstract: In a world that values personalized, interactive, and easily accessible learning, our project stands at the intersection of art and technology, offering an innovative solution. We aim to revolutionize the understanding and teaching of complex movements by providing a tailored and immersive learning experience, departing from traditional tutorials. In the domain of Motion Knowledge, where movement's beauty meets learners' enthusiasm, our project represents a groundbreaking approach.

Driven by the belief that tutorials should be inclusive, we leverage cutting-edge technology like PoseNet and CGAN to deconstruct tutorials into digestible steps, simplifying the learning journey. Our primary objective is to empower individuals of all skill levels to explore, learn, and excel in the art of movement without unnecessary complications. Our project provides dynamic and highly personalized learning experiences accessible to individuals from diverse backgrounds, whether they're novices or seasoned practitioners.

Users actively shape their motion education narrative, fostering creativity, skill mastery, and a profound connection with their movements. Our unique solution marries art and technology to meet the demand for engaging and personalized learning experiences.

Keywords: PoseNet, CGAN, Motion Knowledge, personalized learning experiences, immersive learning experience.

I. INTRODUCTION

In today's fast-paced world, the importance of maintaining a healthy and active lifestyle cannot be overstated. Unfortunately, much of the available instructional content tends to adopt a one-size-fits-all approach. Our innovative solution seeks to blend art and technology seamlessly, fundamentally changing how we teach and learn about motion. Instead of simply copying movements onto digital avatars, we've embraced a novel approach that harnesses technology and computer vision to reshape the learning process, ensuring accessibility and engagement for all. Dance, exercise, and fitness have evolved into immersive experiences driven by the demand for personalized, innovative, and effective approaches.

Deep learning, a dynamic aspect of artificial intelligence, is emerging as a transformative tool in redefining how we approach physical well-being. It offers an unprecedented opportunity to infuse precision, personalization, and adaptability into dance, exercise, and fitness routines.

At the core of our project is an interactive learning journey where learners are empowered to take control. We utilize advanced technologies like Convolutional Neural Networks (CNN) for precise pose recognition, deep learning for tailored animation, and Conditional Generative Adversarial Networks (CGAN) for seamlessly integrating character and motion.
Rather than simply mirroring poses onto digital characters, our emphasis is on instructional videos. By transforming input videos into a series of moving images, we simplify complex motion sequences into manageable steps.

Our commitment is to ensure that our tutorials are accessible to everyone, catering to both experienced enthusiasts seeking mastery and newcomers venturing into the world of movement. This approach allows individuals to craft personalized animations that reflect their unique movements, making the learning and refinement of motion an inclusive, enjoyable, and personalized experience for all.

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Image-Based Object Classification and Distance Measurement for the visually Impaired

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Abstract: In response to the imperative of universal accessibility in today's fast-paced technological landscape, this project is committed to empowering visually impaired individuals by devising a comprehensive system to tackle their daily challenges. Leveraging cutting-edge real-time image processing techniques, our initiative is centered on creating a robust framework that addresses key obstacles faced by the visually impaired. This encompasses the development of sophisticated algorithms for object classification, accurate distance estimation, precise person identification, and auditory feedback integration. By prioritizing the creation of an efficient object classification model and a precise distance estimation algorithm, our system aims to deliver effective support to visually impaired users. Additionally, we are pioneering advancements in person identification accuracy and plan to seamlessly integrate audio models for accessible feedback. Rooted in considerations of technical feasibility, market demand, user input, cost-effectiveness, and ethical standards, our project follows a systematic methodology. This entails clearly defined objectives, meticulous hardware and software selection, data acquisition protocols, and rigorous image processing procedures. Designed with adaptability and scalability in mind, our system endeavors to continuously meet the evolving needs of visually impaired individuals, thereby significantly enriching their daily lives.

Keywords: Image processing, Computer vision, Machine learning, Deep learning, Convolutional neural networks (CNNs), Object detection, Distance estimation, Auditory feedback, Assistive technology, Accessibility solutions, Visual impairment, Camera input.

I. INTRODUCTION

In an age marked by remarkable technological progress, the concept of universal accessibility has risen to prominence. It is within this context that this project is set, with a central objective of enriching the daily lives of visually impaired individuals. Through the creation of an innovative and comprehensive system, this endeavor strives to address critical challenges: robust object classification, distance estimation, precise person identification, and auditory feedback. Visual impairment often leads to hurdles in object recognition and spatial awareness, impacting the quality of life for those affected. This project seeks to surmount these challenges by leveraging real- time image processing techniques. It aims to build a comprehensive system with interconnected goals:

creating a efficient object classification model and a distance estimation algorithm capable of accurately measuring distances between the user and objects. These two components form the foundation of a system intended to provide effective assistance to the visually impaired. The project doesn't stop at object recognition and distance estimation. It delves into the realm of person identification, striving for a degree of accuracy to classify individuals as known or unknown. Furthermore, it plans to provide an audio model to translate the system's outputs into accessible auditory feedback, thereby ensuring that users receive information in a user-friendly and practical manner. This four-fold approach encompasses a wide array of challenges and is rooted in considerations of technical feasibility, market research, user feedback, cost, and compliance with legal and ethical standards.

This endeavor rests upon a well-defined methodology. It commences with a clear articulation of objectives, followed by meticulous hardware and software selection, data acquisition, and rigorous image processing. The system is designed with adaptability and scalability in mind, aiming to meet the unique and evolving needs of visually impaired users. By getting together a mixture of cutting-edge technology and user-driven feedback, this project aspires to bridge the accessibility gap. In doing so, it seeks to empower visually impaired individuals with enhanced independence, safety, and an enriched daily experience

INTELLIMEETS: Remote Collaboration Platform Integrated with Automated Documentation

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Abstract

Virtual meetings are central to modern communication, particularly in remote work settings. However, manual documentation is often inefficient, leading to missed details, untracked decisions, and decreased productivity. To address this, we propose an AI-powered real-time meeting documentation platform. Utilizing large language models (LLMs) for text processing, speech-to-text for transcription, WebRTC for seamless streaming, and sockets for synchronization, the platform ensures accurate, real-time documentation. The MediaRecorder API records meetings, while libraries generate structured PDF summaries, highlighting key topics, conclusions, and action items.

This automated system improves accountability, enhances teamwork, and streamlines follow-ups. Businesses and organizations relying on virtual communication benefit significantly, as the process minimizes errors and reduces reliance on manual input.

Keywords: Virtual Meetings, AI-Powered Documentation, Real-Time Transcription, Meeting Summaries, WebRTC, large language models, speech-to-text methodologies, Remote Work Collaboration.

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Ai Based Picture Translation

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Abstract: This work presents the development of an AI-based image translation web application designed to recognize objects within an image and provide translations in Hindi, English, and Kannada. The system integrates advanced computer vision and natural language processing techniques to deliver accurate and real-time translations. Object detection is carried out by YOLOv5s (You Only Look Once version 5 Small) which is an extremely effective deep learning model developed for real-time object identification. OpenCV applies its power for operations such as image preprocessing- image resizing, normalization, and noise reduction, ensuring high-quality inputs for the model. The system utilizes TensorFlow for processing in neural networks and PyTorch for training and fine-tuning the deep learning models involved in object recognition. To enhance its functionality, the application also employs Tesseract OCR (Optical Character Recognition) to get the text from images that shall be translated into the selected languages. With a user-friendly interface, users can upload images and receive immediate translations of recognized objects and text in Hindi, English, or Kannada. This AI-powered image translation tool offers a practical solution for overcoming language barriers, benefiting diverse user groups in fields such as education, travel, and everyday communication.

Index Terms **- AI-based Translation, Object Detection (YOLOv5s), Deep Learning, Optical Character Recognition (OCR), Multilingual Translation.**

I. INTRODUCTION

Increasing demand for uninterrupted communication among different languages around the world has highlighted the problems individuals face and different communities in transcending a linguistic gap. One of the primary obstacles is the inability to quickly translate written or labelled content in images, which can hinder understanding and accessibility in various contexts such as education, travel, and daily interactions. Traditional translation methods often rely on text input, leaving a gap when users need to translate objects or text present in images. To address this challenge, the proposed project aims to develop a web-based application that leverages advanced AI techniques for real-time object recognition and multilingual translation. The system utilizes state of-the-art deep learning models, including YOLOv5s for object detection, OpenCV for image preprocessing, and Tesseract OCR for extracting text from images. Once objects are detected, the system translates them into three major languages—Hindi, English, and Kannada—using a combination of TensorFlow and PyTorch for model training and inference. This is an AI-powered translation tool, which has an easy interface that allows users to upload images; the system later identifies and translates the objects and text detected into the specified language. The application is intended to help in achieving more inclusive communication through overcoming the language barriers for a vast number of users, such as tourists and students, and thus enhancing everyday communication between people from different linguistic backgrounds. With such sophisticated computer vision and natural language processing technologies, this system offers a workable and accessible solution to meet multilingual communication needs.

AI-Driven Classification System for Human vs Machine-Generated Audio Detection

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Abstract: As advancements in artificial intelligence continue to shape numerous industries, ensuring the authenticity of audio content has become increasingly significant. The AI-Driven Classification System for Human vs Machine-Generated Audio Detection Project employs SVM to classify audio samples as genuine human voices or AI-generated imitations, addressing a critical challenge in media verification and security. Using datasets like the "FakeWave" collection for synthesized voices and the Common Voice Audio Corpus for natural human speech, this project builds a robust binary classification model. After rigorous training, the model achieves high accuracy in distinguishing between the two types of audios, leveraging advanced machine learning techniques. The system also provides an accessible prediction tool, enabling real-time analysis of voice authenticity. This innovation offers applications in media validation, fraud detection, and secure communications, emphasizing the importance of distinguishing between synthetic and authentic voice data in the modern digital landscape.

Keywords: Support Vector Machines, "FakeWave" dataset, Common Voice Audio Corpus, audio classification, machine learning, synthetic voice detection, audio verification, real-time prediction, media security.

I. Introduction

The field of audio processing is undergoing a significant transformation, driven by advancements in machine learning. As synthetic audio generation improves, the need for reliable methods to find difference between human and AI-generated voices becomes increasingly critical. This project overcomes this challenge by leveraging Support Vector Machines (SVMs) to classify audio samples. Using diverse datasets, such as the "FakeWave" dataset for synthetic audio and the Common Voice Audio Corpus for human voices, the project develops an efficient classification system. By extracting features like Mel-frequency cepstral coefficients (MFCCs) and spectral properties, the system achieves high accuracy in distinguishing real from synthetic voices.

The solution what we are implementing not only improves the security and reliability of audio-based systems but also finds potential applications in content verification, media authentication, and combating disinformation. This paper presents the design, implementation, and evaluation of the AI-driven Classification System for Human vs Machine Generated Audio Detection, showcasing its effectiveness and importance in the era of increasingly indistinguishable synthetic audio.

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ORAL SQUAMOUS CELL CARCINOMA DETECTION USING DEEP LEARNING ON HISTOPATHOLOGICAL IMAGES

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Abstract: The most prevalent type of head and neck cancer is oral or mouth neoplasm, namely oral squamous cell carcinoma (OSCC).Despite its impact on mortality, it is invariably diagnosed late due to the ineffectiveness of early detection screening techniques. Early detection and treatment of oral squamous cell carcinoma (OSCC) is crucial for improved patient outcomes. Deep learning (DL) offers a promising approach for automated OSCC detection and classification. DL models can extract complex features from histopathological image dataset, achieving high accuracy in OSCC detection and classification. Studies have demonstrated DL is effective in distinguishing OSCC from benign lesions and classifying OSCC into different stages. DL-based OSCC detection and classification can improve diagnostic accuracy and efficiency, leading to earlier detection and treatment. However, further research is needed to validate DL models' clinical performance and ensure data quality and model interpretability. Overall, DL holds promise for revolutionizing OSCC diagnosis and management, enabling more accurate and personalized patient care.

Keywords: Deep learning(DL), Convolutional Neural Networks (CNNs), Oral Squamous Cell Carcinoma (OSCC), Histopathological

I. INTRODUCTION

Oral squamous cell carcinoma (OSCC) is a form of cancer that develops in the lining of the mouth accounting for, more than 90% of oral cancer cases. It falls under the category of head and neck cell carcinoma (HNSCC) which is a significant global health concern. Factors that contribute to the risk of developing OSCC include alcohol consumption, smoking, poor oral hygiene, exposure to papillomavirus (HPV) genetic predisposition, lifestyle choices, ethnicity and geographic location. Early detection plays a vital role in treating OSCC and improving survival rates since this type of cancer has a challenging prognosis with an average cure rate of 50%. Currently the standard diagnosis relies on analyzing tissue samples through biopsy analysis. However this process can be time consuming and prone to errors. Therefore there is a need for diagnostic tools that can assist pathologists in assessing and diagnosing OSCC. Recent advancements have explored the use of Artificial Intelligence (AI) and Deep Learning (DL) to enhance medical diagnostics by leveraging diagnostic imaging techniques. DL has shown success in analyzing images for various diagnoses, within medical image processing. Computer aided diagnosis (CAD) systems based on DL have been widely adopted for diagnosing types of cancers. However researchers are focusing on utilizing DL for diagnosing cancer from pathological images.

II. LITERATURE SURVEY

Jelena Musulin et al,(2021),This paper demonstrates the enormous potential of using AI-based algorithms to achieve an accurate prognosis of OSCC and increase people's chances of survival. For the multiclass classification problem authors compared various deep learning models with different configuration settings in order to achieve satisfactory classification performance.[1]

Premanand Ghadekar et al,(2021),This paper presents cancer detection using Histopathological scanned images implemented using CNN models to classify if a particular scan of lymph node is cancerous or not. Tagged Image format is used which gives great result in the field of Computer-aided imaging detection and diagnosis.[2]

Chiagoziem C. Ukwuoma et al,(2022),This paper presents a deep learning model for early detection of Oral Squamous Cell Carcinoma (OCSCC) using microscopic images. Departing from traditional methods, it introduces a novel layer-sharing approach that improves classification accuracy. While dataset limitations are recognized, this research marks a crucial step in enhancing OSCC detection, leveraging advanced deep learning for more effective early diagnosis.[3]

Semantic Conversational Content Moderation

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Abstract - In today's digital environment, social media platforms have become an integral part of our daily lives, facilitating global communication, knowledge sharing and community building. However, these platforms are increasingly vulnerable to the spread of offensive and toxic content, including misinformation, harassment and hate speech. Such content poses a significant threat to the safety and well-being of Internet users. In response to this immediate problem, we set out to develop an AI-based conversation moderation service aimed at effectively detecting and removing offensive or semantically toxic information in real time. Our solutions strive to make the internet safer and more user-friendly, thereby promoting a more positive and inclusive online environment.

***Key Words*:** Natural Language Processing(NLP), Moderation, Semantic Analysis, Mistral.

1. INTRODUCTION

In today's connected world where social media platforms play a central role in communication, ensuring a safe and inclusive online environment is of utmost importance. This project is an innovative AI-driven conversation moderation service carefully crafted to quickly identify and filter out semantically toxic or offensive content in real time. Utilizing state-of-the-art natural language processing (NLP) and machine learning techniques, the service offers a robust solution to combat online toxicity, promoting a safe and welcoming digital space for users. It works seamlessly across multiple social media platforms and provides continuous monitoring and analytics that leverage advanced NLP models capable of understanding linguistic nuances, context and user intent. Thanks to its ability to distinguish harmless conversations from malicious content, the system effectively flags, warns or removes offensive messages and images, thereby stopping the spread of malicious content and minimizing its emotional impact on users. In the ongoing fight against online hate and toxic behavior, this AI-based moderation service is a beacon of promise, constantly improving the user experience, promoting inclusivity and protecting against harm. This introduction sets the stage to delve into the architecture, training methodologies, and ethical considerations underlying this transformative solution, offering valuable insights into its implementation and potential societal impact. As social media platforms strive to cultivate safer and more inclusive digital communities, the adoption of this AI moderation service represents a key step towards achieving this goal.

2. LITERATURE REVIEW

[1] Heng Sun & Wan Ni (2022): This article proposed an AI-based TCM system, which was developed on an AI cloud service platform, and the system could automatically and intelligently analyze and detect the text content input by users from the web-end and app-end by calling built-in algorithm models on the cloud-end. The model developed in this paper can dynamically balance workload according to use cases, hence making the system more efficient.

[2] Parikshit S (2023): This research paper, they presented a comprehensive study on the advancements in OCR through the development and application of a novel deep learning algorithm for enhanced text recognition. Their algorithm harnesses the power of Convolution Neural Networks (CNNs) to achieve significant improvements in OCR accuracy, thereby overcoming several limitations of traditional OCR methods.

[3] Jiang A Q et al (2023): This paper presents the pre-trained model we are using in our application, Mistral 7B demonstrates that language models may compress knowledge more than what was previously thought. This opens up interesting perspectives: the field has so far put

Resume Ranker and Parser with LinkedIn Data Extraction: Revolutionizing Recruitment Using AI

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Abstract

The system presented aims to streamline recruitment and automatically shortlist candidates using advanced AI and web scraping systems. By integrating resume parsing with LinkedIn data extraction, the platform processes resumes in PDF or DOCX formats to extract critical information like skills, qualifications, and experience. Additionally, it analyzes LinkedIn profiles for professional activities, endorsements, and networks. Leveraging GPT-4 technology, the system conducts contextual ranking of candidates against job descriptions, surpassing basic keyword matching. The platform supports batch uploads, ensures ethical web scraping, and complies with privacy laws. Future enhancements include integrating new professional networks, soft skill assessments, and real-time feedback for improved candidate engagement.

Keywords: LinkedIn data extraction, GPT-4, Contextual ranking, Semantic matching, Ethical web scraping, AI in hiring.

1 Introduction

Recruitment processes in modern organizations face significant challenges due to the ever-increasing volume of applications for job openings. Traditional methods of manual sorting and keyword-based screening often prove insufficient in identifying the most suitable candidates, leading to inefficiencies and missed opportunities. The Resume Ranker and Parser with LinkedIn Data Extraction system is designed to overcome these challenges by leveraging advanced AI, natural language processing, and web scraping technologies.

This system automates resume parsing, extracting critical details such as skills, qualifications, and work experience from resumes in formats like PDF and DOCX. It enhances this data by incorporating insights from LinkedIn profiles, such as professional activities, endorsements, and networks, providing recruiters with a holistic view of each candidate. By employing GPT-4 technology, the system goes beyond basic keyword matching to offer contextual and semantic analysis, ranking candidates based on how well their profiles align with job descriptions. This ensures a more accurate and nuanced assessment of candidate suitability.

The platform supports scalability, allowing batch uploads of resumes and processing large datasets efficiently. Ethical web scraping and strict adherence to privacy regulations ensure that data handling remains secure and compliant. Future enhancements, such as AI-driven soft skills assessments and real-time feedback for candidates, aim to create a seamless, engaging, and transformative recruitment experience, ultimately helping organizations hire with greater precision and confidence.

CNN-BASED MODEL FOR OSTEOPOROSIS DETECTION USING MEDICAL IMAGING

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Abstract

In this project, we are going to create a process for detection of osteoporosis where CNNs are trained using medical images such as X-rays. Osteoporosis lowers bone density and increases the chance of fracture, but early diagnosis leads to better treatment outcomes. Osteoporosis screening requires image marked and labeled appropriately and model is designed for that purpose. Data Debt Hypothesis, Transfer learning A new type of model, CNN 2D that exploits one of the pre-trained architectures has been established to perform critical part in this process, i.e. to differentiate between healthy and osteoporotic bone structures.

Performance of the model is decent even on less training data. During training, different variants of cross-validation were employed in order to guarantee the accuracy and dependability of the results, while also dealing with edge cases. How it works: Attention mechanisms are integrated with our network to highlight critical aspects of bone anatomy, leading to better diagnostic accuracy. Making it less oily and invasive to be effective and impactful for osteoporosis diagnosis.

Keywords: Convolutional Neural Networks(CNN), Osteoporosis detection, Medical Imaging, X-ray Classification, Bone structure analysis, Healthcare AI, Medical image processing.

1 Introduction

Osteoporosis is a common, age-related skeletal disease that results from progressive loss of bone mass, leading to the weakening of bone structures and increased fracture risk. Early detection is fundamental due to the timely treatment, which in possible cases can avert further fractures. Osteoporosis is technically definable using X-ray imaging but is rarely used as it is not practical for mass testing, given its high price tag, time to perform and limited access to imaging machinery.These challenges emphasize the need for a radiation-free, more widely available diagnostic tool.

This is where Deep Learning, a (particularly successful) branch of Artificial Intelligence (AI) comes to rescue. As an example, convolutional neural networks (CNNs), a strong kind of deep learning, can compute and interpret intricate medical image data. This feature is why CNNs excel in diagnosing diseases as they comprehend the pixel features of images.

In this paper, we employ CNNs to create a robust biomedical expert system aimed at automated osteoporosis diagnosis. It is developed to read X-ray images, detect specific bone-contain regions and classify these sectors into health categories including “healthy” or “osteoporotic.” However, extensive training on labeled medical images allow the model to distinguish these classes accurately.

DERMAPAWS: A DEEP LEARNING SYSTEM FOR CLASSIFICATION AND DETECTION OF CANINE SKIN DISEASES FROM DERMATOLOGICAL IMAGES

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Abstract: *This paper presents a web-based application designed for the classification of skin diseases in animals, with a focus on dogs. The system utilizes deep learning techniques to analyze images and identify various skin conditions. Initially, the MobileNetV2 model is employed to determine whether the uploaded image is a microscopic image. Once identified, the system applies a specialized skin disease classifier, trained specifically to detect skin conditions in dogs. The classifier is capable of distinguishing between healthy skin, fungal infections, and bacterial infections. The system processes the uploaded images through a subtraction technique to assess their suitability for microscopic classification. Subsequently, a pathogen-specific model is used to determine the type of skin disease, if present. The primary goal of this tool is to assist pet owners and veterinarians by providing an efficient means of early detection for skin diseases, enabling prompt intervention and improved care for animals. This approach aims to contribute to faster diagnosis and better treatment outcomes for skin-related conditions in pets.*

Keywords: *Skin disease classification, deep learning, MobileNetV2, dog skin conditions, fungal infections, bacterial infections, early detection, animal health.*

1. Introduction

Dog skin infections brought on by bacterial and fungal pathogens are a frequent issue that need prompt and precise diagnosis. Conventional diagnostic techniques, such laboratory testing and manual inspections, can be expensive, time-consuming, and unavailable in remote locations. The goal of this project is to create a web application that uses deep learning to automatically classify dog skin diseases.

The application employs a two-step process: first, it determines whether the uploaded image is a microscopic image by using a pre-trained MobileNetV2 model. After validation, the system uses a specially trained classifier to classify the skin condition as either healthy skin, fungal infection, or bacterial infection. Through an easy-to-use interface, users can upload photographs to the web application. The system verifies that the uploaded image is suitable for microscopic classification before executing the infection prediction model. The results are shown right away, informing users if the photograph is invalid or offering feedback on the condition that was detected.

The project, which was developed with Flask for the web interface and TensorFlow/Keras for the machine learning models, provides a quick and effective tool for first diagnosis. By cutting down on time and expense, and facilitating early intervention in the treatment of skin infections, it seeks to support pet owners.

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Real-Time Stock Market Prediction Using Deep Learning

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Abstract: -There is no one approach that appears to anticipate stock price both precisely and long-term at the same time, despite years of research on the subject by academics and financial experts. This is brought on by the unpredictable pattern of stock movement and numerous factors that affect market performance. The real-time stock market prediction uses real-time market data to forecast stock price movements and provide buy/sell signals to investors, lowering risk of loss while boosting profit. To anticipate the stock price, the proposed paper employs an ensemble of approaches, including the Rainbow Deep Q Network, Long Short-Term Memory (LSTM), Gated Recurrent Unit (GRU), and Moving Average Convergence Divergence (MACD).

Index Terms **-** Real-time stock, LSTM, GRU, MACD.

I. INTRODUCTION

The stock market can be described as unpredictable, non-linear, and dynamic. It is difficult to predict stock values since they depend on several variables, such as the state of the world's politics, the performance of the company's finances, and more. By examining the pattern over the last few years, strategies to estimate stock values in advance could therefore prove to be very helpful for making stock market movements, maximizing profit and minimizing losses. For estimating an organization's stock price, there have historically been two basic approaches put forth. The closing and opening prices of stocks, volume traded, adjacent close values, and other historical stock price data are all used by technical analysis methods to forecast future stock prices.

The second sort of analysis is qualitative, and it is carried out based on outside variables such as the firm profile, the market environment, political and economic issues, textual data in the form of financial news stories, social media, and even blogs written by economic analysts. Modern predictive methods involve sophisticated intelligence procedures based on technical or fundamental analyses. An effective model that can find the hidden patterns and intricate relationships in this vast data collection is required to handle this diversity of data. Compared to previous methodologies, machine learning techniques in this field have been shown to increase efficiencyby 60–86%.

However, with the aid of the ensemble, AI has enabled us to analyze both technical and fundamental data. For the purpose of predicting stock prices, a number of machine learning and deep learning algorithms have been separately implemented. They only appear to function effectively for a brief period of time, and the crucial aspect of generalization—the ability to function well on previously unknown data—is lost. A martingale impact on the stock price is to blame for this. This has made these methods ideal for achieving quick results. Better models with state of the-art performance are the product of recent advancements and concepts in the field of artificial intelligence, and they have the potential to provide outcomes that have never been seen before.

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Deep Learning Based White Blood Cancer Detection In Bone Marrow Using Histopathological Images

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ABSTRACT: This work has employed a deep learning strategy to automatically detect and classify white blood cell (WBC) cancers, including leukemia, using histopathology images. This technique analyses histopathological images and uses convolutional neural networks (CNNs) to accurately detect distinct WBC cancer subtypes. When compared to pathologists who manually read cases, our method provides answers more quickly and accurately. Tested extensively on multiple datasets, our method consistently outperforms existing methods in terms of sensitivity, specificity, and overall accuracy. The study has also been made to improve the effectiveness of transfer learning techniques, which allow our model to adapt and perform well on different datasets. Because of its versatility, it can be applied in real-world clinical settings, which has the potential to revolutionize personalized medicine approaches to WBC cancer diagnosis and treatment. Additionally, our method employs explainable AI techniques to give doctors greater assurance and understanding by revealing the model's decision-making process. More informed treatment decisions by healthcare professionals lead to better outcomes for patients with WBC malignancies. By combining advanced deep learning methods with interpretable models, our research provides a significant step toward integrating AI-driven treatments into standard clinical practice. This has the potential to significantly improve patient care and outcomes in the field of oncology.

KEYWORDS: White Blood Cancer Detection, Artificial intelligence, Deep learning, Histopathological Images, Convolutional Neural Networks (CNNs), Benign, Malignant, Rank-Based Ensemble, Inceptionv3, Xception, MobileNet

I.INTRODUCTION

White blood cell (WBC) malignancies, which include lymphoma and leukemia, are a hard field in oncology because of their wide variety of subtypes, inconsistent clinical presentation, and difficult diagnostic procedures. Initiating suitable treatment options and improving patient outcomes depend on the quick and correct detection of these cancers. A crucial component of diagnosing WBC cancer continues to be the histopathological analysis of blood smears, which provides invaluable information about the distribution and morphology of cells. However, the labor-intensive, subjective, and subject to observer variability manual interpretation of histological pictures by skilled pathologists may result in inconsistent diagnoses and delays in therapy.

The field of medical image analysis has undergone a significant transformation with the introduction of deep learning techniques, specifically convolutional neural networks (CNNs), which have automated feature extraction and classification tasks. These AI-driven methods have great potential to improve the precision, effectiveness, and repeatability of cancer diagnosis, particularly malignancies of the white blood cells. Deep learning algorithms may detect fine patterns and subtle differences indicative of many cancer subtypes by utilizing large-scale annotated histopathology datasets, outperforming conventional diagnostic methods in this regard.

Our main goal in this work is to create a deep learning system that is broad enough to automatically identify and classify WBC tumors from histopathology pictures. By using CNNs, the study aims to lessen the difficulties involved in manual interpretation and provide a reliable and scalable method for diagnosing WBC cancer. Our approach employs methodical

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INSECT PEST IMAGE RECOGNITION AND MATURITY STAGES CLASSIFICATION USING FEW-SHOT MACHINE LEARNING APPROACH

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Abstract: The agricultural industry, pivotal for global food security and sustainability, grapples with a persistent challenge posed by insect pests wreaking havoc on crops. Identifying these pests and discerning their maturity stages are crucial for effective pest management and safeguarding crop yields. Traditional manual identification methods prove imprecise, time-consuming, and often inefficient, even for seasoned agronomists, due to visual similarities among insect species, especially at identical maturity stages. Notably, deep learning emerges as a prominent approach, albeit demanding extensive labeled datasets for effective training, a resource that remains scarce, demanding, and insufficient in addressing the wide-ranging variability within insect classes. Additionally, integrating pesticide recommendation systems could enhance pest management strategies, aiding in the selection of appropriate treatments for specific pests and crop types. This research proposes a solution to this problem using a few-shot learning approach as a solution to this predicament, delving into insect classification for pest management. A few-shot prototypical network is proposed based on a comparison with other state-of-art models and divergence analysis. Experiments were conducted separating the adult classes and the early stages into different groups, and at last recommending suitable pesticides that will help in th yeilding of good crops.

Keywords: Few-shot learning; Insect pest classification; Insect maturity stages; Convulution Neural Network; Prototypical Networks.

I. INTRODUCTION

Insect pest image recognition and maturity stage classification using machine learning and few-shot learning approaches represent a significant role in agricultural science and pest management. Insects play important roles within ecosystems, however, some species may turn into pests that destroy crops posing a threat to food security. Identifying causes by insects at an early stage as well as accurately determining the pests development periods is necessary for prompt actions towards control, repair of crop failures, and better farm practices. Machine learning has transformed the way pest management is done by making it possible to automatically and quickly identify insect pests from images. By employing deep learning algorithms, one can create strong models that are capable of accurately identifying various types of insects as well as their attributes. Such models trained on features such as body shape, color, size, and texture to differentiate between different kinds of pests while correctly classifying them according to maturity levels.

The lack of labeled training data is one reason that it is difficult to develop efficient insect pest identification and maturity stage classification models. Here is where the few-shot learning techniques come in picture. Few-shot learning refers to a division of machine learning which specializes itself on the exercising of models having limited labeled instances. This approach is especially useful for insect pests recognition, as collecting large data of labeled data for every species of pests and their stages can be problematic and time-consuming.

In summary, this application provides a good way to address agricultural pests' problems. These technologies enable farmers and other stakeholders in agriculture with useful means of early pest detection that eventually leads to sustainable and resilient food production systems.

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MALE FERTILITY DETECTION USING DETECTRON2 & CSR-DCF

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Abstract: This paper introduces an optimized approach for detecting and tracking sperm in phase-contrast microscopy image sequences, with the aim of improving fertility analysis and sperm behavior studies. The proposed method integrates advanced object detection techniques with a modified multi- object tracking algorithm to achieve superior accuracy and robustness. Through comprehensive experimentation, our approach demonstrates exceptional performance in challenging scenarios such as high-density sperm samples, occlusions, and collisions, achieving an F1 score of 96.61% in tracking accuracy. This optimized algorithm holds significant promise for advancing research in reproductive health.

I. INTRODUCTION

Accurate sperm tracking is essential for effective fertility analysis and reproductive health studies. Conventional single-sperm tracking methods often fail in scenarios involving sperm collisions or overlaps, necessitating the development of more advanced multi-object tracking algorithms. In this context, we propose an optimized multi- object sperm tracking algorithm that combines cutting-edge object detection frameworks with innovative tracking techniques. By seamlessly integrating detection and tracking phases, our approach ensures high precision and reliability in analyzing sperm behavior and fertility potential.

II. FEATURES

Enhanced Object Detection with Detectron2 Our method leverages Detectron2, a deep fully convolutional neural network, for accurate sperm detection in phase-contrast microscopy images. By considering a concatenated sequence of frames, our detection model captures vital motility attributes essential for fertility analysis, thereby enhancing overall detection performance.

Refined CSR-DCF Tracker with Novel Functionalities: The core of our tracking algorithm is based on the CSR-DCF tracker, originally designed for single-object tracking. We extend this framework to handle multiple sperm tracking by incorporating novel functionalities such as the "missing tracks joiner." This innovative feature addresses challenges posed by false positives and false negatives in tracking results, ensuring superior tracking accuracy.

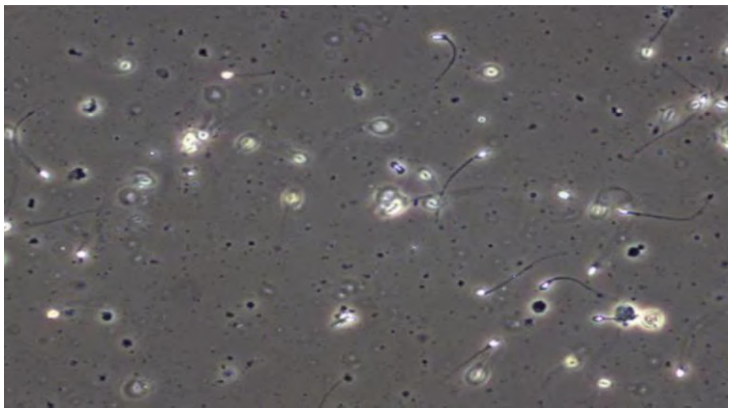

Fig-1: microscopic video frame

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Lip Reading Using Machine Learning and Neural Networks

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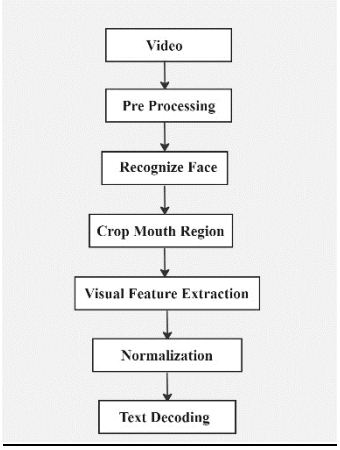
Abstract: Lip reading, often overlooked in communication, involves visually interpreting lip movements to understand spoken words. This process entails recognizing lip positions and movements, organizing them into sound sequences, and decoding sentences. Machine learning can play a crucial role by training models on labeled datasets of lip movements and corresponding phonemes. These models can then extract features from new lip movements to classify spoken phonemes. Such technology can assist individuals with hearing impairments by improving speech recognition in noisy environments and aid security forces in situations lacking audio records. By integrating innovative technologies seamlessly, our solution aims to empower people with hearing loss to engage more fully in society and bolster security measures.

Key Words: Lip Reading, Machine Learning, Convolutional Neural Network (CNN)

1. INTRODUCTION

Lip reading is a skill that allows people to understand speech by observing the movements of the speaker's lips. It is a useful skill for people with hearing loss, as well as for people who need to communicate in noisy environments or with people who speak different languages. This project aims to develop a lip-reading system using machine learning which is designed to be helpful when say there is a situation where we need to extract conversations from recorded footages but audio data is not available or reliable, or a noisy environment, where audio/speech detection becomes unreliable and erroneous, also it will help to improve the quality of life of those people with hearing and speech impairments. The system will be trained on a dataset of lip movements labeled with the corresponding words and phrases. Once trained, the system will be able to recognize words and phrases from new lip movements. The system will be developed using a deep learning model. Deep learning models are a type of machine learning model that are particularly well-suited for tasks such as image recognition and speech recognition. In this context deep learning, image processing is used in lip reading systems because they are particularly well-suited for tasks such as feature extraction and pattern recognition.

2. METHODOLOGY



Preprocessing: Initially, the video undergoes preprocessing by dividing it into frames. These frames, initially in RGB format, are converted to grayscale to streamline processing and reduce parameter overhead. The resulting frames are then subjected to further analysis.

Face Detection and Cropping: Following frame extraction, the system employs a face detection mechanism, specifically targeting full frontal views using DLib's face detector and landmark predictor with 68 landmarks. Frames lacking a detected face are discarded. Subsequently, the system identifies the Region of Interest (ROI), focusing on the lips and mouth area using a Haar cascade classifier. This region is cropped using an affine transformation, resulting in mouth-centered crops of 100*50 pixels. RGB channels are standardized to zero mean and unit variance before saving the cropped images as a NumPy array.

Feature Extraction and Normalization: Features are extracted from the ROI, emphasizing spatio-temporal characteristics, which are then fed into a Convolutional Neural Network (CNN) for training. Normalization is

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Lumpy Skin Disease Detection

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Abstract: The Lumpy Skin Disease is one of the major factors. Lumpy Skin Disease is known as a major risk to cattle production and substantial impacts on livelihoods and food security especially for our country. Currently, detection of Lumpy Skin Disease in our country is assessed manually. However manual evaluation takes significant amount of time and requires trained professional and experienced person. Therefore, technology is needed to prevent animal disease epidemics. Automated detection of Animal Lumpy Skin Disease has advantages over the manual technique. Detection of Lumpy Skin Disease in Cows is developed in literature. But Animal Lumpy skin disease has different classification based on its severity. There is a need to further identify the different stages of Lumpy skin disease to know to what extent the animal is affected by lumpy skin disease.

Keywords: Lumpy Skin Disease (LSD), Machine Learning (ML), Prediction, Feature Selection, Datasets, Algorithms Evaluation Metrics, Support Vector Machines (SVM), Random Forests, Neural Networks, Accuracy Improvement, Clinical Practice, Patient Outcomes, Healthcare Management, Early Identification.

I. INTRODUCTION

Lumpy skin disease (LSD) is a highly contagious viral infection that affects cattle, causing significant economic losses in the livestock industry worldwide. The disease is characterized by the development of nodular lesions on the skin, leading to reduced milk production, weight loss, and decreased fertility. Early detection and management of LSD are crucial to prevent its spread and minimize its impact on cattle populations. In recent years, advancements in machine learning algorithms have shown promise in accurately identifying and diagnosing lumpy skin disease, offering a potential solution to improve disease surveillance and control. Machine learning techniques, particularly those based on computer vision and image processing, have emerged as valuable tools for automating the detection of LSD lesions in cattle. These algorithms can analyze digital images of cattle skin and identify characteristic features associated with the disease, such as the size, shape, and texture of the nodules. By training machine learning models on large datasets of labelled images, researchers can develop robust algorithms capable of distinguishing between healthy and diseased cattle with high accuracy.

One approach to lumpy skin detection involves the use of convolutional neural networks (CNNs), a type of deep learning algorithm specifically designed for image analysis tasks. CNNs can automatically learn hierarchical representations of image features, enabling them to effectively identify complex patterns associated with LSD lesions. By feeding CNNs with annotated images of cattle skin, the model can learn to recognize the distinctive visual characteristics of lumpy skin disease, allowing for accurate and efficient detection.

Another promising machine learning technique for lumpy skin detection is the use of support vector machines (SVMs) and other supervised learning algorithms. SVMs excel at binary classification tasks by finding the optimal hyperplane that separates data points belonging to different classes. By extracting relevant features from images of cattle skin, such as colour histograms or texture descriptors, SVMs can learn to classify regions of interest as either healthy or affected by lumpy skin disease. Through iterative training and refinement, SVM-based models can achieve high levels of sensitivity and specificity in detecting LSD lesions.

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DISEASED BETEL NUT DETECTION USING IMAGE PROCESSING

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Abstract: Arecanut, commonly known as betel nut, is a significant tropical crop, with India being the second-largest producer and consumer worldwide. Throughout its lifecycle, it faces various diseases, affecting its roots, leaves, and fruits. Currently, disease detection relies solely on visual observation, requiring farmers to meticulously inspect each crop periodically. This project proposes a system utilizing Convolutional Neural Networks (CNNs) to detect diseases in arecanut leaves and trunk, offering corresponding remedies. CNNs are Deep Learning algorithms designed to analyze images by assigning learnable weights and biases to different features, thereby distinguishing between them. To train and validate the CNN model, a dataset comprising healthy and diseased arecanut samples was curated. The dataset was split into training and testing sets in an 80:20 ratio. For model compilation, categorical cross-entropy was employed as the loss function, with adam serving as the optimizer function and accuracy as the metric. Training the model over 50 epochs yielded high validation and test accuracies with minimal loss. The proposed approach demonstrated effectiveness, achieving a remarkable 98% accuracy in identifying arecanut diseases.

Keywords: Arecanut, betel nut, disease detection, Convolutional Neural Networks (CNN), deep learning, image classification, dataset creation, training, validation, optimization, accuracy, remedies, agricultural technology.

I. INTRODUCTION

In countries like India, where agriculture serves as the backbone of the economy, there's a pressing need for efficient disease detection in crops. The current reliance on manual observation methods proves to be laborious, time-consuming, and prone to errors. Therefore, the development of an automated disease detection system is imperative to address these challenges effectively. Such a system would harness advanced technologies like machine learning and image processing to streamline the detection process. By promptly identifying diseases, especially in their early stages, farmers can take necessary actions to minimize their impact and prevent further spread. Moreover, the adoption of this system would enhance productivity by enabling farmers to survey larger areas more efficiently. The cost-effectiveness of this solution lies in its potential to reduce labor costs and mitigate crop losses. With the accessibility of technology such as smartphones and drones, the implementation of this system could be democratized, benefiting farmers across diverse regions, including remote areas. Ultimately, the integration of an automated disease detection system holds significant promise for transforming agriculture in India and promoting its sustainable development.

II. LITERATURE SURVEY

[1] "Classification of Diseased Areca nut based on Texture Features," proposed by Suresha M et al., introduces a technique for segmenting and classifying raw arecanut using color-based classification methods after segmentation and masking.

[2] "Areca Nut Disease Detection using Image Processing Technology," proposed by Dhanuja K C et al., proposes a system for disease detection in arecanut utilizing texture-based grading and the K-Nearest Neighbor (KNN) algorithm.

AI Powered Virtual Try-On

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Abstract: Revolutionary tools that improve customer experiences, and streamline operations are now needed because the fashion industry is rapidly transforming digitally. Using a variety of advanced AI technologies such as Stable Diffusion and GANs, our project creates many virtual human models that overlay multiple clothing items, providing a highly realistic and personalized experience for users to try on outfits. This solution helps many fashion retailers cut costs, and save time, while it offers consumers an engaging, and fun shopping experience. Lifelike avatars were generated, a strong image processing pipeline was built and several high-quality final outputs were produced. The visualization of clothing on virtual models can be enabled by this system, and online fashion retail may be revolutionized by it. It provides a flexible, customer-concentrated method that connects technology, and fashion, creating many dynamic and efficient virtual shopping options.

Keywords: AI-powered virtual try-on, fashion industry, Stable Diffusion, GANs, virtual models, clothing overlay, e-commerce, personalized shopping, digital marketing, customer engagement.

I. Introduction

The fashion industry is experiencing a major digital change, fueled by new consumer demands and many technical improvements. Often, the growing demand for personalized and immersive shopping experiences is not met by customary methods of presenting apparel, which frequently fall short in this regard. Artificial intelligence powers many virtual try-on systems and they revolutionize how many customers engage with fashion brands, and products.our project, combines cutting-edge technologies like Stable Diffusion, and Generative Adversarial Networks (GANs), creating virtual human models and simulating clothing try-ons that achieve outstanding realism. This system removes the need for physical trials. It improves convenience for consumers. It also brings major advantages to fashion retailers. These include low running costs, and quick time-to-market. Additionally it enables better digital marketing strategies.Our virtual try-on system is designed, developed, and implemented in this paper. We examine important processes like creating virtual models, building image pipelines and applying AI algorithms to smoothly add clothing items. AI-driven solutions can revolutionize

RESUMATCH: INTELLIGENT RESUME GENERATOR

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Abstract: *In an increasingly competitive job market, personalized and professional resumes are critical for effective self-presentation. This paper presents the development of an innovative resume generator website that simplifies resume creation using state-of-the-art technologies. The platform allows users to log in, select from multiple customizable templates, input their information, and generate polished resumes via an API integration with Gemini. The system leverages a robust tech stack, including React for an intuitive frontend, Node.js for backend operations, MongoDB for scalable data storage, and Razorpay for seamless payment integration. By automating the resume creation process, this project demonstrates how artificial intelligence and modern web technologies can enhance user experience, reduce effort, and ensure high-quality output. The proposed solution is evaluated on its functionality, user satisfaction, and scalability, highlighting its potential as a practical tool for students and professionals alike.*

Keywords: *AI-powered resume generator, Google Gemini API, professional resume templates, personalized resume creation, scalable web application, content customization, intelligent resume generation.*

1. Introduction

In the digital era, creating an impactful and professional resume is a critical step in job applications, shaping the first impression for potential employers. Traditional resume creation often requires significant time and effort, along with a deep understanding of formatting and content presentation. To address these challenges, we present a novel web-based resume generator platform that leverages artificial intelligence and modern web technologies to streamline the process.

This platform allows users to log in, select from professionally designed templates, and input their personal and professional details. By integrating Google's Gemini API, the system automates the generation of customized and contextually relevant resume content, reducing the user's cognitive load. The website is built on a robust tech stack comprising React.js for an interactive frontend, Node.js for backend logic, and MongoDB for scalable data storage. Additionally, Razorpay is integrated to facilitate secure and efficient payment processing for premium features.

The proposed solution not only enhances user experience but also ensures high-quality, personalized resumes that align with modern recruitment standards. This paper details the design, implementation, and evaluation of the platform, focusing on its technological foundation, scalability, and potential to revolutionize the resume creation process.

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An AI-Powered Companion for Deaf and Mute Communication

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Abstract: SLR seeks to translate gesture-based communication into text or voice to further elaborate on correspondence between the hard of hearing quiet people and other hearing people. Despite this action having a huge cultural impact, it is nonetheless quite difficult due to its complexity and wide variety of hand signals. Existing SLR methods utilize grouping models in consideration of hand-crafted features to handle communication via gestures developments. Lately, it is attempting to gather robust features that can adapt to the wide range of hand movements. We suggest a specific 3D convolutional neural network (CNN) to handle this problem

I. INTRODUCTION

These days, we do not need much complicated methods to perform tasks as most of them are automated thanks to technology. However, this automated environment does not seem to benefit the disabled much, and the deaf and dumb people have not been developed yet as they find it hard to interact with others. One of the significant reasons for this is because they talk differently than normal people and the technological advancement has not provided special consideration to individuals with disabilities. So that becomes one key reason to choose a project to benefit them. The HGRSLTV program, which translates to "Hand Gesture Recognition of Sign Language for Text and Voice Conversion," allows deaf and dumb people to communicate with one another by observing and tracing the movements of their hands. Hand motion detection is possible through a web camera.

II LITERATURE SURVEY

[1] "Two Way Communicator between Deaf and Dumb People and Normal People" proposed by Ahire, Prashant G. et al. The ability to speak one's mind by reacting to events is one of nature's precious gifts to the human race, but denied some, it widens the gap between privileged and ordinary people. This product allows easy communication through a system mapping ISL movements to speech from real-time video and animated natural language translation of ISL movements.

[2] "Orientation sensing for gesture-based interaction with smart artefacts" by Alois, F., Stefan, R., Clemens, H., and Martin, R Direction detection is an important resource for smart artifacts that are designed to provide embodied interaction based on position, orientation, and relevant features. We classify hand-worn, hand-carried, and hand-graspable objects, supporting research across these categories for artifacts subject to manual control. Our framework applies orienta -tion sensor-based gesture recognition, viewing orientation features as "signals" from a theoretical perspective.

[3] "Automated speech recognition approach to continuous cue symbols generation" by Ibrahim Patel and Dr. Y. Srinivasa Rao The research aims to help the deaf and mute population by translating spoken language into sign language, in this case, converting American Sign Language (ASL) into spoken signals. Using an ASL dictionary for words, fingerspell when a word cannot be found with the words in the model, while for vocal disability, images for prompts from the audio input is generated through HMM that converts the audio input.

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Epileptic Seizure Recognition using Machine Learning

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Abstract: Epilepsy, a severe neurological disorder, is identified by analyzing intricate brain signals generated by interconnected neurons, often monitored through EEG and ECoG. These signals, characterized by complexity, noise, and non-linearity, pose significant challenges for seizure detection. However, recent strides in machine learning have facilitated the development of robust classifiers capable of effectively analyzing EEG and ECoG data. By leveraging these advancements, researchers can accurately detect seizures and extract pertinent patterns, thereby aiding in the diagnosis and management of epilepsy. Machine learning techniques empower clinicians to uncover valuable insights into the condition, ultimately enhancing patient care and treatment strategies.The integration of machine learning with EEG and ECoG analysis holds promise for advancing our understanding of epilepsy and improving patient outcomes.

Keywords: Seizure detection, data preprocessing, training the model, EEG signals, LSTM model, machine learning.

I. INTRODUCTION

Epilepsy is a condition of the brain that is characterized by recurrent seizures, which can occur without any apparent cause. It is the fourth most common neurological disorder globally, affecting people of all ages, races, and ethnic backgrounds. Seizures are caused by surges of abnormal electrical activity in the brain, leading to various manifestations such as confusion, muscle jerks, or unconsciousness. The diagnosis of epilepsy typically occurs after a person experiences two or more unprovoked seizures. Treatment often involves anti-seizure medication to manage and reduce the occurrence of seizures. Understanding epilepsy is crucial as it can impact safety, relationships, work, and various aspects of daily life. The field of epilepsy has seen significant advancements in treatment and research, aiming to improve outcomes and reduce the social stigma associated with the condition.Early diagnosis, appropriate treatment, and ongoing support are essential for individuals living with epilepsy to lead full and healthy lives.Additionally, understanding the distinction between provoked seizures, non epileptic events due to other medical problems, and psychogenic non epileptic seizures is essential in providing proper care and management for individuals experiencing seizures. Epileptic seizure recognition is a critical aspect of managing epilepsy, a neurological disorder characterized by abnormal brain activity leading to seizures. The detection of epileptic seizures plays a vital role in improving the quality of life for individuals affected by epilepsy. Various techniques, such as electroencephalography (EEG), have been employed to evaluate brain activity during seizures, aiding in the automatic detection of seizure.

II. LITERATURE SURVEY

[1] The paper introduces a learning framework using Gated Recurrent Unit (GRU) RNNs for seizure detection, addressing the critical need for automated systems due to the unpredictable nature of seizures. Focusing on a 3-class classification problem, the study collates EEG data into healthy, inter-ictal, and ictal states, employing 51 sub-segments to tackle the challenge of training on long-temporal sequences. This approach enables effective modeling of temporal sequences, enhancing the potential for accurate seizure detection and early warning systems.

[2] The paper provide a neonatal EEG dataset with seizure annotations for early diagnosis. EEG files are de-identified and annotated by three experts using Nicolet Reader software, with seizure onset and duration provided in MATLAB and CSV formats. Code availability for reading EEG files and montages aids accessibility for research.

[3] The paper introduces a review of epileptic seizure detection methods, focusing on EEG and ECoG data and employing statistical features and machine learning classifiers. They emphasize the superior performance of decision forest classifiers compared to others and discuss their effectiveness in seizure localization. This work aids in refining detection techniques and exploring brain lobe localization, providing valuable insights for researchers in the field.

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HEALTHCARE VIRTUAL ASSISTANT

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Abstract: In today's world where healthcare technology is everywhere, creating a Healthcare Chatbot could completely change the way patients are cared for and how things run behind the scenes. Our whole project is about introducing this super smart healthcare chatbot that uses AI, NLP and ML. It is designed to give patients direct access to health information and help whenever they need it. Think of it as a friendly, always-on assistant for patients, allowing them to ask questions, get advice, and manage their health using just text or voice. By simplifying healthcare and removing the middleman, this chatbot makes work easier for everyone. We have taken a deep dive into all the details and details to make sure it is technically, financially, legally and operationally sound for healthcare. And of course, we are all about following the rules, keeping data safe and respecting patients' privacy. Our main goal? To engage patients more, make paperwork less of a headache and provide accurate healthcare information. This chatbot isn't just a great idea, it's a giant leap toward a healthcare system that's easier to navigate and puts patients first.

Keywords: Natural Language Processing, Next.js, RNN

I. INTRODUCTION

In the dynamic realm of healthcare, technology continues to be a driving force, driving advances that improve patient care, accessibility and operational efficiency. Among these innovations, healthcare chatbots have emerged as a transformative solution that uses natural language processing (NLP) and artificial intelligence (AI) capabilities to solve various problems faced by patients and healthcare providers alike.

Our project is squarely focused on harnessing the potential of chatbot technology to revolutionize patient engagement and support. Through careful design, development and implementation, we strive to create a healthcare chatbot that not only streamlines interactions, but also provides users with accurate information and timely assistance. From designing an intuitive interface to integrating sophisticated NLP algorithms, our goals include improving accessibility, providing personalized support and even facilitating emergency assistance through location-based services.

Our project embodies a multifaceted approach, carefully crafted to harness the transformative power of chatbot technology in healthcare. Central to our efforts is the creation of a user-friendly interface that supports seamless interaction between patients and the chatbot. Focusing on the implementation of advanced NLP algorithms, our goal is to enable the chatbot to understand and effectively respond to natural language queries, ensuring accurate and reliable communication. In addition, we prioritize the integration of location-based services to offer users instant access to nearby medical facilities in emergency situations. Through continuous evaluation and feedback mechanisms, we are committed to fine-tuning the performance of our chatbot, ultimately aiming to increase user satisfaction and improve healthcare accessibility and outcomes..

II. LITERATURE SURVEY

Soufyane Ayanouz, Boudhir Anouar Abdelhakim *et al*..,[1] This paper focuses primarily on simulating human conversation via text or voice messages in order to convincingly mimic human-like interaction. Although their use has expanded in various domains, the ability of chatbots to dynamically improve their knowledge base on the fly remains limited. They use artificial intelligence and deep learning methods to understand user input and generate meaningful responses, engaging users with natural language. In healthcare, chatbots serve as valuable assistants to doctors, nurses, patients, and families, helping to organize patient information, manage medications, and resolve minor health issues, thereby reducing the workload of physicians and increasing the overall efficiency of healthcare delivery.

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A Deep Learning Approach to Detect Cancer in Cirrhotic Liver

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Abstract: Hepatocellular Carcinoma (HCC), the primary liver cancer, is a global health concern linked to cirrhosis from hepatitis infections and excessive alcohol consumption. Early detection is vital but often occurs at advanced stages, compromising treatment and survival. Traditional diagnostic methods like biopsy and PET scans are invasive and expensive, making them unsuitable for cirrhotic patients. We propose an AI-powered diagnostic system integrating MRI images and blood biomarkers for a non-invasive, efficient, and potentially more accurate alternative. To develop a solution to detect cancer in cirrhotic liver using Random Forest and Convolutional Neural Network (CNN), our objectives encompass creating a multi-modal data integration framework with greater accuracy, ensuring user-friendliness, and reducing the burden on healthcare professionals. This feasibility study underscores the technical readiness for this project and highlights the pressing need for a reliable diagnostic system. By utilizing diverse datasets, integrating deep learning and traditional algorithms, and employing score ensembles, we aim to provide a unified platform for cirrhotic liver cancer diagnosis, leading to improved accuracy, early detection, efficient clinical workflow, and the potential for valuable research insights.

Keywords: Hepatocellular Carcinoma detection, Cirrhosis detection, Multi-modal data integration, Blood biomarkers data analysis, Image based analysis, Random Forest, Convolutional Neural Network.

I. INTRODUCTION

Hepatocellular carcinoma (HCC) is the most common type of primary liver cancer and a major health problem worldwide. The main risk factor for HCC is cirrhosis, which is a scarring of the liver caused by chronic hepatitis B or C infection, excessive alcohol consumption, or non-alcoholic fatty liver disease (NAFLD). Early detection and treatment of HCC are essential for improving survival. However, HCC is often diagnosed at an advanced stage, when it is more difficult to treat.

This is because HCC typically develops in patients with cirrhosis, which can mask the early signs and symptoms of cancer. Traditional methods of HCC diagnosis include liver biopsy and positron emission tomography (PET) scans. However, these methods are invasive, time-consuming, and expensive. Additionally, liver biopsy can be risky for patients with cirrhosis. Artificial intelligence (AI) has the potential to improve the accuracy and efficiency of HCC diagnosis.

We propose a deep learning-based diagnostic system that has the potential to improve the early detection and diagnosis of HCC in cirrhotic livers by integrating MRI images of cirrhotic liver and relevant blood sample biomarkers such as albumin, bilirubin, phosphate, and aminotransferase, etc. The system is also non-invasive, efficient, and potentially more accurate than traditional methods of HCC diagnosis.

II. LITERATURE SURVEY

[1] The paper introduces deep learning methods, such as the Hybridized Fully Convolutional Neural Network (HFCNN), have been proposed for liver tumor segmentation and lesion identification. These methods have shown high accuracy in extracting features of medical images and segmenting liver tumors. However, in this case, they concentrated on detecting cancer in the normal liver.

SecQRMark:Fake Product Detection using Blockchain

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Abstract - In response to the global challenge of counterfeit products, this paper presents an advanced anti-counterfeit system leveraging blockchain technology. The system utilizes Ethereum, Solidity, and Ganache to establish an immutable and transparent ledger, enabling real-time tracking of products from manufacturer to consumer. Manufacturers register their products on the blockchain, generating unique QR codes with Copy Sensitive digital images for secure identification. Consumers employ an Android application to scan these QR codes, decrypting the encrypted text to access vital information about product authenticity. This system not only empowers consumers with instantaneous verification but also provides businesses with a robust defense mechanism against counterfeit threats, safeguarding their reputation and revenue. The integration of innovative technologies revolutionizes the authentication process, instilling trust in consumers and bolstering brand integrity. Our solution stands as a pioneering force in the battle against counterfeit production, offering a scalable and efficient method for detecting fake products using blockchain technology.

***Key Words*:** Block chain, smart contracts, QR(Quick Response) code, anti- counterfeit.

1.INTRODUCTION

Blockchain technology, with its decentralized and immutable ledger system, stands at the forefront of combating counterfeit products. By leveraging blockchain, stakeholders across supply chains can establish a transparent and secure framework for verifying product authenticity and tracing its journey from production to consumption. Smart contracts, embedded within the blockchain, automate various aspects of the supply chain, ensuring compliance with agreed-upon standards and protocols. Additionally, QR (Quick Response) codes play a pivotal role in the anti-counterfeit efforts by serving as unique identifiers linked to product information stored on the blockchain. Consumers can easily scan QR codes to access real-time authentication data, empowering them to make informed purchasing decisions and thwart counterfeit attempts effectively.

Through the integration of blockchain technology, smart contracts, and QR codes, anti-counterfeit efforts are bolstered with enhanced transparency and accountability. Blockchain's immutable ledger ensures the integrity of transaction records, while smart contracts automate supply chain processes, reducing the risk of counterfeit infiltration. QR codes serve as gateways to real-time authentication data stored securely on the blockchain, enabling consumers to verify product authenticity with ease. This multifaceted approach not only strengthens consumer confidence but also fosters trust and integrity across supply chains, ultimately mitigating the pervasive threat of counterfeit products in the global marketplace

2.Literature Review

In recent years, the proliferation of counterfeit products has significantly impacted various industries, posing challenges to sales and profitability. To address this issue, blockchain technology has emerged as a promising solution, offering enhanced security and transparency throughout the supply chain [1]. By leveraging blockchain, consumers can independently verify the authenticity of purchased products without relying on third-party intermediaries. In a notable study, a blockchain-based management system was proposed for detecting counterfeit products using barcode readers [2]. This system stores product details and unique codes as blocks in the blockchain database, allowing customers to verify product authenticity by comparing the provided code with entries in the database. Additionally, advancements in blockchain and supply chain technologies have led to innovative approaches for combating counterfeiting [3]. For instance, the integration of one-time password (OTP) authentication enhances security measures, while quality control officers monitor product standards to ensure

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Using ML Models and IOT to Secure Smart Vehicles from Relay Attacks

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Abstract: This introduces an innovative approach to enhancing the security of smart vehicles by combining Machine Learning (ML) and the Internet of Things (IoT). The system utilizes IoT sensors to collect real-time data from the vehicle's environment and keyless entry system, which is then analyzed using ML algorithms to detect anomalies and potential relay attacks. To strengthen security, the system incorporates multi-factor authentication with biometric recognition such as fingerprint and facial recognition. Continuous learning and adaptation mechanisms ensure the system remains resilient to evolving threats, offering a robust defense against cyberattacks in smart vehicle environments. Through experimentation and validation, the system demonstrates its efficacy in accurately identifying and mitigating security threats, making it suitable for integration into existing automotive security frameworks.

Keywords: Keywords for securing smart vehicles from Relay attacks include IoT sensors, machine learning models, real-time monitoring, response mechanisms, Relay attacks, smart vehicles, security, detection, adaptability, resilience, continuous improvement, cyber threats, transportation, and digital age.

I. INTRODUCTION

The advancement of smart transportation has significantly increased efficiency through the integration of smart technology, computer systems, networks, and global communication enhancements. However, this progress has also brought about a higher risk of cyberattacks targeting modern vehicles. Cybercriminals now require specialized tools, skills, resources, and financial backing to carry out sophisticated attacks, often operating clandestinely and honing their abilities in secret. Smart cars are particularly vulnerable due to potential weaknesses in their hardware, software, and data infrastructure. To mitigate this risk, our study focuses on leveraging smart computer programs to detect cyberattacks, with a specific emphasis on relay attacks that can cause substantial harm. By combining IoT, cybersecurity, and AI principles, our detection system learns from extensive datasets comprising various attack scenarios and distances, effectively identifying threats such as the Man in the Middle (MITM) and replay attacks. The culmination of these efforts will result in a hardware model that showcases our project's capabilities in enhancing the safety and security of smart cars, thus contributing to a more resilient and protected transportation ecosystem.

II. LITERATURE SURVEY

[1] A Deep Learning-Based Cyberattack Detection System for Transmission Protective Relays. Khaw, YM, Jahromi, AA, Arani, MFM et al, A Deep Learning-Based Cyberattack Detection System for Transmission Protective Relays, IEEE Transactions on Smart 2020 This paper presented a deep-learning-based cyberattack detection system for transmission line protective relays and different possible attack scenarios. This paper used a Novel Deep learningbased cyberattack detection system that includes an autoencoder method.

[2] Securing smart vehicles from relay attacks using machine learning. Usman Ahmad, Hong Song, Awais Bilal1, Mamoun Alazab2, Alireza Jolfaei Securing smart vehicles from relay attacks using machine learning: April 2020. This paper proposed a relay attack detection method by making use of a CART algorithm that uses seven security features for profiling normal key fob messages. The proposed algorithm can identify the legitimate drivers using three driving features and an LSTM recurrent neural network and comparison of CART algorithm with SVM and KNN learning algorithms is done.

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Predictive System for Students Stress Health Using Machine Learning

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Abstract: The increasing pressure of academic life significantly affects students mental health, making early detection of stress essential to prevent long-term consequences. Extended exposure to academic pressures can negatively impact students' emotional health and impede their academic development. This research presents a system aimed at recognizing early signs of stress in students prior to any decline in their mental health. Methodology utilizes a mix of machine learning algorithms and analysis of multimodal data. We examine audio recordings through Natural Language Processing (NLP) techniques, concentrating on identifying stressed and not stressed words to assess emotional tone and stress indicators derived from speech. Visual information, obtained through student photographs, is analyzed by a Convolutional Neural Network (CNN) to identify subtle facial expressions linked to stress. Additionally, student responses to structured questionnaires are examined using a Random Forest algorithm to identify behavioral patterns linked to stress. By integrating insights from audio, visual, and questionnaire data, the system enhances accuracy in stress prediction across various academic settings. This tool can help educational institutions track student well-being, facilitating prompt interventions to foster a healthier learning atmosphere.

Keywords: Facial Expression Recognition, Audio Analysis, Natural Language Processing (NLP), Stress Prediction, Image-Based Stress Analysis.

I. INTRODUCTION

In the rapidly evolving academic landscape, student mental health has become a pressing issue. The increasing demands of academic achievement, combined with personal and social difficulties, have resulted in a notable escalation of stress among students. Stress not only interferes with academic performance but also poses a serious threat to their overall health, making it crucial to identify and address it early. In light of this escalating concern, educational institutions are increasingly turning to technology-based solutions to assess and manage student stress. This project centers on creating a non-intrusive, multimodal system for detecting stress in students by analyzing audio recordings, facial images, and behavioral responses from surveys. The system employs sophisticated machine learning techniques, using Natural Language Processing (NLP) for feature extraction and analysis from audio data, Convolutional Neural Networks (CNNs) for interpreting facial expressions from images, and Random Forest algorithms to evaluate responses from surveys. The uniqueness of this method lies in its capacity to gauge stress levels through various data sources without encroaching on students' personal space. By combining audio, visual, and behavioral data, the system delivers a thorough evaluation of stress, providing more precise predictions than single-modality systems. This research highlights the necessity of addressing student stress as a worldwide issue, due to its direct effect on academic success and mental health. By leveraging advanced machine learning methods for real-time stress monitoring, this study seeks to contribute to ongoing initiatives aimed at enhancing mental well-being in educational environments. The solution presented in this research emphasizes the potential of technology to tackle critical challenges such as student stress, ultimately promoting a healthier and more nurturing educational atmosphere.

II. LITERATURE SURVEY

[1] The paper emphasizes the role of wearable sensors in continuous stress monitoring through real-time physiological data collection. It categorizes stress detection methods based on environments like academic settings and techniques involving Electrocardiogram (ECG), and Photoplethysmography (PPG). Key machine learning models such as Random Forest and Support Vector Machine are highlighted for their accuracy in in stress prediction.

AI-BASED RESEARCH PAPER SUMMARIZATION AND TRANSLATION APPLICATION

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Abstract: The number of academic publications has increased drastically; thus, the need to have concise and accurate summaries of research papers has gone up. This project, therefore, presents the development of an automated research paper summarization tool that harnesses advanced natural language processing techniques. The system would enable users to upload any research paper in PDF or DOCX formats and also generate abstractive summaries based on their needs. Utilizing two fine-tuned BART models, trained on PubMed and arXiv datasets, the tool ensures domain-specific accuracy and relevance. A user-friendly web application, built with Django, integrates seamless PDF handling and supports multilingual summaries through Google Translate. This project has demonstrated the efficiency of fine-tuned models to produce high-quality summaries with some challenges related to the size of the dataset, efficiency of training, and computational constraints. The proposed tool demonstrates its utility for researchers and students, ensuring efficiency and accessibility in the workflow for such workflows.

Keywords: Automated research paper summarization, BART fine-tuning, abstractive summary, PubMed and arXiv datasets, multilingual summaries, Django web application, PDF and DOCX handling, academic workflows.

1. Introduction

Managing the sheer volume of literature in the modern academic and research landscape is one of the most significant challenges facing researchers, students, and professionals. Summarizing research papers manually is both time-consuming and prone to inconsistencies, thus requiring automation to achieve efficient comprehension and utilization of scientific knowledge.

This project introduces an advanced research paper summarization system that utilizes fine-tuned BART models for abstractive summarization. The system is optimized with datasets such as PubMed and arXiv to generate concise yet comprehensive summaries for academic and research contexts.

The platform will allow uploading a PDF or DOCX document and returning a structured summary, greatly simplifying review. It is built upon Django for backend operations for a very user-friendly approach while having robust performance and scalability. It will include the Google Translate library in order to provide summaries that are multilingual in a global marketplace.

The proposed solution not only deals with the challenges of managing academic workloads but also enhances accessibility to scientific content across linguistic barriers. This paper discusses

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Marine Garbage Detection Using Deep Learning

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Abstract: The persistent issue of marine litter represents a significant environmental challenge, endangering aquatic life and disrupting ecosystems. Traditional monitoring methods, which rely on manual identification, are both time-intensive and resource-demanding. To address these limitations, advanced computer vision techniques such as YOLOv8 (You Only Look Once) offer a promising solution. This research explores the implementation of YOLOv8 for real-time marine debris detection, emphasizing its precision, speed, and efficiency. By leveraging publicly available datasets and employing transfer learning, this study provides a robust framework for automating marine garbage detection, thus contributing to global conservation efforts.

Index Terms **- YOLOv8, marine garbage detection, deep learning, computer vision, environmental sustainability**

I. INTRODUCTION

The accumulation of waste in marine environments is a growing concern globally. As marine debris proliferates, it poses severe threats to biodiversity, navigation, and even human health. Traditional monitoring systems, though effective to a degree, are hampered by scalability issues. With the advent of AI, particularly deep learning-based object detection models, automating this process has become increasingly viable. YOLOv8, one of the most advanced object detection models, provides an efficient approach for real-time identification of marine litter in diverse environmental conditions. This study focuses on implementing YOLOv8 for detecting and categorizing marine debris, bridging a critical gap in monitoring and cleanup initiatives.

II. LITERATURE SURVEY

[1] Highlighted the potential of earlier YOLO versions for object detection in natural environments but lacked emphasis on marine settings.

[2] Demonstrated the use of transfer learning with deep learning models to enhance detection accuracy for marine objects.

[3] Focused on marine debris detection by integrating YOLOv7 with various attention mechanisms, comparing lightweight coordinate attention, CBAM, and a bottleneck transformer. Results show CBAM achieved superior performance in box detection and mask evaluation, with F1 scores of 77% and 73%, respectively. Interestingly, while the bottleneck transformer had lower overall performance, it revealed areas missed by manual annotation, showcasing potential use in specific scenarios.

[4] Presents APM-YOLOv7, an enhanced method for detecting small-target water-floating garbage. It addresses challenges such as limited information and complex backgrounds by incorporating advanced features like an adaptive Canny algorithm for river channel extraction and a multi-scale gated attention mechanism. The results demonstrate significant improvements in detection precision, with a 7.02% increase in mean

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Survey And Anlysis On Automated Speech Read On Various Languages Using Deep Learning

Divya[*1], Dr.Suresha D[2], Dr. Sanjeev Kulkarni[*3,] Navya Rai[4], Jyoth

Abstract

Speech reading is a process of understanding the language with the with or without sound especially useful for hearing impaired, or presented paper, we explore variation of lip texture features visemes. Aiding the cause, Deep learning, and Machine lea recognition approach is used for Regional Indian Language word rec high accuracy at an estimate of computation. A study of comparisons reading approaches is presented in this paper with the main focus deep learning and related methodologies with promising result for b and classification schema for lip-reading sentences. It might invest different neural network topologies such as (CNNs), (RNNs), in lip attentional strategies. RNN is a recurrent kind of artificial neural net series data or sequential data. A neural network type called a c architecture, or CNN or ConvNet, is particularly adept at processing architecture, like an image. Work focuses on benefits of Attenti Temporal Convolutional Networks for classification compared Networks. Paper includes analysis of well-organized lip reading linguistic systems. Comparison of various Algorithms, discussion of many algorithms, adopted methodologies performance and li formulated. The study focuses more on Machine Learning & Deep L regardless of particular application areas for speech reading domai

Keywords—*Lip Reading, Feature extraction, Spatio-Temporal Re classification, Hidden Markov Model (HMM), MTCNN, D3D (Dense*

Introduction

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Adaptive Semi-Active Suspension System

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Abstract: Safety, reliability and cost are the major driving factors for research in automotive applications. The current suspension systems available today prove to be a bit lackluster by compromising on either the ride quality or stability of the vehicle. By compromising stability, traction also gets compromised. Automotive suspension systems play a vital role in ensuring the comfort and safety of a vehicle. Our project proposes an adaptive version of the semi-active suspension system with a new design that focuses on cheaper production and better stability. It aims to tackle the above-mentioned issues by monitoring the conditions and determining the type of irregularity present in the road ahead, and reacting to these irregularities and conditions by pumping a specific amount of oil into the suspension system in order for the suspension to stiffen or soften accordingly.

The suspension system proposed by us displays the integration of Artificial Intelligence (AI) and IOT together that aims at improving the traction and holding the position of the vehicle to the surface of the road thus improving the stability of the vehicle, reducing body roll and trying to prevent motion sickness, leading to better riding comfort.

Keywords: You Only Look Once (YOLO), Canny edge detection, Euclidean distance and Morphological Operations.

1. INTRODUCTION

In this ever-expanding world, the use of transportation systems has also observed a massive expansion. Along with this the demand to reach somewhere rapidly is very crucial. This has led to reckless driving behaviour, which in turn leads to accidents. It has been observed that every day approximately 1,130 accidents occur on Bhartiya roads which can translate to 422 deaths per hour on average. To tackle such situations the need to enhance vehicle safety, comfort, and performance becomes very important. This has

led to many significant advancements in recent years, with passive suspension systems becoming the industry standard due to the performance ratio they provide for the cost of production and active suspension being a niche category among high-end users. Yet, there are challenges which are faced by the industry. Factors such as the adaptiveness of the passive suspension system, which either leads to compromise in safety at high speeds or the ride comfort of the user, high power consumption of active-suspension system, and the high chance of failure if the rubber membrane ruptures in the active-suspension system. This project is designed to provide a comprehensive solution to these challenges.

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Chronic Kidney Disease Prediction using Machine Learning

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Abstract: The abstract introduces the pressing issue of Chronic Kidney Disease (CKD) and underscores the importance of early identification to mitigate its progression and enhance patient outcomes. It highlights the increasing utilization of machine learning (ML) algorithms for CKD prediction but identifies a need for more accurate and efficient models. The paper aims to fill this gap by conducting a thorough literature review on CKD prediction using ML techniques, analyzing features, datasets, algorithms, and evaluation metrics utilized in existing studies. Additionally, it proposes a novel approach that combines different feature selection and ML techniques to improve prediction accuracy. The findings demonstrate the potential of ML algorithms such as support vector machines, random forests, and neural networks to achieve high accuracy in CKD prediction, with the proposed approach enhancing accuracy by up to 5%. The implications of this study suggest the development of more effective CKD prediction models that could positively impact clinical practice and patient outcomes.

Keywords: Chronic Kidney Disease (CKD), Machine Learning (ML), Prediction, Feature Selection, Datasets, AlgorithmsEvaluation Metrics, Support Vector Machines (SVM), Random Forests, Neural Networks, Accuracy Improvement, Clinical Practice, Patient Outcomes, Healthcare Management, Early Identification.

I. INTRODUCTION

Chronic kidney disease (CKD) is a common and serious disease that affects millions of people worldwide. Early detection and prediction of CKD progression are critical to implement appropriate interventions and improve patient outcomes. In recent years, machine learning techniques have become valuable tools for accurate prediction and risk assessment in several health care domains. This study aims to explore the potential of machine learning algorithms to predict the progression of CKD. Using large data sets that include patient demographics, medical history, laboratory results, and other relevant features, we can develop robust predictive models to identify individuals at risk of CKD or disease progression. Machine learning models can learn from historical data, patterns and correlations to reveal hidden relationships and complex patterns that human experts may have difficulty detecting. Predictive models can analyze and weigh different risk factors, enabling personalized predictions based on individual patient characteristics.

Using machine learning algorithms to predict CKD could have significant implications for clinical decision making and patient management. Early identification of those at risk can facilitate preventive measures such as lifestyle changes, medication adjustments or referral to nephrology specialists. In addition, accurate prediction of CKD progression can help optimize resource allocation and health care planning. In this study, we use various machine learning algorithms such as linear regression, support vector machines, random forests, and knn, to develop predictive models for CKD. The models are trained and evaluated on real patient data, enabling us to evaluate their performance and compare their predictive ability. Finally, the development of an accurate and reliable model of prognostic chronic disease based on machine learning promises to improve patient outcomes, optimize health resources and enable early

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WELLWISE: ADVANCED NUTRITION MONITORING SYSTEM

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Abstract: In recent times, advancements in deep learning and computer vision have paved the way for innovative solutions in food detection and nutritional analysis. This paper presents a pioneering framework for detecting food items using ensemble learning techniques, leveraging cutting-edge object detection models like YOLOv7 and YOLOv8. The proposed system aims to precisely identify and categorize various food items in images, catering to diverse user needs such as nutrition research, dietary monitoring, and culinary exploration. The framework initiates by pre-processing food images and inputting them into multiple pre-trained YOLOv7 and YOLOv8 models to extract features and generate decision scores for each detected food item. These decision scores are then combined using a fusion technique, such as the Gompertz function, to amalgamate the strengths of each model and enhance prediction accuracy. To assess the system's performance, experiments are conducted using a comprehensive food image dataset encompassing a wide variety of cuisines and dishes. Performance metrics including accuracy, precision, recall, and F1-score are measured to evaluate the effectiveness of the ensemble approach in accurately detecting and categorizing food items. The proposed framework offers a sturdy and efficient solution for food detection tasks, serving diverse user classes including nutrition researchers, health-conscious individuals, restaurant owners, and culinary enthusiasts. By harnessing ensemble learning techniques and state-of-the-art object detection models, the system aims to empower users with precise and reliable food detection capabilities, facilitating applications such as dietary monitoring, nutrition analysis, and food recognition systems across various domains.

Keywords: YOLOv7 , YOLOv8, Ensemble learning, nutrition monitoring system.

I. INTRODUCTION

In today's fast-paced world, the daily consumption of high-calorie foods may appear innocuous but conceals a dangerous trap leading to conditions like diabetes, obesity, and hypertension. As our reliance on technology grows, individuals are turning to Food Tracker Apps to monitor their diet. However, the burden of manual data entry has emerged as a significant drawback, prompting many to abandon these apps over time. Our project proposes an innovative solution to this challenge. By leveraging advanced deep learning algorithms, sophisticated computer programs capable of learning and analysing, we aim to simplify the process. Users can now capture images of their meals, allowing the algorithms to recognize the food items and approximate their nutritional content. This approach eliminates the time-consuming manual entry, making it more convenient and encouraging users to maintain healthier eating habits. Acknowledging the common struggle to meet daily water intake goals, we have integrated an additional feature into our project. This feature tracks an individual's water consumption, serving as a supportive tool to remind users to achieve their recommended daily water intake. Our vision is to harness technology to improve well-being, ensuring that managing nutrition and hydration is not only effective but also easily manageable.

II. RELATED WORK

1. **IndianFoodNet: Detecting Indian Food Items Using Deep Learning(2023)** : Ritu Agarwal1* , Tanupriya Choudhury1,2,3 , Neelu J. Ahuja1 , Tanmay Sarkar4, School of Computer Science, University of Petroleum and Energy Studies (UPES), Dehradun 248007, India CSE Department, Graphic Era Deemed to be University, Dehradun 248002, Uttarakhand, India CSE Department, Symbiosis Institute of Technology, Symbiosis International (Deemed University), Pune 412115, India Department of Food Processing Technology, Malda Polytechnic, Bengal State Council of Technical Education, Malda 732102, India Corresponding Author Email: agarwalritu7@gmail.com.
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Detection Of Glaucoma Eye Disease Using Retinal Fundus Images

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Abstract: Glaucoma is a term used to describe the cumulative loss of retinal cells in the optic nerve or permanent vision loss due to optic neuropathy. Glaucoma is a disease of the human eye. This disease is considered an irreversible disease that causes deterioration of vision. They have no early warning signs of glaucoma. You may not notice a change in your vision because the effect is so subtle. Many deep learning (DL) models have been developed to improve the diagnosis of glaucoma. Therefore, we present an architecture for accurate glaucoma detection based on deep learning using convolutional neural networks (CNN). The distinction between glaucoma and non-glaucoma patterns can be made using CNN. CNN provides a hierarchical structure for image differentiation. Using the current method, the disease is detected. It determines whether the patient has glaucoma or not, the relationship between the eye and the disc. Improved diagnosis by combining image data generator techniques to augment data. The results show that the proposed model outperforms existing algorithms, achieving 98.47% accuracy.

Keywords: Feature Extraction, Machine Learning, CNN, Image Data Generator,Glaucoma,keras,streamlit

I. INTRODUCTION

Glaucoma is a group of eye diseases that cause damage to the optic nerve (or retina) and loss of vision. Open-angle glaucoma is often unnoticed as it develops slowly over time and is painless. Peripheral vision first decreases, then central vision, and if left untreated, blindness. Angular glaucoma can develop slowly or suddenly. The most common types are open-angle glaucoma (wide-angle, chronic simple), in which the drainage angle remains open to fluid in the eye, closed-angle glaucoma (narrow-angle, acute-occlusive), and normal-tension glaucoma. Sudden eye pain, blurred vision, medium-sized pupils, red eyes, and nausea may occur. Loss of vision from glaucoma is permanent once it occurs. Eyes affected by glaucoma are called glaucomatous. Risk factors for glaucoma include increasing age, high pressure in the eye, family history of glaucoma, and use of steroid medications. For eye pressure, a value of 21 mmHg or 2.8 kPa above atmospheric pressure (760 mmHg) is used, with higher pressures posing a greater risk. However, some can have high pressure for years and never experience any damage. Conversely, normal pressure can cause damage to the optic nerve with normal pressure, known as glaucoma. The mechanism of open-angle glaucoma is thought to be the slow release of humor through the trabecular tissue, while in angle-closure glaucoma, the iris obstructs the trabecular tissue. Dilated eye examination is usually used for diagnosis. Often, the optic nerve shows an amount of cupping that is abnormal.

II. LITERATURE SURVEY

In [1] Glaucoma Detection using Convolutional Neural Network: Aniket Patil, Risha Shetty, Sakshi Jain, Sejal D'mello have proposed a Convolutional Neural Network (CNN) system for early detection of Glaucoma. Initially, eye images are augmented to generate data for Deep learning. The eye images are then pre- processed to remove noise using Gaussian Blur technique and make the image suitable for further processing. The system is trained using the pre-processed images and when new input images are given to the system it classifies them as normal eye or glaucoma eye based on the features extracted during training.

In [2] Glaucoma-Deep: Detection of Glaucoma Eye Disease on Retinal Fundus Images using Deep Learning : Abbas Q Qaisar, Riyadh have proposed convolutional neural network (CNN) unsupervised architecture was used to extract the features through multilayer from raw pixel intensities. Afterwards, the deep-belief network (DBN) model was used to select the most discriminative deep features based on the annotated training dataset. At last, the final decision is performed by s linear classifier to differentiate between glaucoma and non-glaucoma retinal fundus image.

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Ingredient Detection and Recipe Recommendation Using Deep Learning

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Abstract: In response to the hectic pace of modern life, there's a growing need for a smartphone web app that streamlines meal preparation. Our project aims to address this need by developing a sophisticated recipe recommendation system powered by technologies such as computer vision and machine learning. The primary objective is to simplify the culinary experience for users who often find themselves uncertain about what to cook with the ingredients they have on hand. By leveraging computer vision techniques, our system can accurately identify the ingredients available to the user. This information is then processed using machine learning algorithms to generate tailored recipe suggestions. This approach eliminates the need for extensive meal planning or manual recipe searches, saving users valuable time and effort. To tackle this, we prepared an ingredient dataset containing image 12,558 images across 15 food ingredient classes. The YOLOv8 object detection model was used to detect and classify food ingredients. Additionally, the recommendation system was built using machine learning. In the end, we achieved an accuracy of 96%, which is quite impressive.

Keywords: Object Detection, YOLOv8, FastAPI, TF-IDF, Word2Vec.

I. INTRODUCTION

In a world where convenience frequently takes precedence over creativity in culinary trends, our project seeks to revolutionize home cooking. Our commitment lies in creating an innovative mobile application that tackles a basic kitchen problem: what to make using the ingredients at hand. Our app signifies a change in the way people approach cooking; it goes beyond conventional recipe apps by utilizing object detection technology to evaluate photos of ingredients and provide recipe recommendations based on the detected ingredients.

At its core lies the YOLOv8 model, used in real-time object detection, which serves as the foundation for identifying ingredients within culinary images. Complementing this, the utilizes word embeddings, a technique rooted in natural language processing, to discern semantic similarities among ingredients and curate tailored recipe recommendations.

Powered by a FastAPI backend, the system presents a streamlined interface for seamless interaction, facilitating efficient data transmission and processing. Through meticulously crafted endpoints, it offers a gateway to the underlying functionalities, enabling users to effortlessly harness the system's capabilities.

II. LITERATEURE SURVEY

[1] The paper aims to develop a tool that would help in pairing various ingredients from different cuisines and suggest an alternate ingredient. The goal is to support the creation of novel recipes and, by suggesting substitute ingredients, assist those who are allergic to particular ingredients. The study finds popular ingredient pairs from various cuisines and suggests substitutes using two machine learning models: the vector space model and the Word2Vec model.

[2] This paper aims to develop a system that can recognize food ingredients from images and recommend recipes based on the detected ingredients using deep learning and machine learning techniques. To use a convolutional neural network (CNN) model based on ResNet50 architecture to classify 32 different food ingredients from a custom dataset. Design a recipe recommendation algorithm using a 2D matrix to store the relationship between 19 recipes and 32 ingredients. The paper was able to achieve an accuracy of 94%.

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A DEEP LEARNING APPROACH TO DETECT SKIN CANCER USING DERMOSCOPIC IMAGES

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Abstract: Dermatology remains one of the foremost branches of science that is uncertain and complicated because of the sheer number of diseases that affect the skin and the uncertainty surrounding their diagnosis. The variation in these diseases can be seen because of many environmental, geographical, and gene factors and the human skin is considered one of the most uncertain and troublesome terrains particularly due to the presence of hair, its deviations in tone and other similar mitigating factors. Skin disease diagnosis at present includes a series of pathological laboratory tests for the identification of the correct disease and among them, cancers of the skin are some of the worst. Skin cancers can prove to be fatal, particularly if not treated at the initial stage. The idea behind this project is to make it possible for a common man to get a sense of the disease affecting his/her skin so they can get a head start in preparing for its betterment and the doctor in charge can get an idea about the type of cancer which helps them in the diagnosis. Users are greeted with a login page, and when they log into the home page, users can upload an image of the diseased part of their skin. The trained model gives a prediction, following which the users can take the necessary steps to contain the disease.

I. INTRODUCTION

Skin Cancers have wreaked havoc since the early ages, and it is particularly because of the sheer number of cancers that are present that they pose such a high risk. It is difficult to diagnose them without a laboratory test. And there are a growing number of people who deem the diseases of skin too trivial to get diagnosed by a doctor.

In a rare case if the disease indeed is something fatal, without proper treatment, the patient could be in mortal danger. In our attempt to bring about a change in this ecosystem, we have proposed an automatic skin cancer classification system that can help people in identifying the cancer that has spread.

The Convolutional Neural Network system proposed in this paper aims at identifying seven skin cancers: Melanocytic Nevi, Melanoma, Benign keratosis-like lesions, Basal cell carcinoma, Actinic keratoses, Vascular lesions, and Dermatofibroma. We were able to get our hands on the dataset: "Skin Cancer MNSIT: HAM 10000", which contains a disproportionate number of images for each of the seven diseases ranging from a few hundreds to a few thousands.

A user can theoretically get accurate predictions when they upload an image of the deteriorated skin, given the dataset is of a certain quality and the classification result is of acceptable accuracy. We have followed the same principles and have come up with a system that can accurately detect 7 types of skin cancers.

II. LITERATURE REVIEW

SCOPE AND METHODOLOGY

Scope

The scope of this approach is significant, as Skin cancer is one of the most common cancers and early detection is critical for successful treatment. Dermoscopic images provide a wealth of information that can aid in the diagnosis of skin cancer, but interpreting these images requires extensive expertise and can be time-consuming. The use of deep learning-based approaches such as CNN models can help improve the accuracy and speed of skin cancer diagnosis by automating the process of analyzing Dermoscopic images.

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Detection of Pathological Myopia using Deep Learning Techniques

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Abstract: Myopia commonly known as near sightedness, is a prevalent vision problem affecting a considerable portion of the global population, particularly among adolescents and young adults. Detecting myopia early is crucial to effectively manage and prevent associated complications such as retinal detachment, myopic macular degeneration, and glaucoma. While traditional methods of myopia detection often rely on subjective evaluations by eye care professionals, which can be time-consuming and require specialized equipment, our study proposes a novel approach using deep learning techniques. By harnessing advancements in computer vision and deep learning, we have developed a convolutional neural network (CNN) model trained on a large dataset of retinal images. This model is capable of automatically identifying signs of myopia, including optic disc anomalies, retinal stretching, and other characteristic features associated with myopic progression. Our experimental findings demonstrate the effectiveness of this deep learning model in accurately detecting myopia from retinal images with high sensitivity and specificity. Furthermore, the model's performance surpasses that of traditional methods, offering a more efficient and objective approach to myopia detection. This system we have developed shows promise for early screening initiatives, telemedicine applications, and assisting healthcare professionals in the timely diagnosis and management of myopia-related conditions.

Keywords: Myopia detection, Deep learning, Convolutional neural networks, Retinal imaging, Healthcare AI.

I. INTRODUCTION

Pathologic myopia, also referred to as high myopia or degenerative myopia, is a serious condition identified by extensive structural changes in the eye, predominantly impacting the retina and choroid. These changes often lead to distortions in the eye's fundus, significantly affecting vision and giving rise to various complications. Key characteristic of pathologic myopia is its progressive nature, marked by rapid vision changes. Consequently, individuals afflicted by this condition frequently require frequent updates to their corrective lenses, like eyeglasses or contact lenses, typically every four to six months. In the United States , pathological myopia is recognized as the seventh leading reason for blindness among adults, underscoring the severity of the condition and its potential to cause substantial visual impairment if not untreated or unmanaged. While it affects a relatively small percentage of the population, around 2% of all cases of myopia, it remains a significant concern for health experts.

Certain regions, notably in East Asia such as Singapore, Hong Kong, and Taiwan, exhibit a higher occurrence of pathologic myopia. Environmental factors and genetic predispositions in these areas may contribute to its increased prevalence, highlighting the importance of early detection and intervention. This disability affects quality of life as well as efficiency, and it may have an influence on independence, social interactions, and emotional stability Moreover, pathologic myopia increases the risk of developing serious complications such as retinal detachment, macular degeneration, and glaucoma, which can result in irreversible vision loss if not managed promptly. These complications stress the significance of regular monitoring and suitable management strategies. In conclusion, pathological myopia is a substantial public health concern globally, presenting significant challenges concerning visual impairment and associated complications. Addressing this condition necessitates comprehensive approaches focused on early detection, regular monitoring, and tailored interventions to preserve vision and enhance the affected individuals' quality of life.

II. RELATED WORK

Their study, "Automated Diagnosis of Pathological Myopia from Heterogeneous Biomedical Data," was published [3]. They suggested using PM-BMII, a computer-aided diagnosis technique, to identify pathological myopia. Based on various combinations of data sources, such as retinal fundus image data, clinical data, and gene-related data, it automatically detected problematic myopia. Their results showed an 88% Area under the Curve (AUC) when they combined many possibilities.

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Detection and Risk assessment of Parkinson's disease : A Machine Learning Approach

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Abstract: Leveraging DenseNet architecture, our novel approach to Parkinson's disease detection focuses on analyzing spiral and wave images derived from handwriting samples, a method proven to capture subtle motor abnormalities characteristic of the condition. By training the model on a dataset comprising annotated samples from individuals with clinically confirmed diagnoses, our system learns to discern distinctive patterns indicative of Parkinson's disease. Through the integration of traditional image processing techniques for preprocessing, we enhance the model's ability to extract relevant features from handwriting patterns. The multi-label classification enables not only the identification of Parkinson's disease presence but also offers insights into its severity and progression. This comprehensive approach empowers clinicians with a reliable tool for early diagnosis and personalized treatment planning, ultimately improving patient outcomes and quality of life.

Keywords: DenseNet architecture, Parkinson's disease detection, Spiral and wave images, Handwriting samples, Motor abnormalities, Early diagnosis

I. INTRODUCTION

The rising prevalence of Parkinson's disease has emerged as a significant public health concern, with a profound impact on individuals and healthcare systems worldwide. As the population ages, the incidence of Parkinson's disease continues to climb, underscoring the critical need for early detection and intervention strategies. Leveraging the power of machine learning, specifically DenseNet architecture, in conjunction with sophisticated analysis of spiral and wave images extracted from handwriting samples, this research endeavors to pioneer a non-invasive approach to Parkinson's disease diagnosis. By capturing subtle motor abnormalities inherent in these images, our innovative detection system offers a promising avenue for early identification of the disease, facilitating timely interventions and personalized treatment plans.The non-intrusive nature of our methodology ensures patient comfort and privacy, overcoming barriers commonly associated with traditional diagnostic techniques. Moreover, by harnessing the capabilities of deep learning algorithms, our system has the potential to enhance diagnostic accuracy and efficiency, thereby improving patient outcomes and reducing the burden on healthcare providers.In an era marked by rapid technological advancements, the integration of machine learning and medical imaging holds immense promise for revolutionizing healthcare delivery. By championing innovation in Parkinson's disease detection, this research not only addresses an urgent unmet need but also sets a precedent for leveraging technology to improve patient outcomes and promote overall well-being.

II. LITERATURE SURVEY

[1] This research proposes a novel approach for Parkinson's disease (PD) detection using DenseNet, a deep learning architecture. The method leverages spiral and wave drawings as input data. It involves analyzing these drawings using DenseNet to classify them and potentially identify features indicative of PD. While this approach has the potential to outperform traditional methods, challenges like variations in drawing styles and potential inconsistencies in the drawings themselves need to be addressed for robust detection.

[2] This paper explores a new method for Parkinson's disease (PD) detection utilizing DenseNet, a deep learning architecture. DenseNet analyzes spiral and wave drawings for potential signs of PD. Similar to advanced driver assistance systems that employ image sequences to improve accuracy, this approach leverages the sequential nature of the drawing process within a single image. By analyzing the entire drawing, DenseNet can potentially capture subtle changes that might be missed by analyzing isolated sections. This has the potential to enhance the detection of PD compared to traditional methods.

LUMPY SKIN DISEASE DETECTION IN CATTLE

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Abstract: *Lumpy Skin Disease (LSD) is a highly contagious viral disease affecting cattle, resulting in significant economic losses in the livestock industry. This project employs an AI-driven approach to early detection of LSD using image analysis and machine learning techniques. A convolutional neural network (CNN) is trained on a robust dataset comprising healthy and infected cattle images to identify characteristic lesions and disease markers. Advanced preprocessing and augmentation techniques improve the model's robustness and accuracy. This scalable diagnostic tool enables timely intervention, reducing disease spread, mortality, and economic impact. The findings highlight the transformative potential of artificial intelligence in modern veterinary diagnostics, particularly in regions where traditional diagnostic infrastructure is limited.*

Keywords: *Lumpy Skin Disease, Convolutional Neural Network, Veterinary Diagnostics, Machine Learning, Image Processing, Livestock Health.*

1. INTRODUCTION

Lumpy Skin Disease (LSD), caused by the Capripoxvirus, has become a growing concern for livestock farmers globally. Characterized by fever, nodular skin lesions, weight loss, and reduced productivity, LSD affects the health and economic stability of livestock-dependent communities. The primary transmission vectors are biting insects like mosquitoes, flies, and ticks, making the disease highly prevalent in tropical and subtropical regions.

The economic impact of LSD is immense. Losses arise from reduced milk production, trade restrictions, mortality, and treatment costs. Additionally, outbreaks place a significant burden on veterinary infrastructure, particularly in rural areas where access to diagnostic tools is limited. Traditional methods such as clinical examination and polymerase chain reaction (PCR) tests are effective but often slow, costly, and resource-intensive.

With advancements in artificial intelligence (AI), automated systems offer the potential to bridge this gap, providing rapid, cost-effective, and accurate diagnostic solutions. This paper explores the development of an AI-driven diagnostic tool employing convolutional neural networks (CNNs) to detect LSD from cattle images. This approach democratizes access to diagnostics and supports early intervention efforts to curb the spread of the disease.

2. LITERATURE SURVEY

Artificial intelligence, particularly in the form of Convolutional Neural Networks (CNNs), has proven to be a transformative tool in automating image-based disease detection across various domains, including veterinary diagnostics. Recent studies highlight the effectiveness of CNNs in identifying subtle patterns in medical and veterinary images, enabling precise classification of diseases that might otherwise require expert analysis. In the context of livestock health, AI-driven systems have shown promise in diagnosing conditions such as foot-and-mouth disease, brucellosis, and tuberculosis, and more cost-effective solutions compared to traditional methods.

MACHINE LEARNING-BASED EARLY DETECTION OF AUTISM IN CHILDREN

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Abstract: *This project aims to analyze and predict autism spectrum disorder (ASD) diagnosis using machine learning techniques. ASD is a developmental disorder that affects communication, behavior, and social interactions. Early diagnosis is crucial to provide the necessary interventions for individuals with autism. The dataset used in this study contains various features, such as age, gender, and behavioral traits, which are analyzed to identify patterns associated with ASD. Convolutional Neural Networks (CNN) is utilized for image-based data analysis, particularly for facial feature extraction, which enhances the predictive accuracy of the models. The performance of these models is evaluated based on accuracy, precision, recall, and other metrics to determine their effectiveness in real-world scenarios. Additionally, data preprocessing techniques like handling missing values and feature selection are applied to improve model performance. The project also explores the ethical considerations of using machine learning in healthcare, ensuring that the models are interpretable and reliable for medical applications. Overall, the project demonstrates the potential of AI in aiding early autism diagnosis and contributing to better healthcare outcomes.*

Keywords: *Autism Spectrum Disorder (ASD), Machine Learning, CNN, behavioral disorder, chatbot.*

1. INTRODUCTION

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition that affects an individual's ability to communicate, interact socially, and engage in repetitive behaviors. It presents in early childhood, with symptoms varying in severity, making early diagnosis essential for effective intervention and support. Traditional methods for diagnosing autism are often time-consuming, subjective, and resource-intensive, which can delay treatment for children who need early interventions.

In recent years, advancements in machine learning have provided promising opportunities to enhance the early detection of ASD. By analyzing behavioral, demographic, and other clinical data, machine learning algorithms can identify patterns that may not be immediately evident to healthcare professionals.

Audio, Text, and Image Steganography: A Comprehensive Study

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Abstract: Steganography in audio, text, and images represents a critical frontier in secure communication by embedding sensitive data within digital media. This technique goes beyond traditional encryption by concealing the existence of the hidden data, making it less susceptible to detection. Among the prominent methods, Least Significant Bit (LSB) encoding is widely utilized for its simplicity and efficiency, although it often faces limitations in robustness against steganalysis. Spread spectrum and adaptive techniques have emerged to address these issues, offering improved resilience and capacity while maintaining imperceptibility.
This paper investigates these steganographic methods, focusing on their strengths and limitations. It highlights the trade-offs between imperceptibility, robustness, and payload capacity, key factors that determine the efficiency of a steganographic system. The challenges posed by advanced steganalysis techniques, such as statistical and machine-learning-based detection, are also explored. The study identifies diverse applications for steganography, including secure communication, digital watermarking for intellectual property protection, and copyright enforcement. Future advancements are proposed, emphasizing the integration of artificial intelligence to enhance adaptive steganographic techniques. By leveraging AI, steganographic systems can dynamically respond to detection attempts, ensuring greater security and reliability in increasingly sophisticated digital environments. The research aims to bridge gaps in current methodologies, paving the way for robust and efficient data-hiding solutions.

Keywords: Steganography, secure communication, LSB encoding, digital media, steganalysis

I. Introduction:

In the digital era, securing sensitive information is paramount as data transmission continues to expand across global networks. Steganography, derived from the Greek words *steganos* (hidden) and *graphy* (writing), represents a vital field of information security that focuses on concealing data within a cover medium. Unlike cryptography, which secures data through encryption but signals its presence, steganography conceals both the content and existence of the information, offering a covert means of communication. This dual approach enhances security, especially when both methods are combined, providing robust protection against unauthorized access. Audio, image, and text steganography are among the most researched domains due to their practical applications in multimedia communication. Audio steganography leverages the human auditory system's limitations to embed data within audio signals imperceptibly. Techniques such as Least Significant Bit (LSB) encoding and phase modulation are common, balancing data capacity with imperceptibility. Similarly, image steganography modifies pixel values or transforms coefficients to embed data, maintaining visual quality while ensuring the hidden

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Creation and Annotation of a Code-mixed Kannada English Dataset with accurate labels for Detecting Depression and Major Depressive Disorder Categories

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ANALYSIS OF WHATSAPP CHAT USING NLP MODELS

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Abstract:

With the increasing usage of WhatsApp and other similar platforms, huge amounts of chat data are being generated every day, thus opening wide avenues for analysis. The following research work will study the application of NLP to WhatsApp chats for insights into user behavior, emotional trends, and communicational patterns. The major techniques that shall be used include sentiment analysis, which shall help in showing the emotional tone; topic classification, which shall classify chats into personal or work-related ones; and named entity recognition, which is important for extracting names, places, and dates. It does preprocessing of the text by cleaning and tokenizing text with Pandas, NLTK, and SpaCy, along with sentiment detection via TextBlob. The visualizations using Matplotlib and Seaborn will indicate the trend, engagement, and emotional dynamics. Insights from these will be useful in customer service, monitoring mental health, and market research—to show the use of WhatsApp chat analysis for optimization in communication and decision-making.

Key words: Whatsapp, Chat Analysis, NLP, Data Visualization, Sentiment Analysis, Url classification

1.Introduction:

In today's digital era, WhatsApp has become an essential tool for daily communication, serving over 2 billion active users worldwide, including nearly 400 million in India. Originally designed as a simple messaging platform, WhatsApp has evolved into a multifaceted medium for personal and professional communication. Every day, billions of messages are exchanged on the platform, resulting in an immense reservoir of data. When properly analyzed, this data holds the potential to reveal valuable insights into user behavior, social dynamics, and emotional trends. Despite its significance, a large portion of this data remains untapped, leaving important patterns and trends unexplored [1][2][3].

Brain Tumour Detection in Foetus and Infant using Deep Learning technique

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Abstract: Brain tumours are a major medical concern, particularly in foetus and infants, where prompt and accurate diagnosis is essential for effective treatment and improved outcomes. Magnetic resonance imaging (MRI) and ultrasound are two important imaging modalities that provide detailed insight into brain structure and abnormalities. It's also important to ensure independence will enter in due course. Brain tumours can range from benign, such as pituitary tumours, to aggressive, such as gliomas and meningiomas. Early and accurate diagnosis enhances outcomes and reduces the risk of long-term complications.

This work exploits the power of convolutional neural networks (CNNs) to classify brain tumours from MRI and ultrasound images. Convolutional neural networks excel in image classification by directly learning spatial features from raw image data, eliminating the need for manual filtering. The CNN model is designed to classify brain tumours, including Meningioma tumour, Pituitary tumour, Glioma tumour, and no tumour.

The performance of the model is evaluated using key parameters such as accuracy, sensitivity, specificity, and F1 score. This design highlights the deep learning capabilities of medical imaging, providing an effective non-invasive method for the early detection of brain tumours in foetus and infants. Transferable results are reliable and fast. The proposed system aims to help health professionals make rational decisions, ultimately improving the quality of prenatal care for infants.

Keywords: Medical Image Processing, Foetus brain tumour, Meningioma Tumour, Pituitary tumour, Glioma tumour.

I.INTRODUCTION

Brain tumours in foetus and infants, although rare, are very serious and can severely affect a child's early development and long-term health Early diagnosis is important, as it can influence treatment decisions to increase his chances of survival. Typically, MRI and ultrasound scans are used to diagnose these tumours', but interpretation of these images is a complex task that requires a high level of expertise, making the process time-consuming and prone to human error This is where Convolutional Neural Networks (CNNs), powerful deep learning, comes into play. They offer a promising solution to classify and detect brain tumours in fetal and infant MRI and ultrasound images. In our study, we used a CNN model to classify brain tumours in fetal infant brain scans using the resulting MRI and ultrasound images Surprisingly, and emphasizes the power of CNN in the early detection and classification of brain tumours' a time when Intervention is needed The thing is, However, the journey is not without its challenges. There is variability in imaging because of differences in device type, patient size, and tumour characteristics. Furthermore, there are few annotated datasets, and the lack of definition in CNN models may hinder reliability, especially in clinical settings. Where access to advanced imaging technologies is limited, brain tumours' are more severe in foetuses and in infants, CNN-based automated diagnostic systems may provide an effective solution, allowing for early diagnosis and treatment careful planning, especially in underdeveloped areas.

Gamified Programming Education Application

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Abstract: *Currently, programming education is becoming very complicated, and an innovative tool must be effective even more to catch the learner's attention and improve results. This research presents CodeEase, a completely gamified and interactive platform for easing programming education. The aspects of gamification, structured learning paths with progress tracking, make the teaching platform even more engaging. Built using modern web technologies such as React, Next.js, Tailwind CSS, and coupled with backend tools like Clerk for authentication, Neon for database management, CodeEase is a true fit for new-age web design. Empirical evidence shows significant improvements in user engagement with outstanding feedback from early users. The paper discusses how this platform can be built, its architecture, and potential transformations of the programming education system.*

Keywords: *Programming Education, Gamification in learning , Interactive Learning, Leaderboards and Rewards, Real-time feedback, User Engagement.*

1. Introduction

Programming has become a crucial skill, and the sad part about it is most of the traditional learning methodologies do not motivate the students at all. Although lesson-structure monotony, low interactivity, and high rates of course dropout reflect the challenges, the urgent need is for tools that make the teaching of a programming language engaging and interactive. CodeEase was created to do just that: address that gap by merging structured modular learning with gamification. Through interactive coding challenges, leaderboards, and other rewards characteristic of a game, this platform motivates users to finish their learning paths while improving their coding prowess. The intention here is to show how gamification can start working wonders in programming education, making learners more active and successful.

PNEUMONIA DETECTION USING MACHINE LEARNING TECHNIQUES AND EXPLAINABLE AI

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Abstract

Pneumonia is a major worldwide health concern in the modern world, which emphasizes the importance of prompt and accurate diagnosis in order to enhance patient outcomes. The traditional diagnostic techniques rely heavily on manual interpretation, which can be laborious, error-prone, and require a great deal of experience. Using chest X-ray and CT scan pictures, this study develops a deep learning-based framework for identifying and categorizing pneumonia. The method accurately classifies data into normal and pneumonia categories by utilizing DenseNet-121 for efficient feature extraction. To verify robust outcomes, a weighted averaging technique integrates predictions from both imaging modalities. Methods like Class Activation Maps (CAMs) emphasize the most suggestive pneumonia in the area to improve interpretability. The accuracy, precision, F1-score, and other metrics are used to measure the system's performance.

Keywords:

Pneumonia detection, deep learning, densnet121, Chest X-ray analysis, Explainable AI, Class activation map.

1. Introduction

Pneumonia has become an epidemic of global proportions as the number of cases diagnosed has been rising annually in recent years. Recent developments in deep learning have significantly changed medical imaging, particularly when it comes to using chest X-rays and CT scans to diagnose conditions like pneumonia. DenseNet-121 and other convolutional neural networks (CNNs) have shown remarkable accuracy in identifying pneumonia, suggesting quick and reliable diagnostic capabilities. A persistent issue with these AI models, meanwhile, is that they are black boxes, which limits how transparent their forecasts may be. This lack of interpretability raises questions about accountability and trust, particularly in situations involving critical healthcare where knowing the basis for a diagnosis is essential. Conventional diagnostic techniques depend on radiologists' manual analysis, which can be laborious and prone to human error.

This project addresses these issues by introducing a deep learning framework for the identification of pneumonia that combines explainable AI (XAI) methods with the analysis of chest X-rays and

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IoT based technological support for moisture stress experimental study on plants with stress prediction using deep learning

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Abstract.
BACKGROUND: The increased depletion of ground water resources poses the risk of higher moisture stress environment for agriculture crops. The rapid increase in the moisture stress situation imposes the need of efficient agricultural research on determining the impact of moisture stress on variety of crops.
OBJECTIVE: The prime objective of the proposed work is building an IoT based Plant Phenotyping Device for moisture stress experimental study on variety of crops with deep learning model for stress response detection.
METHODS: In this work, IoT technology is used for building a proposed system for conducting the moisture stress experiments on plants and adopting the image processing and convolution neural network based model for stress prediction.
RESULTS: The accuracy of the proposed system was experimentally evaluated and empirical results were satisfactory in maintaining the desired level of moisture stress. Performance analysis of LeNet, AlexNet, customized AlexNet and GoogLeNet CNN models were carried out with hyper-parameters variations on the leaf images. GoogLeNet achieved a better validation accuracy of 96% among other models. The trained GoogLeNet model is used for predicting the moisture stress response and predicted results were matched with manual observation of stress response.
SIGNIFICANCE: The affirmative results of proposed system would increases its adoption for in-house precision agriculture and also for conducting various moisture stress experiments on variety of crops. The confirmative detection of moisture stress tolerance level of plant provides knowledge on minimum level of water requirement for plant growth, which in-turn save the water by avoiding excess watering to plants.

Keywords: IoT, sensors, Raspberry Pi, moisture stress, deep learning

1. Introduction

Moisture stress has been one of the most common abiotic stresses affecting variety of crops across the world [1, 2]. The rapid increase of dry land and shortage of water poses new challenges for handling the drought stress in a better way to minimize crop loss [3]. Agricultural researchers around the world are conducting drought stress related experiments on variety of crops to get a better insight into drought stress to mitigate the stress induced diseases. The early detection of moisture stress responses on plants using farmer affordable technology has been a need of the hour.

The depletion of water sources push the need of growing crops by providing the adequate level of water and avoiding the over-supply of water to plants. Moisture stress tolerance level characteristic of a plant need to be carefully analyzed to identify the

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Detection Of AI Generated Images Using Machine Learning and Deep Learning Models

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Abstract: Artificial intelligence (AI)-generated images intended to incite social and economic unrest have become more widely shared since the introduction of advanced AI tools. AI-generated images using Generative Adversarial Networks (GANs) are frequently used to create content that makes it difficult to discern between real and artificial content. As a result, false information is spread along with an increase in cybercrimes. The goal of this proposed work is to detect these AI-generated images by building a Convolutional Neural Network (CNN) model. This CNN model will be trained to distinguish between real and AI-generated images. This strategy will support the preservation of social and economic stability, which may be jeopardized by improper use of images produced by artificial intelligence in informational campaigns. It will also aid in the prevention of cybercrimes like image forgery and impersonation that are caused by AI-generated images.

Keywords: Generative Adversarial Networks (GANs), Convolutional Neural Network (CNN), AI-Generated Images

I. INTRODUCTION

AI images generated using advanced Generative Adversarial networks (GANs) are a potential problem in today's digital environment. It is difficult to discern what is genuine and what is not because of these images. False and misleading information is disseminated due to the ease with which these AI generated images are created. This creates difficulties in determining what to believe thus leading to social, political, religious, and financial concerns.

The primary objective of the proposed work is to address the proliferation of false AI-generated images by focusing solely on the detection of such content using a specialized Deep Learning model.
By leveraging Convolutional Neural Networks (CNN), the proposed approach aims to effectively identify AI-generated images designed to disrupt societal harmony. By narrowing the scope to a single model, we streamline the detection process, enabling more efficient and accurate identification of deceptive content.

Through the exclusive utilization of CNN, the proposed initiative seeks to develop a robust framework capable of differentiating between genuine and AI-generated images. By eliminating the complexity introduced by multiple models, we enhance the reliability and effectiveness of the detection mechanism.

When utilized improperly, the rise in AI-generated content can be a serious danger to dependability and confidence in the digital sphere. By using the proposed initiative, which can differentiate between real and artificial intelligence-generated content, we help to maintain social peace, financial stability and the credibility of information.

II. LITERATURE REVIEW

In [11] deep learning-based Computer Generated Face Identification model, employing a customized Convolutional Neural Network (CNN) architecture. Utilizing PGGAN and BEGAN models for generating deepfake images from CelebA dataset, they tackled imbalanced data concerns through an Imbalanced Framework (IF-CGFace) by training AdaBoost and eXtreme Gradient Boosting (XGB) with features extracted from CGFace layers. A notable work by Deng Pan; Lixian Sun; Rui Wang[8] , the researchers employed Xception and MobileNet, leveraging their capabilities for classification tasks to automatically detect deepfake videos. They utilized training and evaluation datasets from FaceForensics++, encompassing four datasets generated with distinct deepfake technologies. The research achieved highaccuracy, ranging from 91% to 98%, across all datasets.

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STUDS, Speech Therapy Utility for Detection and Analysis of Stuttering

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Abstract: Abstract: Stuttering, a complex speech disorder, presents significant challenges in both diagnosis and treatment. In this study, we propose a novel approach for predicting stuttering severity in Kannada speech, aimed at enhancing therapeutic interventions for individuals affected by stuttering. Leveraging a dataset comprising video recordings of therapy sessions, our methodology involves the extraction of acoustic features from 3-second audio segments, including mean pitch, intensity, speech rate, and MFCCs. These features, along with annotations for disfluency types such as prolongation, repetition, and block, form the basis of a comprehensive dataset. Through the application of a CNN-LSTM hybrid neural network, we demonstrate promising results in predicting stuttering severity, with implications for personalized therapy strategies. Our research underscores the potential of machine learning techniques in improving the diagnosis and treatment of stuttering, paving the way for more effective interventions and improved outcomes for individuals with this speech disorder.

Keywords: MFCCs, CNN-LSTM, Kannada speech, stuttering.

I. INTRODUCTION

Stuttering, a challenging speech disorder characterized by disruptions in fluency and rhythm, presents significant obstacles for individuals and clinicians alike. Assessing stuttering severity remains a complex task, often reliant on subjective assessments. This paper proposes a novel approach for predicting stuttering severity in Kannada speech, leveraging machine learning and acoustic analysis techniques. By providing clinicians with an objective tool, our research aims to enhance treatment planning and outcomes.

Our methodology utilizes a dataset of therapy session recordings, capturing nuances of stuttering behavior through annotation and feature extraction. A hybrid CNN-LSTM architecture integrates advanced machine learning algorithms to enhance predictive capabilities. Implications of this research extend to clinical practice, offering tangible benefits for treatment planning and patient care. Subsequent sections detail our methodology, present experimental findings, and discuss broader implications for the field of speech pathology. Through our endeavors, we contribute to advancing stuttering research and developing innovative solutions to improve the lives of affected individuals.

II. LITERATURE SURVEY

The study on automatic recognition of stuttering in speech [1] compared event-based and interval-based segmentation methods, revealing that event-based segmentation yielded superior performance in recognition systems. It emphasized the impact of linguistic features, highlighted the need for thresholds in clinical applications, and discussed challenges in achieving fully automated stuttering severity assessment. The study recommended event-based procedures for improved machine learning model capabilities, despite limitations like manual labeling requirements and class imbalance issues.

The Stutter Diagnosis and Therapy System based on deep learning [2] focused on automating tasks in speech-language pathology. It included a Stutter Assessment for analyzing stuttering and Therapy Suggestions for recommending therapies based on patient progress.

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Cervical Abnormality Detection with Deep Learning Powered Colposcopy Analysis

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Abstract: Cervical cancer represents a significant global health challenge, particularly in underserved regions where access to conventional screening methodologies is limited. In this study, we investigated the efficacy of deep learning models, including Densenet 201, Vgg16, and Vgg19, trained on the International Agency for Research on Cancer (IARC) Colposcopy Image Bank dataset. The dataset was partitioned into training and validation subsets, and the performance of each model was evaluated on the validation data. Our findings reveal that Densenet201 exhibits superior validation accuracy compared to Vgg16 and Vgg19. The primary objective of this research is to develop a robust and accessible tool for early detection and intervention, with the ultimate aim of alleviating the burden of cervical cancer screening in resource-constrained settings.

Keywords: Colposcopy, Cervical cancer screening, Deep learning.

I. INTRODUCTION

Cervical cancer remains a formidable global health challenge, especially prevalent in underserved regions where conventional screening methods encounter limitations. Despite advancements in medical technology, the burden of cervical cancer persists, marked by significant morbidity and mortality rates often attributed to delayed diagnosis and inadequate treatment options. Traditional screening approaches, such as Pap smears and HPV testing, though effective in many contexts, face logistical and infrastructural challenges in resource-constrained areas, resulting in missed opportunities for early detection and intervention.

To address the critical need for accessible and reliable cervical cancer screening methods, recent research has turned to the potential of deep learning techniques. Deep learning, a subset of artificial intelligence, exhibits remarkable capabilities in image recognition tasks, rendering it well-suited for analysing medical images, including those obtained through colposcopy of the cervix. Utilizing extensive datasets such as the International Agency for Research on Cancer (IARC) Colposcopy Image Bank, researchers have endeavoured to train deep learning models to recognize patterns indicative of cervical abnormalities, potentially paving the way for automated and scalable screening solutions.

This study aims to contribute to the field by exploring the feasibility of utilizing deep learning models, specifically Densenet 201, Vgg16, and Vgg19, for cervical cancer screening. The primary objective is not merely to evaluate the models, but rather to assess their performance in detecting cervical abnormalities using images from the IARC Colposcopy Image Bank dataset. Through rigorous experimentation and validation, we seek to determine the efficacy of these models in providing accurate and timely identification of potential precancerous lesions or abnormalities. By harnessing the power of deep learning, our ultimate goal is to develop a reliable and accessible tool for early detection and intervention in cervical cancer, with the potential to alleviate the burden of the disease in resource-constrained settings and improve outcomes for women globally.

II. LITERATURE REVIEW

In [1] Uterine Cervical Cancer computer-aided-diagnosis it on a Computer-Aided-Diagnosis (CAD) system for uterine cervical cancer screening and colposcopy adjunct. The CAD system is designed to automatically analyse data acquired from the uterine cervix, providing tissue and patient diagnosis, as well as examination adequacy assessment. The system architecture is open, modular, and feature-based, allowing for multi-data, multi-sensor, and multi-feature fusion. For cervical cancer screening, the CAD system can be integrated into instruments such as handheld devices. It analyses digital RGB images of the cervix post-acetic acid application, detecting features like acetowhite epithelium, vessel structure, and lesion margins to provide diagnostic results and exam adequacy assessment. The system's flexible design allows for progressive enhancements with new algorithms and data sources.

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Frame Interpolation Using FILM

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Abstract: Frame interpolation is a computational technique used in video processing to create additional frames between existing frames, thereby enhancing the smoothness and visual quality of motion in the video.Existing techniques for frame interpolation in videos include path-based and phase-based conventional methods, convolutional neural network (CNN)-based flow-based methods, kernel-based methods utilizing convolution operations over local patches, and recent advancements such as deformable convolution-based approaches like AdaCoF. Addressing the challenges in frame interpolation is essential for developing more efficient and versatile techniques applicable across various platforms and applications. High computational costs, particularly prevalent in methods reliant on deep neural networks (DNNs), hinder deployment on resource-constrained devices or real-time applications. Complexity arises from intricate model architectures or multi-stage processes, complicating both understanding and implementation. Additionally, limited generalization restricts the practical utility of certain techniques, as they may excel on specific datasets but struggle with diverse or unseen data. Methods relying solely on pixel-wise information or local kernels may falter in accurately interpolating frames with complex motion, occlusion, or fine details. Furthermore, the large size of state-of-the-art models poses challenges for storage, training, and deployment, especially on mobile or embedded devices. Addressing these issues is paramount for advancing frame interpolation methods towards greater efficiency, practicality, and applicability across a broad spectrum of contexts and platforms. Our Compression-Driven Framework for Video Interpolation (CDFI) addresses key challenges as follows: Reduced Computational Cost, Simplicity and Efficiency, Improved Generalization, Enhanced Motion Handling, Compact Model Size.

Keywords: Video frame interpolation, Optical flow-based, Real-time solutions, Visual quality, Real-time applications, Stakeholders, Video processing.

I. INTRODUCTION

Frame interpolation, the generation of intermediary frames between two input frames, plays a pivotal role in applications ranging from temporal up-sampling to the creation of slow-motion videos. Recently, a novel application has emerged within the realm of digital photography, where the prevalent practice of capturing near-duplicate photos presents an exciting opportunity. The ability to interpolate between these closely timed images offers the potential to craft captivating videos that not only reveal intricate scene dynamics but also provide a visually enhanced representation of the captured moment.

However, the challenge arises when dealing with near-duplicates, as the temporal spacing between frames can be significant, resulting in substantial scene motion. Existing frame interpolation methods, which excel in scenarios with small temporal gaps, struggle to address this unique challenge. Previous attempts to handle large motion involved training on extreme motion datasets, yet these approaches exhibit limitations when confronted with scenarios featuring smaller motion.

This research introduces a pioneering approach to frame interpolation, offering a network that adeptly handles both small and large motion. The methodology involves adapting a multi-scale feature extractor with weight sharing across scales and implementing a "scale-agnostic" bidirectional motion estimation module. By intuitively recognizing similarities between large motion at finer scales and small motion at coarser scales, this approach maximizes pixel availability for supervising large motion. The findings underscore the effectiveness of this technique in handling diverse motion scenarios, presenting a promising solution for advancing frame interpolation capabilities.

II. LITERATURE SURVEY

In [1] This research introduces a novel module for improving video frame interpolation (VFI) by efficiently extracting both motion and appearance information in a unified manner. By rethinking the information processing in inter-frame

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TEXT EXTRACTOR: OCR-NER FORM FILLING AUTOMATION

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Abstract: "Text Extractor OCR-NER Form Filling Automation" is an innovative software solution designed to streamline the process of extracting text from documents, performing Optical Character Recognition (OCR) and Named Entity Recognition (NER) tasks, and automating form filling tasks. This project aims to enhance efficiency and accuracy in data extraction and form completion processes across various industries. The system leverages OCR technology to extract text from scanned documents, images enabling users to digitize and analyze textual content effectively. Additionally, it employs Named Entity Recognition techniques to identify and categorize specific entities such as names, dates, locations, and organizations within the extracted text. Key features of the application include a user-friendly interface for uploading and processing documents, robust OCR and NER algorithms for accurate text extraction and entity recognition, and automation capabilities for filling predefined form fields with extracted information. Through this project, users can significantly reduce manual data entry efforts, minimize errors associated with manual transcription, and expedite the processing of documents and forms.

Keywords: Text Extractor, OCR-NER, Form Filling, Automation, Software Solution, Optical Character Recognition, Named Entity Recognition, Data Extraction, Document Management, Data Processing.

I. INTRODUCTION

Text Extractor OCR-NER Form Filling Automation is a software solution designed to streamline the process of data extraction and form filling by making use of technologies such as Optical Character Recognition (OCR) and Named Entity Recognition (NER). The goal of our project is to provide users with a robust and efficient tool that automates the time-consuming task of manually extracting information from documents and filling forms. The information from legal documents can be either scanned or directly uploaded to the application, extracting relevant information from the image and performing Named Entity Recognition (NER) to extract the entities.

The application aims to automate the entire workflow, from data extraction to form filling. The Optical Character Recognition (OCR) technology, which enables the software to accurately convert scanned documents and images into editable text. This functionality allows users to digitize paper-based documents and extract text data from them with ease. Additionally, Named Entity Recognition (NER) technology, which identifies and categorizes specific entities within the extracted text, such as names, addresses, dates, and more. Our solution employs a custom-trained spaCy pipeline for Named Entity Recognition (NER), which intelligently identifies and categorizes specific entities within the extracted text. This includes names, addresses, dates, and more, ensuring precise and accurate data extraction.

The project offers a user-friendly interface that allows users to customize and configure the extraction and form-filling process according to their specific requirements. Overall, the Text Extractor: OCR-NER Form Filling Automation project aims to revolutionize the way organizations handle data extraction and form filling tasks. By harnessing the power of OCR and NER technologies, we empower users to automate repetitive tasks, reduce manual errors, and improve productivity, ultimately leading to significant time and cost savings.

II. LITERATURE SURVEY

In paper [1] the study aims to enhance information extraction in legal texts by developing a legal NER system. Custom Dataset was used for training NER in the Indian legal domain and experiment with various annotation tools. The resulting dataset is used to train a Spacy pre-trained pipeline for accurate legal name entity prediction.

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ANOMALY DETECTION IN TIME SERIES DATA IN IoT ENVIRONMENT

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Abstract: This project is about technique or approach in finding anomalies, which represents deviations from expected patterns, can signify critical events of irregularities, malfunctioning of sensors, demanding accurate detection. Internet Of Things (IoT) represents a framework that links physical devices to the internet, allowing them to communicate and exchange data. The quality of IoT services usually depends on the integrity and accuracy of the data. Time series is a common type of data found in everyday situations like traffic flow, network performances, financial records, etc. Detecting anomalies in time series IoT sensor data is very much needed because of the possibility of noise and unavailability of labels in the sensor readings and it's also an important research topic with practical uses such as spotting intrusions in networks, monitoring traffic, and identifying errors in sensor data. In this project the Inter-Berkeley Research Lab dataset is used for unlabeled anomaly detection technique and UNSW-NB15 IoT weather board sensor dataset is used for labelled anomaly detection, which is suitable for testing and validating different anomaly detection methodologies. This project is proposed to work on hybrid models such as , LSTM – Autoencoder +Isolation Forest, Bi – LSTM + OneClass SVM, an Ensemble model of DBSCAN, LOF, SVM, and a Statistical approach for anomaly detection in IoT sensor Time Series Data, using the results to understand better about the performance of these proposed models.

Keywords: Internet Of Things (IoT),Bidirectional Long Short-Term Memory(Bi-LSTM),One-Class Support Vector Machine(One-Class SVM),Density-Based Spatial Clustering of Applications with Noise.(DBSCAN),Local Outlier Factor (LOF).

I. INTRODUCTION

The Internet of Things have changed the way we live by attaching day-to-day things to the web. IoT devices gathers information from sensing units and also using it to make jobs less complicates. This exchange of information allows devices to interact as well as make educated decisions. It helps us to comprehend our actions, practices, and choices resulting in the tailored experiences. For example, IoT can recommend items or offer health and wellness suggestions based upon our information. Data – driven choices additionally boost effectiveness. IoT also boosts security as well as protection by discovering abnormalities or threats such as uncommon patterns in protection or surveillance systems.

Time series data, which tracks modifications in time is important for recognizing IoT sensing unit analyses. This information's time-based nature gives understandings right into patterns which helps us to find the irregularities. Irregularities are abnormalities that might suggest problems in IoT systems. Different techniques consisting of analytical plus deep learning- based strategies are utilized for discovering anomalies.

Many deep learning techniques are known for its ability to capture complex patterns over time, and so is widely used. But there are also some common problems occurring when identifying anomalies like the model may miss anomalies if it predicts too well but also when it predicts poorly normal data may be misunderstood as anomalies. Having the balance between these two is essential for the accurate detection of anomalies in time series data. Detecting anomalies in time series data is more complicated than in a normal data, because of the time dependence and its non-stationary nature.

In this project, we propose a hybrid approach to anomaly detection in IoT time series data using a hybrid model integration method. Our approach includes using models such as Bi-LSTM + One-Class SVM, LSTM Autoencoder + Isolation Forest, and an ensemble model of DBSCAN, LOF, SVM to detect anomalies, visualize it, and compare the results through graphs. This method aims to enhance the security by making use of the unique strengths of each model.

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DEEP NEURAL FUZZY SYSTEM FOR INTRUSION DETECTION

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Abstract: This project presents an innovative intrusion detection approach that utilizes the combined capabilities of deep neural networks (DNN), multilayer perceptron (MLP), long short-term memory (LSTM), convolutional neural networks (CNN), and fuzzy logic within a unified deep neuro- fuzzy framework. The key differentiator of this system lies in its strategic integration with Principal Component Analysis (PCA) during the training phase, which aims to increase feature representation and overall model performance. A distinctive feature of this system is the incorporation of PCA, a critical pre-processing step that plays a key role in extracting significant features from the CICIDS2017 and CICIDS2019 dataset. By using PCA, the dimensionality of the data set is substantially reduced, allowing the system to focus on the essential information necessary for effective intrusion detection. This dimensionality reduction leads to a remarkable improvement in feature representation, resulting in excellent model performance. PCA integration acts as a catalyst in the training phase, facilitating the extraction of relevant information and optimizing the deep neuro-fuzzy system for increased accuracy and robust generalization capabilities. The results show that this innovative approach not only improves the accuracy of intrusion detection, but also improves the system's ability to adapt to diverse and dynamic threats. Overall, the strategic use of PCA coupled with a unified deep neuro-fuzzy framework sets this system apart, making it a promising advancement in intrusion detection.

Keywords: Intrusion detection, Deep neural networks (DNN), Principal Component Analysis (PCA) Deep neuro-fuzzy framework

I. INTRODUCTION

In today's rapidly evolving digital realm, intrusion detection is a critical defense mechanism necessary to protect networks from malicious activity. This importance is even more pronounced in light of the expanding attack surface represented by a number of interconnected devices. As technology advances, the proliferation of the Internet of Things (IoT) has skyrocketed, bringing a complex network of devices that require robust intrusion detection mechanisms. However, the effectiveness of intrusion detection systems faces numerous challenges, especially when it comes to face recognition and detection in IoT environments. The exponential growth of IoT devices contributes to an expanding attack surface, making detection and prevention of cyberattacks on IoT infrastructure increasingly challenging. This spread introduces a large number of devices, each of which is potentially vulnerable to security threats. In addition, the interconnected nature of IoT devices results in diverse and heterogeneous traffic traversing the Internet.

The challenge lies in distinguishing normal behavior from anomalous patterns in this complex network of interconnected devices, which complicates the identification and classification of potential security threats. Rapid detection in the IoT environment is paramount, given the potential for malicious hackers to exploit vulnerabilities in the rapidly evolving infrastructure. Early identification of attacks is critical to mitigating potential damage and securing sensitive information. To solve these problems, it becomes necessary to integrate different deep learning (DL) models into a separate intrusion detection ensemble. However, achieving high accuracy and low false-positive rates across different datasets and classification scenarios is a significant hurdle in building a reliable and efficient intrusion detection system. This project aims to overcome these challenges by introducing a comprehensive approach that combines deep neural networks, multilayer perceptrons. long short-term memory networks, convolutional neural networks, and fuzzy logic within a unified deep neuro-fuzzy framework. In addition, the strategic use of principal component analysis (PCA) in the training phase improves feature representation and optimizes the system for accurate and robust intrusion detection. This innovative methodology aims to provide a solution that not only addresses the challenges posed by the rapid growth of IoT devices, but also ensures rapid detection and high accuracy in the face of diverse and heterogeneous IoT traffic.

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BRAIN STROKE PREDICTION USING ENSEMBLE LEARNING

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Abstract: Brain stroke prediction is a critical task in healthcare, as early detection can significantly improve patient outcomes. In this study, we propose an ensemble learning framework for brain stroke prediction using convolutional neural networks (CNNs) and pretrained deep learning models, specifically ResNet50 and DenseNet121. The ensemble model combines the strengths of these architectures to enhance predictive performance. Firstly, the CNN extracts relevant features from brain imaging data. Then, ResNet50 and DenseNet121, renowned for their efficacy in image classification tasks, further refine these features through deep learning-based feature extraction. The ensemble model integrates the predictions from these individual models to make a final prediction.

Keywords: Ensemble learning, Classification, CNN, Resnet50, DenseNet121

I. INTRODUCTION

Brain stroke, also known as cerebrovascular accident (CVA), is a leading cause of mortality and morbidity worldwide, accounting for a significant burden on healthcare systems and societal well-being. Prompt detection and intervention are crucial to mitigate the devastating consequences of stroke, which can include permanent disability or even death. However, accurately predicting the onset of a stroke remains a challenging task due to its multifactorial nature and complex interplay of risk factors.

The major challenges in the face recognition and detection includes;

(i)Complex Interplay of Risk Factors: Brain stroke can be influenced by a multitude of risk factors, including hypertension, diabetes, obesity, smoking, and genetics, among others.

(ii) Heterogeneity of Stroke Subtypes: Stroke can manifest in different subtypes, including ischemic stroke, hemorrhagic stroke transient ischemic attack

(iii) Temporal Dynamics and Progression: Stroke risk may vary over time, with certain risk factors evolving or becoming more pronounced as individuals age or experience changes in health status.

(iv) Dimensionality and Feature Selection: Stroke prediction models often rely on a wide array of features, including demographic, clinical, genetic, and imaging data. However, selecting the most informative features while avoiding overfitting and dimensionality issues remains a non-trivial task.

II. LITERATURE SURVEY

In[1] **A Brain Stroke Detection Model using soft voting based ensemble machine learning classifier(A.Srinivas,Joseph Prakash,2023)**

In their study titled "A Brain Stroke Detection Model using Soft Voting-Based Ensemble Machine Learning Classifier" (A. Srinivas, Joseph Prakash, 2023), the authors propose an approach to improve brain stroke detection accuracy. Their method employs a soft voting-based ensemble machine learning BRAIN STROKE PREDICTION Dept.of AI&MLMITE,Moodabidri. Page 6 classifier, combining predictions from multiple models for enhanced performance. While showing promise, the study identifies areas for improvement. These may include refining ensemble techniques, optimizing feature selection, exploring advanced deep learning architectures, and suggesting avenues for future research, such as improving clinical relevance and real-time implementation

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AI CHEF: AN INTELLIGENT CULINARY EXPERT USING DEEP LEARNING

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Abstract: In the era of advanced technology, the culinary world is embracing the power of artificial intelligence (AI) to revolutionize cooking experiences. Our project, titled 'AI Chef: An Intelligent Culinary Expert Using Deep Learning Techniques,' explores the integration of deep learning and machine learning to create an innovative culinary assistant. AI Chef an Intelligent Culinary Expert is a desktop application, which includes AI and ML based decision-making and data generation. This software mainly focuses on providing best recipe and ingredients using AI/ML approach. The confluence of Artificial Intelligence (AI) and Machine Learning (ML) with the culinary arts has given rise to a innovative concept-"AI Chef". This innovative system envisions a culinary journey where AI becomes a personalized kitchen companion, guiding users through personalized recipe recommendations, innovative recipe generation through interfacing or image recognition. The system leverages ML algorithms to provide cooking guidance, adapting to individual preferences, and seamlessly integrating with AI-enhanced kitchen tools.

Keywords: Artificial Intelligence, Deep Learning, Machine Learning, Culinary Assistant, Image Recognition, Recipe Retrieval, Culinary Exploration.

I. INTRODUCTION

In recent years, the convergence of artificial intelligence (AI) and culinary arts has led to the emergence of innovative solutions aimed at enhancing cooking experiences and culinary exploration. Our project, titled 'AI Chef: An Intelligent Culinary Expert Using Deep Learning Techniques,' represents a significant endeavor in this domain, leveraging cutting- edge technologies to develop an intelligent culinary assistant. "AI Chef an Intelligent Culinary Expert " is an innovative desktop application that revolutionizes your culinary experience with the power of AI and ML.

Discover New Recipes effortlessly, One of the standout features of "AI Chef" is its AI-driven recipe generation. Elevate Your Culinary Skills with Feedback: "AI Chef" offers a sophisticated feedback system that not only refines the quality, quantity, and taste of your dishes but also empowers you to become a better chef. Your cooking adventures are about to reach new heights.

Furthermore, our project incorporates a sophisticated feedback system, integrating machine learning algorithms to continuously improve the accuracy and reliability of the AI Chef's predictions. This feedback mechanism allows users to contribute valuable insights based on their experiences, enabling the AI Chef to adapt and refine its predictive capabilities over time. With 'AI Chef,' we aim to redefine the culinary landscape by offering users a versatile and intelligent culinary assistant that empowers them to explore new cuisines, discover exciting recipes, and enhance their cooking skills. Through the seamless integration of deep learning and machine learning technologies, our project exemplifies the potential of AI to revolutionize traditional practices and elevate culinary experiences to new heights.

II. LITERATURE SURVEY

In [1] Chaitanya et al. (2023) developed a CNN model utilizing transfer learning with Inception v3, trained on the Food-101 dataset with data augmentation and fine-tuning on Google Colab with a Tesla T4 GPU. The model attained a remarkable 87% accuracy in food image classification. Their use of transfer learning with Inception v3, alongside Python, Scrapy, and Selenium for web data extraction, contributed significantly to the study's success, aiding users in making informed dietary choices.

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Enhanced Driver Vigilance System

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Abstract: The concerns rise in driver fatigue-related vehicle collisions has made drowsiness detection in drivers a significant area of study. Experts say that drivers who drive long distance without taking regular rests are at a high risk of experiencing fatigue. Research shows that exhausted drivers in need of rest account for around 25% of all major highway collisions. The purpose of our systems is to spot early indicators of driver exhaustion before they impact one's ability to drive. This system is a novel approach utilizing deep learning techniques, specifically 2D convolutional neural networks (CNNs), to identify signs of drowsiness in drivers face by analysing facial and eye features. The idea is aimed to use traditional models of multi-layer 2D CNN with multi-label classification and Haar-cascade algorithm. Multiple face signs like eye closures and yawning are considered through the input images to improve the detection accuracy under various driving conditions.

Keywords: Drowsiness detection, Facial recognition, eye detection, yawn detection, multi-label classification, Image-based analysis, Deep learning.

I. INTRODUCTION

The growing number of automobiles on the road has led to an increase in traffic accidents, which are now the main cause of death in many countries. In the rapidly changing landscape of the automotive industry, the integration of technology-driven features, particularly advanced driver assistance systems (ADAS), has become increasingly common. Drowsiness among drivers serves as a serious risk on road and is a major factor in many traffic accidents. Addressing driver drowsiness is critical because it compromises road safety. This project focuses on the creation of a non-intrusive detection system for detecting driver tiredness from frontal face image inputs using computer vision and deep learning methods.

The novelty of this approach lies in its ability to analyse fatigue without intruding on the driver's personal space. By emphasizing the global concern of rising car accident fatalities, this research underscores the urgency of preventing driver fatigue to enhance overall road safety.

The current situation of escalating number of vehicles on the roads and the resulting surge in accidents, emphasizes the responsibility of drivers to ensure the safety of themselves and their passengers This research not only underscores the global concern surrounding the escalating fatalities from car accidents but also highlights the need for proactive measures to prevent driver fatigue. By utilizing computer vision and deep learning in real-time driver monitoring, the study seeks to contribute to the ongoing efforts in road safety. The approach presented in this research serves as a testament to the significance of embracing technological solutions to address critical issues such as driver drowsiness, ultimately promoting a safer and more secure driving environment.

II. LITERATURE SURVEY

[1] The paper introduces a novel approach to identify driver drowsiness using a deep 3D convolutional neural network (CNN) and a state probability vector. It involves facial detection, 3D CNN classification of facial image sequences, and concatenation of output probabilities for recognition. Despite improved performance over 2D CNN, challenges arise with large head rotations and occlusions.

[2] The paper introduces an advanced driving assistance system (ADAS) for detecting driver drowsiness, employing sequences of facial images to minimize false positives. Two solutions are proposed: a recurrent and convolutional neural network (R-CNN) and a fuzzy logic-based system. While both achieve comparable accuracy, the fuzzy logic-based system exhibits notably high specificity in reducing false alarms.

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Harnessing AI For Precise Estimation of Medical Leaf Characteristics

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Abstract: This project presents a novel approach for accurately classifying medicinal plant species based on leaf characteristics, utilizing advanced artificial intelligence (AI) techniques. By integrating deep learning models and classic machine learning algorithms, the system offers precise estimations of medicinal plants from leaf images. Users can conveniently upload images through an intuitive web interface, enabling the system to predict the corresponding plant species promptly. The primary focus of this project is to streamline the process of identifying medicinal plants, addressing the challenges associated with manual classification methods. Traditional approaches often entail significant time and effort, leading to potential errors and inconsistencies in classification outcomes. In contrast, our system leverages the power of AI to automate and enhance the classification process, ensuring accurate and reliable results. The core component of the system is a deep learning model, utilized for feature extraction from medicinal plant leaf images. These extracted features serve as input to both a classic machine learning classifier and the deep learning model itself, facilitating robust classification of plant species based on their unique leaf characteristics. Upon image upload, the system swiftly processes the images, extracting relevant features and predicting the corresponding plant species. Additionally, users receive supplementary information about the predicted plant species, including medicinal properties, geographical distribution, and potential applications. By harnessing AI technologies, this project aims to democratize access to accurate medicinal plant classification, benefiting various stakeholders such as healthcare professionals, researchers, and individuals interested in herbal medicine. Moreover, the system empowers users with informed decision-making capabilities regarding the utilization of medicinal plants for various health conditions.

Keywords: Medicinal plants classification,Artificial intelligence,Deep learning,Herbal medicine ,Image-based analysis,Plant species identification,Machine learning,Healthcare applications.

I. INTRODUCTION

Medicinal plants have long been esteemed for their nutritional and medicinal qualities, attributed to bioactive compounds such as antioxidants, anti-allergic, anti-inflammatory, and antibacterial agents. Found in various forms, ranging from trees to shrubs and herbs, their distribution is influenced by environmental adaptations. Approximately 14–28% of plant species exhibit medicinal properties, with significant reliance observed in rural populations of developing countries and a growing interest in developed nations due to concerns over adverse effects of chemical drugs. Despite their multifaceted utility in food, beverages, and cosmetics, global distribution is hindered by counterfeit and substandard products, posing risks to consumers.

Traditionally, botanists identify medicinal plants manually, a process that is both arduous and time-consuming. Leaf morphology, a key identifier, presents challenges due to similarities among species and variations in colour and texture. Despite advancements in feature extraction, vision-based systems still encounter difficulties in accurately classifying medicinal herbs.

This study aims to address this gap by developing a real-time automatic vision system using a proposed deep learning algorithm and machine vision techniques for medicinal plant identification. Responding to the increasing popularity of medicinal plants in artisanal and industrial sectors, the research seeks to enhance automated identification methods to meet evolving demands.

This revised abstract emphasizes the significance of medicinal plants, highlights challenges in their identification, and outlines the research objective of advancing automatic identification methods to meet growing industrial and artisanal needs.

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Deepfake Audio Detection using Deep Learning

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Abstract: The rise of deepfake technology poses a significant threat to the authenticity and integrity of multimedia content, including audio recordings. In response to this challenge, this project proposes a deep learning-based approach for detecting deepfake audio. Leveraging advancements in machine learning and signal processing, the proposed system aims to distinguish between genuine and manipulated audio recordings with high accuracy.The project begins with a comprehensive exploration of existing deepfake detection techniques, focusing on their limitations and strengths, particularly in the context of audio manipulation. Subsequently, a novel deep learning architecture is designed and implemented to effectively capture the subtle cues and patterns indicative of audio manipulation.Key components of the proposed system include feature extraction modules tailored to the unique characteristics of audio data, as well as deep neural network models trained on large-scale datasets of both genuine and deepfake audio samples. Through extensive experimentation and evaluation, the effectiveness and robustness of the developed system are assessed across various types of audio manipulation techniques and levels of sophistication.

Keywords: Deepfake, Audio manipulation, Deep learning, Detection, Feature extraction, Neural networks

I. INTRODUCTION

The advent of deepfake technology has ushered in a new era of multimedia manipulation, posing unprecedented challenges to the authenticity and integrity of audiovisual content. Deepfakes, which are highly realistic synthetic media generated using artificial intelligence algorithms, have raised concerns regarding their potential misuse for malicious purposes such as spreading misinformation, impersonation, and undermining trust in audio recordings.

Amidst this landscape, the detection of deepfake audio has emerged as a critical area of research and development. Unlike traditional methods of audio manipulation, deepfake techniques employ advanced machine learning algorithms to seamlessly alter speech, intonation, and other acoustic attributes, making it increasingly difficult to distinguish between genuine and manipulated audio recordings. Consequently, there is a pressing need for robust and reliable detection mechanisms capable of identifying deepfake audio with high accuracy and efficiency.

This project endeavors to address this challenge by leveraging the power of deep learning—a subset of machine learning that utilizes neural networks with multiple layers of abstraction—to develop an effective deepfake audio detection system. By harnessing the inherent complexity and non-linear relationships within audio data, deep learning models offer the potential to discern subtle patterns and anomalies indicative of audio manipulation, thereby enabling the automated detection of deepfake content.

The primary objective of this project is to design, implement, and evaluate a deep learning-based approach for detecting deepfake audio. This involves the development of novel architectures and methodologies tailored to the unique characteristics of audio data, as well as the collection and curation of large-scale datasets comprising both genuine and manipulated audio samples. Through rigorous experimentation and evaluation, the performance and robustness of the proposed system will be assessed across various types of audio manipulation techniques and levels of sophistication.

Furthermore, this project aims to contribute to the broader research efforts aimed at combating the proliferation of deepfake content and safeguarding the trustworthiness and reliability of multimedia communication channels. By advancing the state-of-the-art in deepfake audio detection, this work seeks to empower individuals, organizations, and technology platforms with the tools and insights needed to mitigate the potential risks associated with audio manipulation in the digital age.

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Implications of end cooling rates on the Mechanical, Viscoelastic, and interlaminar fracture properties of the unidirectional glass Fiber/Epoxy composites

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Abstract

This research explores the impact of different end cooling rates on the mechanical, viscoelastic, and fracture properties of Glass Epoxy (GE) composites. Unidirectional (UD) glass fiber and epoxy resin were utilized to prepare composite laminates, subjected to three distinct end cooling conditions (slow cooling, air cooling and fast cooling). The composites were characterized through tensile, flexural, viscoelastic, interlaminar shear strength (ILSS), mode I and II fracture tests. Results revealed a higher degree of cure in slow cooled samples (87.23%) compared to air cooled (85.11%) and fast cooled specimens (81.56%). Results also revealed that cooling rates significantly influenced the mechanical, viscoelastic and fracture properties, with higher cooling rates improving ILSS(38.92MPa to 46.31MPa), mode I (256.28J/m^2 to 373.85J/m^2) and mode II (1044.19J/m^2 to1151.85J/m^2) interlaminar fracture

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Performance Analysis of Tulip Turbine at Different Angles Using IOT

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ABSTRACT: Recent times have seen a dramatic increase in the utilization of renewable energy sources to meet the enormous demand for consumption, bringing wind turbines into picture. Since majority of the wind turbines are remotely situated, which can be monitored through IoT rather than conventional approaches by using electronic devices like sensors and microcontrollers which can produce more precise findings. The purpose of the study is to look at how a turbine's direction will affect both its performance and energy output. In this research "Performance analysis of tulip turbine at different angles using IoT", the data obtained through technology by the sensors, turbine performance and its behaviour can be monitored and predicted. The analysis was carried out by collecting data from sensors installed on the turbine and transmitting them to an IoT platform for processing and analysis. The obtained output would help us to recognize the further enhancement for higher efficiency and give scope for improvements and also for the predictive maintenance of the system.

KEYWORDS: Renewable Energy ,IoT ,Different Angles, Efficiency .

I. INTRODUCTION

A wind turbine is a device that converts the kinetic energy of wind into electrical energy. Wind turbines are an increasingly important source of intermittent renewable energy, and are used in many countries to lower energy costs and reduce reliance on fossil fuels.

To meet the requirements of energy necessity, wind energy is utilized as the substitute wellspring of energy. To utilize wind energy adequately, proper maintenance of wind plants are required. At some point shortcoming happens in windmills and it turns into a troublesome errand to reconfigure it so we need a decent method to do it. The Internet of Things (IoT) is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment.

IoT based windmill parameter monitoring system is a remote monitoring and remote-control system for windmills. It helps to monitor some internal and external parameters and control the operation of windmills from a distance. It uses sensors to detect the condition around the windmill and a wireless network to send data to a central server. The central server can then generate reports on the condition of the windmill and send it back to remote locations. The data collected can be analysed to determine the efficiency of the windmill which can also help in predicting any potential problems that might arise, thereby helping in maintaining a healthy windmill. Moreover, the live information from the sensors is shown straight forwardly on a dashboard for distant checking. The control experts can get to this dashboard, and some other activities, whenever required, can be taken. The information can appear on hourly, day by day, week after week, or month-to-month premise. It is important for windmills to be monitored because they are expensive pieces of machinery that produce energy for electricity. If not monitored, they could break down and need repairs which would cost a lot more money than if they were monitored. The benefits of using IoT in windmill parameter

DESIGN AND FABRICATION OF RC HELICOPTER BY USING NITRO ENGINE

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Abstract:-

This paper presents the design and analysis of a gas-operated remote-controlled (RC) helicopter, focusing on performance, stability, and control mechanisms to enhance efficiency and reliability for various applications. The study addresses critical challenges encountered during the design process, including the selection of suitable materials, optimization of rotor blade aerodynamics, and the integration of a gas engine to ensure consistent and efficient power delivery. A comprehensive evaluation of the helicopter's mechanical structure and electrical systems is undertaken, with particular attention given to the development of an advanced flight control system. This system is further supported by a flight dynamic stabilization system designed to maintain the helicopter's stability during operation. The research incorporates both computational analysis and experimental testing to validate design choices and identify potential areas for improvement. These methodologies ensure that the helicopter meets its performance goals while maintaining stability and control under various operating conditions. The findings reveal that utilizing a nitro gas engine significantly improves flight times and payload capacity compared to battery-powered alternatives. However, challenges such as increased noise and vibration are highlighted, emphasizing the need for advanced vibration dampening and noise reduction techniques. The study concludes by proposing strategies to enhance the current design, such as improving rotor efficiency, refining the stabilization system, and incorporating modern technologies like lightweight materials and advanced sensors. This research demonstrates how gas-operated RC helicopters can be optimized for performance, making them more effective and dependable for applications in surveillance, aerial photography, and other specialized fields.

Keywords:-
Helicopter, Sensors, Autonomous navigation, Advanced GPS Product

INTRODUCTION:

The idea of remote-controlled helicopters emerged in the middle of the last century when A. Malinovsky and his abler fellows started working on and producing resistance controlled miniature models of helicopters after having successfully worked with full-scale helicopters [(1)]. At first, such models were powered with nitro (glow fuel) engines, but as the years progressed, the applications of nitro engines became more common owing to the

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Integration of AI And Robotics in Precis Agriculture: Enhancing Crop Yield an Resource Efficiency

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The research focuses on applying artificial intelligence and robotics in precision agriculture improve farming practices, productivity, and resource usage. The research employs a combinatic of quantitative and qualitative methods, structured into three phases: The first is analysis ar planning, the second one is design and build and the last one is testing and review. AI technique machine learning frameworks, and robotic systems were developed and implemented in differe agricultural applications including soil identification, plant disease diagnosis, and crop productic estimation. Sensor technologies enabled real-time monitoring of the parameters such as moistu content, temperature and nutrient content of the soil which are vital for the efficient use of wat and fertilizers. The outcomes reveal a much higher efficiency of applying AI in comparison traditional methods in terms of accuracy, resource consumption, and crop productivity. Th integration strategy allowed to have the effective cooperation between AI systems and robotic part and improved decision-making in farming. It focuses on the opportunities of AI & robotics contemporary agriculture and the necessity of the ethic approach to the technology implementatio The research evidence indicates that the use of the above technologies enhances sustainable use the resources in farming thus enhancing food security and conserving the environment.

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Design and Analysis of Horizontal Axis S Turbine for Low Wind Velocity Using QBl

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Abstract

Renewable energy systems are of high importance considering the present day energy requ design and analysis of wind turbines for enhanced efficiency at low at wind speed is studied one of the key aspects which determines the efficiency of the turbine. In this paper airfoil G are considered for the study with a blade length of 0.762 m. General Public Licensed Softwar which uses Blade Element Method (BEM). Comparison of performance parameters for di blade is designed using G4510 airfoil nomenclature. Using these blades, a three bladed r analysis is performed to know the pressure distribution on different areas of the blade. Final assembly and simulation is carried on the small wind turbine. Graphical relationship betwe and coefficient of pressure is obtained for analysis.

Keywords: *BEM, HAWT, QBlade, Rotor, Wind Energy*

1.0 Introduction

For the environmental and economic sustainability, the world is targeting for renewable energy sources. To reduce the concerns to some extent related to global energy demand, global communities are trying to find alternate energy production and saving strategies; also implement

to the usage of these so the environment and is cause environmental po changes in adverse man clean and sustainable a need not only in India

Power Generation by Moving Vehicles on Speed Breaker Using Bicycle Pedal Mechanism

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Abstract. The Generation and storage of electricity is a prime concern in this modern era of development and innovations. Currently, several eco-friendly and conservative strategies are available with different approaches for the generation of electricity. However, development of an efficient methods and innovative ideas are limit less. Currently, lot of energy is wasted in different forms and these can be utilized efficiently. For this project, we created a model with moving cars on a speed breaker that uses a bicycle pedal mechanism to provide modest quantities of electricity for specific applications. The system designed and implemented provides affordable solution for energy crisis affected to the common people. As a developing country, India's energy management is a crucial challenge. The proposed model has the ability to drive vehicle loads, and by installing numerous units of this kind in our nation's densely inhabited places, we can significantly reduce our energy consumption.

Keywords: Electricity generation, Bicycle Pedal mechanism, Road hump, Speed breaker

1 Introduction

Discovery of electricity is considered as one of the major revolutions in the history of science and technology. In this modern era, electricity plays a vital role and is crucial for domestic and commercial purposes. At present, human life is made easy with electricity and cannot imagine a day without its application. With the increase in human population, use of electric power has also increased. Also, the need for electricity is rapidly growing due to the enhancement in technology [1]. Energy crisis is a major concern now due to the shortage of resources available for generating electricity. Hence, there is an immediate requirement to generate electricity efficiently from the resources available in day-to-day life.

To overcome the electricity crisis, we need to develop a cost-effective system with optimal utilization of conventional resources available to us for the conservation of energy. Over the years different mechanisms have been implemented [2-13] with speed breaker mechanism to generate electric power (Table 1). In order to generate electricity, road hump electricity generating system is embedded in the road near tollgates, city malls or high traffic regions in metro cities. In this proposed model, when vehicle passes on the surface of this device, due to the pressure on the hump the device will dip down.

Bond Graph Modeling and Simulation of Electromechanical Rescue Hoist System

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Abstract

This study models a helicopter rescue hoist as a bond graph to understand its dynamic behavior. The rescue hoist is a multi-domain system that includes electrical, mechanical-translational and mechanical-rotational domains. The aim of the study is to compare the behavior of the input voltage, current and output transients of a hoist that is loaded as opposed to a hoist that is not loaded. The comparison is done to study the time taken for the system to attain steady state behavior, and to study the size and damping time of transients. The assumption is made of a hovering helicopter that is holding its position constant as long as the study is completed. Also, the effect of the helicopter downwash is neglected in this study.

Keywords: *Rescue hoist, Dynamic Model, Bond graph*

INTRODUCTION

A Rescue Hoist is a device used in Helicopters that is used to pull in (wind up) or let out (wind out) or otherwise adjust the tension of a rope or wire rope (also called "cable" or "wire cable"). In its simplest form, it consists of a spool (or drum) attached to a hand crank or a motor.

Figure 1 Helicopter with rescue hoist [1]

A rescue hoist is used to lower or pull up a load from a hovering helicopter, or transport a hung load from one place to another.

Generally, the motor used is a DC motor or n induction motor. This study considers a 28V DC motor that is generally used in most helicopters. The cable or winch is generally made of braided steel cords but can also be made of other materials like nylon.

Iconic Equivalent of the Rescue Hoist

The first step in analyzing the dynamics of the rescue hoist is to convert the physical system into its iconic equivalent. The iconic diagram is shown below:

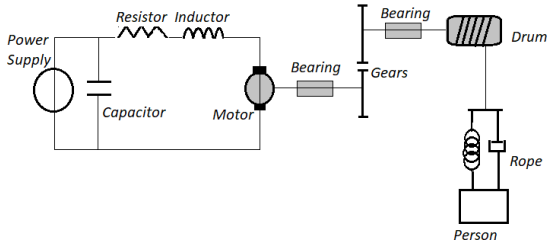

Figure 2 Schematic diagram of Rescue hoist System

The power supply to the system is through the aircraft DC supply. The supply is a constant voltage 28V DC power unit. This source can be through the DC generator, Static inverter or the aircraft battery.

The capacitor shown here is the capacitive equivalent between the power cables. The resistance shown is the combined resistance of the cables as well as the armature resistance of the DC motor. The inductance shown is the armature inductance of the armature winding inside the DC motor.

The output of the DC motor drives the shaft that is connected to the reduction gears by means of bearings. The gears reduce the speed (rpm) of the motor shaft by about 100 times. The second shaft connects the gears to the drum that is used to wind the cable. This connection is also made

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Fabrication and Flexural Performance of Self Composites with Micro-Vascular Chann

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Abstract

Composite materials play an important role in weight reduction, making them suitable f including aircraft components. To account for efficiency losses caused by impact, existi incorporate large safety margins, which can result in overweight and less effective struct healing capabilities is another way to reduce sensitivity to impact damage. This work fo of self-healing composite materials and demonstrating how strength is recovered when are dispersed at specific intervals within the composite. The primary goal is to mini properties while maximising efficiency of healing events. In this research, the specime were created both with and without micro-vascular channels. The specimens with micr filled with a resin and hardener mixture. Both types of specimens were then subjected t the loss in strength. The results showed a 6.7% and 14.3% loss in flexural strength of th materials compared to a control specimen. Due to this minimal loss, these materials h application. In aerospace, they could be used in fuselage and aerostructures, engine bla coatings, smart paints, and impact-resistant space structures.

Keywords: Self-Healing Composites, Micro-Vascular Channels, Vacuum Assisted F Flexural Test, Structural Integrity, Aerospace Applications.

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PAPER • **OPEN ACCESS**

Experimental Evaluation Of Quasi-Static Strength Of Composite Laminate With Nano Particles

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DESIGN AND ANALYSIS OF G+3 COMMERCIAL BUILDING AT MUNNUR GRAM PANCHAYAT,MANGALORE

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Abstract : In order to compete in the ever-growing competent market it is very important for a structural engineer to save time. As a sequel to this an attempt is made to analyze and design a multi-storied building by using a software package STAAD-Pro for analyzing a multi storied building one has to consider all the possible loadings and see that the structure is safe against all possible loading conditions.

Key words **- STAAD Pro, Seismic loads**

I.INTRODUCTION

Occurrences of recent earthquakes in India and in different parts of the world are resulting in various losses, especially human lives due to damage of structures which has highlighted the structural inadequacy of buildings to carry seismic loads. The procedure for seismic analysis and design of buildings has still not received adequate attention in India in causalities in past earthquakes is the collapse of buildings. To overcome this there is a need to know about the earthquake design philosophy for an economical and safe design of a building, and to perform step-by-step procedure for lateral load analysis for all multi and single storied buildings.

In this project a G+3 building is considered for design and analysis for both gravity and lateral loads. This analysis includes the determination of lateral loads by equivalent static load method. Our project involves analysis and design of multi storied (G+3) using a very popular design software STAAD Pro.

II.OBJECTIVES

- To perform gravity load analysis as per IS Code.
- To perform seismic load analysis as per IS Code.
- To obtain zero errors in Staad Pro result, leading to a safe design.
- To design various structural components using shear force and bending moment values obtained via Staad Pro.
- To generate a rendered 3D model of the structure using Sketch-Up

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Experimental study on the Strength Parameters of Geopolymer concrete with and without Chemical admixture

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Abstract : Ordinary Portland cement production is the second generator of carbon dioxide, which pollutes the atmosphere. In addition to that, large amount of energy was also consumed for the cement production. Hence, it is inevitable to find an alternative material to the existing most expensive; most resource consuming Portland cement. Geopolymer concrete is an innovative construction material which shall be produced by the chemical action of inorganic molecules. Geopolymer concrete helps in reducing the environmental pollution as there is no use of cement during its manufacturing. Many industrial wastes such as Fly-ash, GGBS, silica fume, rice husk ash, kaolin and metakaolin can be used as alternative materials for cement and M-sand is used as fine aggregate in Geopolymer concrete. The Alkali activators are prepared by combining sodium hydroxide and sodium silicate solution in the ratio of 2.5 and molarity of 12N. This project work is to make and to study the Compressive, split tensile and flexural strength of Fly-ash, GGBS based Geopolymer concrete with and without using M-Sand and also by compare the strength parameters with conventional concrete of M30 grade. The investigation expected that FA-GGBS based Geopolymer concrete with Super plasticizers result in high workability and high strength when compared with Geopolymer concrete without Superplasticizers.

Index Terms **– Geopolymer Concrete, Workability, Compression Strength, Split Tensile Strength, Flexural Strength**

1. INTRODUCTION

Ordinary Portland Cement (OPC) is the most commonly used binder material in construction practices. There is a need to reduce the ill effects of using OPC has brought about the evolution of a new type of binder known as Geopolymer binder. Geopolymer concrete (GPC) is basically cement less concrete and it has the potential to reduce the global carbon dioxide emissions and is thus considered to be an environmentally friendly and pollution free construction material. Next to water, concrete is the most used material, which required large quantities of Portland cement. It is inevitable to find an alternative material to the existing most expensive; most resource consuming Portland cement. Geopolymer concrete is an innovative construction material which shall be produced by the chemical action of inorganic molecules

In this study comparative strength behavior was studied on Gopolymer concrete with and without super plasticizers. In this study Geopolymer concrete shall be produced without using any amount of ordinary Portland cement, instead, combination of Fly-Ash and GGBS in different proportions are used. Compressive strength of Geopolymer concrete is very high compared to the ordinary Portland cement concrete. Geopolymer concrete also showed very high early strength. The compressive strength of Geopolymer concrete is about 1.5 times more than that of the compressive strength with the ordinary Portland cement concrete,

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AUTOMATION IN STEEL QUANTITY TAKEOFF IN BUILDING

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Abstract : The Bar Bending Schedule (BBS) is basically the representation of bend shapes and cut length of bars as per structure drawings. BBS is prepared from construction drawings. For each member separate BBS is prepared because bars are bended in various shapes depending on the shape of member. "BBS" The word BBS Plays a significant role in any construction of High rise buildings. It helps to quote for tender the cost incurred by steel. Finding the cutting length and bending length in reinforcement detailing improves the quality of construction and minimize the wastage of steel, makes an economic construction. This increases faster construction and reduces the total construction cost For site engineers, It becomes easy to verify the cutting length and bending length of the reinforcement before placing the concrete.

Key words **– Autocad, Excel, Bar Bending Schedule.**

I. INTRODUCTION

A Bar Bending Schedule, provides detailed information about the shape, size, length, and quantity of steel bars required for construction. Bar Bending Schedule is in tabular form that includes designation, shape of bar, no. of bars, diameter of bar, cutting length, total length, unit weight and total weight.BBS is mainly used in the field of civil engineering to ensure that the correct type of bars is used in the construction.BBS is mainly used in the cost estimation of steel bars required for the project.The components of BBS are Bar mark, Bar description, length, quantity, shape code and bending details. With proper BBS details construction workers can easily identify and it is easy to utilize the correct reinforcement bars in the construction site.Bar Bending Schedule can be done using excel sheet .

There is already a thrilling software which is Bar-Be-Que which has too many manual calculation to lessen the manual calculation we went to the automation in steel quantity take off for buildings. The bar shape that will be utilized in the bar bending schedule's tabular format can be designed using Autocad software.Exact results cannot be reached through manual computation because there are too many errors involved. Bar bending software automation is required to reduce these inaccuracies. The benefit of BBS software is that it saves time for consultants and engineers, as well as reducing rework caused by errors in manual calculations. It is also cost efficient and safer.

Bending of Bars Making a schedule for the construction of RCC work is a more labor-intensive and challenging task. The working drawings must precisely depict the shape of the bar. Thus, Bar-Be-Que, a program developed by Ensoft Consultant, was introduced to address all of these issues. There are far too many manual entries in this software that must be completed by the engineer or consultant. This procedure wastes the consultant's or engineer's time, and human calculations might result in significant wastage of steel bar. To mitigate this drawback, the Bar-Be-Que program automates the takeoff of steel quantities for construction projects.

Second, automation produces exact answers as opposed to manual calculation, which is prone to human mistake. Automation is a great tool in addressing this issue. BBS offers a plethora of benefits, and developing software for it can lower costs and lighten the weight of the steel or reinforcing bars needed for building. Construction workers will find it easier to understand the drawing and cut and bend the bar to the precise length specified in the report sheet, which will be in PDF format, thanks to this automation, which will also eliminate material waste and human mistake.

A bar bending schedule, which appropriately provides the arrangement, bending shape, total length, and amount of all the reinforcements specified in a structural drawing, is a crucial structural working document. It is frequently supplied apart from the structural drawing on a different page of paper, usually A4. The bar bending schedule is immediately updated with the bar marks from the structural details design.

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AIR POLLUTION CONTROL OF FISH MEAL & OIL INDUSTRY USING BIO-FILTERS

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Abstract: The fish oil extraction industry plays a critical role in providing essential omega-3 fatty acids and other valuable compounds to consumers worldwide. However, this process often generates toxic and noxious odors due to dimethylamine (DMA) and trimethylamine (TMA) gases, which pose serious ecological and socio-environmental problems and are considered strong environmental pollutants. This project aims to reduce the noxious odor emissions from the fish meal and oil extraction industry by introducing a novel approach using odor-reducing agents such as acetic acid, lactic acid, and activated charcoal as a bio-filters. The research aims to improve the overall quality of final products while addressing environmental concerns. The findings contribute to the development of sustainable practices in the industry, promoting efficient and eco-friendly fish processing.

Key words: omega-3 fatty acids, toxic and noxious odors, noxious odor emissions, activated charcoal as a bio-filters.

I. INTRODUCTION

Fish tissues are rendered in order to extract the precious oil, which is high in omega-3 fatty acids and other beneficial substances. This technique can be problematic for the workers as well as the neighboring community because it frequently generates offensive and sometimes dangerous aromas into the surrounding area.

These smells are strong and poisonous, which can make it difficult to comply with environmental regulations and lower the general standard of living in the neighborhoods that surround fish processing plants.

Our project's reaction to this problem centers on putting in place a complex plan to lessen the harmful aromas that fish oil extraction tanks emit. The main goal is to provide an efficient and practical approach that can be easily incorporated into current processing facilities without sacrificing quality.

II. OBJECTIVES

a. To evaluate the effectiveness of activated charcoal in reducing noxious odors during fish meal & oil extraction as a bio- filters.

b. To determine the practical applicability of these odor-reducing agents within the fish processing industry.

c. To improve the working environment for overall quality of life in the areas surrounding of the fish processing facilities and pose environmental compliance challenges.

d. To ensure compliance with environmental regulations by reducing odor emissions.

e. To enhance the quality of life for communities located near fish processing facilities by minimizing the impact of noxious odors.

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MODIFIED PRE-FABRICATED FENCING WALL PANELS

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Abstract :

Modified pre-fabricated fencing wall panels offer a sustainable and efficient solution for construction needs. They streamline the process, reduce labor, and minimize waste. Versatile in design, they cater to various architectural requirements, ensuring both functionality and aesthetic appeal. Engineered for durability, these panels withstand environmental challenges and vandalism, providing long-term security. Their sustainable features include optimized material usage, reduced construction waste, and minimal maintenance needs, making them an ideal choice for modern infrastructure projects

Index Terms – Flexural strength, Compression strength, Plastic Mesh, Galvanized Mesh, Pre cast Wall Panels

I. INTRODUCTION

Modified pre-fabricated fencing wall panels offer a revolutionary solution to modern construction and infrastructure needs. With innovative design and manufacturing techniques, these panels have transformed the way fencing is installed and utilized in various applications. This introduction will delve into the key features and benefits of modified pre-fabricated fencing wall panels, highlighting their efficiency, versatility, and sustainability in meeting the demands of contemporary projects.

Traditional methods of erecting fences often involve time-consuming processes, extensive labor, and significant material waste. In contrast, modified pre-fabricated fencing wall panels streamline the construction process by prefabricating panels off-site to exact specifications. This not only reduces on-site labor requirements but also ensures precision and consistency in the final product. One of the standout features of these panels is their versatility. They can be customized to suit a wide range of design preferences, from sleek and modern aesthetics to more traditional styles, catering to various architectural requirements. Additionally, the panels can be easily integrated with other structural elements, such as gates, lighting fixtures, and security features, enhancing both functionality and visual appeal.

Furthermore, modified pre-fabricated fencing wall panels are engineered for durability and longevity. Constructed from high-quality materials and subjected to rigorous quality control measures, these panels offer superior strength and resilience against harsh environmental conditions, vandalism, and wear and tear. As a result, they provide long-term protection and security for residential, commercial, industrial, and institutional properties alike. In terms of sustainability, these panels present a compelling option for environmentally conscious projects. By optimizing material usage and minimizing construction waste, they contribute to resource conservation and reduce the carbon footprint associated with traditional fencing installations. Moreover, their durable nature ensures minimal maintenance requirements over their lifespan, further reducing environmental impact.

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Review

Prelithiation of electrodes in lithium-ion capacitors: A review

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Abstract: Lithium-ion capacitors (LICs) are one of the modern state-of-the-art hybrid capacitors, comprising a high potential window and imparting a higher energy density than supercapacitors (SCs). These LICs encompass elevated power density and a longer life span than lithium-ion batteries (LIBs). Preparation of high-performance electrode materials with electrochemically active microstructure and prelithiation are two efficient approaches to fabricate highly efficient LICs. But it comes across as a real dilemma of low initial Columbic efficiency if only microstructure is considered as an efficient way to enhance the performance. Nevertheless, prelithiation plays a crucial role in the manufacturing of LICs, improving the initial Coulombic efficiency and enlarging the voltage window. This paper reviews the recent lithiation approaches for lithium-ion capacitors by providing their methods and discussing their results concerning their energy and power density.

Keywords: electrodes; columbic efficiency; prelithiation; LIC; energy density

1. Introduction

An increase in the market size of EVs and consumer electronic goods like computer systems and mobiles has swayed the research attention towards high-density energy storage systems [1]. These energy storage systems should be capable of generating fair output power and safe operational characteristics to be used in both vehicles and consumer electronic applications [2]. Among all types of energy storage devices, lithium-based materials are the most commonly used commercial systems to store energy from renewable energy sources. Among most lithium-based energy storage systems, LIBs have become the most widely used electrochemical energy storage device due to their superior energy density values, much needed for modern-day EVs and consumer electronics [3,4]. Nonetheless, both LIB's and SCs exhibit a notable discrepancy in performance due to their inability to meet the demands of fast charging and slow discharging. Thus, to overcome such discrepancy, an electrochemical energy storage device needs to be able to have both a high energy density and a high power density in order to achieve these requirements [5].

LICs are hybrid energy storage systems where SC's type cathode and LIB's type anode are used to derive high power and energy densities simultaneously. Conventionally activated carbon is used as a cathode material, which imparts greater power density, and compositions like $LiTi_5O_{12}$ are used as anode materials, which result in higher energy density. This asymmetric device construction makes these devices appropriate for both consumer electronics as well as automotive mobility. It is well known that the

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Drug Abuse Detection using IOT and Fuzzy Neural Network

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ABSTRACT

The increasing use of drugs among the youth is a big concern nowadays. The inability to detect drug consumption is a major issue. One of the ways to detect drug consumption is with the use of IoT devices. IoT devices are providing various dimensionalities and online services. These applications have provided a new platform to millions of people for getting benefits in various fields. This led to the introduction of IoT technology and related devices to be used in the medical field, strengthening the various features of these drug detection online applications. The present drug detection applications also use the Cloud Computing technology for secured storage and accessibility. For availing better services to the people over the online drug detection, the proposed project uses a new Cloud and IoT based Mobile drug detection application for monitoring and detection of drug usage among the youth. In this project, a new systematic approach is used for the drug detection and the related medical information is generated by using the UCI Repository dataset. In addition, the proposed project applies SVM(Support Vector Machine) Classifier, Neural Network and Fuzzy Tool Box for diagnosing the drug and its severity. The electrocardiogram sensor unit is used to further improve the accuracy of the result.

Keywords: Drug, SVM (Support Vector Machine), Fuzzy Neural Network, IoT.

INTRODUCTION

Drug abuse stands as a pervasive global problem, impacting individuals and societies profoundly. Traditional methods of detecting drug abuse lack the necessary accuracy and real-time monitoring capabilities required for effective intervention. However, recent technological advancements have opened doors to innovative solutions. One such approach involves the fusion of the Internet of Things (IoT) and Fuzzy Neural Networks (FNN). IoT technology allows for seamless integration of various sensors, enabling the continuous collection of extensive data from the physical world. In parallel, FNN, a combination of fuzzy logic and neural networks, excels at handling uncertain and imprecise data. This amalgamation of IoT and FNN offers a promising avenue for drug abuse detection. IoT devices can monitor an individual's physiological parameters, behavioral patterns, and environmental factors in real-time. FNN processes this data, identifying subtle patterns and deviations indicative of drug abuse. A significant advantage of this approach is its ability to provide real-time alerts to caregivers, healthcare professionals, and authorities, facilitating timely intervention and improving rehabilitation outcomes. However, the implementation of IoT and FNN for drug abuse detection raises ethical and privacy concerns. Finding a balance between monitoring for societal well-being and safeguarding individual privacy is crucial and requires robust legal and ethical frameworks. Ongoing research and development efforts are necessary to optimize this approach further. Interdisciplinary collaboration between experts in medicine, neuroscience, machine learning, and ethics is essential. Through these collective efforts, the integration of IoT and FNN offers a promising solution to enhance drug abuse detection, intervention, and support while respecting individual privacy and ethical considerations. This interdisciplinary approach holds the potential to significantly improve the outcomes in the ongoing battle against drug addiction.

LITERATURE SURVEY

Tsz-Tsun Ng et.al.[1]: Reviewed a detailed discussion on wooden-tip electrospray ionization mass spectrometry (WT-ESI-MS), a simple and cost-effective technique, developed for rapid detection and quantitation of common drugs-of-abuse, including methamphetamine, methylenedioxymethamphetamine, cocaine, heroin and tetrahydrocannabinol, in urine and oral fluid. The results indicated that WT-ESI-MS could be used for rapid screening of drugs-ofabuse in urine, oral fluid as well as other body fluids.

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Aquasafe: A Portable Water Quality Monitoring And Pathogen Detection System– A Review

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ABSTRACT

This research describes the development of a portable water quality detection device that assesses drinking water quickly andaccurately by utilizing various sensors, drawing insights from multiple research papers. It emphasizes the limitations of traditional monitoring methods and explores the evolving landscape of sensor technologies, including biosensors, nano sensors, and optical sensors, for enhanced sensitivity and real-time data collection. The integration of remote sensing and IoT technologies in continuous water quality monitoring is discussed. Critical challenges and major facts that affects the accuracy of the system are highlighted for their integrity in pathogen detection. Advanced analytical tools like mass spectrometry and microfluidic devices in water quality assessment are also covered. Addressing challenges and future prospects, the review underscores the need for standardization and cost-effectiveness. Global case studies provide insights into the efficacy of sensor-based monitoring systems. This review aims to guide future research towards developing robust, scalable, and sustainable solutions for ensuring water safety worldwide.

INTRODUCTION

In an era where environmental sustainability is of paramount importance, our water quality monitoring project aims to address the critical need for assessing and preserving the quality of water resources. As populations grow and industrial activities expand, understanding and safeguarding the health of our water ecosystems become increasingly vital. This project endeavors to employ advanced monitoring techniques and technology to analyze various water parameters, providing valuable insights into the state of our water bodies. Through this initiative, we strive to contribute to the ongoing efforts to ensure access to clean and safe water, fostering a healthier environment for both ecosystems and human communities alike. Ensuring safe drinking water is crucial forhuman health. Water contains organic (humus, protein) and inorganic matter (ions like Ca, Mg) that impact quality. Comprehensive parameters such as permanganate index, COD, TOC, and conductivity are used for rapid monitoring. Achieving swift and holistic assessments is vital to preventing diseases caused by poor water quality [1]. A computer vision system is developed to enhance the detection of impurities in bottled mineral water, addressing shortcomings in traditional methods. Usinghigh-speed industrial cameras and RGB model image analysis, the system applies HSI color format transformation for environmental brightness normalization. Through hue and saturation thresholding, impurities are identified, facilitating efficient removal of substandard products from the assembly line, improving accuracy and efficiency [2]. Water quality detection, crucial for various activities, requires sensors with high sensitivity, selectivity, and quick response times. Recent advancements in Optical Sensors (OS), Microelectronics Mechanical Systems (MEMS), and Bio-Sensors offer notable benefits such as independence from reference sensors, immunity to electromagnetic interference, and real-time analysis capability. This paper explores the applications of these technologies in detecting key water quality parameters—pH, Dissolved Oxygen (D. O), Turbidity, Escherichia Coli (E. coli), and Residual Chlorine [3]. This study focuses on designing a water turbidity monitoring system for a water treatment plant in Indonesia. Turbidity, caused by suspended particles, impacts water quality. The prototype employs light scattering principles, utilizing a photodiode and infrared LED in a turbidity sensor controlled by an Arduino Uno microcontroller. Measurement results, converted from ADC values to NTU units, are displayed on a 2x16 LCD. This system aidswater treatment processes, ensuring adherence to turbidity standards for safe water distribution [4]. The urgent global problem of water pollution and its impact on health, emphasizing the lack of awareness and monitoring systems, especially in developing countries. It proposes a Wireless Sensor Network (WSN) design to monitor water quality in real-time by collecting data on various parameters, providing a novel approach for ongoing information retrieval and timely actions to protect water resources

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Design and Fabrication of Patch Antenna for Wi-Fi Applications

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ABSTRACT

A microstrip patch antenna on an FR-4 substrate is a small, low-cost radio frequency antenna widely found in wireless communication equipment. It comprises a thin, flat conductive patch element positioned above an FR-4 printed circuit board, with a ground plane on the bottom layer. The dielectric constant of the FR-4 material impacts the electrical properties of the antenna. When an RF signal is applied to the patch, it emits electromagnetic waves, and its operating frequency and radiation pattern are determined by design parameters such as patch size, shape, and substrate qualities. Because of its ease of integration, low cost, and compatibility with common PCB fabrication processes, FR-4 microstrip patch antennas are frequently used in devices such as smartphones, Wi-Fi routers, and IoT devices. These antennas may be designed to operate in specified frequency bands and to achieve desired radiation characteristics, making them excellent for applications ranging from mobile phones and GPS devices to radar systems and satellite communication terminals.

Keywords: **Microstrip patch antenna, FR-4 substrate, Radio frequency antenna, Wireless communication equipment, Conductive patch element, IoT devices, RF signal, Satellite Communications, Integration**.

1. INTRODUCTION

A patch antenna is a low-profile, straightforward radio antenna that is commonly used in radar applications, communication systems, and other wireless devices. Its similarity to a tiny patch on a printed circuit board (PCB) is where it gets its name. These antennas are widely used because of their directed emission pattern, small size, and simplicity of construction. They are frequently found in equipment like satellite communication systems, GPS units, mobile phones, and Wi-Fi routers that have limited space. Patch antennas work by producing electromagnetic waves in a conducting material patch, often on a substrate made of dielectric. The antenna's radiation properties and resonance frequency are dictated by the patch's dimensions and shape, in addition to the type of substrate used. Patch antennas' high efficiency and gain can be attained through suitable design for certain frequency bands, which is one of its main advantages. They can be readily incorporated into electronic systems and are capable of radiating in a variety of polarizations, including circular and linear types. Combining performance, compactness, and ease of integration with contemporary electronic equipment, patch antennas provide a workable solution for a range of wireless communication requirements. An antenna that is optimized for the intended frequency band and performance criteria is created through a series of procedures in the fabrication of a patch antenna for Wi-Fi applications.

2. LITERATURE SURVEY

Boonyarit Kumkhet *etal.*,[1]discuss using wearable textile fabrics as antennas in wireless communication. Flexible textile antennas, such as microstrip patch antennas, are suitable for wearable applications. They employ fabric substrates, have low dielectric constants, minimize surface wave losses, and increase antenna bandwidth. Wearable patch antennas for the 2.45 GHz frequency are adaptable, easy to manufacture and operate well.

Akinola Segun *et al.*,[2]have proposed the idea that the integration of technology in healthcare is transforming the sector, with wearable antennas playing an important part. This paper gives a thorough analysis of wearable antenna applications in healthcare, emphasizing their influence on chronic illness management and pandemic preparation, and argues that bio-magnetic applications can help avert future epidemics.

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Object Detection in Fog Using Lidar

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ABSTRACT

In India the majority of the individuals die in street mishaps as opposed to by illnesses. Vehicle crash shirking and snag location framework is one in all the chief basic factors inside the car drove. This method distinguishes the hindrance before the vehicle & cautions the framework. The camera is utilized to distinguish moving or fixed articles. The LIDAR is encased with this method to registering the space of constant moving and the fixed article. The caution is given to the framework inside the vehicle with respect to the obstruction so that the framework helps in impact evasion. During this work, the space between the vehicle and hindrance is estimated by the LIDAR and article identification is done by the camera. By melding both these sensor esteems the snag is identified and subsequently the separation is furthermore precisely estimated.
Keywords: LIDAR, Camera, Sensor.

INTRODUCTION

LiDAR (Light Detection and Ranging) sensors have become crucial eyes for autonomous vehicles and robots, providing highly accurate 3D point clouds of the environment. However, their effectiveness plummets in adverse weather conditions like fog, where light scattering significantly reduces visibility and distorts point cloud data. Object detection in such scenarios becomes a critical challenge with immense practical implications for safe autonomous navigation.The emergence of autonomous vehicles has necessitated robust object detection systems that perform seamlessly across diverse weather conditions. While cameras dominate in clear weather, their effectiveness plummets in fog, causing safety concerns. LiDAR (Light Detection and Ranging) sensors, on the other hand, thrive in low-visibility environments due totheir direct measurement of distance and inherent immunity to light. This project explores the potential of LiDAR for object detection in foggy conditions, with a focus on real-time vehicle and animal detection on roads using an ESP32 microcontroller and a TF Mini S LiDAR.Our primary objective is to develop a lightweight, low-power system capable of reliable object detection in foggy environments using LiDAR data. The system will utilize an ESP32 microcontroller for real-time processing and an Ultralytics-trained deep learning model for object classification. We aim to achieve a minimum detection accuracy of 80% for both vehicles and animals while maintaining a fast-processing rate suitable for onboard deployment.The project leverages the use of some specific components, such as the TF Mini S LiDAR, Arduino Uno, ESP-EYE and the servo motor, to achieve foggy objects detection. TF Mini S LiDAR is a LiDAR sensor with a small stature and lightweight design that can provide distance measurement under various circumstances, ranging from haze to sunlight. The cooperation of the Arduino Uno and the LiDAR sensor, as a microcontroller means that they communicate with each other so that data acquisition and processing can be managed. We can therefore assume that ESP-EYE is being used for further processing or communicational purposes, for example, data transmission to a remote device or liaising with other devices.Combining all these aspects of the project and using LiDAR technology, our objective is to design a stable object detection mechanism which will be able to work well in fog and thus contribute to make aviation and transport, monitoring, and industrial processes safe as well as productive.

LITERATURE SURVEY

K. Usmani *etal.*,[1]In this paper, researchers address the problem of object recognition in degraded environments including fog and partial occlusion. Both long wave infrared (LWIR) imaging systems and LiDAR (time of flight) imaging systems using Azure Kinect, which combine conventional visible and lidar sensing information, have been previously demonstrated for object recognition in ideal conditions.

X. Liu *et al.*,[2]In this paper, researchers investigate this issue and propose a novel improved You Only Look Once (YOLO) model based on a cross-attention strategy transformer, called CAST-YOLO. This detector is a teacher–Student knowledge transfer-based detector. We design a transformer encoder layer (TE-Layer) and a convolutional block attention

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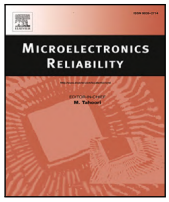

Review paper

Ionizing radiation defects and reliability of Gallium Nitride-based III-V semiconductor devices: A comprehensive review

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ABSTRACT

The remote sensing and satellite community working for space organizations have expressed interest in building advanced devices with potential choices for Gallium Nitride based transistors. Radar and satellite communication applications employ nitride High Electron Mobility Transistors (HEMTs) due to their high radiation-absorbing and temperature tolerant qualities. However, they also deteriorate simultaneously upon such radiations that cause a drastic fall in their lifetimes. This article carries out reliability studies of GaN-based III-V semiconductor devices, including HEMTs, Schottky and thin film diodes by reviewing the defects induced by radiation. A review of the various kinds of defects induced in these devices upon subject to several radiation beams like proton, neutron, gamma, alpha, and other sources has been discussed here. GaN, when subject to high energy ionizing radiation particles, produce point defects in the material that are more dominated by extended disordered regions. Trap states also occur as a part of radiation damage with forbidden gaps consisting of deep thermal ionization energies, which causes the device's mobility and electrical conductivity to decrease drastically. A short description on how these defects can be mitigated to a certain extent has been given, eying towards more withstanding capabilities for these devices in radiation-hardened environments.

Contents

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Design and Implementation of a High Performance Sram Cell

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ABSTRACT

A significant technological advancement, the 9-Transistor (9T) Static Random-Access Memory (SRAM) cell provides enhanced performance and dependability over the conventional 6-Transistor (6T) cells. With three access transistors and six storage transistors, this novel cell design addresses major issues in contemporary semiconductor memory architectures and allows for increased functionality. The 9T SRAM cell's increased transistor count helps explain why it performs so well during read and write operations. The use of read-assist strategies, such assist circuits or assist devices, which improve the efficiency and dependability of data retrieval, is made easier by the addition of more transistors. This capability is especially important for satisfying the growing need in modern electronic devices for high-speed, low-power memory solutions. Furthermore, the 9T SRAM cell has improved write capability and decreased susceptibility to mild faults, which makes it a desirable option for high-performance computing and safety-critical system applications. Greater flexibility in balancing power consumption and access time is made possible by the design, which provides a solution that can be tailored to meet a variety of technical needs. In conclusion, the 9T SRAM cell, which uses its increased transistor count to address issues with performance and reliability, marks a substantial advancement in SRAM technology. This breakthrough might contribute to the continuous advancement of semiconductor memory design and enhance the capabilities of memory systems in a variety of applications, ranging consumer electronics to essential computer settings.

Keywords: Leakage Current, Power Consumption, Data Retention, Stability, Bitline

INTRODUCTION

The design and implementation of a 9T SRAM represents a critical aspect in modern Integrated Circuit (IC) development, essential for various computing applications ranging from microprocessors to embedded systems. This paragraph provides an overview of the intricate process involved in crafting such a memory unit. Initially, the design phase entails meticulous consideration of key parameters including access time, power consumption, area efficiency, and stability. Engineers must navigate trade-offs between these factors to achieve an optimal balance that meets the target specifications. This involves architectural decisions such as cell size, transistor sizing, and topology selection. Following the design phase, the implementation process involves translating the theoretical design into a physical layout using Electronic Design Automation (EDA) tools. This step demands precision and expertise to ensure proper functionality and adherence to fabrication constraints. As part of this stage, layout engineers must grapple with challenges such as minimizing parasitic effects, ensuring proper interconnect routing, and optimizing layout for manufacturability. Additionally, thorough verification and testing procedures are integral to validate the design's functionality and reliability across various operating conditions. Overall, the design and implementation of a 9T SRAM necessitates a holistic approach encompassing design exploration, layout optimization, and rigorous validation to deliver a robust and efficient memory solution for modern computing systems. The significant development in semiconductor memory technology, the 9T SRAM cell aims to improve integrated circuit memory storage performance and efficiency. The principal aim of this research is to develop, examine, and enhance a new SRAM cell architecture that utilises just nine transistors. The goal of this project is to meet the increasing need for modern electronic gadgets to have faster processing, less power consumption, and more memory density. A smaller footprint and energy-efficient operation are made possible by the fewer transistors, which makes them especially important for battery-powered applications. This project's scope includes a thorough investigation of the 9T SRAM cell's transistor-level design, modelling, and characterization. By exploring the nuances of this cutting-edge cell structure, the research attempts to provide significant insights and answers to the problems related to modern memory architecture, opening the door for more effective and small memory solutions in next semiconductor technologies.

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A Review on Solar-Powered Seed and Fertilizer Sprayer System

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ABSTRACT

Introducing a cutting-edge agricultural innovation, the "Solar Seed and Fertiliser Sprayer" revolutionizes modern farming practices by enhancing crop production efficiency while minimizing environmental impact. This innovative system utilizes a hopper-based mechanism to efficiently distribute seeds and fertilizers using a fan or blower, eliminating the need for manual labour in the planting process. Powered by solar energy, the system prioritizes sustainability and promotes eco-friendly farming methods by reducing reliance on conventional energy sources. With remote control capabilities enabled by the ESP8266 and WIFI integration, farmers gain precise control over seeding and fertilization operations, allowing for optimized resource management and improved crop yields. Beyond its labour-saving potential, the project embodies the principles of precision agriculture and offers a practical solution for enhancing agricultural productivity in a manner that is both environmentally conscious and technologically advanced. By leveraging state-of-the-art technologies and sustainable practices, the Solar Seed and Fertiliser Sprayer represents a significant step forward in modern agriculture, promising increased efficiency, reduced environmental footprint, and ultimately, a more sustainable future for farming.

Keywords: Solar Power, Agriculture, ESP8266, Smart Control, Seed Sprayer, Fertilizer Sprayer

INTRODUCTION

Today's agricultural landscape is undergoing profound changes, driven by technological innovations that address the changing challenges of global food production and sustainability [1]. At the heart of this agricultural renaissance is the integration of solar technology into key agricultural machinery, representing a key advancement with transformative potential. Since agriculture plays a vital role in feeding a large portion of the population, especially in regions like India, it is crucial to adopt sustainable practices [2]. Solar-powered seed and fertilizer sprayers have proven to be a compelling alternative to conventional methods, as they reduce reliance on traditional energy sources and are in line with international initiatives to reduce the carbon footprint associated with agricultural activities [3].

Due to the need to improve operational efficiency while minimizing resource waste, solar sprayers have great prospects for development, especially for small-scale farmers, who are an important group in agriculture [4]. This report explores the multiple benefits and innovations of solar-powered seed and fertilizer sprayers to gain a comprehensive understanding of their impact on precision agriculture, resource efficiency, and environmental protection.

Our project represents a holistic approach to optimizing seed and fertilizer distribution, combining the use of solar energy with smart distribution systems. Harnessing the sun's energy through solar panels, our system powers a precise distribution mechanism equipped with advanced sensors and algorithms. These mechanisms ensure accurate and efficient distribution of seeds and fertilizers based on crop type and growth stage, thereby minimizing resource waste and maximizing the effectiveness of nutrient delivery [5].

Accurate seed and fertiliser distribution is essential for productive crop development. Conventional approaches frequently fail to achieve the required accuracy, which results in inconsistent crop growth and inefficient use of resources. In order to overcome this difficulty, solar seed and fertiliser sprayers have developed clever and resource-conscious distribution strategies [6]. In addition to being sustainable, the use of solar electricity advances precision agriculture, which in turn promotes higher production and environmental awareness in the future[7]. .

In the next sections of this review, we discuss certain initiatives and developments in the field of solar fertiliser and seed sprayers. A unique attempt to use solar technology to improve farming operations can be seen in each project. This paper explores the methods, benefits, difficulties, and complex internal workings of our solar-powered sprayer system in an effort to provide a thorough knowledge of how these creative solutions are changing the face of agriculturetoday.

Seed Spraying Mechanism

The solar-powered sprayer's intricate seed-spraying mechanism was influenced by research like [7] and [8]. For effective seed distribution, a blower system should be included, as covered in [7]. An essential part that uses regulated airflow to distribute seeds uniformly throughout the intended area is the blower. It functions in concert with a seed hopper, which holds seeds before to releasing them into the airflow. .

One essential part of the solar-powered seed spraying mechanism that helps to achieve uniform and ideal seed dispersal in agricultural fields is the blower system. Drawing on seminal works like [7], [8], and [12], the blower system integrates essential components to optimise efficiency and durability. An electric motor with a high power output, as suggested in [12], powers the blower and uses solar energy to ensure environmentally friendly operation. Farmers may precisely distribute seeds by adjusting the air stream intensity according to crop kind, seed size, and environmental factors with the help of an adjustable airflow control mechanism that was inspired by [8]. The aerodynamic design maximises the efficiency of seed distribution by minimising turbulence and air resistance, which is determined by [7]. The incorporation of a seed hopper, as expounded upon in reference [10], guarantees an uninterrupted seed supply, monitored in real-time to optimise

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Highly Directive and High Gain Multiple Beam Reconfigurable Antenna for Base Stations

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ABSTRACT- A directional pattern reconfigurable array with high gain is proposed in this paper in which each antenna element is an array of driven and parasitic arc dipoles. The elements can be selectively excited using RF switches and power dividers to produce high gain patterns in desired single or multiple directions. By providing optimum spacing to array elements via stacking, gain can be further improved by exciting multiple elements simultaneously. The array resonates at 5.8 GHz, which is an ISM frequency. The directivity and realized gain of the unit element are 12 dB and 10.2 dB respectively. We hereby present a configuration of stacked antennas suitably arranged on a mast, which can find application as a base station antenna for next-generation wireless communication systems to switch patterns having directivity 14.3 dB and realized gain 12.1 dB in multiple directions with a reasonable bandwidth of 500 MHz and efficiency of 70%.

Keywords: Directional, reconfigurable, base-station, stacking, dipole, array.

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1. INTRODUCTION AND BACKGROUND

Directional base station antennas with enhanced gain [1] can improve the range, coverage and signal quality of the wireless communication system and have great significance in the current scenario. Beamforming is the backbone of future 5G and 6G communication technologies which mainly relies on highly directional and high gain antennas for increased signal strength, reduction of interference from undesired signals and to overcome propagation challenges [2-5]. Different techniques [6-9] have been explored by researchers to attain very high directivity in antenna arrays. But majority of the compact super-directive arrays existing in literature reported poor efficiency, low gain, narrow bandwidth, and impedance mismatch [10-12]. Here in this work, by optimizing various geometrical parameters of an arc dipole array such as arc length, radius and spacing, higher directivity is attained compared to existing structures without compromising much on gain, bandwidth, and efficiency.

To enhance antenna, gain also along with directivity, stacking techniques are adopted by researchers [13-15]. Some of the realizations suffered from poor efficiency and attempts at size reduction led to not so high gain.
Haskou et.al [16] in 2015 had designed a super-directive broadside array by stacking four elements, a pair at top and another pair at bottom to improve gain and directivity. They also studied how offset between the stacked elements affects their performance. But the reported radiation efficiency was only 8.3%. Hossain et.al [17] did a comparison study on bandwidth, gain, directivity and return loss of conventional and stacked antennas. It was concluded that stacked structure produced better gain but as they were trying to reduce the size of the structure, they could achieve a gain of 6.2 dB only.

In this work, a highly directive and high gain stacked antenna of directivity 14.3 dB, gain 12.1 dB and efficiency 70% is realized by stacking two directive elements. The attained gain is higher when compared to structures with similar dimensions realized earlier. A comparison study is presented in *table 1*.

The structure is capable of switching highly directive patterns in multiple directions and gain of the pattern is enhanced via stacking. The resonant frequency has been chosen as 5.8 GHz as it is an open ISM frequency which offers faster network with higher bandwidth and has less congestion when compared to 2.4 GHz. Due to the smaller wavelength, the size of antenna gets reduced and propagation characteristics of the signal is much better at 5.8 GHz. Besides, the frequency falls within the 5G network band.

2. UNIT ELEMENT DESIGN

A microstrip arc dipole-based end-fire array acts as the unit element comprising of a driven element and remaining parasitic elements, namely a reflector and four arc directors as illustrated in *figure 1*. Arc dipole gives higher directivity than a straight dipole as obtained from parametric analysis. Lengths and radii of arcs and spacing between driven element and

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Automated Wheelchair Cum Bed with Patient Monitoring System

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ABSTRACT

A wheelchair convertible to a stretcher is a specialized piece of medical equipment designed to serve dual purposes: as a regular wheelchair for mobility and as a stretcher for patient transportation in emergency situations or when a patient needs to lie flat. This type of equipment is particularly valuable in healthcare settings such as hospitals, clinics, nursing homes, and ambulances, where patients with varying mobility needs may require quick transitions between sitting and lying positions. The wheelchair cum stretcher is equipped with a health monitoring system. This system could include sensors and devices for tracking vital signs such as heart rate, blood pressure, oxygen saturation, and even ECG readings. These readings can provide real-time data to healthcare providers. Safety features are incorporated, including locks to secure the stretcher in place during transport and mechanisms to ensure the patient's stability. The project aims to revolutionize the way patients are transported and monitored in casualty and emergency care environments. This innovative system combines the functionality of a wheelchair and a stretcher while integrating advanced health monitoring capabilities to enhance patient care, streamline healthcare processes, and improve overall outcomes. The project represents a significant step forward in emergency care, offering a holistic solution that enhances patient monitoring, transportation, and overall quality of care. With its potential to revolutionize the way healthcare providers operate in critical situations, this project holds promise for improving patient outcomes and streamlining healthcare processes in casualty and emergency care environments.

Keywords: Wheelchair, Strecher, Heart rate, ECG.

INTRODUCTION

A wheelchair is a mobility device designed to assist individuals who have difficulty walking or cannot walk at all. It provides a means of transportation and greater independence for people with various disabilities, injuries, or medical conditions that affect their ability to move about on their own. A wheelchair convertible to a stretcher is an innovative piece of medical equipment designed to enhance the versatility and functionality of traditional wheelchairs. This hybrid device serves a dual purpose: it can function as a standard wheelchair for everyday mobility, and with a few adjustments, it can transform into a stretcher for transporting patients, particularly in healthcare settings such as hospitals, clinics, and emergency response situations.The primary goal of a wheelchair convertible to a stretcher is to provide a smooth and efficient means of patient transport while maintaining the utmost comfort and safety. This versatile piece of medical equipment is particularly valuable in cases where patients need to be moved between different locations within a healthcare facility or when transitioning from a seated to a horizontal position is necessary for medical treatment, examinations, or emergencies.In recent years, advancements in healthcare technology have led to the development of innovative solutions aimed at improving patient care and enhancing the efficiency of medical facilities. One such innovative development is the "**Wheelchair Convertible to Stretcher with Incorporated Health Monitoring System**." This leading-edge medical device represents a fusion of mobility aid and comprehensive patient monitoring, designed to meet the evolving needs of modern healthcare settings, particularly in emergency and casualty situations.

LITERATURE SURVEY

Hirudkar, Akshay, et al.: The paper discusses the increasing number of disabled individuals in India and the need for improved mobility aids to assist in their transportation, particularly in indoor and outdoor environments. It highlights that wheelchairs and stretchers are commonly used medical equipment for this purpose. However, a significant issue is the difficulty faced by attendants and nurses when transferring patients from wheelchairs to stretchers or medical beds. To address these challenges and enhance mobility equipment for disabled individuals, the paper proposes the development of a

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RoboWash: A Review on Automated Laundry Collection System

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Abstract: *The system uses modern robots and sensor technology to increase the efficiency and automation of the laundry process. The system's central robot is equipped with infrared sensors to identify obstacles, load cells to measure weight precisely, and traction motors to enable mobility. The robot, which is powered by an Arduino Uno, efficiently collects laundry supplies, recognises them by scanning Data Matrix Codes (DMC) that are attached, and weighs them to calculate the approximate cost and washing time. The robot moves the laundry to the ironing station after navigating to the washing machine and updates the user interface with its present status. After the laundry is ironed, it is wrapped and designated as finished, and the system modifies the status once more. Load cells give accurate weight information, servo motors allow precise laundry item movement, and infrared sensors ensure safe navigation. The goal of this all-inclusive system is to increase the effectiveness of laundry management by automating procedures and giving real-time status updates.*

Keywords: Sensor Technology, Load Cell, Infrared Sensors

I. INTRODUCTION

Automation is revolutionising ordinary chores more and more in this era of fast technological growth. The task of gathering laundry is one of the most promising areas for innovation among them. Presenting Robowash: an automated laundry collection system meant to improve and simplify the process of collecting soiled laundry in homes and businesses. Robowash is a major advancement in home automation technology that makes laundry easier by utilising cutting-edge robotics and artificial intelligence. Robowash provides users with unmatched simplicity and dependability by eliminating the need for labour-intensive manual soiled clothing collection by means of autonomous navigation through pre-designated zones. This introduction lays the groundwork for examining how Robowash uses creative automation to solve the problems associated with traditional laundry management, offering not just productivity but also a window into the direction automated service solutions will go in the future. It provides an advanced technique that automates the entire washing process—from collection to management—with the lowest possible level of human intervention. It combines state-of-the-art technology for robotics, IoT (Internet of Things) detectors, and data collection in real time to give users a seamless and hassle-free experience. It uses a sophisticated DMC (Data Matrix Code) scanning system to accurately identify and categorise each item, ensuring that it receives the best care possible at every stage. Additionally, it has a sophisticated weight detecting technology that enables precise laundry load measurement

II. LITERATURE SURVEY

Kunchev et al., [1]: This research investigates obstacle avoidance as a means of improving robot navigation. It describes the selection of pertinent research, the kinds of studies that were included, and the process of extracting data. An explanation of the analysis method for contrasting approaches and showcasing navigational advances is provided. There may be an optional quality evaluation stage. Robots are capable of moving without the need for human assistance, increasing productivity in a variety of settings, including manufacturing and cleaning. protects the robot and its immediate environment by assisting in the prevention of collisions, which is essential in settings like factories.

Baharuddin et al., [2]: This research proposes a line sensor setup to increase the differential driving line following robot's navigation dependability. A strategy for alf navigation can do this. It is employed for grid junction, 90-degree

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Design and Verification of 16 Bit RISC Processor Using Vedic Multipliers

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ABSTRACT

A 16-bit RISC processor leveraging Vedic multiplier design is developed for enhanced performance and efficiency. Utilizing Reduced Instruction Set Computer (RISC) architecture, the processor exhibits superior speed and simplicity through a concise instruction set. The design is implemented using the Verilog Hardware Description Language (HDL), and simulation is done using the Cadence design suite. One notable new development is the incorporation of the Vedic Sutras into the multiplier unit of the Multiplier and Accumulator (MAC) and Arithmetic and Logic Unit (ALU). The application of vedic mathematics principles reduces processing overhead by streamlining difficult calculations. The RISC processor design is completed by key components such the Control unit, Register Bank, Program Counter, and Memory in addition to the ALU and MAC. With 14 instructions to execute, the CPU uses less power and has less latency than traditional architectures. Vedic ALU and MAC integration with other processing blocks minimizes area utilization, lowers power consumption, and improves speed even further. This study highlights improvements in processor performance, power economy, and area reduction made possible by creative Vedic multiplier incorporation into a 16-bit RISC architecture.

Keywords: RISC, MAC, ALU, Vedic multiplier.

INTRODUCTION

A computer having a smaller, more specialized instruction set than those often seen in other architectures, such as the Complex Instruction Set Computer (CISC), is equipped with a microprocessor CPU design known as the Reduced Instruction Set Computer (RISC). The primary distinction between RISC and CISC architecture features is that RISC processors are optimized to have a high number of registers, instruction pipelining, and low clock cycle counts per instruction. Also, LOAD/STORE architecture is a key component of RISC. The controller design of CISC is complicated and its performance fell short of expectations. This is the reason that most RISC architectures have very few instructions, with the exception of load and store, where the CPU retrieves data from memory. Vedic mathematics, which provides mathematical results and fundamentally understandable frameworks, is taken from ancient Indian scriptures. The word "Vedic" comes from the word "Veda," which denotes a repository for all knowledge.

The sixteen Sutras that form the foundation of Vedic mathematics supply the manipulations in arithmetic, logical math, geometry, etc. Vedic mathematics uses a different estimating technique and a mathematical organization based on sixteen sutras. The processing algorithms' complexity, size, power, and execution time will all be improved by incorporating these techniques. The Vedic System offers a unique and very persuasive approach that covers a wide spectrum, from the organization of non-direct imperfect differential conditions to concluding a generally driven topic. It starts with basic multiplication.

Digital signal processing needs to perform activities like frequency domain filtering (FIR, IIR) and frequency transformations like DFT, FFT, and DCT. Multiplications are an essential hardware component for these tasks. For this reason, choosing how to display the entire structure depends in large part on how the multiplier is presented. This is due to the fact that the multiplier is the framework's slowest and most laborious element. Therefore, a notable test for the framework architects is the improvement of the multiplier speed and area. The application of ancient Vedic mathematical methods can effectively overwhelm this test.

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Smart Ayurvedic Medicine Vending Machine

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ABSTRACT

The Smart Medicine Vending System represents a pioneering solution aimed at revolutionizing the accessibility and efficiency of medication distribution in modern healthcare settings. Leveraging advanced technologies such as Bluetooth connectivity, barcode scanning, and servo motor automation, this system offers a seamless and user-friendly interface for individuals to access essential medications anytime, anywhere. Through a mobile application, users can effortlessly browse through a comprehensive inventory of medications, select their desired items via barcode scanning, and initiate the dispensing process with a simple tap on their smartphones. The system's real-time inventory management capabilities ensure accurate tracking of medication stock levels, facilitating automatic replenishment and minimizing the risk of product shortages. this innovative system not only enhances accessibility but also promotes public health initiatives such as social distancing and infection control. Through a commitment to continuous improvement and user-centric design, the Smart Medicine Vending System seeks to redefine the future of healthcare delivery, offering a glimpse into a world where access to essential medications is convenient, efficient.

Keywords: **Vending machine, Barcode, App, Servomotor, Microcontroller**

INTRODUCTION

In the realm of healthcare, accessibility to essential medications and medical services remains an ongoing challenge. The current landscape is fraught with issues ranging from limited access to medical stores, especially during off-hours and in remote areas, to the critical problem of timely diagnosis and medication delivery. In India, as in many parts of the world, countless lives are lost due to these pressing concerns. In this backdrop, the concept of an automatic medicine vending machine emerges as a beacon of hope and innovation. It addresses the urgent need for a reliable, 24/7 healthcare solution that can adapt to any situation. These vending machines offer mobility, portability, and unwavering service delivery, thereby ensuring that essential medications are accessible to all, precisely when required. In a time when medical stores may be closed, especially during nighttime hours or in remote and rural areas with limited access to healthcare resources, the Automatic Medicine Vending Machine takes center stage. Its mission is to bridge the healthcare gap by providing medications efficiently and seamlessly. This innovative machine redefines the healthcare experience, offering a user-friendly environment that includes contactless payment methods and efficient medicine delivery. Users can conveniently place their orders through a user-friendly webpage, complete with secure transactions through open-source payment gateways. This system also keeps users informed about medication availability, offering assurance in times of urgency. It boasts an inbuilt pill dispensing mechanism and ample storage for a wide range of medications, ensuring that users receive the precise medicines they require, precisely when needed. These automated dispensing machines not only enhance medication distribution efficiency but also elevate patient safety. Furthermore, the system facilitates easy updates and maintenance by the owner, ensuring uninterrupted operations and swift resolution in case of payment issues or failed deliveries. In conclusion, the automatic medicine vending machine is a beacon of hope for healthcare access, revolutionizing the way people receive essential medications. It stands as a testament to the power of innovation and technology in improving the lives of people, ensuring that urgent medical needs are met promptly and efficiently. This initiative does not merely address a problem; it redefines the future of healthcare, offering hope and relief to countless individuals across the nation

LITERATURE SURVEY

D. P. S et.al.[1]: This 24/7 medicine vending machine utilizes an ATmega16 controller, ESP8266, DC motor, IR sensor, and motor driver IC to store and dispense various medicines based on user requests via a web interface. It's designed to provide medication access in remote and rural areas where traditional stores are scarce, enabling users to place orders and make payments online for convenient, round-the-clock service.

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IOT Based Energy Monitoring System

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Abstract: The importance of energy monitoring in the face of increasing electricity demand caused by population growth, urbanization, and industrialization. To get over the limitations of traditional energy monitoring and control methods, this research study proposes an IoT-based energy monitoring system solution utilizing Bluetooth. In order to enable users to actively manage and optimize their energy consumption, the proposed system seeks to deliver real-time energy statistics, user-friendly interfaces, and seamless interaction with a variety of devices and appliances. The system's architecture, features, and advantages in terms of effective energy management, and environmental sustainability are discussed. The usefulness of the suggested approach in enabling users to make knowledgeable decisions about energy use and realize large energy savings is demonstrated by experimental findings and case studies.

Keywords: IOT, Energy Monitoring, Sensors, Energy Consumption, Power consumption

I. INTRODUCTION

According to government statistics, India's power consumption increased by almost 9% year over year in February of this year, reaching 117.84 billion units. The highest supply in a day, or the peak power demand, increased to 209.66 gigawatt (GW) in February 2023 [1]. The inappropriate use of electrical energy in homes and businesses is leading to increased power costs and waste, and future energy shortages are predicted. Electricity power is one of the essential needs for humans, using it wisely is one of the critical responsibilities of humans. But many humans waste many watts of power in their homes, offices, etc. knowingly or without their knowledge. Internet access is becoming more widespread as technology advances more quickly. IOT is therefore rising to the top of the technology list. IOT's primary goal is to improve healthcare. Energy management systems are essential parts of energy conservation in the era of contemporary grids and are crucial in promoting the integration of renewable energy, which safeguards the environment [2]. By keeping an eye on numerous activities, such as energy management, in the home environment, we can develop clever solutions to a wide range of issues and significantly reduce our energy use by employing IOT.

The application of Internet of Things to electrical networks opens up opportunities for small-term, medium-term, and a long-term development processes as smart technology spreads from home appliances to large-scale industry. The findings demonstrate that IoT has real-world application capabilities that will result in technology that is mature and durable [3]. There have been various approaches for monitoring the energy usage in households and industries. The authors of [4] have presented an energy monitoring system that provides precise energy consumption values and computes energy usage for intervals of 1 msec. The suggested architecture is internet-capable and creates a distinctive IP address that enables the user to obtain data on the load's energy usage by utilizing the WIFI module that is built within the ESP8266. In [5] the authors examined ILF (Intelligent load forecasting) methods from a number of angles in their survey, outlining both their benefits and drawbacks. In order to emphasize the important scientific achievements, they first reviewed the ILF area, including its history and uses. A regular energy meter can become a smart energy meter by mounting an electronic meter automation device on it. With the use of customized web pages, smart Apps, and SMS notifications, the user may monitor the meter readings at any time utilizing this meter's Wi-Fi capability [6]. In [7] the authors have suggested that the SEM module, which gives customers and other end users control and surveillance capabilities, is a portion of the overall system. The authors of [8] have created a stable smart home model that can track residential building energy consumption, comfort levels, and safety. The data is transmitted by the model to more complex information and communication technology (ICT) platforms where it may be analyzed and aggregated to offer the user and community many kinds of feedback. The authors of [9] propagated a model which is used to estimate the household's energy usage and even provides a useful reading for the energy unit. As a result, it decreases energy waste and raises awareness among everyone. Even so, the manual intervention will be subtracted. In [10], the authors created a cost-effective Internet of Things (IoT) energy monitoring system that makes use of the Message Queuing Telemetry Transport protocol and Wi-Fi. The created system will offer accurate statistics of energy use and consumption trends.

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Affordable Dip Coating Machine: A Cost Effective Solution for Thin Film Deposition

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ABSTRACT

Designed to be a low-cost dip coating machine with mechanical parts, the endeavor aims to offer a cost-effective solution for small-scale thin film deposition. Flexibility and economy are given priority in this apparatus, which is built with hardwood supports for vertical stability and metal rods for important parts including DC motors, couplers, lead screws, and ball bearings. It is noteworthy for providing exact control over the parameters of immersion depth, dipping speed, and drying, hence accommodating a wide variety of substrates and coating materials. Performance assessments confirm that it can provide consistent, repeatable coatings that are appropriate for a range of thin-film uses. For smaller companies and academic institutions looking to improve their thin film deposition techniques, it offers a more affordable option than 3D printing because it is mechanically constructed. Its mechanical design also encourages teamwork, which propels innovation in the technical and scientific fields. To sum up, this affordable dip coating machine offers a practical way to maximize thin film deposition in small-scale environments, encouraging innovation and progress in all sectors that depend on accurate coating techniques. Its adaptability and accessibility point to bright futures for additional thin-film technology research and development.

Keywords: Arduino UNO, DC Motor, Dip Coating Machine, Linear Actuator.

INTRODUCTION

With the clever integration of Arduino Uno microcontroller technology, a new dip coating device presents an innovative method for small-scale thin film deposition. With its smooth integration of necessary parts such as limit switches, DC motors, and H-bridge modules, this device provides an advanced and intuitive framework for accurate control and monitoring. The brains of the system are the Arduino Uno, which controls the complex interactions between different parts to guarantee smooth functioning and intuitive user interface. With the use of H-bridge modules for direction control and a potentiometer for immersion depth adjustment, operators may easily modify the dipping parameters and immersion depth to customize the deposition process for a variety of substrates and coating materials. Limit switches also prevent over-immersion or collision incidents, facilitate smooth motor direction changes, and protect experimental materials and equipment, all of which contribute to improved operational safety. The incorporation of Arduino Uno technology into the dip coating machine takes it above its basic mechanical design and makes it a smart, versatile instrument that has the potential to revolutionize thin film deposition in small-scale applications. The machine, which promises improved efficiency, reproducibility, and versatility for both researchers and small-scale firms, marks a substantial leap in coating technology with its user-friendly interface and precise control capabilities.The machine's usefulness is expanded and its possible uses are enhanced by the creative combination of Arduino Uno's digital adaptability with mechanical precision. This cutting-edge system provides academics and entrepreneurs with a potent tool to explore new frontiers in materials science and engineering, opening possibilities to experimentation and innovation in thin film deposition. This dip coating machine, with its strong structure, easy-to-use interface, and accurate control capabilities, is at the forefront of accessible and reasonably priced coating technologies, and it has the potential to propel advancements across multiple industries.

LITERATURE REVIEW

Christy Dunlap, et al., [1] The demand for cost-effective and efficient surface coating solutions led to the invention of an

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Bridging the Gap Between Intent and Movement: A Review of Accelerometer-Based Wheelchair Control Systems

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Abstract: *There are currently 15% of people on the planet who are disabled in one way or another. Mobility incompetence is the most common type of impairment among the others. Frequent complication that has a major impact on the patient's day-to-day life. Attaching the patient to a standard wheelchair is the standard method. Unfortunately, because the user will always need help from others, it doesn't give them a taste of independence. This device can be manually operated, but it will require a significant amount of physical exertion on the part of the user. Significantly less work can be done with a smart wheelchair that has multiple driving modes. Using two different driving systems—a thumb and a gesture control system—we designed a smart wheelchair for this study. The user can quickly traverse the menu and select their chosen control system thanks to the User Interface (UI) design. It includes a heart rate sensor to calculate. The patient's medical status. A notification will be sent to the concerned party using the built-in response mechanism in the event of an emergency.*

Keywords: Accelerometer sensor, Heart rate sensor, Arduino Uno, Gesture

I. INTRODUCTION

In order to improve the mobility and autonomy of people with limited mobility, there has been an increasing focus on creating novel assistive technology in recent years. For these people, wheelchairs are essential equipment that let them move about and take part in more activities. Wholeheartedly in daily pursuits. However, the safety, control, and maneuverability of conventional wheelchair designs are frequently compromised.

In order to overcome these restrictions and enhance overall usefulness, this project presents a revolutionary approach to wheelchair design by utilizing cutting-edge technologies. An Arduino Uno microprocessor controls a single DC motor, a differential drive mechanism, an ultrasonic collision avoidance system, and a gesture-based control interface in the proposed wheelchair system. With the use of a differential drive mechanism and a single DC motor, users may easily negotiate a variety of situations thanks to the vehicle's responsive steering and efficient propulsion. Moreover, adding an ultrasonic collision avoidance system improves security by identifying obstructions in the wheelchair's route andautomatically changing course to avoid collisions. The gesture-based control interface is a keycomponent of the wheelchair system's usability, offering both the user and their carer an easy way to navigate. Users are given more autonomy and control over their mobility with the Arduino Uno microcontroller, which interprets human movements recorded byonboard sensors andperforms movement and steering orders. The goal of this project is to improve the safety and quality of life of people who have limited mobility in addition to their mobility and autonomy. This wheelchair system marks a substantial improvement in assistive technology by fusing cutting-edge technologies with user-centric design concepts, providing a complete solution that takes into account the various demands of consumers in practical situations.

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Pothole Detection using TINYML

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Abstract - Potholes present a widespread issue on roadways globally, causing vehicle damage, accidents, and posing safety concerns for drivers and pedestrians. Detecting these potholes involves identifying and pinpointing their locations, a process traditionally performed manually by road inspectors, which is both time-consuming and ineffective. The complexity of pothole detection arises from their varying sizes, shapes, and depths, often obscured by shadows, debris, or other road features, making them challenging to discern. However, automated pothole detection systems are gaining popularity due to their ability to swiftly and accurately identify potholes across extensive areas. As technology advances, particularly with the refinement of machine learning algorithms, these automated systems are becoming increasingly precise and efficient. This progress holds promise for enhancing road safety and reducing the financial burden associated with road maintenance.

Key Words: TinyML, Edge-computing, Fomo mobileNet v2, Pothole detection.

1.INTRODUCTION

In today's dynamic landscape, characterized by thriving urbanization and transportation networks, ensuring the safety of our roadways is of utmost importance. Potholes, enduring imperfections in roads, pose significant risks to drivers, leading to accidents, vehicle damage, and imposing substantial maintenance expenses on road authorities.

The integration of an advanced TinyML (Tiny Machine Learning) model with a camera-based system, operating independently without reliance on cloud services, presents a comprehensive solution to address these safety concerns.

This innovative approach leverages real-time data analysis and predictive capabilities, facilitating a prompt response to road hazards. In addition to the immediate benefits of detecting potholes in real time and alerting drivers to potential dangers, this system extends its functionality to include the detection of speed breakers.

By providing drivers with real-time alerts to navigate speed breakers, it minimizes jolts and enhances overall road safety.

2. METHODOLOGY

Detecting potholes using TinyML (Tiny Machine Learning) models involves creating a compact and efficient machine-learning model that can run on resource-constrained devices like microcontrollers.

Methodology for pothole detection using TinyML.

1. *Preprocessing (Data collection):* Gathered images of roads with and without potholes.
2. *Data labeling*: Annotated images to indicate the presence of potholes.
3. *Data augmentation:* Applied techniques such as flipping, rotation, and scaling to increase dataset diversity.
4. *Normalization:* Ensured uniformity in pixel values across images.
5. *Model Selection:* Edge Impulse FOMO (Faster Objects, More Objects) is a novel machine learning algorithm that brings object detection to highly constrained devices. It lets you count objects, find the location of objects in an image, and track multiple objects in real-time using up to 30x less processing power and memory than MobileNet SSD or YOLOv5.
6. *Defined training parameters*: Batch size, learning rate, and number of epochs. Utilized regularization techniques to prevent overfitting. Evaluated model performance using metrics such as accuracy, precision, and recall. Model training is a critical phase in developing a pothole detection system using TinyML.
7. *Hardware selection:* Opted for Raspberry Pi as the deployment platform. Considered factors such as cost, size, power consumption, and computational capabilities. Evaluated alternatives and justified selection based on project requirements.

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Sewage Pipe Crawling Robot

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ABSTRACT

This report thoroughly examines a sewage pipe crawling robot, highlighting its central role in transforming sewage infrastructure inspection and maintenance practices. By combining cutting-edge technologies like Arduino-controlled systems, ultrasonic sensors, 3D printed parts, DC geared motors, and customized polymer sheets, this robotic system stands out as an innovation in the industry. The development process is explained in detail, focusing on integrating components and the unique benefits each technology offers. Additionally, the document explores the broader impact of implementing such technology, discussing its potential to enhance cost-effectiveness, improve operational efficiency, and reduce environmental impact in sewage infrastructure management. By presenting both practical evidence and theoretical insights, the report showcases the transformational capacity of this robotic system, positioning it as a key element in the ongoing evolution of sewage infrastructure management practices.

Keywords: **Robotics, Sewage infrastructure, Ultrasonic sensors, 3D printing, DC motors.**

INTRODUCTION

Sewage infrastructure plays a vital role in the development of cities, serving as a key element in maintaining public health and safeguarding the environment. With the continuous growth of urban populations and the expansion of cities, the importance of efficient sewage management systems is becoming increasingly crucial. However, traditional approaches to sewage system upkeep often fall short, characterized by labor-intensive tasks, time-consuming processes, and significant economic burdens.

To address these challenges, the incorporation of robotics and advanced technologies emerges as a promising solution for modernizing sewage infrastructure management. This overview aims to provide a comprehensive examination of the design and implementation of a sewage pipe crawling robot, an innovative creation set to transform conventional pipeline inspection and maintenance procedures. By utilizing cutting-edge technologies like Arduino-based control systems, ultrasonic sensors, 3D printed parts, DC geared motors, and custom polymer sheets, this independent system offers to streamline operations and improve resource utilization in sewage infrastructure maintenance tasks. The detailed methodologies involved in developing the robot, including the seamless integration of different components and the unique advantages provided by each technology, are thoroughly explored.

Additionally, the overview seeks to investigate the potential significant impact of using such groundbreaking technology, emphasizing the expected improvements in cost-effectiveness, operational efficiency, and environmental sustainability. By meticulously combining empirical evidence with theoretical analysis, this review underscores the transformative influence of robotics in managing sewage infrastructure, presenting a compelling outlook for addressing contemporary challenges in a more efficient and sustainable manner.

As the strains of urbanization and environmental decay escalate, the pressing demand for advanced sewage management solutions becomes increasingly apparent. Robotics, with its ability to automate everyday tasks, enable real-time monitoring, and facilitate timely interventions, emerges as a pivotal tool in mitigating the hazards associated with aging infrastructure and environmental deterioration.

Through automating tedious and error-prone tasks, robotic systems can notably enhance operational efficiency and accuracy while minimizing human involvement. Furthermore, by integrating advanced sensing and data analytics capabilities, these systems can offer valuable insights into the condition of sewage infrastructure, enabling proactive maintenance and optimizing resource allocation.

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Hydroponics Automation Smart Watering System with Network time protocol

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ABSTRACT

The practice of hydroponics dates back about 2500 years. When compared to conventional farming, it yields more and conserves land and water. A portion of the earth's surface is frequently utilized for different types of agriculture. But in the modern era, the amount of land that may be used for cultivation is steadily declining in comparison to land that is accessible for other uses, including the industrial sector. A number of agricultural systems that can produce all the desired needs of the society on a little amount of land have arisen in response to this problem. The hydroponic farming system is one of the modern farming approaches. When implemented correctly, hydroponics is a cutting-edge method of agriculture that boosts sustainability and allows plants to thrive in arid climates. Another option to organic gardening is hydroponic farming. By identifying and providing the study's specifics, the goal of this job is to assist the researcher in their investigation of the marketing and other characteristics required in hydroponics. Additionally, this review paper emphasizes the work that has been suggested in the various literature surveys and the changes that must be made in order to have self-acting hydroponic systems that function in a regulated environment and have nutrients that dissolve in water, air circulation, and water supply. The assessment of the literature highlights that well-managed and arranged hydroponic systems yield higher growth rates and significantly lower human intervention.

Keywords: **Hydroponics, Network time protocol.**

INTRODUCTION

The world's population is steadily increasing. meanwhile, resources are depleting, and research suggests that it is possible to reach 9.5 billion people by 2050. The current population is six billion, with a per capita land area of 0.25 hectares, while the projected 2050 population is 9.5 billion. Hydroponic farming is a type of agriculture in which mineral solutions are used to produce plants rather than dirt. It is a scientific answer to the problem of rising food demand and shrinking acreage. Soil-less farming is another term for hydroponic farming, which uses similar techniques to construct a vertical garden. People chose this strategy because it allowed them to use less land. The source of plant life in hydroponic systems is a nutrient-rich liquid known as the root nutrition solution.

Hydroponics provides regular consistency in lighting, pH, and oxygen levels by giving water and dissolved nutrients to plants in an environment totally controlled and monitored by computers, allowing for optimal harvests from your investment. The efficacy of hydroponics was investigated at various stages of development. Theoretical analysis works well in tandem with numerical and experimental analysis.

A pot filled of seedling trays and/or planter boxes, a nutrient solution reservoir, pumps, and other electronics compose an automated hydroponic system. Sensors can measure parameters such as plant nutrition levels, pH levels, dissolved oxygen levels, and water temperature. The construction of a vertical farm is determined not only by the project's geographical location, but also by the agricultural design and cultivation lines. LED technology has played an essential role in supplying sufficient light for photosynthesis after researching aspects such as canopy density and lighting.

LITERATURE SURVEY

Vyshnavi*etal.*,[1] This research thoroughly investigates hydroponic farming, a modern agricultural strategy noted for its effectiveness in producing large crop yields with little area and resources. The study discusses its history, types, and key principles, as well as benefits such as greater yields, adaptation to adverse soil conditions, and reduced water and pesticide

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A Review on Haircap Precision Monitoring for Scalp and Hair Conditions using AI- Technology

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Abstract: The haircap is equipped with high-resolution imaging to collect comprehensive data on scalp temperature, moisture levels, pH balance, and hair density. AI algorithms, trained on extensive datasets, analyze this data to detect issues such as dandruff, hair thinning, and dermatitis, enabling early detection and personalized care recommendations. The device also tracks the effectiveness of treatments over time, providing users with valuable insights into their scalp and hair health. This technology represents a significant advancement in non-invasive, realtime monitoring solutions, offering a convenient method for users to manage and improve their scalp and hair health. By enhancing the ability to diagnose and treat scalp and hair conditions, the AI-enhanced haircap contributes to better overall dermatological care and research. This abstract explores the design, functionality, and potential applications of this cutting-edge technology.

Keywords: AI, haircap technology, Raspberry Pi cameras, scalp monitoring, hair health, real-time analysis.

I. INTRODUCTION

Hair health is closely related to overall health and reflects an individual's nutritional status, environmental exposures, and underlying health conditions, traditional methods of assessing hair condition often rely on visual inspection or laboratory tests, which may not be able to provide continuous or real-time monitoring. However, recent advances in artificial intelligence (AI) and the accessibility of platforms such as the Raspberry Pi, when paired with camera modules, have opened up new avenues for non-invasive and accessible health monitoring.

This study suggests creating and deploying an AIpowered system for ongoing hair health monitoring that makes use of a Raspberry Pi and a camera module. Utilizing the Raspberry Pi's real-time image gathering and processing capabilities, the system can be applied in both clinical and personal health care settings. The technology uses machine learning algorithms to take high-resolution pictures of hair strands and analyzes them to determine factors including scalp health, follicle density, hair texture, and color distribution. With the help of machine learning models that have been trained on large datasets containing a variety of hair features and related health profiles, the system is able to identify minor deviations from the norm. These variations may point to possible medical conditions such nutritional deficits, hormone abnormalities, or stressors from the environment that affect the health of the hair. When compared to conventional methods, the AI-driven methodology improves the objectivity and accuracy of hair health assessments, providing individualized insights and enabling prompt actions. In this paper, we describe the architecture and deployment of our camera module-based Raspberry Pi-based AI-driven hair health monitoring system. We go over the methods used for acquiring, processing, and analyzing images; we also show how the system can be used to improve personalized health care practices; and we look ahead to see how we can further develop the system's capabilities and use it in more healthcare.

II. LITERATURE SURVEY

The purpose of the paper "Hair and Scalp Disease Detection using Machine Learning and Image Processing" by Mrinmoy Roy[10] is to develop an advanced and efficient system for diagnosing hair and scalp diseases using cuttingedge technology.The objective of this research is to effectively recognize and categorize different hair and scalp disorders from photographs by utilizing machine learning algorithms and image processing techniques. The suggested method aims to provide dermatologists and other medical practitioners with a quicker, more dependable, and easier-touse diagnostic tool by automating the detection process. Reducing human error, increasing diagnostic precision, and facilitating patient early action are the main goals. Furthermore, the goal of this work is to improve the field of medical image analysis and lay the groundwork for automated dermatological diagnostics in the future. The paper attempts to show the benefit and effectiveness of the suggested solution in actual clinical situations through thorough testing and validation.

The paper "ScalpEye: A Deep Learning-Based Scalp Hair Inspection and Diagnosis System for Scalp Health" by Wan-Jung Chang[11] outlines a sophisticated approach to diagnosing scalp health using deep learning techniques.Convolutional neural networks (CNNs) are used by the ScalpEye system to evaluate high-resolution photographs of the scalp and hair. Through extensive training on a vast collection of annotated scalp photos, the CNN model acquires

A Review of the Design & Implementation of Efficient Architecture For DFT

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Abstract: **The Discrete Fourier Transform (DFT) is a critical tool for digital signal processing, used to convert signals from the time domain to the frequency domain. This project aims to design an efficient DFT architecture using Verilog hardware description language and validate it using Cadence tools. Over the years, DFT implementation has evolved significantly. Initially, DFT was performed using general-purpose processors, but the demand for real-time processing has led to the exploration of specialized hardware solutions.**

The Fast Fourier Transform (FFT) has been a major advancement, reducing computational complexity from O(N^2) to O(N log N). Current trends are focused on making FFT algorithms faster in hardware, such as in Field-Programmable Gate Arrays (FPGAs) and Application-Specific Integrated Circuits (ASICs). This project seeks to capitalize on these advancements by implementing a 2-point radix-2 Decimation-In-Time FFT algorithm. It will utilize sophisticated techniques like carry-save adders and Booth multipliers in its system architecture for improved performance. The project's scope involves designing a 2-point Decimation-In-Time FFT architecture with a bit-width of [3:0] and considering only real values, excluding the imaginary part in the testbench.

Cadence tools will be employed to perform software simulation for validation, ensuring accuracy and efficiency. This work aims to provide an efficient hardware solution for real-time applications in the digital signal processing domain, pushing the boundaries of current FFT implementation. The simulation was performed using Cadence tools. The methodology encompasses the design of carry-save adders and booth multipliers, the design of the Multiply-Accumulate (MAC) unit, and the architecture design for DFT.

Index Terms**: Discrete Fourier Transform (DFT), Digital Signal Processing (DSP), Verilog HDL, Cadence tools, Fast Fourier Transform (FFT), Computational Complexity, Real-Time Processing, FPGA, ASIC,2-point Radix-2 DIT-FFT, Carry-Save Adders, Booth Multipliers, MAC Unit, Hardware-Efficient Architecture, Software Simulation, Real Values, Bit-Width, Signal Transformation, Specialized Hardware Solutions, Hardware Descriptive Language**

I. INTRODUCTION

The DIT-FFT algorithm is an efficient method for computing the Fast Fourier Transform. It works by breaking down a sequence of time-domain samples into smaller subsequences, splitting the data into even-indexed and odd-indexed elements, and applying the FFT algorithm to these smaller groups. The results are then combined to obtain the final frequency domain representation. This divide-and-conquer approach reduces computational complexity from O(N^2) to O(N log N), making it highly efficient for processing large sets of data in real-time applications. DIT-FFT is commonly used in digital signal processing for real-time signal analysis and filtering, as well as in telecommunication for efficient modulation and demodulation, particularly in OFDM and other systems.

II. LITERATURE SURVEY

[1] Keerthan (2018) proposed a new bit-slicing-based scheme that optimizes data flow and processing stages involved in the FFT algorithm to reduce its power consumption and computational complexity. This would thus significantly reduce hardware complexity while enhancing the overall efficiency of FFT computation. Experimental results showed tremendous enhancements in both power efficiency and computational performance over traditional FFT implementations, which should make the modified FFT one of the potential solutions for power-sensitive and high-performance signal processing applications.

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Chesslogic: AIML-Powered Chess Arbitrator

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ABSTRACT:

Chess, a strategic and intellectual board game, has seen a transformative evolution with the integration of digital technologies. This paper delves into the methodologies and techniques used for detecting and analyzing chess moves, focusing on the intersection of computer vision, machine learning, and artificial intelligence. We provide a comprehensive overview of current state-of-the-art methods for move detection, including convolutional neural networks (CNNs), optical character recognition (OCR), and real-time video processing algorithms. Key challenges in chess move detection are discussed, such as varying board designs, fluctuating lighting conditions, and partial occlusions, which can affect the accuracy and reliability of detection systems. We explore solutions to these challenges, highlighting advancements in image processing and machine learning models that improve the robustness and precision of move detection. Furthermore, the paper examines the practical applications of these technologies in various domains. In the realm of competitive chess, move detection systems enhance the integrity and fairness of the game by providing real-time monitoring and analysis. For enthusiasts and players, these technologies offer improved tools for training and coaching, enabling detailed analysis of games and facilitating skill development. In the context of spectatorship, automated move detection enriches the viewing experience by providing instantaneous updates and insights during live broadcasts. The integration of AI in chess is not only preserving the traditional essence of the game but also driving innovation and new research directions in computer vision and pattern recognition. This paper aims to provide a thorough understanding of the current landscape and future potential of chess move detection technologies, emphasizing their significance in the ongoing digital transformation of chess.

1. INTRODUCTION

A game with centuries of history, chess is more than just entertainment. Two thoughts engage in strategic combat on a checkered terrain in this intellectual warfare. But why is chess such a compelling game, and are there any drawbacks to this age-old sport? The secret to chess's charm is its flawless fusion of depth and simplicity. Anyone can pick up the pieces and play since the fundamental rules are simple to understand. Below this easily visible exterior, however, comes a vast array of strategic opportunities. Every action has an impact on everything, necessitating thoughtful preparation and foresight. It takes strong analytical, problem-solving, and critical thinking abilities to become a master chess player. Chess has several advantages that go well beyond the board. It can enhance memory, focus, and spatial thinking, according to studies. It encourages innovation as you devise cunning plans and anticipate your opponent's next move.. In addition to teaching important life lessons, chess also helps players develop their decision-making and resource-management abilities. Chess has benefits, but it also has disadvantages. Strong chess matches can be psychologically exhausting, especially for novices up against more experienced players, and can result in frustration and despair. The game can take a lot of effort to master, which could take time away from other activities. Furthermore, some chess players may experience harmful amounts of stress due to the game's competitive character. These drawbacks can be lessened, though. Less pressure may be applied by approaching the game of chess with an emphasis on fun and education rather than winning alone. Playing with friends who are at the same skill level as you or using online matching services that match players based on skill can guarantee a more balanced and pleasurable experience. To sum up, chess provides a special fusion of strategic depth and intellectual difficulty. This game may provide you a lifetime of intellectual stimulation, sharpen your mind, and enhance your cognitive abilities. However, to completely reap the rewards of chess, one must be aware of any potential negatives and keep a healthy mindset. Chess provides a special fusion of historical context, strategic nuance, and intellectual challenge. It's a voyage that may bring you lifetime intellectual stimulation, sharpen your mind, and enhance your cognitive abilities. Thus, whether you're an experienced tactician or an inquisitive novice, think about stepping into the checkered battlefield and starting your own chess journey.

2. LITERATURE SURVEY

S. Maharaj, N. Polson, and A. Turk.,[1] Stockfish and LC Zero are two competing chess engines. Stockfish's search algorithm was more efficient in solving Plaskett's Puzzle, searching through 1.9 billion positions. LC Zero's selective search was less efficient due to wrong lines and its evaluation function failed to recognize the positional potential of knight sacrifices. Machines can potentially possess a similar imagination, as they can predict likely checkmate positions and use these to condition the search. This process extends the assessment of win probability by conditioning on the event of reaching

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A Review on Design and Implementation Of 6T SRAM Cell

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Abstract: SRAM, or Static Random Access Memory, is one of the fundamental elements of the digital world. In general, it uses a tremendous quantity of energy. A lot of SRAM research is thus being done in the areas of power dispersion, RAM chip size, and supply voltage requirements. This work considers SRAM analysis for low power applications in terms of Static Distortion Margin, The Information Retention Voltage, which is Read Margin (RM), and Write Margin (WM). One of the most crucial factors in memory design is static noise margin (SNM), which has an impact on both read and write tolerance. The threshold voltages of the SRAM cell's negative oxide metal transistor (NMOS) and positive metal oxide semiconductor (PMOS) components are correlated with SNM. High Write and Read Snr Margin are also major design obstacles. The challenge of the 6T SRAM project using 180nm, 90nm and 45nm technologies at Cadence Virtuoso is to address the scaling challenges of SRAM designs and explore the possibilities offered by different technology nodes. The focus is on optimizing the performance and energy efficiency of the 6T SRAM cells considering the effects of scaling and process variation. The purpose of this project is to analyze the trade-offs between power consumption, access time, and stability at each technology node, identify optimal design configurations, and develop guidelines for efficient and reliable 6T SRAM design. By leveraging Cadence Virtuoso's capabilities, this project aims to provide valuable insight into the development of robust, high performance SRAM cells in 180nm, 90nm and 45nm technologies.

Keywords: Noise Margin, Read Margin, SRAM, 6T-SRAM, Virtuoso, Write Margin

I. INTRODUCTION

SRAM is a type of semiconductor memory that stores data using bistable circuits. Unlike dynamic memory technologies such as DRAM, SRAM does not require constant refreshing of data, making it faster and more power-efficient. SRAM is widely used in various electronic devices, particularly as cache memory in processors and controllers. SRAM cells are designed using CMOS technology, which offers several advantages such as low power consumption, high noise immunity, and compatibility with integrated circuit fabrication processes. The basic building block of SRAM is a flip-flop circuit, typically implemented using six transistors (hence the term 6T SRAM cell). This configuration provides stability to store a bit of data without the need for constant refreshing. Although SRAM has a higher cost and lower density compared to DRAM, it offers superior performance and reliability. SRAM is commonly found in a range of electronic devices, including computers, smartphones, networking equipment, and automotive systems. As technology continues to advance, SRAM plays a critical role in meeting the demands for faster and more efficient data storage and access in various industries.

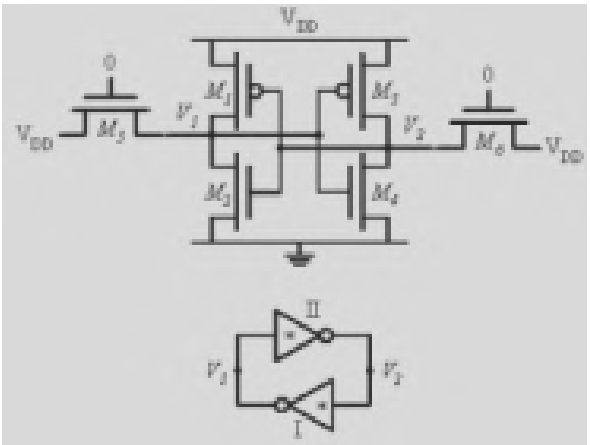

Fig 1.1 SRAM Transistor and FlipFlop

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Design and Simulation of 1x4 Patch Array for Enhanced Gain

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Abstract: *In contemporary wireless communication systems, antenna design plays a crucial role in achieving better performance metrics like gain, directivity, radiation efficiency, and appropriate impedance matching. In this work, a 1x4 array antenna operating at 2.4 GHz is designed and simulated. With an emphasis on single patch antennas and linear arrays with 1x2 and 1x4 components, beam steering in antenna array investigates the design, simulation, and analysis of antenna arrays at 2.4 GHz using CST Microwave Studio. In order to maximize performance, the project starts with the design of a single patch antenna. Important factors such as substrate material, patch dimensions, and feed mechanisms are examined. To improve gain, directivity, and bandwidth, 1x2 and 1x4 linear arrays are designed as an extension of the single patch design. The antennas are simulated using CST Microwave Studio, which offers comprehensive insights into their radiation patterns, impedance matching, and overall performance. Based on the simulations, it can be observed that a 1x4 array has substantially better gain and directivity when compared to a single patch. As a result, these arrays are more appropriate for applications that need more concentrated beams and greater coverage. Performance comparisons between the single patch, 1x2, and 1x4 arrays are included in the project's thorough study, along with a discussion of the trade-offs between design complexity, physical size, and performance advantages. The findings demonstrate the advantages of antenna arrays in improving 2.4 GHz wireless communication systems and provide insightful guidance for the creation of effective and high-performing antennas in this frequency range. The suggested antenna array exhibits encouraging performance in terms of parameters like gain, directivity, and efficiency, which qualifies it for use in particular applications including Internet of Things (IoT), wireless communication systems, and radar systems.*

Keywords: Patch Antenna, CST, gain, directivity, return loss

I. INTRODUCTION

In order to improve output transmission, an antenna is a specialized device that can emit certain energy in a specific direction. Antenna arrays are created by adding a few additional antenna elements to an existing antenna for more efficient output. An array of antennas is utilized because a single antenna has strong directivity but struggles to transmit signals to the receiver due to losses. We require antennas with exceptionally high directional properties for a wide range of applications, and these characteristics can be further improved by enlarging the antenna's electrical dimension. The requirements of contemporary wireless communication systems, such as 5G and the soon-to-be 6G networks, are driving current advancements in antenna array technology.Antennas are essential for efficient transmission and reception of signals in the field of current wireless communication and sensor technologies. The capacity of array antennas to improve performance measures including gain, directivity, and efficiency has drawn a lot of interest among different antenna configurations. In particular, the 1x4 patch array antenna is an adaptable design with uses in a variety of industries where directional and high-performance antennas are critical. Array antennas are known for their ability to synthesize a desired radiation pattern by combining signals from multiple elements, thereby offering improved signal reception, transmission range, and interference rejection capabilities.

The 1x4 configuration, consisting of four patch elements arranged in a specific pattern, further enhances these capabilities while maintaining a compact form factor and cost-effectiveness. The 1x4 patch array antenna consists of

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Diagnosis of Parkinson's: A Novel Approach

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Abstract: *In Europe, 1.2 million people suffer with Parkinson's disease (PD), and during the next few decades, there will likely be an exponential increase in the disease's prevalence. The lack of neurologists qualified to provide skilled care for Parkinson's disease (PD) will provide a challenge to this epidemiological trend. Patients are calling for strict symptom management and treatment education as Parkinson's disease (PD) becomes more widely recognized. Furthermore, due to the very diverse character of symptoms among patients as well as changes within the same patient, new tools are needed to enable clinicians and patients monitor the disease in the context of their daily lives and modify treatment in a more pertinent manner. Currently, a number of body-worn sensors (BWS) have been proposed to track clinical aspects of parkinsonian patients, including motor variations like tremor, has been included to tools for research and patient management. Here, we offer a useful anthology that highlights the features of the BWSs that PD patients in Europe use the most, with an emphasis on how they might be used as instruments to enhance therapy management. Technology for monitoring non-motor aspects is also taken into consideration. BWS undoubtedly present fresh chances to enhance PD management tactics, but it's important to define exactly how they fit into everyday routine treatment.*

Keywords: EMG sensor, OLED, MPU-9250, XCLUMA vibration module

I. INTRODUCTION

Parkinson's disease (PD) is a condition that affects the brain and leads to problems with movement. It's important to detect and monitor PD early to manage it well. Traditional methods to predict PD mostly use data from movement sensors worn on the body, which can limit how well these predictions work. We have a new idea for a healthcare system that predicts PD by combining different types of data. Instead of just using movement data, our system also includes voice recordings. This combination makes the predictions more accurate and thorough. The proposed system combines wearable sensors for capturing movement data with microphones for recording voice samples. Real-time analysis of multi-modal data streams enables continuous monitoring and early detection of PD symptoms. Our embedded system provides an integrated approach to Parkinson's disease (PD) prediction through the use of movement and voice data. This allows for the timely intervention and improved outcomes for patients. With potential applications in addition to PD prediction in various healthcare domains, it offers an innovative structure for utilizing multimodal data in healthcare systems.Individual treatment is important because each person's symptoms are different and change over time. Physical therapy is often used to help with balance and movement. Sometimes, surgery like deep brain stimulation is used to treat symptoms. There is no cure for Parkinson's disease. It's important to detect and monitor PD early to manage it well. Traditional methods to predict PD mostly use data from movement sensors worn on the body, which can limit how well these predictions work. We have a new idea for a healthcare system that predicts PD by combining different types of data. Instead of just using movement data, our system also includes voice recordings. This combination makes the predictions more accurate and thorough. The proposed system combines wearable sensors for capturing movement data with microphones for recording voice samples. Real-time analysis of multi-modal data streams enables continuous monitoring and early detection of PD symptoms.

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INVESTIGATING DOUBLE GATE LITHIUM NIOBATE-BASED METAL FERROELECTRIC METAL INSULATOR SEMICONDUCTOR (MFMIS) NCFETS THROUGH ANALYTICAL MODELING AND SIMULATION

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Abstract

As the miniaturization of silicon circuits continues, the primary challenge has shifted towards reducing energy consumption. The Boltzmann limit, a fundamental barrier in traditional semiconductor devices, has prompted the exploration of novel solutions. One promising candidate is the Negative Capacitance Field Effect Transistor (NCFET). NCFETs introduce a second insulating ferroelectric material to create a negative capacitance (CFE) effect, which counteracts the positive capacitances inherent in Field Effect Transistors (FETs). This interaction allows for lower operating voltages and enhanced energy efficiency. Silicon, a ubiquitous material in semiconductor devices, remains a focal point of this research due to its widespread use and well-understood properties. Extensive analytical studies have been conducted on silicon-based devices, examining their performance at ever-decreasing nanoscale gate levels. This work presents a significant advancement with the introduction of high-performance $LiNbO_3$-based NCFETs. Compared to traditional single-gate designs, the proposed $LiNbO_3$-based NCFET demonstrates superior performance metrics. Notably, it exhibits hysteresis-free characteristics, leading to a more stable and efficient operational region. The absence of hysteresis not only simplifies the device's operation but also enhances its reliability and scalability for future applications. In conclusion, the implementation of $LiNbO_3$-based NCFETs represents a promising step towards overcoming the limitations imposed by the Boltzmann limit, offering a pathway to more energy-efficient silicon circuits as they continue to shrink in size.

Keywords: **Ferroelectric materials; Lithium Niobate; L-K theory; MFMIS architecture; NCFET; Silicon Circuit**

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NavigateNow: Innovative Indoor Mapping for Seamless Navigation

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Abstract: *A University Campus can span vast areas and may consist of multiple campuses. Annually, numerous students enroll in the university, leading to the construction of new buildings, the introduction of new courses, and the establishment of various facilities such as departments, cafeterias, libraries, etc. This expansion can pose challenges for newcomers in navigating the campus efficiently and on time. Similarly, new faculty members, staff, and visitors encounter difficulties in finding their way around. In recent times, a significant number of students, faculty, and staff have turned to using Android smartphones for personal use. A web-based Global Positioning System (GPS) application, integrated with videos and images, would greatly assist in locating specific places and finding the most direct routes from one's current location to the desired destination. This solution would alleviate the frustration and confusion experienced by individuals within the campus. The application has been developed using HTML, CSS, and the Django framework, with Python as the programming language and MySQL as the database for data storage.*

Keywords: web-based mapping applications, Django framework, HTML and CSS web development, MySQL database, real-time analysis

I. INTRODUCTION

Exploring vast university campuses, which are often spread across multiple locations and filled with numerous buildings, presents a considerable challenge, particularly for newcomers, students, faculty, staff, and visitors. Every year, a large influx of new students enrolls, and the campus infrastructure is constantly expanding with the addition of new buildings, courses, and amenities like departments, dining halls, and libraries. This ongoing growth makes it hard to pinpoint specific areas from where one is standing, leading to delays and frustration.This research focuses on creating an application that offers precise directions and the quickest routes to various spots, using visual tools such as videos and pictures to guide users effortlessly. By leveraging the latest web technologies, including HTML, CSS, the Django framework, and MySQL for data storage, this application aims to simplify the navigation process within the campus setting.This paper delves into the current landscape of campus navigation technologies, with an emphasis on the creation and deployment of web-based mapping applications. It looks into the use of multimedia elements to improve the user experience and assesses how these technologies can address typical navigation problems. The objective is to ensure a more effective and user-friendly experience on campus, reducing confusion and enhancing the ease of movement for everyone on campus. The paper starts by analyzing the current navigation solutions available, ranging from traditional paper maps, static directories, to the latest digital platforms. It points out the shortcomings of these traditional approaches, such as the absence of real-time updates and the inflexibility of printed materials, which are unable to keep pace with the dynamic changes on a campus.

II. LITERATURE SURVEY

The literature survey examines existing campus navigation technologies, highlighting traditional methods and digital solutions. It explores the development and effectiveness of web-based mapping applications using HTML, CSS, Django, and MySQL. The integration of multimedia aids and addressing challenges like GPS accuracy and user privacy are also discussed.

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Real-Time Traffic Sign Detection and Obedience System for Autonomous Vehicle on Indian Roads using Machine Learning

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Abstract: Traffic sign detection plays a pivotal role in enhancing road safety and enabling autonomous vehicles. Indian roads, with their unique multilingual signs and dynamic environments, present significant challenges due to diverse regional languages, fonts, and conditions. Addressing these complexities is essential for developing reliable navigation systems for autonomous bots and vehicles. This objective aims to design and implement a real-time traffic sign detection system for Indian roads using the YOLOv5 model deployed on a Raspberry Pi. The system integrates multilingual detection capabilities and dynamically displays decisions in a terminal interface, enabling autonomous bots to operate efficiently in unpredictable environments. The methods in the dataset comprising multilingual Indian traffic signs were collected and annotated. The YOLOv5 model was trained with augmented data to enhance detection accuracy. The trained model was optimized for edge devices using TensorRT and Pytorch. A Raspberry Pi, integrated with a depth camera, processed real-time video streams for detection. Detected signs were mapped to pre-programmed actions, which were displayed in the terminal and executed via bot navigation. The Results of the system achieved high detection accuracy and low latency, even under challenging lighting and weather conditions. Multilingual OCR integration ensured robust detection of diverse traffic signs. Real-world tests demonstrated reliable navigation and responsive action execution. The project's significant contribution to traffic management, road safety, and autonomous vehicle technologies, addressing the unique challenges of multilingual environments. The scalable solution has implications for smart city initiatives and real-time navigation systems on Indian roads.

Keywords: YOLOv5, Autonomous Vehicles, Traffic Sign Detection, Multilingual OCR.

I. INTRODUCTION

A. Background on Traffic Sign Detection

Traffic sign recognition is a crucial aspect of intelligent transportation systems, combining computer vision, machine learning, and road safety. Traditional methods, such as color and shape-based detection, faced challenges with lighting variations, weather conditions, and sign degradation. Modern deep learning models like YOLOv5 have revolutionized this field, offering real-time, robust detection capabilities adaptable to complex and dynamic road environments.

B. Relevance of Multilingual Support on Indian Roads

India’s diverse linguistic landscape adds complexity to traffic sign detection. With 22 official languages and numerous regional dialects, traffic signs often feature region-specific symbols and text. This diversity necessitates a detection system capable of transcending linguistic and design barriers to ensure accurate recognition across different regions. Failure to interpret signs correctly can result in severe safety risks, emphasizing the need for reliable, multilingual recognition systems for autonomous navigation on Indian roads.

C. Objectives and YOLOv5 Integration

This project focuses on designing a real-time traffic sign detection system using YOLOv5 and a Raspberry Pi. The system ensures accurate recognition of traffic signs under varying conditions, translating detections into actionable commands for safe navigation. Optimized for the Raspberry Pi, the setup leverages frameworks like TensorFlow Lite, enabling cost-effective, scalable deployment for autonomous vehicles.

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Electronic Load Device for Testing DC Power Supply

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Abstract: *The project deals with a programmable electronic load device capable of dynamic variations of its load parameters to simulate a myriad of electrical conditions. Hence, one of the objectives of this paper is to implement, in a designed setup, variously heated loads, such as constant current, voltage, resistance, and power modes. That said, the designed system has hardware and software aspects that integrate advanced microcontroller capabilities so that high accuracy is assured through a series of test procedures on the system. The hardware design of the project encompasses choosing various resistors and relays modules (ESP32), selection of the proper power supplies, and microcontrollers. A program is being developed in the Arduino IDE that will program the microcontroller to do dynamic load control.It all began with the circuit design and resistor value choice, taking into consideration their power rating about effective heat dissipation. Dynamic loading control by the ESP32 microcontroller allows variable changes which are automatic in nature. On top of this, relay modules were used for effective switching of load and its adjustments, hence making the system flexible and responsive. The firmware developed in Arduino IDE automates control processes, which enables the smooth running of operations. In this regard, our experiments output results that show the device—a programmable electronic load mimicking load situations and providing performance information. Notably, the automated control system coupled with adjustable load capabilities increased the testing process efficiency and accuracy to a great deal. The overall effect of the programmable electronic load device is that it makes testing more professional by way of automation and provision of precise management for the test settings of the load. Its versatility also provides simulation of a wide scope of scenarios accommodating test conditions. It is designed to cater to heat regulation and power dispersion for the reliability of performance whiles in operation*

Keywords: DC electronic load, Switch Mode Power Supply, Heat dissipation, Load stability

I. INTRODUCTION

In the area of designing electronic circuits is a need to test their power supplies. Requirements are ever increasing, versatile and accurate electronic load devices in the world of designing electronic circuits. This paper works on developing a programmable electronic load device. The electronic load is a device designed for a one-test instrument designed for current sinking and absorbing of power out of a power source. It offers flexibility and accuracy in test cases relating to power. Different conditions can be emulated by changing the quantity of electric current and resistance. Any type of electronic device, during its testing and development processes, relies on an electronic load device as a very essential tool. It emulates those things that would happen to an electrical load through a device or power source in real-life situations. An electronic load device emulates the device under test to test the power supply powering it. The following report gives a brief overview of the electronic load device developed during the internship period. Again, this turns out to be inefficient, more precisely during dynamic testing when manual switching of the resistors to change the load and configuring the circuit is required. Testing is time-consuming, particularly since fixed resistors have to be used to adjust to changes and there is no automation in controlling the resistors. It emulates several situations and real devices that could be connected to your power source. The automation of electronic loads eases the testing process and enhances the development of complex test scenarios, able to lower the probable occurrences of errors and raise general testing effectiveness. The electronic load device is a versatile tool within industries testing and

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AI IN MEDICINAL PLANT DISCOVERY AND HEALTH CARE

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Abstract: Ayurveda, an ancient Indian system of medicine rooted in the Vedas, has gained global attention for its holistic approach to health. India is well-known for offering an optimal environment that supports a wide variety of medicinal plants. The various components of these plants play a crucial role as key elements in crafting natural remedies. Fascinatingly, numerous medicinal plants thrive in our own backyards or along sidewalks. Identifying and differentiating between these plants is nearly impossible for someone without proper training. The manual process of identifying plant species is both challenging and time-consuming, exacerbated by a lack of expertise in the field. This challenge is especially evident in the accurate classification of medicinal plants, where the process can be intricate and perplexing. To overcome these challenges, this project aims to harness the capabilities of machine learning for the automatic detection of medicinal plants. This approach aims to streamline the identification process, minimizing the reliance on manual labor. The automation of this crucial task not only targets improved efficiency and accuracy but also strives to make it more user-friendly for individuals with diverse levels of expertise. Incorporating Convolutional Neural Networks (CNNs), identified as optimal for the project, the AI algorithm specializes in image classification, particularly suitable for the diverse shapes, colors, and textures of plant leaves. CNNs not only identify the plant but can also extract crucial information on its medicinal properties and practical applications through training on labeled datasets. This innovative fusion of AI and Ayurveda holds immense potential to revolutionize healthcare. Empowering individuals to actively engage in their well-being, the project aims to provide access to the expertise of Ayurveda practitioners, fostering a healthier and sustainable future for all.

Keywords: Medicinal plants, Machine learning, Image processing, Convolutional neural Network, feature extraction, plant recognition

I. INTRODUCTION

In the exploration of medicinal plants, the quest for identifying and harnessing their therapeutic potential stands as a pivotal endeavor. Across centuries, traditional systems of medicine like Ayurveda have relied on the profound knowledge of botanical diversity and their healing properties. However, the manual process of identifying medicinal plants often proves cumbersome and error-prone, especially in distinguishing between closely related species.

In addition to Convolutional Neural Networks (CNNs), various other AI models such as Inception Networks, Residual Networks (ResNets), MobileNets, DenseNet, VGGNet, and Xception have been employed for image classification tasks. While each model offers distinct advantages and applications, the preference for CNNs in our project underscores their efficacy and versatility in analyzing botanical imagery.

CNNs have emerged as the cornerstone of image classification due to their ability to automatically learn and extract hierarchical features from raw pixel data. Their architecture, inspired by the visual cortex of the human brain, comprises convolutional layers that detect local patterns and spatial relationships, followed by pooling layers that down sample feature maps to capture essential information efficiently.

Within our model architecture, we employ various layers including Dense, Dropout, Flatten, Conv2D, MaxPool2D, and Batch Normalization, each serving distinct functions in enhancing the model's performance.

The utilization of CNNs and associated layers enables our system to analyze real-time leaf images uploaded by users, swiftly identifying plant species and providing comprehensive insights into their medicinal properties. By automating this process, we mitigate reliance on expert knowledge and expand accessibility to plant identification, particularly in remote areas.

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Enhancing Vision Care: Detection of Eye Diseases and Prediction of Refractive Errors

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Abstract : Our novel system, Enhancing Vision Care: Detection of Eye Diseases and Prediction of Refractive Errors, employs a deep learning architecture trained on a dataset of diverse fundus photographs encompassing various eye diseases, including diabetic retinopathy, glaucoma and cataracts and prediction of refractive errors like myopia, astigmatism and hypermetropia. The system employs multi-task learning and attention mechanisms to simultaneously detect and localize distinct disease signatures within each image. This project represents a significant step towards automated, multi-disease eye disease detection with high accuracy and generalizability. Its potential lies in enabling early intervention, improving individual prognosis, and reducing healthcare costs associated with vision loss. Future work will focus on integrating Enhancing Vision Care: Detection of Eye Diseases and Prediction of Refractive Errors into clinical workflows and exploring its application in underserved communities.

Keywords: Artificial intelligence, deep learning, multi-disease detection, eye diseases, retinal imaging, early diagnosis, healthcare

I. INTRODUCTION

Vision plays a crucial role in our daily lives, yet millions suffer from retinal diseases that can lead to blindness if left undiagnosed. Examples include diabetic retinopathy and glaucoma. Early treatment significantly improves outcomes, potentially restoring or slowing disease progression. However, access to qualified ophthalmologists is often limited, especially in rural areas where infrastructure and trained personnel are scarce. Traditional remote screening methods often require expensive equipment and expertise. Fortunately, advancements in technology and image analysis offer promising solutions through automated disease detection and referral systems. Several systems utilizing digital image processing and machine learning have been developed, particularly for diabetic retinopathy and age-related macular degeneration, with performance comparable to human experts. However, many are specialized to specific diseases, requiring intricate disease-specific feature engineering [1].

The global burden of blindness is increasing, with new cases outpacing the number of sight-restoring surgeries performed each year. The vascular theory of glaucoma proposes that impaired blood flow to the optic nerve head plays a vital role in its degeneration. This localized damage is thought to occur when the pressure at which blood perfuses the eye (ocular perfusion pressure) falls outside the normal range where it can be automatically regulated. This disruption can be attributed to either systemic issues like low blood pressure, significant nighttime blood pressure drops, or peripheral vasospasms, or to local abnormalities within the eye's blood supply itself. Cataracts are a leading cause of blindness, affecting millions of people worldwide. While there are efforts to provide cataract surgery to those in need, the number of new cases is outpacing the number of surgeries performed, leading to a concerning increase in global blindness [2].

Diabetic retinopathy (DR) is a major complication of diabetes that can lead to blindness if left untreated. It affects the blood vessels in the retina, causing them to leak fluid and distort vision. DR is one of the most common eye diseases, according to statistics from the US, UK, and Singapore [3]. While early diabetic retinopathy often progresses silently with minimal to no noticeable symptoms, significant damage to the neural retina and microvascular changes occur unseen .

This underscores the crucial role of regular eye screenings for diabetic patients, as timely diagnosis and subsequent management are essential for preserving vision . Given that controlling hyperglycemia, hyperlipidemia, and hypertension remains the only preventive strategy, early detection of DR becomes even more critical. Furthermore, existing interventions like laser photocoagulation can significantly reduce the risk of blindness in proliferative retinopathy and diabetic maculopathy by up to 98%, provided treatment is initiated at an early stage. This clearly demonstrates that early detection and appropriate treatment are key to delaying or even preventing blindness from diabetic retinopathy [4].

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CROP CARE-A WEB APPLICATION FOR CROP MANAGEMENT

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ABSTRACT: "CROP CARE" is an online application that uses machine learning to provide personalized suggestions on crop selection, fertilizer use, and disease control. It truly transforms crop farming. Users may optimize yields and sustainability by entering their location and receiving personalized advise based on the local climate and soil characteristics. From user-uploaded photographs, its image recognition quickly detects crop diseases, providing a prompt diagnosis and treatment advice. Additionally, the website makes it easier to share illness data with specialists and Krishi Bhavan, as well as to sell to vendors. Farmers obtain competitive rates by putting suppliers to the test through manual bidding. This easily navigable tool advances food security and sustainability on a single, easily accessible platform by encouraging sustainable practices, boosting production, and strengthening resilience in agriculture.

KEYWORDS: Machine Learning, Crop Selection, Image recognition, Instant diagnosis, Resilience .

I. INTRODUCTION

A crucial component that plays a big part in feeding the world's expanding population is agriculture. Farmers must utilize their resources as efficiently as possible to maximize yield while reducing losses in order to meet the growing demand for food. Modern agriculture places a high priority on predicting and analyzing crop growth, and machine learning has become into a potent tool for achieving this objective [1,2]. Precision agriculture, often known as smart farming, is a contemporary agricultural method that maximizes crop yield while minimizing waste by leveraging cutting-edge technology.The goal of smart farming is to maximize crop yield while consuming the least amount of energy, fertilizer, and water possible [3]. Machine learning applications have become more prevalent in our lives in recent years, and they have proven useful in scenarios requiring decision-making in a variety of fields, including urbanization, education, health, and defense. Simultaneously, it began to generate technological and information solutions by serving as the foundation for the recently developed infrastructure of search engines, such ChatGPT (Chat Generative Pretrained Transformer from the OpenAI, Google Bard).Machine learning algorithms may be taught on extensive farm data, including weather patterns, soil characteristics, crop growth phases, and pest and disease outbreaks, to be used in agriculture, particularly in the cultivating area. Machine learning algorithms are able to anticipate business growth, production, and quality with a great degree of accuracy by analyzing the gathered data [4].

In addition, machine learning may assist farmers in determining which crops, given market demand and environmental conditions, will provide the highest profits. Machine learning algorithms can forecast crop demand and recommend the best dates and places for planting based on past market data and weather trends. [5].By doing this, farmers may reduce the chance of crop failure while increasing their income. Machine learning is capable of not only forecasting crop growth and yield but also evaluating the quality of the harvested crops.

Fruits and vegetables may be graded for ripeness and quality using machine learning models that examine their color, texture, and form. By using this data, harvesting procedures may be improved and it will be guaranteed that consumers only purchase food of the highest caliber [6, 7].Crop diseases are another important element that significantly lowers the quantity and quality of agricultural products in an indirect manner. There are several pesticide types available to reduce illness and boost output. However, determining the most recent disease, suitable, and efficient pesticide to control the infectious disease is challenging and necessitates professional advice, which is costly and time-consuming.The symptoms on the leaves are the primary indicator of disease presence on the plant. Therefore, a machine vision system that is automated, accurate, and less expensive is required to identify illnesses from images and recommend the best pesticide for the situation.

II. LITERATURE SURVEY

In [8] Bandara, P., Weerasooriya, T., Ruchirawya, T., Nanayakkara, W., Dimantha, M., & Pabasara, M.(2020) “Crop Recommendation System” comprising a theoretical and conceptual platform for a recommendation system built on

Mobile Application based Blended Learning in the Cloud for Professional Education

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***Abstract*— The rapid advancement in mobile cloud technologies has revolutionized the educational landscape, particularly in the realm of blended learning. This paper explores the blended learning solutions that leverage mobile cloud platforms, examining factors that influence their adoption among students and educators. By integrating insights from recent studies, this research identifies key determinants of acceptance, highlights challenges, and provides recommendations for improving the adoption of mobile cloud-based blended learning systems. To facilitate the implementation of blended learning, an Android application called MobiLearner was deployed at the client mobile device. The user can study the text-based notes, observe the video lessons, listen to the seminars and he can also engage in assessments. In order to evaluate the proposed model, an experiment was conducted by measuring the satisfaction level of the users after using the application. By assessing the usability of MobiLearner application, satisfaction was used as the main criteria to carry out experimentation on users who are using this application. The research work has showed the satisfactory evaluation of the MobiLearner application in support of the proposed model for Cloud based blended learning.**

***Keywords*— Cloud Computing; Mobile Learning; Blended Learning; Android Application; Professional Education**

I. INTRODUCTION

Since the last decade, there is a huge trend in the higher educational establishments to adopt innovative schemes of learning together with the conservative schemes. Education division was willing to enter into a novel scientific era because of the swift revolution in Information and Communications technologies. The on hand usual face to face learning has been constantly improvised with electronic and mobile learning that makes the education practice better and effective. It is apparent that the on hand conventional face to face learning routines are not pleasing the demands and requisites of industries. These routines are also slow-moving that make the overall educational development relaxed. Thus, it is the demand of the hour to amplify the learning practices consistent with the mounting needs of the industry and students.

Modern mobile phone is the core factor in bringing the cost-cutting initiatives being introduced in modern institutions. Companies are allowing the staffs to carry their personal devices to access the company information. The handiness and easy to use equipment provided by modern smart devices has given rise to an extensive array of uses in the contemporary institutions. Among the main tools used by the contemporary institutions concerning the smart devices is mobile cloud computing (MCC). Fernando et al. (2013) have provided the definition of MCC as “Mobile cloud computing is the concept, wherein the data gets processed and stored in the cloud and not within the mobile device. The computations and storeroom shift away from the mobile into the cloud, which brings the applications to wider series of mobile devices”.

At the moment, the technologies related to the mobile devices are changing rapidly, resulting in more sophisticated mobile phones whose ability is comparable with the personal computers as discussed by Singh et.al (2018). The mobile devices are being equipped with abundant features and applications. They have provided the advantage of using them during travel anyplace and fetching the information any time. With these abilities these smart devices can be instantly plugged in to the cloud resulting in an innovative standard namely mobile cloud computing.

The future should be extremely exciting for the engineering education area. Two technologies which are anticipated to confirm a brisk movement in the near future are mobile learning and mobile cloud computing. There exists huge scope for these two fields to connect collectively as cloud is expected to offer better competencies for smart phone data access and browsing.

Mobile learning was on the progress during the previous years and hard works have been put to boost its presentation. In essence, accomplishment of mobile learning needed a lot of funds and possessions. So, some alternatives in mobile learning were needed to be implemented so as to reduce the funds. It was found that mobile cloud is the finest fit mechanism to realize mobile learning.

In mobile cloud, provision for hardware assets and memory space were made external to the smart device. Thus, cloud based mobile learning avoids the device source and space

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TRAFFIC MANAGEMENT SYSTEM

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Abstract: In an era characterized by rapid urbanization, the efficient management of traffic stands as a paramount necessity. The challenges posed by traffic congestion, road accidents, and the ever-evolving landscape of infrastructure development require innovative solutions. This project introduces an intelligent traffic management and prediction system harnessing the power of Artificial Intelligence (AI) and Machine Learning (ML). It sets out to revolutionize the management and control of traffic, with a focus on streamlining traffic flow, reducing congestion, enhancing road safety, and supplying critical data for informed infrastructure development. Beyond traditional traffic management, this system offers a suite of advanced features, including convoy route planning and dynamic journey optimization, which is designed to benefit both traffic authorities and road users. This abstract encapsulates the essence of a visionary system that aspires to usher in a smarter, safer, and more organized approach to urban traffic management, poised to harmonize the needs of our ever-growing cities with the demands of modern transportation.

Keywords: Deep Learning, Vehicle Detection, Intelligent Traffic Control

I. INTRODUCTION

In today's rapidly urbanizing world, efficient traffic management is an everpressing need. Traffic congestion, road accidents, and infrastructure development are critical issues that cities and communities face. To address these challenges, the concept of an intelligent traffic management and prediction system powered by Artificial Intelligence (AI) and Machine Learning (ML) emerges as a promising solution.

This project aims to design an innovative traffic management, control, and prediction application system that leverages AI and ML technologies to streamline traffic flow, reduce congestion, enhance road safety, and provide essential data for infrastructure development. This application goes beyond conventional traffic management systems by offering additional features such as convoy route planning and journey planning. It is intended to serve as a comprehensive solution for traffic management, benefiting both authorities and road users.

This pioneering project is on a mission to redefine the way we perceive and handle traffic management. By harnessing the cutting-edge technologies of AI and ML, this system seeks to revolutionize the management, control, and prediction of traffic patterns.

Its primary objectives are to streamline traffic flow, alleviate congestion, enhance road safety, and provide valuable data for informed infrastructure development decisions. Going beyond the boundaries of traditional traffic management, this application introduces innovative features such as convoy route planning and journey planning, aiming to provide a holistic solution that benefits both authorities and road users.

II. LITERATURE SURVEY

Gaurav Meena, Deepanjali Sharma, and Mehul Mahrishi [1], aim to forecast accurate traffic flow data, considering disruptions like signals, crashes, rallies, and road repairs. Emphasizing informed decision-making for drivers and autonomous cars, they advocate for big data principles in transportation due to the exponential increase in traffic data. Existing prediction approaches are deemed unsuitable, leading to the development of a solution using machine learning, genetic algorithms, soft computing, and deep learning. Image processing aids traffic sign detection for testing self-driving cars. Despite recognizing the importance of deep learning and genetic algorithms, the paper argues for their underrepresentation in the ML community. The proposed algorithm surpasses current precision and enhances dataset complexity.

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ENHANCED MOBILE LEARNING PLATFORM

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Abstract: The Enhanced Mobile Learning Platform presents an innovative approach to education on mobile devices, aiming to transform traditional learning methods by utilizing the flexibility and accessibility of smartphones and tablets. Mobile learning (M-Learning) is increasingly recognized as vital among today's youth, offering benefits such as fostering critical thinking and driving deeper engagement, ultimately leading to the meaningful acquisition of knowledge. Among its advantages, M-Learning serves as a supplementary learning resource accessible anytime, anywhere, on any network, through various wireless devices. It stimulates students' interest in learning and facilitates communication by providing learning materials in diverse formats, accessible at their convenience. Furthermore, M-Learning introduces novel learning avenues through mobile devices like smartphones and MP3 players. This chapter aims to explore the current landscape of mobile learning, its advantages, characteristics, and challenges in sustaining effective learning, while also discussing various mobile applications designed for learning purposes. A mobile application, in this context, refers to software application developed for educational activities specifically tailored for smartphones and tablets, diverging from traditional desktop or laptop computers.

Keywords: Mobile learning, Critical thinking, Smartphones, Software application.

I. INTRODUCTION

E-learning has emerged as a versatile method of delivering education through digital platforms, witnessing a notable surge in significance alongside rapid technological advancements. However, the focus has often been on technological enhancements rather than understanding the diverse needs and learning preferences of individual learners. The COVID-19 pandemic further accelerated the adoption of online learning worldwide as educational institutions were compelled to transition to remote teaching and learning modalities.

Traditional recommender systems primarily rely on collaborative filtering, recommending items based on the preferences of similar users, as seen in e-commerce platforms. However, this approach encounters challenges, particularly in scenarios with limited initial data (cold start) and where learning paths and styles vary significantly among students in an e-learning environment.

Content filtering, another common technique, relies on predefined rules and demographic details to recommend content but often results in static and ineffective suggestions. Therefore, a hybrid approach that combines content filtering with a model capable of learning individual learning patterns and styles appears most suitable for content recommendation in e-learning systems.

This paper proposes a recommendation engine designed to address these challenges by integrating a pedagogically curated content hierarchy that reflects the prerequisites of educational concepts. Additionally, it incorporates mechanisms to detect and adapt to the diverse learning styles and patterns of students, thereby facilitating the personalized recommendation of educational content.

In an e-learning setting, students aim to achieve various goals through interactions with the system, whether it be completing a course, skill development, or simply acquiring knowledge. An adaptive e-learning system should thus prioritize recommending educational concepts tailored to individual student performance, knowledge, skill levels, and learning patterns and styles.

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Automated Bank Cheque Verification System

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ABSTRACT: Fraudulent cheques are commonly distinguished using manual identification. Manual identification, unquestionably, is the least successful activity to battle against cheque frauds. This requires staff's ability to distinguish fake cheques dependent on the security highlights and other visual attributes. Furthermore, if the paper cheque is damaged, OCR will not be able to detect the cheque. Hence, its need to be cleared manually by a person. Then the automation process will not be successful. Moreover, current CITS based paper cheque clearance requires at least one day to clear a cheque which could extend up to three working days. Additionally, the user needs to go to the bank to deposit cheque with consuming both time and cost. Proposed system will be implemented as a python web application using Django framework. To verify the authenticity of the cheque, account holder's signature on the cheque will be analyzed using deep learning techniques. Account holders' signatures are collected, and system builds a deep learning model. Model is trained using account holder's signature dataset by extracting the features from every signature image and labeling it. System uses CNN for training and classification.

KEYWORDS: Check truncation system, online banking, remote check deposit, digital check forgery, forgery detection, image forensics, expert system, JPEG artifacts.

I. INTRODUCTION

In the ever-evolving landscape of financial technology, the traditional process of cheque clearance and verification is undergoing a profound transformation. The advent of smart digital cheque clearance and verification, powered by cutting-edge deep learning techniques, represents a significant leap forward in ensuring the security and authenticity of financial transactions. This innovative solution will be implemented as a Python web application, leveraging the robust Django framework to create a user-friendly and efficient platform. At the core of this technology lies the ability to verify the authenticity of a cheque by analyzing the account holder's signature. Traditionally, this process relied heavily on manual inspection, which could be time-consuming and prone to human error.

However, with the application of deep learning, the system can not only expedite the verification process but also enhance its accuracy and reliability. The system begins by collecting signatures from account holders, creating a diverse dataset that will serve as the foundation for building a deep learning model. This model is carefully crafted by extracting essential features from each signature image and associating them with the account holder's identity, effectively labeling each dataset entry. The choice of Convolutional Neural Networks (CNN) for training and classification ensures that the model can effectively learn and distinguish the intricate nuances of each individual's signature. This innovative solution not only streamlines the cheque clearance process but also adds an additional layer of security by making it significantly more difficult With the integration of deep learning techniques and the Python web application using Django, the financial industry is poised to enter a new era of efficiency, accuracy, and trust in cheque verification.

II. LITERATURE SURVEY

In[1] " Cheque Image Security Enhancement in Online Banking"discusses the implementation of the Cheque Truncation System (CTS) to expedite cheque clearance while eliminating the risks associated with physical cheque movement. It emphasizes the use of software-based solutions and robust security measures, including SVD digital watermarking and 256-bit AES encryption, to protect cheque images from unauthorized access and fraud. Furthermore, automated techniques such as pantograph region extraction and MICR region extraction are employed to enhance fraud detection and operational efficiency in the banking system, ultimately resulting in improved customer service, liquidity, and security.

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METAVERSE FOR IMMERSIVE LEARNING EXPERIENCE

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Abstract: By integrating 3D model animations to make things easier to learn and recall, the platform seeks to change education. It demystifies difficult topics and gives students understandable representations of abstract concepts through dynamic graphics. This method dramatically increases accessibility and accommodates a variety of learners, particularly for challenging topics. The platform's inclusive design accommodates many learning methods and guarantees that people with a range of backgrounds and abilities may easily access and benefit from the information. To further improve the learning process, it incorporates cutting-edge technology like virtual reality and the Metaverse. The platform is a paradigm for transformative education, encouraging a deeper and more lasting grasp of a variety of disciplines, thanks to its immersive teaching features and dedication to diversity.

Keywords: Subject comprehension, Immersive Education, 3D model, Animations, Metaverse.

I. INTRODUCTION

Within the walls of actual classrooms, students in the conventional educational system were frequently forced to participate in a passive learning process centered around lectures and textbooks. Although somewhat successful, this traditional method had drawbacks when it came to encouraging participation and real-world application of learned material. The COVID-19 epidemic has contributed to the growth of online learning platforms, which has brought about a paradigm change in the way people view and approach education. The shift to online platforms hasn't been without problems, though, as demonstrated by phenomena like "Zoom fatigue," which draw attention to the drawbacks of indirect and passive learning in virtual environments. Innovative approaches to education are desperately needed in the face of these difficulties. One potential way to change education is through the use of immersive technologies like mixed reality (MR), augmented reality (AR), and virtual reality (VR). When used properly, these technologies create dynamic, interactive virtual worlds that enhance education and encourage greater participation.

The idea of the Metaverse, a digital space where virtual and real-world realities converge to create immersive learning settings, is essential to this revolutionary potential. The Metaverse, which has its roots in science fiction, has developed into a complex idea that includes mirror worlds, augmented and virtual realities, and life tracking. It offers a range of opportunities, from developing exclusive virtual areas where users engage via avatars to enhancing real-world settings. The Metaverse has significant educational implications since it provides opportunities for experiential learning, group projects, and improved social interaction. The Metaverse has the potential to improve educational outcomes by bridging the gap between virtual and physical learning experiences by surpassing the limitations of standard online platforms. This paper aims to explore the potential of the Metaverse in revolutionizing education, examining its applications, challenges, and future prospects in fostering immersive and impactful learning environments.

In recent years, the educational landscape has witnessed a rapid evolution, driven by advancements in technology and changing pedagogical paradigms. The traditional model of education, characterized by passive learning and standardized curricula, has gradually given way to more dynamic and interactive approaches. However, the transition to online learning, accelerated by the COVID-19 pandemic, has revealed the limitations of conventional virtual platforms in fostering meaningful engagement and experiential learning. Enter the Metaverse—a concept that transcends the boundaries of traditional online spaces by offering immersive, interconnected virtual environments where users can interact, collaborate, and learn in ways previously unimaginable. Stemming from science fiction roots, the Metaverse has emerged as a tangible reality, blending elements of augmented reality, virtual reality, and social networking to create holistic learning experiences.

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Glaucoma Detection using Machine Learning with OCT

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Abstract: Glaucom Detection is devoted to advancing the diagnosis of glaucoma and its primary sub-conditions: Choroidal Neovascularization (CNV), Diabetic Macular Edema (DME), and Drusen, recognizing their significant impact on global vision loss. Glaucoma, often termed the "silent thief of sight," leads to progressive optic nerve damage and irreversible vision loss. While elevated intraocular pressure (IOP) is a primary cause, not all cases stem from high IOP, underscoring the multifactorial nature of its development involving genetics, age, race, and family history. This complexity necessitates a comprehensive approach for early detection and management to counteract the disease's silent progression.To meet the pressing need for early intervention, this project integrates cutting-edge machine learning and image analysis techniques alongside traditional diagnostic methods like tonometry and ophthalmoscopy. By harnessing these advanced technologies, the project aims to enhance early detection capabilities, facilitating tailored approaches to diagnose and manage glaucoma and its sub-conditions effectively. Early identification is paramount due to the insidious nature of glaucoma, which often advances unnoticed until irreversible damage occurs. Prioritizing early intervention not only decelerates disease progression but also safeguards the quality of life for affected individuals, underscoring the significance of personalized diagnostic and treatment strategies for various complications and subtypes of glaucoma. This holistic approach seeks to revolutionize glaucoma management by integrating state-of-the-art technology with established diagnostic methods, ultimately improving outcomes for patients worldwide..

Keywords: Glaucoma diagnosis Choroidal Neovascularization (CNV) Diabetic Macular Edema (DME) Drusen Early detection Machine learning Image analysis.

I. INTRODUCTION

Glaucoma, often referred to as the "silent thief of sight," is a prevalent and potentially devastating eye disease characterized by the progressive damage to the optic nerve, leading to irreversible vision loss. It is estimated that over 80 million individuals worldwide are affected by this condition, making it one of the leading causes of blindness. While glaucoma primarily affects the elderly population, it can also manifest in individuals of all ages, making its early detection and management of paramount importance. This project is dedicated to the development and enhancement of diagnostic methods for glaucoma, with a specific focus on the identification of its primary sub-conditions: Choroidal Neovascularization (CNV), Diabetic Macular Edema (DME), and Drusen.

To fully comprehend the significance of these sub-conditions and the urgency for their early detection, we must delve into the causes and symptoms of glaucoma itself.he primary cause of glaucoma is elevated intraocular pressure (IOP), a condition where the fluid within the eye, known as aqueous humor, is not adequately drained. This leads to increased pressure within the eye, which, over time, damages the optic nerve.

Elevated IOP is a major risk factor, but it is essential to recognize that not all individuals with glaucoma have high IOP, and not all individuals with high IOP develop glaucoma. Additionally, other factors such as genetics, family history, age, and race can play a role in glaucoma's development.While traditional diagnostic methods such as tonometry and ophthalmoscopy are valuable, this project aims to employ state-of-the-art machine learning and image analysis techniques to enhance the early detection of glaucoma and its sub conditions, CNV, DME, and Drusen. By advancing our understanding and diagnostic capabilities, we endeavor to contribute to improved patient care, early intervention, and the preservation of vision The project's emphasis on early detection is crucial because glaucoma and its sub-conditions often progress silently, causing irreversible damage before noticeable symptoms manifest.

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DeepVision Captioneer : Image Caption Generator For Visually Impaired

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Abstract: The Image Caption Generator utilizes cutting-edge deep learning techniques to transform the way machines interact with visual content. By leveraging state-of-the-art Convolutional Neural Networks (CNNs), it extracts detailed features from images, enabling the generation of coherent and contextually appropriate captions. This is further enhanced by advanced language models such as Transformer-based architectures, ensuring accurate linguistic alignment. The project's impact is profound and diverse. It introduces a higher level of accessibility for individuals with visual impairments by providing verbal descriptions of images, empowering them to independently engage with visual content. Additionally, it simplifies content creation, benefiting social media influencers and content creators by automatically adding descriptive captions, saving time and effort. Users across various platforms benefit from enriched interactions as they enhance their posts with meaningful image captions, thereby increasing engagement and communication. Moreover, the Image Caption Generator improves image search and retrieval, enabling users to quickly locate relevant images. Its applications extend to content moderation and educational support, underscoring its versatile utility. With the potential for multilingual support and contributions to assistive technologies, the Image Caption Generator represents a significant advancement in artificial intelligence. By amalgamating images and language, it heralds a future of improved human-computer interaction, establishing a precedent for visual comprehension in the digital age.

Keywords: Image Caption Generator, Deep learning techniques, Convolutional Neural Networks (CNNs).

I. INTRODUCTION

In a world dominated by visuals, imagine if a computer could not only "see" images but also describe them in human-like language. That's exactly what our project aims to achieve with the creation of an Image Caption Generator. Think of it as giving a voice to pictures, enabling them to tell their own stories. have you ever wondered how your smartphone knows what's in your photos when you search for them? It's not magic, it's a product of advanced technology like the one we're developing.

Our Image Caption Generator uses powerful algorithms inspired by how our brains process information, teaching machines to not just recognize objects, but to turn that recognition into meaningful sentences. imagine a world where visually impaired individuals can experience and understand the content of images around them. This technology has the potential to revolutionize their everyday lives, providing them with a new level of independence and access to information. The Image Caption Generator stands at the forefront of innovation in the realm of deep learning, revolutionizing the way machines interact with visual content. Through the integration of cutting-edge Convolutional Neural Networks (CNNs) and advanced language models like Transformer-based architectures, it seamlessly extracts intricate features from images and generates contextually relevant captions. This innovative technology not only enhances accessibility for visually impaired individuals by providing verbal descriptions for images but also streamlines content creation for social media influencers and content creators.

By automating the addition of descriptive captions, it saves considerable time and effort while enriching user interactions across various platforms. Moreover, the Image Caption Generator optimizes image search and retrieval, offering swift access to relevant visuals, and extends its utility to content moderation and educational support. With the potential for further developments such as multilingual support and contributions to assistive technologies, this groundbreaking application represents a significant leap forward in artificial intelligence, paving the way for enhanced human-computer interaction in the digital age.

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KEYSTROKE RHYTHM ANALYSIS FOR IDENTITY VERIFICATION

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Abstract: Analysing behavioural biometrics involves examining various user behaviours, such as the dominant hand used on a phone, the angle of device holding, typing speed and style, including keystroke rhythm and pressure applied, along with swipe and scroll patterns. Gait analysis further contributes by assessing an individual's walking pattern. Continuously monitoring these biometric traits and comparing them against established user profiles can significantly bolster security against identity theft and online fraud. However, it's paramount to strike a delicate balance between the security benefits and privacy concerns, ensuring the responsible use and safeguarding of user data. Our multi-modal authentication system harnesses both facial features and typing patterns, employing cutting-edge algorithms and real-time processing to deliver a seamless user authentication experience. Anti-spoofing measures are integrated to enhance system integrity, while comprehensive testing validates its effectiveness across a wide range of applications, from cybersecurity to access control. Continuous monitoring and updates are implemented to maintain optimal system performance, adapting to evolving security threats and user needs. By leveraging the distinctiveness of these behavioural biometrics, our system stands as a pioneering solution in enhancing security measures while prioritizing user privacy and usability.

Keywords: Behavioural biometrics, Keystroke rhythm, Finger pressure, Swipe patterns, Gait analysis.

I. INTRODUCTION

The integration of keystroke dynamics classifiers employing long short-term memory (LSTM) layers marks a significant stride forward in authentication system development. This paper endeavours to offer an exhaustive elucidation of the classifier implementation process while presenting a methodology for ascertaining the optimal number of test samples per individual necessary for ensuring the security and sustainability of the system. By capitalizing on LSTM layers, renowned for their ability to capture temporal dependencies within data, keystroke dynamics classifiers present a robust solution for user authentication. A central aim of this paper is to advocate for the incorporation of keystroke dynamics as a ubiquitous authentication mechanism. Rather than supplanting conventional password systems, keystroke dynamics can serve as a complementary layer, augmenting security measures without imposing additional burdens on users. Through seamless integration into existing authentication frameworks, users stand to benefit from heightened security without necessitating significant alterations in behaviour. The paper delves into the potential of keystroke dynamics as an authentication modality, evaluating its accuracy and efficacy. Crucial considerations encompass its capacity to mitigate prevalent security threats like keyloggers, which pose substantial risks to password-based authentication schemes. By mandating a typing rhythm vector alongside a password, accounts can be shielded from unauthorized access, even in scenarios of password compromise.

Moreover, keystroke recognition exhibits promise in addressing concerns related to account sharing, a longstanding issue for service providers. By scrutinizing typing rhythms, it becomes feasible to detect instances of account sharing and implement corresponding policies. Leveraging publicly accessible datasets and advanced machine learning methodologies, keystroke recognition systems can play a pivotal role in upholding the integrity and security of online platforms.

In summation, this paper serves as a comprehensive examination of keystroke dynamics classifiers, spotlighting their potential to fortify authentication systems across diverse domains. Through empirical analyses and theoretical discourse, it underscores the significance of integrating keystroke dynamics analysis into everyday applications, thereby fortifying security measures and safeguarding user accounts against unauthorized access.

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ROBOTIC ASSISTANCE FOR ELDERLY CARE

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Abstract: In today's fast-paced world, families often struggle to provide continuous care for elderly relatives, raising concerns about the risk of falls and related injuries. While existing fall detection systems offer a solution, reliance on wearable sensors presents practical challenges and discomfort. To overcome this, an innovative automatic fall detection and alert system has emerged. Utilizing computer vision techniques for pose detection and integrating a sophisticated deep learning model, this system offers non-intrusive monitoring without wearable devices. Its swift detection of falls and instant alerts signify a significant advancement in elder care, tackling healthcare challenges associated with aging populations.

Keywords: Computer vision, Pose detection, Deep learning model.

I. INTRODUCTION

The demographic landscape, notably in countries like India, is witnessing a rapid surge in the elderly population, primarily attributed to increased life expectancy. However, this demographic shift brings forth significant challenges, with a notable concern being the prevalence of falls among seniors. Falls can result in severe consequences such as tissue damage, fractures, and head trauma, particularly alarming for those living independently. Compounded by busy schedules and reliance on caregivers, ensuring timely assistance becomes paramount. Consequently, the development of AI-powered fall detection systems emerges as a critical solution to address this pressing issue. These innovative systems leverage advanced algorithms to promptly detect falls and alert caregivers, thereby reducing the risk of prolonged immobility and further complications. By providing timely intervention, these systems play a crucial role in safeguarding the well-being of the elderly, especially considering the escalating likelihood of falls with advancing age. As the aging population continues to grow, the importance of such technologies cannot be overstated, offering a vital lifeline for elderly individuals living independently and their caregivers, ensuring their safety and quality of life.

II. LITERATURE SURVEY

In [1] T. R. Aditya, Sanath S Pai, Karthik Bhat U, P. Manjunath, G. Jagadamba. “Real Time Patient Activity Monitoring and Alert System” in Electronics and Sustainable Communication Systems (ICESC), 2020 International Conference the paper proposes a method to compare, capture, and generate alert messages regarding the patient's condition using the sensors and GSM module. It tries to provide an efficient monitoring system for effective health care services for the patients of ICU.

In [2] Rui Hu, Bruno Michel, Dario Russo, Thomas Brunschwiler. (2020, December) “An Unsupervised Behavioral Modeling and Alerting System Based on Passive Sensing for Elderly Care” in Future Internet 2021 the research likely introduces an innovative system that utilizes passive sensing techniques to develop unsupervised behavioral models for elderly care. By analyzing behavioral patterns and implementing alerting mechanisms, the system aims to enhance the monitoring and support of elderly individuals, offering a non-intrusive and proactive approach to caregiving.

In [3] Sharnil Pandya, Mayur Mistry, Ketan Kotecha, Anirban Sur, Asif Ghanchi, Vedant Patadiya, Kuldeep Limbachiya. (2021, May) “Smart Aging Wellness Sensor Networks: A Near Real-Time Daily Activity Health Monitoring, Anomaly Detection and Alert System” in Second International Conference on Computing, Communications, and Cyber-Security, contribution of the paper lies in the development of the Smart Aging Wellness Sensor Networks (SAWSN) system, which integrates advanced sensor technologies and real-time monitoring capabilities to provide comprehensive daily activity health monitoring, anomaly detection, and alert systems specifically tailored for elderly individuals.

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WILD ANIMAL DETECTION IN FARMLAND

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Abstract: Animal assaults that cause crop damage are one of the main factors lowering agricultural yields. Crop raiding is turning into one of the most vexing human-wildlife conflicts as a result of the extension of farmed land into former animal habitat. India's farmers face significant risks from pests, natural disasters, and animal damage, which lowers production. In order to monitor crops and deter wild animals, farmers cannot afford to pay guards and their traditional tactics are not very efficient. Given the equal importance of ensuring the safety of humans and animals, it is crucial to safeguard crops from animal damage and safely redirect animals away from crops. Crop striking is turning into one of the most acrimonious human-wildlife conflicts due to the expansion of cultivated land into former animal habitat. It is essential to thoroughly and effectively verify that wild animals are allowed to remain in their natural habitat. Therefore, we employ deep learning to identify animals visiting our farm by applying the deep neural network idea, a branch of computer vision, in order to overcome the aforementioned issues and achieve our goal. This suggested system would use a camera to capture the surrounding area all day long and monitor the entire farm at predictable periods. When an animal enters the area, the system uses a deep learning model to recognise it and plays the proper noises to scare it away.

Keywords: Convolutional Neural network, Deep learning, Remote monitoring, Alert system.

I. INTRODUCTION

The various problems that arise when agriculture and wildlife coexist call for creative solutions. In addition to providing raw materials for other businesses, agriculture is the backbone of food production. On the other hand, crop productivity and public safety are seriously threatened by the existence of wild animals on agricultural land.

The harm that strays wild animals inflict to crops has become a major worry in many areas. Goats, cows, and wild buffalo are among the species infamous for their destructive foraging practices, which can occasionally cause human mortality. This puts farmers' lives, who depend on these crops for survival, at jeopardy in addition to causing financial losses. The entire agricultural productivity is severely harmed by animal intervention, especially for basic crops like potatoes and wheat.

Strict wildlife laws exacerbate the problem by frequently preventing small farmers from adopting practical precautions to safeguard their crops. Farmers may find themselves unable to fully handle the issue in spite of experiencing significant losses—up to 40–50% of their produce. Farmers feel vulnerable and helpless as a result of this regulatory restriction, which makes an already difficult situation worse.

Proactive steps to discourage wild animals are especially necessary in areas such as India where there is a high rate of conflict between humans and elephants. Elephants in particular have a reputation for seriously damaging property and crops, which exacerbates conflicts between local people and animals. To reduce these conflicts and protect lives and livelihoods, farmers need technology that makes it possible for them to quickly identify and react to animal invasions.

In addition, the situation is made worse by the deforestation caused by human growth, which leaves animals in their natural habitats with less access to food, water, and shelter. Conflicts between humans and animals increase when wild animals invade homes in quest of food, creating more difficulties for both communities and law enforcement.

Animal interference in agriculture has effects that go beyond short-term financial setbacks. Food insecurity is made worse by the ensuing rise in food costs, which disproportionately affects the poor and those who cannot purchase basic food items. Therefore, it is imperative to address the problem of wild animal detection on farms in order to maintain agricultural output as well as to guarantee that everyone in society has fair access to food.

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LIGHTNING PREDICTION AND ALERT SYSTEM

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ABSTRACT: Lightning, a natural phenomenon, poses substantial risks to life and property, necessitating accurate detection and timely alerts. Traditional methods relying on ground-based sensors have limitations in coverage and accuracy. However, recent advancements in deep learning have revolutionized lightning detection and alert systems. This paper introduces the Lightning Prediction and Alert System (LPAS), employing deep learning to enhance response to lightning threats. LPAS utilizes deep learning, particularly convolutional neural networks (CNNs) to process diverse data sources effectively. These models excel in detecting complex spatiotemporal patterns associated with lightning strikes. Furthermore, LPAS enables real-time lightning detection and alerting, delivering instant notifications through mobile apps, SMS, and email. In summary, the Lightning Prediction and Alert System powered by deep learning signifies a significant leap in lightning prediction technology. Its integration of multimodal data, deep learning models, and real-time alerting capabilities enhances public safety and benefits various industries. By mitigating lightning risks and enhancing our understanding of storm dynamics, LPAS promises a safer future for communities worldwide.

KEYWORDS: Convolutional Neural network, Deep learning, Remote monitoring, Alert system.

I. INTRODUCTION

A Lightning Prediction and Alert System is a crucial project designed to forecast lightning strikes, issuing timely warnings to mitigate associated risks. Lightning poses threats such as fires, electrical damage, and harm to human life, necessitating proactive measures for public safety. Utilizing advanced technology, including deep learning algorithms, this system aims to accurately predict lightning occurrences in specific areas. By integrating ground-based sensors and radar technologies, it provides real-time alerts tailored to different user groups and geographical regions. This comprehensive approach enhances community resilience and reduces the impact of thunderstorms. Detecting lightning strikes in real-time also prevents electrical damage to appliances by triggering safety mechanisms. Overall, the Lightning Prediction and Alert System serves as a vital tool for safeguarding lives, properties, and infrastructure in regions prone to lightning activity, demonstrating its significance in enhancing safety and minimizing risks associated with natural phenomena. This paper introduces the Lightning Prediction and Alert System (LPAS), employing deep learning to enhance response to lightning threats. LPAS utilizes deep learning, particularly convolutional neural networks (CNNs) to process diverse data sources effectively. These models excel in detecting complex spatiotemporal patterns associated with lightning strikes. Furthermore, LPAS enables real-time lightning detection and alerting, delivering instant notifications through mobile apps, SMS, and email. In summary, the Lightning Prediction and Alert System powered by deep learning signifies a significant leap in lightning prediction technology. Its integration of multimodal data, deep learning models, and real-time alerting capabilities enhances public safety and benefits various industries. By mitigating lightning risks and enhancing our understanding of storm dynamics.

II. LITERATURE SURVEY

Lightning Detection System Efficiency from Lightning Strike Density Analysis for Light Rail Transit

This system finds lightning detection system efficiency from ground and space as well as its correlation with lightning event counter data on existing external protection system. Lightning detection system data from ground and space in Palembang have positive correlation, even though flash rate density map from space have lower resolution than the

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Forest Monitoring using WSN

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Abstract: Forests are part of the important and indispensable resources for human survival and social development that protect the balance of the earth ecology. In recent years, the frequency of forest fires has increased considerably due to climate changes, human activities and other factors. Currently, Forest Fire prevention methods largely consist of Patrols, Observation from watch towers, Satellite Monitoring. To restrict smuggling of forest resources and to save the forests from fires around the globe some preventive measures need to be deployed. Although observation from watch towers is easy and feasible, it has several defects. In the first place, this method requires many financial and material resources and a trained labor force. Second, many problems with fire protection personnel abound, such as carelessness, absence from the post, inability for real-time monitoring and the limited area coverage.

We are developing such a system using WSN which can be used to restrict this smuggling and to help our natural vegetation form forest fires. animal detection have been an important field in order to have a better understanding on animal behavior and to restrict the damages done to humankind when they are outside the forest by reporting to authority immediately. In this project we propose a wireless sensor network paradigm for real-time forest fire and conservation detection. The wireless sensor network can detect and forecast forest fire, increase in carbon-dioxide, decrease in soil moisture and also falling of trees more promptly. This project mainly describes the data collecting and processing in wireless sensor networks for real-time forest fire and conservation detection. In this project to the neck of animal this light weight designed system is attached such that spark generating sensor will be very close to the body of that animal. Thus, if it goes over boundary line it is sensed and sends to micro controller properly. Uses ZIGBEE modem to send signals and from there it will be sent to Server Room.

Keywords: Wireless Sensor Networks (WSN), Forest Monitoring, ZIGBEE, Spark Generating Sensor, Forest Fires.

I. INTRODUCTION

Forests, integral to human survival and ecological balance, face escalating threats from factors like climate change and human activities, leading to a surge in forest fires globally. Current preventive methods such as patrols and satellite monitoring, while essential, suffer from limitations like resource intensiveness and inadequate real-time monitoring. To combat these challenges and safeguard our natural resources, we propose a comprehensive forest monitoring system leveraging Wireless Sensor Networks (WSN).

This innovative system aims to curtail smuggling activities and mitigate forest fires by providing real-time detection and conservation measures. By employing a network of wireless sensors, our project facilitates prompt detection and forecasting of forest fires, along with monitoring indicators like carbon dioxide levels, soil moisture, and tree falls. Additionally, the system integrates animal detection functionalities to enhance understanding of animal behavior and promptly report any incidents to relevant authorities. Through lightweight design and efficient communication protocols like ZIGBEE, our system ensures seamless data transmission for enhanced forest protection and conservation.

Our project introduces a transformative approach to forest monitoring using Wireless Sensor Networks (WSN). By leveraging lightweight sensors and advanced communication technologies like ZIGBEE, our system enables real-time detection of forest fires and animal activities. With a focus on proactive conservation efforts, our innovative solution aims to mitigate the increasing threats to forest ecosystems and safeguard our natural resources effectively.

Ramanamma Parepalli, Sanjeev Shama* and Mohan Kumar Naik

Bufferless NoC router design for optical networks-on-chip

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Abstract: In large-scale tiled chip multiprocessors (TCMPs), network-on-chip (NoC) is a prevalent interconnect solution. The NoC router plays a crucial role in NoC architecture, and two primary types exist: buffered and bufferless. The latter offers a promising solution due to its streamlined design, reduced energy consumption, and hardware efficiency. This paper proposes a 2D 4×4 mesh NoC architecture with a novel bufferless NoC router design using XY routing algorithm. The proposed mesh network consists of routers and processing elements, with each router connected to its four adjacent peers (North, South, East, and West) and a single processing element. The proposed router design eliminates the input buffers, output buffers and crossbar switch. The novel bufferless NoC router architecture comprises of various functional blocks, including ejection and injection controllers and Data ranking based on port prioritization, and age incrementor which efficiently solves long critical path issues by dynamically changing the port priority and hence solves the deadlock issue. By leveraging efficient routing and prioritization mechanisms, the novel architecture facilitates the seamless flow of flits through the network. Optical NoCs are based on optical interconnects and optical routers, and have significant bandwidth and power advantages. Our results indicate that the proposed bufferless router can lead to significant area (30.3 %) reduction over the standard BLESS.

Keywords: optical; Network-on-Chip; bufferless router; communication; routing algorithm; deflection

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1 Introduction

The advent of advanced chip technology has enabled the integration of heterogeneous cores, ranging from simple memories to complex digital signal processors (DSPs), on a single system-on-chip (SoC). As the number of on-chip processing elements increases, the complexity of inter-core communication also escalates. Recently, network-on-chip (NoC) architectures have emerged as a crucial component of SoCs, offering a promising solution to mitigate the communication challenges inherent in complex SoC designs [1]. NoCs define the physical interconnection of processing elements through a network of routers and links, facilitating efficient data transfer between nodes. The primary objective of NoC design is to optimize data movement within the chip, minimizing impact on the overall design while meeting or exceeding key performance metrics (Power, performance, area, etc.). NoC aim to address the limitations of conventional shared bus architectures, providing a scalable and efficient communication infrastructure for complex SoC designs.

The router is a critical component of network-on-chip (NoC) architectures, playing a pivotal role in data transfer within the network. As the number of cores in a network increases, the number of routers also scales proportionally, making the design of an efficient router a paramount requirement to achieve optimal system performance. The efficiency of a router is primarily determined by four key factors: NoC architecture, routing technique, network topology and buffers size. Optimizing these factors is crucial to designing a high-performance router, which in turn, significantly impacts the overall performance and scalability of the NoC.

There are two types of routers: Buffered and bufferless routers [2]. In buffered routers, Buffers are integral part of existing NoC routers. Buffers are necessary for high network throughput and increases total available bandwidth in network but have several disadvantages such as it requires significant chip area, adds complexity and consume significant energy and power. Bufferless have been proposed to overcome these disadvantages. BLESS (bufferless routing) is a routing technique that eliminates input buffers, instead forwarding incoming flits to an output port immediately. This approach, also known as hot-potato routing, operates on

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A REVIEW ON DESIGNS OF WHEEL CHAIR-CUM -STRETCHER

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Abstract: Wheelchair and stretchers are commonly used in hospitals. And this medical equipment is used for transferring patients from one place to another. During transferring patients, it creates problems to patients and also creates problems for attendant and nurse. Sometimes it creates problems to patient while transferring patient from wheelchair to stretcher, stretcher to bed and bed to wheelchair is always issue for both hospital staff and family members of patient. This system causes stress, body pain to patients and sometimes chances to sleep down the patient. Understanding the various issues regarding the mobility equipment a better design will be an asset for medical field and helpful for disabled person. This paper presents the various design and fabrication of wheelchair cum stretcher and aims to explore design for patient to transfer patient from bed to wheelchair and wheelchair to stretcher. This innovation helps medical staff to transfer patient from chair to bed very easily because chair become a stretcher and it is adjustable to height of bed. Conversion of wheelchair to stretcher and vice versa is achieved by simple linkage mechanism which can be manually or automatically operated mechanism.

I. INTRODUCTION

This technical review delves into the fascinating field of wheelchair-cum-stretcher systems, examining the complex engineering feats, design concerns, and future directions in mobility assistance technology. Wheelchair-cum-stretcher systems combine comfort, functionality, and adaptability to meet the many demands of people who are limited in their mobility. The goal of this analysis is to analyse several parts of current designs, such as material choices, user interfaces, propulsion systems, and conversion mechanisms. We hope to identify gaps, obstacles, and opportunities in the development of these game-changing technologies by carefully examining the literature landscape. This will open the door to future developments and improved accessibility in healthcare settings and beyond.

Electro-Discharge Machining of Microholes on 3d Printed Hastelloy Using the Novel Tool-Feeding Approach

Abstract

Hastelloy, a nickel-based superalloy renowned for its exceptional resistance to corrosion at high temperatures, is widely used in sectors such as nuclear, aerospace, chemical processing, and pharmaceuticals. Microelectrical discharge machining (µ-EDM) is crucial for generating microholes and channels on Hastelloy. Since it effectively addresses difficulties like work hardening, high strength & wear resistance, and low thermal conductivity in traditional machining. Microholes play a major role in many critical components for precise control of fluids in fuel injectors, managing heat in turbine blades, controlled gas exchange, etc. The current research investigates the drilling of 8:1 aspect ratio microholes machined by 400µm diameter electrodes. This study investigated the influence of tool material (tungsten carbide, carbide drill bit, and brass) on µ-EDM performance. Compared to tungsten carbide and carbide drill bits, brass exhibited significantly lower electrode wear, leading to more precise microholes with reduced overcut and taper angle. However, brass also required a substantially longer machining time. Carbide drill bits offered a balance between wear resistance, machining time, and overcut/taper angle.

Keywords: Micro-EDM, Hastelloy, Micro Holes, Evaluation, Drill Bit, Straight Cutting, Orbitary Cutting

1. Introduction

The ever-evolving world of manufacturing has experienced an important shift with the combination of advanced materials and cutting-edge procedures to process them. Hastelloy is an advanced material that has emerged as a prominent material in the aerospace and chemical processing sectors [1]. This is due to its remarkable corrosion resistance and high-temperature strength properties. Hence, microholes machined on Hastelloy prove its requirement within the combustion chamber to mitigate elevated temperatures, even when the material's melting point is exceeded during firing [2]. Also, its exceptional resistance to chemical reactions [3] makes it viable in petrochemicals for heat exchangers, gas desulphurization systems, reactors, nuclear fuel processing, condensers, submarine blades, combustor components, etc. For this purpose, it is crucial to have an accurate micromachining technique, emphasizing the vital requirement for Hastelloy machining. Conventional machining of advanced metals and superalloys presents difficulties, mainly due to the work hardening, high strength, wear resistance, low thermal conductivity, and rapid deterioration of the cutting tool. Non-conventional, non-contact machining methods overcome these difficulties, eliminating the need for direct contact. Major techniques are µ-EDM, water jet, laser beam, and electrochemical machining. µ-EDM is a prominent thermal erosion material removal process among the available techniques. During this procedure, the workpiece is connected to the anode, while the tool electrode is connected to the cathode. The proximity between the tool electrode and the workpiece results in the electrostatic attraction of electrical charges, causing a regulated discharge of sparks. This spark,

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ORIGINAL ARTICLE

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The combined effect of split fueling strategy and EGR on the combustion, performance, and emission characteristics of a CRDI biofuel engine

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Abstract

The current research investigates the impact of a split fueling strategy combined with several flow rates of exhaust gas recirculation (EGR) on the combustion and emission characteristics of a diesel engine running on B20 waste cooking oil (WCO) biodiesel. A four-stroke single-cylinder common rail direct injection engine was employed for experiments. It operates with a B20 blend of WCO biodiesel at 600 bar pressure for varying pilot

Abbreviations: aTDC, after top dead center; B20, 20% of biodiesel + 80% of diesel (% vol.); B20P10, 20% of biodiesel + 80% of diesel with 10% pilot fueling (% vol.); B20P20, 20% of biodiesel + 80% of diesel with 20% pilot fueling (% vol.); B20P30, 20% of biodiesel + 80% of diesel with 30% pilot fueling (% vol.); BSFC, brake-specific fuel consumption (kg/kWh); bTDC, before top dead center; BTE, brake thermal efficiency (%); CA, crank angle; CHRR, cumulative heat release rate (kJ); CI, compression ignition; CO, carbon monoxide (% vol.); CRDI, common rail direct injection; CO2, carbon dioxide (% vol.); DME, dimethyl ether; ECU, electronic control unit; EGR, exhaust gas recirculation; HC, hydrocarbon (ppm); HDPE, high-density polyethylene; NHRR, net heat release rate (J/deg.); NOx, nitrogen oxides (ppm); PID, period of ignition delay; ppm, parts per million; WCO, waste cooking oil.

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PAPER

Wear debris analysis of Al-Si/MWCNT nanocomposite during dry sliding wear tests

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Keywords: wear resistance, multi-walled carbon nanotubes, LM6 aluminum alloy, oxidation protection, SEM, EDS, nanocomposite

Abstract

This study demonstrates the enhancement of wear resistance achieved by incorporating multi-walled carbon nanotubes (MWCNTs) in LM6 aluminum alloy to form nanocomposites. Experiments on wear resistance study were performed at different test parameters for various compositions of MWCNT in LM6 alloy. The size and nature of debris obtained post experiments were significantly dependent on the MWCNT contents. Wear resistance was found to increase with increase in the MWCNT fraction in the nanocomposite. The worn surface and the shape as well as the size of the debris were studied under scanning electron microscopy (SEM). Energy-dispersive spectroscopy (EDS) analysis of the worn surfaces was used to detect and measure the constituents present in the debris. SEM micrographs of the nanocomposites show that the features of the wear debris are completely altered when MWCNT was added. Further the wear mechanism underwent a change from oxidative in LM6 to that of ploughing in LM6 nanocomposite. The recorded surface roughness values also confirm the above findings and show significantly reduced surface roughness (~82%, 0.75 wt% MWCNT). These results clearly demonstrate the advantage of addition of MWCNT for enhancing resistance to wear in LM6 alloys.

1. Introduction

Material wear is the progressive loss of material from the surface of a solid due to relative motion between two surfaces in contact [1]. The main types of wear are abrasive wear, adhesive wear, fatigue wear, and tribo-chemical wear. The conditions affecting wear rate are: materials involved, applied load, sliding speed, and lubrication used. The frictional force that is created during wear prevents the surfaces from sliding smoothly over one another and also generates heat at the sliding interface. Progressive wear leads to significant damage to the component at its surface and in the most severe case will render it unusable. The involved member may become structurlly deformed, undergo changes in phase, develop micro-cracks, weld with the worn particles etc. or a combination of these may occur.

Wear resistance is a critical consideration to ensure compatability and needs to be duly considered in the design of components that experience relative motion. The smooth operation of modern machinery depends on reducing friction and wear [2]. Wear, tear, and seizure are major problems in engineering systems and automotive components, making the study of wear essential [3]. The frictional loss of material is influenced by the properties that are formed in it during the production process [4]. A key factor in determining the wear rate is the applied load. Aluminum alloys have a low wear rate when subjected to wet sliding conditions and high stresses. Al-Si eutectic alloy, one of the aluminum alloys, has demonstrated superior wear resistance compared to other alloys, which increases linearly with load [5]. The silicon in Al-Si alloy has shown improved wear resistance, minimum coefficient of thermal expansion, lower density, improved specific strength and stiffness compared to pure aluminum [6, 7].

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VALIDATION OF CONDITION MONITORING OF ROTARY EQUIPMENT USING VISUAL RECURRENCE QUANTIFICATION ANALYSIS

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ABSTRACT*: Industrial policy and globalization have made the industrial environment competitive, making maintenance of machines crucial. Condition monitoring (CM) is a process that monitors machinery parameters to predict and measure potential failures. This allows for early maintenance and prevents costly downtime. Vibration analysis is used to measure machine condition, but it requires high skills and experience. Recurrence Quantification Analysis (RQA) is a nonlinear data analysis method that quantifies the number and duration of recurrences in a dynamic system. A test setup is set up to produce flaws in the rotary system, such as unbalance, misalignment, and looseness. The mathematically generated simulated defect signals are examined, and they are contrasted with the experimental values obtained from the test setup using RQA. It has been found that RQA can accurately predict issues like unbalance, misalignment, and looseness, and it has been recommended that RQA can be used as an advanced tool for online/offline condition monitoring of machines.*

KEYWORDS*: Condition Monitoring, Recurrence Quantification Analysis, Rotary Equipments, LabVIEW.*

1 INTRODUCTION

The concept generation, requirement management, development, production, use, maintenance, and disposal phases make up a product's life cycle. Production takes place during the operation phase. Machinery maintenance is necessary to keep products in the intended state in terms of geometric dimensioning, precision, tolerance, surface finish, etc. Therefore, condition-based maintenance monitoring of machinery is crucial.

Maintenance is a planned process that ensures a machine's optimal operational state at the lowest cost, involving repairs or replacements to achieve production goals that align with maintenance objectives. Run to Failure Maintenance is a type of maintenance system that requires immediate action upon a machine or facility failure. Although less costly than other types, it can lead to component failures, reducing production availability and potentially increasing costs (Willmott, 1994).

Preventive maintenance reduces component failure and system performance deterioration, but only applies to aging damage and requires adequate staffing. Corrective maintenance restores systems to their intended state, aiming to increase system effectiveness, eliminate malfunctions, prevent unnecessary repairs, and reduce deviations from ideal operating conditions. Effective planning requires planners, a well-developed database, thorough repair techniques, and specialized tools. Predictive maintenance monitors equipment state, requiring data collection tools. Improvement aims to minimize maintenance requirements, with divisions including engineering services, shutdown improvement, and design-out maintenance. By developing machines with high failure, long-term repair, or replacement costs, maintenance can be simplified or improved.

Condition-based maintenance (CBM) or condition monitoring (CM) is a continuous evaluation of operational equipment to detect issues before component failure or equipment breakdown. CM is particularly useful for analyzing rotational and reciprocating machinery, as it can detect changes in the typical signal that could indicate impending equipment failure. CM approaches include non-destructive testing, infrared thermograph, wear debris monitoring, performance monitoring, sound, vibration monitoring, and visual monitoring. Early detection of failures aids in planning and timely allocation of downtime, resources, and labor (Davies, 2012). CM can also determine machine operation duration and delay closures for production or cash flow considerations. It increases the time between shutdowns, lowers maintenance requirements, and allows for corrective

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Article

Performance Analysis of Helical Milling and Drilling Operations While Machining Carbon Fiber-Reinforced Aluminum Laminates

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Abstract: Being a difficult-to-cut material, Fiber Metal Laminates (FML) often pose challenges during conventional drilling and require judicious selection of machining parameters to ensure defect-free laminates that can serve reliably during their service lifetime. Helical milling is a promising technique for producing good-quality holes and is preferred over conventional drilling. The paper compares conventional drilling with the helical milling technique for producing holes in carbon fiber-reinforced aluminum laminates. The effect of machining parameters, such as cutting speed and axial feed, on the magnitude of cutting force and the machining temperature during conventional drilling as well as helical milling is studied. It was observed that the thrust force produced during machining reduces considerably during helical milling in comparison to conventional drilling at a constant axial feed rate. The highest machining temperature recorded for helical milling was much lower in comparison to the highest machining temperature measured during conventional drilling. The machining temperatures recorded during helical milling were well below the glass transition temperature of the epoxy used in carbon fiber prepreg, hence protecting the prepreg from thermal degradation during the hole-making process. The surface roughness of the holes produced by both techniques is measured, and the surface morphology of the drilled holes is analyzed using a scanning electron microscope. The surface roughness of the helical-milled holes was lower than that for holes produced by conventional drilling. Scanning electron microscope images provided insights into the interaction of the hole surface with the chips during the chip evacuation stage under different speeds and feed rates. The microhardness of the aluminum layers increased after processing holes using drilling and helical milling operations. The axial feed/axial pitch had minimal influence on the microhardness increase in comparison to the cutting speed.

Keywords: fiber metal laminate; drilling; helical milling; surface roughness; damage; temperature; force

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1. Introduction

The need for lightweight, high-performance materials in the automotive and aerospace industries has led to an increased demand for new-age composite materials that amalgamate the merits of metals and composite materials. The emergence of Fiber Metal Laminates (FMLs) is a response to these intricate demands. They consist of Fiber Reinforced Polymers (FRPs) sandwiched between thin metal/alloy sheets, combining the strength of metals/alloys with the exceptional strength-to-weight ratio of FRPs. Presently, the skin panel of the upper fuselage of the aircraft is being built primarily by the use of FMLs [1].

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Smart Tiffin Box - A Brief Review

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Abstract: The Smart Tiffin Box revolutionizes traditional food storage with advanced technology, targeting individuals with busy lifestyles. It integrates sensors and communication modules to monitor temperature, freshness, and nutritional content. A user-friendly mobile app allows customization, real-time updates, and nutritional tracking. The design includes smart sensors and microcontrollers for optimal storage conditions, preventing spoilage. Extensive testing validates its reliability for dynamic lifestyles. The project signifies a technological leap in smart food storage, addressing challenges and offering an intelligent solution. In conclusion, the Smart Tiffin Box enhances daily life by intelligently managing dietary preferences.

Keywords: Smart Tiffin Box, Temperature, Freshness, and Nutritional Content

I. INTRODUCTION

Global food losses have recently been documented to be in the order of 25 percent to 50 percent of production volumes, caloric content and/or market values depending on the commodity. A great number of organizations all over the world such as UN Food and Agriculture Organization (FAO) are studying this enormous problem of postharvest food losses. Much of the developing world in general lacks access to affordable refrigeration systems for precooling, refrigerated transport, cold storage, or freezing during postharvest handling and distribution of perishable foods. [1]. This UK study, commissioned by the Food Standards Agency and conducted in 89 primary schools, aims to enhance the nutritional content of children's packed lunches. The 12-month SMART lunch box program intervention involved 1,291 eight to nine-year-olds, assessing food weights, specific items, and nutrient levels. Results showed the intervention group had higher weights of fruit, vegetables, dairy, and starchy foods, with lower weights of savoury snacks. There was a positive impact on vitamin A and folate levels, an 11% increase in vegetables/salad provision, and a 13% decrease in crisps. While improvements were noted, the overall nutrient profile showed only small gains. Acknowledging the feasibility of such interventions, the study calls for additional strategies to align packed lunches with government standards for school meals, addressing the persistent issue of poor-quality packed lunches in the UK [2]. Human life masses are the evils of poverty and hunger. The world produces enough food to feed every one of us, yet almost one billion people live in hunger. Between one third and half of all food produced globally is wasted or lost along supply chains every year. That's enough to feed twice the number of hungry people in the world. Producing food that will be lost or wasted means wasting human labor, money, land, energy, and water. To put things in perspective, in order to produce food that is never consumed, a surface area larger than Canada and India combined is used, three times the water volume of Lake Geneva is squandered, and roughly 20% of total deforestation is caused. Stunningly, if food losses and waste were a country, it would be the third largest greenhouse gas emitter in the world, as well as a significant contributor to climate change[3].

According to statistics from the Food and Agriculture Organization of the United Nations, up to 1.6 billion tons of food are wasted globally each year, with the edible portion reaching 1.3 billion tons.In July 2022, five United Nations agencies jointly released the "2022 World Food Security and Nutrition Status" report, which stated that the global number of hungry people reached 828 million, exceeding one-tenth of the global total. About 258 million people in 58 countries and regions were affected by the severe food crisis, up from 193 million people in 53 countries and regions in 2021 [4]. Food is any substance which when consumed provides nutritional support for the body. It may be of plant or animal origin, containing the known five essential nutrients namely, carbohydrates, fats, proteins, vitamins and minerals. Usually after consumption, food undergoes different metabolic processes that eventually lead to the production of energy, maintenance of life, and/or stimulation of growth (Aguilera 1999). The history of early man shows that, people obtained food substances through hunting, gathering, and agriculture. The assurance and protection of food quality has always been important to man. This is evident from the fact that, one of the earliest laws known to man was that of Food. Right from the Garden of Eden, there was a law guiding the consumption of food. In our time too, governments over many centuries have endeavoured to provide for the safety and wholesomeness of man's food by legal provisions, (Alsberg 1970; Jango-Cohen 2005) [5]. The electronic nose system was based on wireless data transmission using ZigBee, a series

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Analysis Of Intermetallic Alloy: A Comparative Examination Of Electron Beam And Gas Tungsten Arc Welding For Copper-Stainless Steel Dissimilar Metal Joints

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Abstract. *Dissimilar metal joints are critical areas of aerospace engineering as they demands the joining of materials with diverse properties to meet the requirements of aircrafts and spacecraft. Dissimilar metal joints enables the integration of materials with different mechanical, thermal and corrosive resistant properties and achieve light weight structures with less fuel consumption and enhance the overall performance of aircraft and spacecraft. But creating such a dissimilar joint is very challenging and require advanced welding techniques to ensure improved reliability and efficiency of these joints. During dissimilar metal joints an intermetallic alloy is formed which has to be free from oxides. Copper and Stainless steel joints have a wide range of application in aerospace industry specifically in heat exchangers and electrical connectors. In this paper, a comparative analysis of the dissimilar metal joints of Copper and Stainless Steel 304 made with a conventional Gas Tungsten Arc Welding (GTAW) and Electron Beam Welding (EBW). GTAW is performed with and without filler in an open atmospheric environment whereas Electron Beam Welding is performed inside a vacuum chamber. The presence of fatigue cracks, voids and pores are analyzed using Optical and Scanning Electron Microscope. EDX analysis is also performed to analyze the elemental composition in the intermetallic alloy formed during both welding methods.*

Keywords: Dissimilar Metal Joints, Electron Beam Welding, Gas Tungsten Arc Welding;

1. INTRODUCTION

Copper and Stainless Steel dissimilar metal joints possess a wide range of application in aircraft and

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NEXT-GEN REMOTE SENSING: RCNN AND ANT COLONY OPTIMIZATION FOR ACCURATE LAND COVER MAPPING

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Abstract

Accurate land cover mapping is crucial for various applications, from environmental monitoring to urban planning. Traditional methods often struggle with high-dimensional data and complex landscape features. This study integrates RCNN (Region-based Convolutional Neural Network) and ANT Colony Optimization (ACO) to enhance land cover mapping accuracy. RCNN is utilized for precise segmentation of high-resolution satellite imagery, while ACO is employed for effective feature extraction, leveraging the algorithm's ability to identify and optimize features in the presence of complex patterns. Our method was evaluated using a dataset of 500 km², achieving a segmentation accuracy of 92.5% and a feature extraction precision improvement of 18.3% compared to conventional techniques. The integration of RCNN and ACO demonstrates significant advancements in capturing detailed land cover information and improving overall mapping accuracy.

Keywords:

RCNN, ANT Colony Optimization, Land Cover Mapping, Remote Sensing, Feature Extraction

1. INTRODUCTION

The advancement of remote sensing technologies has revolutionized the way we monitor and analyze the Earth's surface [1]. High-resolution satellite imagery provides a wealth of data that is crucial for applications ranging from environmental management to urban planning [2]. The ability to accurately classify and map land cover types is fundamental for these applications, as it directly impacts decision-making processes and resource management [3]. Recent developments in machine learning and optimization techniques have opened new avenues for enhancing the accuracy of land cover mapping [4].

Despite these advancements, several challenges persist in land cover mapping [5]. High-dimensional data from satellite imagery often contains intricate and overlapping features, making it difficult to achieve precise segmentation and classification [6]. Traditional methods struggle with managing the vast amounts of data and distinguishing between similar land cover types [7]. Additionally, feature extraction, which is critical for effective classification, can be hindered by the complexity of the data and the presence of noise.

The primary problem addressed in this study is the limitation of traditional methods in accurately segmenting and classifying land cover types from high-resolution satellite imagery [8]. Conventional segmentation approaches may not effectively capture the fine details necessary for precise land cover mapping, and standard feature extraction techniques often fail to identify the most relevant features in complex datasets. This results in reduced accuracy and reliability of land cover maps, impacting their utility for various applications.

This study aims to address the limitations of traditional land cover mapping methods by integrating advanced techniques for both segmentation and feature extraction. Specifically, the objectives are:

- To leverage Region-based Convolutional Neural Networks (RCNN) for improved segmentation of high-resolution satellite imagery.
- To apply ANT Colony Optimization (ACO) for enhanced feature extraction, focusing on identifying and optimizing relevant features in complex datasets.
- To evaluate the effectiveness of the integrated RCNN and ACO approach in improving land cover mapping accuracy compared to conventional methods.

The novelty of this study lies in the integration of RCNN for segmentation and ACO for feature extraction within the same framework for land cover mapping. RCNN is known for its ability to perform precise segmentation by leveraging deep learning techniques to identify regions of interest, while ACO offers a robust optimization approach to extract meaningful features from high-dimensional data. Combining these two advanced techniques addresses the limitations of traditional methods and provides a more comprehensive solution for accurate land cover mapping.

This study contributes to the field of remote sensing and land cover mapping in several ways:

- It demonstrates the application of RCNN in segmenting high-resolution satellite imagery with high accuracy, setting a new standard for segmentation performance in land cover mapping.
- It introduces ACO as a powerful tool for feature extraction, showing its capability to enhance feature relevance and improve classification outcomes.
- It provides a comparative analysis of the proposed method against traditional techniques, highlighting significant improvements in segmentation accuracy and feature extraction precision.
- It offers insights into the integration of machine learning and optimization techniques, paving the way for future research and applications in remote sensing.

By addressing the existing challenges and leveraging cutting-edge techniques, this study advances the state-of-the-art in land cover mapping, offering more accurate and reliable tools for analyzing and interpreting satellite imagery.

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DESIGN AND FABRICATION OF TURMERIC AND GINGER CLEANING MACHINE

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ABSTRACT

This study focuses on the development of an innovative turmeric and ginger cleaning machine, addressing inefficiencies in traditional post-harvest processing methods. Turmeric and ginger are vital crops known for their nutritional and medicinal properties but pose challenges due to their tough and fibrous nature during post-harvest processing. To streamline these processes, this project involves the design and fabrication of a robust, multifunctional cleaning machine. The machine integrates a cylindrical container for holding crops, supported by a durable frame for stability. Internally, a series of mechanical components, including rotating mechanisms, facilitate efficient cleaning. Powered by a 0.25 HP induction motor, the machine achieves high cleaning efficiency while maintaining crop integrity. The CAD model and engineering analysis emphasize optimized performance, safety, and cost-effectiveness, ensuring a user-friendly design. Testing revealed a cleaning efficiency of up to 95%, with reduced water and energy consumption compared to traditional methods. The machine's compact design, ease of operation, and low manufacturing cost (Rs. 10,250) make it a viable solution for small to medium-scale farmers and processors. Additionally, the machine reduces manual labor and promotes value addition, enhancing productivity in agricultural operations. This study underscores the machine's ability to address key challenges in post-harvest handling. The innovative design not only supports sustainability by minimizing resource consumption but also aligns with the economic needs of farmers by reducing operational costs. Its portability and modular construction enable broader adoption, promoting mechanization in rural agricultural communities. By ensuring economic viability, environmental sustainability, and practical usability, this machine represents a significant advancement in agricultural mechanization, offering a scalable solution for improved post-harvest processing of turmeric and ginger.

KEYWORDS: Turmeric, Ginger, Agricultural Equipment

1. INTRODUCTION

India's agricultural landscape is dominated by spice cultivation, with turmeric and ginger contributing significantly to its economy and exports. Despite advancements in farming, post-harvest cleaning methods for these crops remain labor-intensive, time-consuming, and inconsistent. Traditional cleaning techniques compromise quality and efficiency, highlighting the need for mechanized solutions. This paper presents the design and fabrication of a compact turmeric and ginger cleaning machine aimed at small to medium-scale farmers.

Previous studies provided a comprehensive understanding of existing crop processing technologies, highlighting their limitations and potential improvements. A turmeric polishing machine with a 50 kg/20 min capacity at 75 rpm improved microbiological quality, was user-friendly, low-cost, and easy to maintain. Farmers benefited from its simple operation and quick assembly, processing 50 kg in one session with high efficiency [1]. A ginger processing machine with two nylon rollers cleaned 13.86 kg/h, with only 2% material loss. Operable by one person, it reduced labor by 42.3% and time by 46.7%, achieving 98.57% washing and 58.97% peeling efficiency at 200 rpm and 3 kg batches [2]. A machine with a 40 kg/min capacity and water recycling reduced turmeric processing time and curcumin loss. Its horizontal drum with paddles streamlined operations and minimized water retention, benefiting small-scale farmers [3].

A stainless steel ginger cleaning machine, built to VDI 2221/2225 standards, featured a 4.5 hp motor and a water recirculation system, improving washing efficiency and reducing water use. It handled 50+ kg/min with possible upgrades for larger capacities [4]. A turmeric polishing machine using abrasion polished 8 kg in 15 minutes with 7.68% efficiency at 60 rpm. It processed up to 30 kg/hr, outperforming manual methods with ease of use and reduced labor needs [5]. A turmeric polisher powered by a 0.37 kW motor processed 63.53 kg/h, saving 81% of time over manual methods. Costing 29,410 INR, it improved polishing quality, reduced labor costs, and boosted productivity [6]. A ginger peeling machine, powered by a 3-hp engine, achieved optimal performance at 75% moisture, 68 kg/h feed rate, and 270 rpm, with improved peeling efficiency, capacity, and minimal damage. It provided an affordable mechanized solution for farmers [7].

The research is undertaken to develop a machine that efficiently

Synthesis, Characterization, Antimicrobial and DFT Studies of Novel Quinolino-Pyrazole Derivatives

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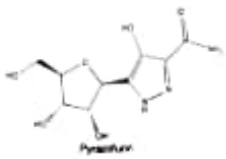
Synthesis of novel (E)-N-(4-(substituted)benzylidene)-6-substituted-1H-pyrazolo[3,4-b]quinoline-1-carbothioamides/carboxamides was achieved by the condensation of 6-substituted-1H-pyrazolo[3,4-b]quinoline-1-carbothioamides/carboxamides with substituted benzaldehydes in alcoholic medium in the presence of acetic acid. The structures of synthesized compounds are assigned on the basis of FT IR, ^{1}HNMR, ^{13}CNMR and Mass Spectral data. The compounds are subjected for their antibacterial, antifungal and DFT studies. Compounds, (E)-6-chloro-N-(4-(dimethylamino)benzylidene)-1H-pyrazolo[3,4-b]quinoline-1-carbothioamide (**5b**), (E)-6-chloro-N-(4-(dimethylamino)benzylidene)-1H-pyrazolo[3,4-b]quinoline-1-carboxamide (**5f**), and (E)-6-chloro-N-(4-hydroxybenzylidene)-1H-pyrazolo[3,4-b]quinoline-1-carboxamide (**5j**) possessed pronounced antibacterial and antifungal activities due to their chemical structure.

Introduction

Pyrazoles are heterocyclic compounds that possess two adjacent nitrogen atoms of the 5-membered ring of three carbon atoms. Pyrazole derivatives have great attention due to their interesting biological and pharmaceutical activities such as antidepressant,[1] antioxidant,[2] anti-inflammatory,[3] anticancer,[4] antimicrobial,[5,6,7] antiviral,[8,9] anticonvulsant,[10] and insecticidal activities.[11] In addition, the natural pyrazole C-glycoside, pyrazofurin (4-hydroxy-3β-D-dribofuranosyl-1*H*-pyrazole-5-carboxamide) has a broad spectrum of antimicrobial, antiviral, and antitumor activities.[12]



M. Chalkha et. al synthesized novel pyrazole derivatives have shown antimicrobial activity.[13] A novel series of pyrazole-4-carboxamide derivatives has been synthesized and exhibited antimicrobial and antitubercular activity.[14] Two pyrazole derivatives, 2-(5-methyl-1H-pyrazole-3-carbonyl)-N-phenylhydrazine-1-carboxamide and 4-amino-5-(5-methyl-1H-pyrazol-3-yl)-4H-1,2,4-triazole-3-thiol, were synthesized and have shown remarkable antidiabetic, antioxidant, and inhibition activities.[15]

The quinoline derivatives has been found to possess antimalarial,[16] antibacterial,[17,18] antifungal,[19] antiviral,[20] receptor agonists,[21] antineoplastic agents[22] and antituberculotic[23] etc activities. Recently, pyrazole derivatives possessing 1, 5, 10, 10a-tetrahydro benzo[g]quinoline-3-carbonitrile moiety were synthesized have good antibacterial activities.[24] A series of 1,2,3-triazol-pyrazol-quinoline derivatives were synthesized exhibited good antibacterial and antifungal activities.[25] A novel series of pyrazole and thiophene linked quinoline analogues was synthesized that have antimicrobial, anti-inflammatory, and anti-leukemic activities.[26] Prompted by these observations and in continuation of our research on biologically active heterocycles,[27] we hereby report the synthesis of some new Schiff bases of pyrazole derivatives containing substituted quinoline nucleus.

Results and Discussion

The synthesis of novel (E)-N-(4-(substituted)benzylidene)-6-substituted-1H-pyrazolo[3,4-b]quinoline-1-carbothioamides/carboxamides (**5**) was achieved as follows. 6-Substituted-1H-pyrazolo[3,4-b]quinoline-1-carbothioamides/carboxamides (**3**) were synthesized by the cyclization of 6-substituted-2-chloroquinoline-3-carbaldehydes (**1**) and thiosemicarbazide/semicarbazide (**2**) as per the literature procedure.[27] 6-Substituted-2-chloro quinoline-3-carbaldehydes (**1**) were prepared by Vilsmeier-Haack formylation of substituted acetanilides using dimethyl formamide and phosphoryl chloride as per process given by Otto-Meth-Cohn.[28]

Novel (E)-N-(4-(substituted)benzylidene)-6-substituted-1H-pyrazolo[3,4-b]quinoline-1-carbothioamides/carboxamides (**5**)

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Experimental, electrochemical and DFT simulation studies of a novel Schiff base derivative as an efficient mild steel corrosion inhibitor in acidic environments

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ABSTRACT

A newly synthesized Schiff base, consisting 3-methyl-2-{(E)-[(2E)-3-phenylprop-2-en-1-ylidene] amino} butanoic acid, is utilized to prevent mild steel from corroding in acidic environments. FTIR spectra validate the prepared SB. The corrosion rate at various temperatures was measured using electrochemical techniques like as polarization and electrochemical impedance tests. At a higher temperature of 333K, this molecule exhibits about 90% inhibition efficacy with 50 ppm inhibitor. The corrosion inhibition mechanism was measured using thermodynamic and adsorption characteristics. These findings suggest that chemical adsorption causes a surface layer to form on the metal surface. The Langmuir adsorption isotherm is followed. The creation of the adsorption layer on the metal surface is confirmed by SEM and AFM pictures. Quantum chemical calculations were calculated and discussed.

1. Introduction

Mild steel is the most common material used in various industries and building materials because of its low cost and good mechanical strength (Abiola et al., 2007; Haque et al., 2021; Hebbar et al., 2015). Acid solutions are used for these applications such as pickling, descaling, etching and cleaning. Corrosion is a main problem associated with this mechanism (Idora et al., 2015; Zarrok et al., 2023; Devendra et al., 2022; Ali et al., 2024; Pais and Rao, 2023). In this process, inhibitors are used to control the corrosion. Inhibitors are organic/Inorganic compounds and these are adhered on the metals surface to control the corrosion.

It is well known that organic compounds containing heteroatoms (N, O, S, etc.) inside aromatic moieties operate as effective corrosion inhibitors in a variety of corrosive conditions (Saraswat et al., 2024; Mehta et al., 2022). Lone pair electrons of these compounds are making the bond with the metals and creates the passive layer on the metal surface by it controls the corrosion (Chauhan et al., 2021; Alahiane et al., 2023; Praveen et al., 2021; Melian et al., 2023). This homogeneous layer lessens the amount of corrosion by isolating the metal surface from the hostile medium. Because Schiff's bases include the –C═N– group, they are also employed as effective corrosion inhibitors for mild steel in HCl conditions (Desai et al., 2024; Varadaraj et al., 2022). The molecule's planarity and the lone pair of electrons on the N and S atoms aid in the molecule's adsorption to the metal surface (Shylesha et al., 2012). Given their non-toxic and biodegradable nature, it is important to investigate their anticorrosive properties, particularly in light of the current emphasis on producing inhibitors with minimal environmental impact (Shylesha et al., 2011).

As well known, some authors have explained that in addition to the pi electrons from the Schiff bases entering the transition metals' unoccupied orbitals, the * orbital can also accept the electrons from the d-orbitals of the same metals to form feedback bonds (Popoola et al., 2019), which allows the metal-inhibitor bond to exist. Additionally, Schiff bases have recently been found to be efficient copper, aluminium,

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Short communication

Hibiscus leaf petiole derived activated carbon as a potential sorbent for basic green 4 and reactive yellow 15 dye exclusion from aqueous solution

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Highlights

- Activated hibiscus leaf petiole powder as cost effective and efficient dye adsorbent.
- SEM and FTIR accomplish adsorbent ability for BG4 and RY15 dyes.
- Adsorption kinetics of both th dyes follow pseudo-second-order model.
- Unconventional adsorbent to remove the toxic dyes from aqueous solutions.

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A multifaceted approach for the development of novel Hantzsch 1,4-dihydropyridines as anticancer agents: Rational design, parallel synthesis, analysis, cytotoxicity and EGFR/HER2 inhibition studies

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ABSTRACT

Dihydropyridines (DHPs) exhibit a wide range of pharmacological properties especially against cancer. In this context, a new series of 1,4-dihydropyridines were meticulously designed employing scaffold hybridization technique targeting the EGFR/HER2 receptors. The parallel synthesis of the designed dihydropyridines was achieved using the Hantzsch multiple component reactions. Following the synthesis, rigorous purification methods were carried out and elucidation of their chemical structures through comprehensive analytical techniques such as IR, NMR, and Mass Spectrometry. The initial synthetic step of acetoacetanilide formation was of less product yield contrasting with the satisfactory yields achieved for final multicomponent reactions. The synthesized ligands were subjected to screening against MCF-7 breast cancer and normal Vero cells to evaluate their potential anti-cancer activity. This assessment was carried out by quantifying cytotoxicity levels and structure activity relationships. Among them, compounds **6** and **14** exhibited the good inhibitory effects on the proliferation of MCF-7 cells with an IC_{50} value of 14.44 and 14.38 μM, respectively, which was quite closer to that of Lapatinib. Furthermore, the influence of ligands on target proteins expressions were assessed *via* flow cytometry experiments against EGFR & HER2. Computational studies were also performed to correlate the experimental results.

1. Introduction

Cancer is an aggressive and life-threatening disease as it is a leading health concern in both economically developed and developing countries. According to data released by the World Health Organization (WHO) in September 2018, cancer is the second leading cause of death worldwide, accounting for 9.6 million deaths in 2018. According to projections, there will be 13 million cancer-related fatalities by 2030 [1]. The disease is caused by genetic mutations or disruptions in normal cellular differentiation, which are caused by a variety of factors including pharmaceuticals, viruses, smoking, and dietary influences [2]. Receptor tyrosine kinases (RTKs), a class of signaling proteins, are frequently the target of oncogenic mutations [3]. These enzymes are essential because they catalyze the transfer of ATP to tyrosine residue in intracellular substrates. Consequently, RTKs exert control over numerous cellular pathways, including those governing cell growth, proliferation, survival, differentiation, metabolism, and apoptosis [4]. Any disruption within kinase-driven cellular signaling cascades, be it mutations or hyperactivation, can result in a spectrum of diseases, including cancer [5–7], neurological disorders [8], inflammation [9], diabetes [10], and autoimmune and cardiovascular disorders [11].

The Epidermal Growth Factor Receptor (EGFR) is a major protein kinase subfamily with four members: EGFR (ErbB1, HER1), ErbB2 (HER2), ErbB3 (HER3), and ErbB4 (HER4) [12,13]. This receptor,

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Research Article

Analysis Of Some Topological Indices At Distance 2 Of Carbon Nanotube $VC_5C_7[h,c]$

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Abstract
Exploring into the area of advanced topological measures, the study significantly contributes to the exploration of complex networks, potentially enhancing ability to characterize their complexities with greater distinction and depth. In a manner akin to the topological indices developed by Gutman and Trinajstić, which rely on the vertex degrees within a network, we can broaden our understanding by introducing generalized topological indices. By considering the degrees of vertices not just at immediate proximity but also at a distance of two edges, these indices offer a richer perspective on the networks structural dynamics, uncovering connectivity patterns that extend beyond direct neighbors.

Key words: Topological Indices, Carbon nanosheets, Distance.

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1. Introduction

Understanding carbon nanotubes involves paying attention to pivotal factors that significantly influence their physical and chemical properties. Among these factors, the shape and arrangement of atoms play a vital role. For example, the geometric shape of carbon nanotubes has a direct impact on their electrical structure. To delve into these properties, researchers use topological indices, which essentially provide a numerical description of how carbon atoms are organized in the nanotube structure. This information is particularly useful in predicting electronic features such as band structure, electronic density, and conductive behavior in carbon nanotubes.

Furthermore, topological indices are instrumental in assessing the chemical reactivity of carbon nanotubes. By understanding the arrangement of atoms and certain topological characteristics, researchers gain insights into the locations of chemical reactivity sites within the nanotube structure. This knowledge is significant for various applications, including the development of nanotube-based materials and functionalization processes. Researchers use topological indices as quantitative descriptors to compare and categorize different carbon nanotube architectures based on their connections. This systematic examination helps in understanding the diversity among nanotube families. Moreover, the application of topological indices aids in the efficient screening of potential nanotube candidates for specific uses, such as electronics, sensors, and drug

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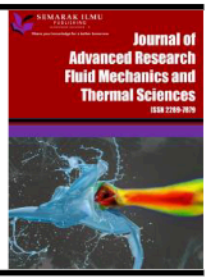

Influence of Sweep Angle on the Surface Pressure of Delta Wing Along Pivot Positions at Hypersonic Mach Numbers

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Mach number; surface pressure; delta wing; similitude; strip theory

ABSTRACT

This study focuses on analyzing pressure distribution across the wing surface under different flight conditions. The distribution of surface pressure plays a crucial role in determining the performance of a delta wing. The outcomes of this research will be beneficial for stability assessment and enhancing performance during the aircraft design phase. The paper illustrates the impact of high supersonic Mach numbers, angles of incidence, and specific locations along the three-dimensional delta wing. Strips located at various span-wise positions are treated independently based on a strip theory, which when combined with hypersonic similitude, results in a piston theory. It is important to note that the current theory is only valid when the shock wave remains attached. Viscosity and wave reflection effects have not been taken into account in this particular study. The parameters considered in the study are the Mach numbers (M) in the range 4 to 7. Furthermore, consideration is given to the Angle of Incidence (θ), which varies between 5° to 25°. Along the Wings chord from 0.2 to 1, different points (h) record the pressure results (P2/P1). For numerical simulations, CFD was used, and simulated results at hypersonic Mach numbers matched well with analytical results.

1. Introduction

The exploration of supersonic and hypersonic flow regimes is an integral and essential component of the field of space exploration. Key areas of study encompass space science, long-range weaponry, and space vehicles. Linearization is made possible by assuming that the waves produced by the body's presence are of low intensity. The small disturbance theory and resulting similitude rely on showing that disturbances and gradients are mainly perpendicular to the free stream. It is important to highlight that although this similitude works well for supersonic flow, it does not provide a resolution for hypersonic flow. A fascinating advancement involves expanding the research on supersonic/hypersonic flow beyond slender bodies and low incidences to include non-slender shapes and high incidences.

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Three-Dimensional Axisymmetric Stagnation-Point Flow in a Nanofluid with Nanoparticles via Moving Surface

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Abstract

In this paper unsteady three-dimensional axisymmetric stagnation point and convection boundary layer flow of nanofluid over a moving surface with anisotropic slip is examined different thermal and concentration boundary layer fraction. The numerical model of nanofluid has been used. The Navier-Stokes and heat equation state numerical solutions. The problem is reduced by a set of appropriate similarity transformations, the basic coupled nonlinear partial differential equations into the ordinary differential equations. The translating resulting equations are solved numerically by using shooting technique with Runge-Kutta-Fehlberg fourth order method in MATLAB. We found that the influence of different physical parameters on temperature, concentration profiles as well as heat transfer rate.

Key Words: Axisymmetric, Stagnation Point Flow, Nanofluid, Nanoparticles, Moving Surface.

Introduction:

The study of SP motion and HT via SS has garnered significant attention from researchers due to its broad range of industrial and engineering applications. These include processes such as rapid spray cooling and quenching in metal foundries, emergency core cooling systems, microelectronics cooling, and ice chillers in air conditioning. Other areas of application include wire drawing, polymer extrusion, continuous metal casting, adhesive tape production, and glass blowing. For example, spray cooling is a highly efficient method for removing high heat flux from heated sheet surfaces through convection. Narisimha Reddy et al. [1] focused on the Casson NFs motions in industry via a non-linear SS. The effect of IMF (Induced magnetic field) on liquid motion close to standstill point created via SS by developed Khan et al. [2]. Mahmood et al. [3] proposed the steady SP motion with viscous dissipation via a Permeable SS. Vinodkumar et al. [4] consider the MHD SP motion of Williamson HNFs with CR and energy generation effects via porous extending sheet. The MHD bioconvective micropolar NFs motion with migrating microorganisms via vertically extending material was analysed by Fatunmbi et al. **[5]**. Boujelbene et al. **[6]** examined the numerical analysis of 3D radiative, steady viscoelastic NFs motion via exponentially SPS. Jawad et al. **[7]** illustrate the ratification of chemically reactive tangent hyperbolic fluid owing to bidirectional SS. Li et al. **[8]** focused the effect associated with mass and heat transport in a liquid motion with heat source or sink. Fatima et al. **[9]** illustrate the theoretical model could be applied to engineering methods, heat transfer and thermal energy.

Heat generation in nanofluid motion refers to the internal production of heat within a nanofluid as it flows, which can significantly affect its thermal behavior. Nanofluids, which are fluids with nanoparticles dispersed in them, typically exhibit enhanced thermal conductivity and heat transfer capabilities. However, when

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BALANCED INDEX SETS OF GRAPHS AN SEMIGRAPHS

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Abstract. Let G be a simple graph with vertex set $V(G)$ and edge set $E(G)$. labeling is an assignment of integers to the vertices or the edges, or both, to certain conditions. For a graph $G(V, E)$, a friendly labeling $f : V(G) \to \{$ a binary mapping such that $|v_f(1) - v_f(0)| \leq 1$, where $v_f(1)$ and $v_f(0)$ rep number of vertices labeled by 1 and 0 respectively. A partial edge labeling f^* a labeling of edges such that, an edge $uv \in E(G)$ is, $f^*(uv) = 0$ if $f(u) = f($ $f^*(uv) = 1$ if $f(u) = f(v) = 1$ and if $f(u) \neq f(v)$ then uv is not labeled by graph G is said to be balanced graph if it admits a vertex labeling f that s the conditions, $|v_f(1) - v_f(0)| \leq 1$ and $|e_f(1) - e_f(0)| \leq 1$, where $e_f(0), e_f$ the number of edges labeled with 0 and 1 respectively. The balanced inde the graph G is defined as, $\{|e_f(1) - e_f(0)|$: the vertex labeling f is friend semigraph is a generalization of graph. The concept of semigraph was intr by E. Sampath Kumar. Frank Harrary has defined an edge as a 2-tuple (vertices of a graph satisfying, two edges (a, b) and (a', b') are equal if and either $a = a'$ and $b = b'$ or $a = b'$ and $b = a'$. Using this notion, E. Sampath defined semigraph as a pair (V, X) where V is a non-empty set whose eleme called vertices of G and X is a set of n-tuples called edges of G of distinct v for various $n \geq 2$ satisfying the conditions: (i) Any two edges of G can have a one vertex in common; and (ii) two edges $(a_1, a_2, a_3, \ldots, a_n)$ and $(b_1, b_2, b_3$

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Short communication

High specific capacitance and NTC behavior of substituted cobalt oxide spinels for electrochemical supercapacitor and thermistor applications

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ARTICLE INFO

Keywords:
Spinels
Cubic phase
Low internal resistance
High diffusion co-efficient
Retention ratio

ABSTRACT

Due to the growing importance of low-cost energy storage devices in smart device applications, finding an appropriate electrode material with the least self-discharging, high power, and energy densities is the need of the hour. In this paper, Cu and Mn-modified Co_3O_4 spinels in the form of $CuCo_2O_4$ and $MnCo_2O_4$ are reported as the most promising electrode materials for high-performance electrochemical supercapacitors. Modified Co_3O_4 spinels were prepared by the co-precipitation technique, and the X-ray diffraction (XRD) studies show a single-phase formation with cubic crystal symmetry. The average crystallite size estimated by considering the highest intensity peak of the diffraction pattern using Scherrer's relation shows the average crystallite size below 30 nm for reported spinels. Scanning electron microscopic (SEM) images stabilize the fact that grains with nanosizes consisting of regular shapes and excellent morphological features. The dc-conductivity measurement establishes the essence of negative temperature coefficient of resistance (NTCR) behavior in nanostructured spinels. The specific capacitance (C_s) of $CuCo_2O_4$ and $MnCo_2O_4$ estimated using cyclic voltammetry (CV) was found to be 616.074 F g^{-1} and 1401.16 F g^{-1} for a scan rate of 10 mV s^{-1} with verified stability up to 1000 cycles. The low internal resistance value in the range of 0.1 Ω for both the spinels verified by the electrochemical impedance spectroscopy (EIS) graph confirms these spinels as encouraging electrode materials for electrochemical supercapacitors.

1. Introduction

As a consequence of extended interrogation for energy storage systems especially in electrical vehicles and portable devices, energy storing schemes aided with supercapacitors (SCs), fuel cells and batteries have gained extensive research enthusiasm [1]. Due to the remarkable power density, high-rate capability and desirable long calendar life, SC's are considered to be potential replacement for batteries in future [2]. On account of these properties, they find potential applications in diverse areas where thrust power is required immediately like auxiliary power source in hybrid vehicles, ignition engines and tapping energy from transient renewable energy sources, defense and military, medicines and so on [3,4]. The electrode materials play an extreme cardinal role in the functional performance of SC's [5].

Numerous researches are under progress based on the carbon based electrode materials that stores charge from reversible adsorption of ions onto their surfaces and contribute to the electric double layer capacitors (EDLC) [6–9]. However, the low specific capacitance, self-stacking property and reduced surface area significantly limits their extensive use in device applications [10]. Hence, certain transition metal oxides and spinels are reported as alternate electrode material for SC's that contributes to the pseudocapacitance and reverse the shortcomings like low utilization rate and inadequate specific capacitance as reported in carbon based electrode materials [11–16].

The transition metal oxides (TMO) acquire a great deal of importance due to their low cost and abundant availability of their starting materials [17,18]. The presence of multiple oxidation states in TMO, fast and reversible redox reaction, high energy storage capacity and high theoretical specific capacitance make them most suitable candidates as electrode materials in SC's [19]. Among those TMO's, manganese and copper exhibit satisfactory specific capacitance values when substituted to A or B sites of pure Co_3O_4 spinel [20]. Wanli Jia et al. [21] synthesized pure Co_3O_4 nanoparticles using facile hydrothermal method and achieved the specific capacitance of 157 F g^{-1}. C V Niveditha et al. [22] could improve up to 396.67 F g^{-1} specific capacitance values for pure Co_3O_4 spinel prepared through a less explored potentiodynamic

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Research Article

RF sputtered metal oxide layers as ARCs to improve photovoltaic performance of commercial monocrystalline solar cell

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ARTICLE INFO

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Transition metal oxides
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ABSTRACT

The rf-sputtered ZnO, MgO and Al_2O_3 transition metal oxide nano layers were developed as efficient antireflection coatings (ARCs) on commercial monocrystalline silicon (m-Si) photovoltaic cells. Wavelength dependence reflectance measurements show minimal reflectance (i.e., ~1.3–2.0%) between 350 and 800 nm wavelength regions affirming antireflection behavior of oxide layers. The phase formation studies of these oxide layers display the crystalline phase however the presence of non-crystalline phase is noted in Al_2O_3 diffractogram pattern. Cross section microstructure characterization carried out using scanning electron microscopy (SEM) to know the ARC layer thickness illustrates MgO, ZnO and Al_2O_3 layers with coating thickness around 85 nm, 87 nm and 77 nm respectively. Also, the thickness of antireflection coatings computed using wavelength dependent refractive index measurement is consistent with cross section microstructure images. Photon to energy conversion (PEC) of ARC coated device under 1 sun condition display 1.99%, 1.07% and 0.39% improvement in efficiencies compared with commercial m-Si-solar cell endorsing suitability of selected transition metal oxides as efficient ARC materials. The external quantum efficiency (EQE) measurements show notable improvement in efficiency for MgO, ZnO and Al_2O_3 coated devices reaffirming their usability as efficient ARC materials on commercial m-Si-solar cells.

1. Introduction

Development of ARC's is an effective surface modification process to trap the photons in photovoltaic cells and improve their PEC efficiency [1]. It is well known fact that, the light incident on front surface of any photovoltaic device leads to the reflection of photon and thereby causes the loss in generation of photocurrent. Reflection of these photons thus reduces the generation of output power and hence negatively impacts the efficiency of the photovoltaic cell. Also, silicon due to its high reflectance i.e., ~35% also contributes to the loss of photocurrent [2]. However, this loss of power output could be addressed using ARC's as a top layer to trap the incident photons and improve the PEC efficiency [3]. The antireflection coatings facilitate more photons enter the device structure and generate surplus electron-hole pairs. The in-built electric field at the p–n junction assists in separation of electron-hole pairs and helps in the movement of charges [4]. Currently, commercial silicon based photovoltaic devices consists of silicon nitride (Si_3N_4) as a single layer ARC and effectively reduces the reflection from the device surface [5,6].

ARC's are usually a nano scale thin layers with optimal thickness and compatible refractive indices with the device structure [7,8]. Along with Si_3N_4 extensive work is carried out on metal oxides like ZnO, MgO, Al_2O_3, TiO_2 and Ta_2O_5 as potential replacements due to their complimenting optical and electrical properties [9–13]. These ARC's are optically transparent and exhibit extremely low reflectance in nano scale which is much needed feature for the transmission of incident photons in device to improve the photovoltaic performance of solar cells [14].

Multilayer ARC is also one of the exciting approach used to trap the photons within device to enhance the efficiency. Normally, Si_3N_4/silicon nanoparticles like SiO_2, SiO_2/ZnS, SiO_2/TiO_2, SiO_2/Al_2O_3 or ZnS/MgF_2 are some of the multilayer ARC's developed on mulitijunction solar cells to improve the photovoltaic performances [15–17]. These multilayer ARC's display systematic reduction in refractive index and exhibit integrated reflection below 5%. In multilayer ARCs, one of the most important criteria is to have alternate layers of high and comparatively low reflective indices resulting integrated reflection below 5% [18]. This least reflection helps in boosting the current density (J_{SC}) of device resulting the development of more photovoltage in the device

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Mechanic

Review

A review on Co_3O_4 nanostructures as the electrodes of su

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Abstract: Usage of supercapacitors in energy storage applica due to their auspicious features. The introduction of pse weightage to be used in a greater number of practical appli constituents of a supercapacitor, based on which the ele supercapacitor is decided. Among the varieties of electrode m oxides are the most suitable ones to fulfill the required criteri redox reactions on the surface of electrodes, the selection o material plays a major role. Co_3O_4 (cobalt (III) oxide) is or materials due to its various peculiar features. This paper r Co_3O_4 as electrode material in supercapacitor applications. It towards different synthesize methodologies and the influen on the electrochemical outputs like specific capacitance, ene

Keywords: cobalt oxide; morphological structure; specific c density

1. Introduction

Supercapacitors are one of the topmost investigate applications further day by day. It has overwhelmed tl the batteries for energy storage practices in assorted breaks, submarines, backup power systems, and volta high efficiency of supercapacitors and high oil cost, sup automobile applications[1]. Multiple investigations are

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Electrical and electrochemical characterization of $FeCo_2O_4$ nanoflakes for flexible supercapacitor applications

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Abstract. Iron-substituted cobalt oxide spinel in the form of $FeCo_2O_4$ nanoflakes was synthesized by using a wet-chemical co-precipitation process. The presence of a metal-oxide bond was confirmed using FTIR spectroscopic analysis. A study of the phase and exterior morphology of $FeCo_2O_4$ nanoflakes confirms the formation of single-phase nano-sized grains. Electrical property analysis shows negative temperature coefficient (NTC) behaviour with high electrical conductivity at elevated temperatures. This fact was also supported by a decrease in the thermal activation energy at higher temperatures. The dominance of small grains and decreasing relaxation time are noteworthy aspects in determining the conduction mechanism in lower and higher temperatures, respectively. The highest specific capacitance was computed to be between 1048.07 and 1690.14 F g^{-1} for flexible and stiff copper current collectors, endorsing the usability of $FeCo_2O_4$ nanoflakes as a superior electrode material. The energy and power densities were estimated to be 47.32 Wh/kg and 759.85 W/kg, respectively, substantiating the use of prepared electrode material for both flexible and solid-state energy storage devices. The decrease in the diameter of Cole–Cole plot and almost leaner characteristics observed in the electrochemical impedance spectrum establishes the NTC trend and low internal resistance, respectively, of $FeCo_2O_4$ nanoflakes.

Keywords. Spinels; cubic phase; low internal resistance; high diffusion co-efficient; specific capacitance; energy and power density.

1. Introduction

In recent times, the development of low-cost and highly efficient energy storage materials for flexible energy storage systems has gained immense research interest due to the advancements in flexible modern-day devices for daily uses [1–3]. The invention of supercapacitor is a quantum leap in the domain of energy storage systems, which establishes its need in a wide variety of fields, from consumer appliances to rocket technology [4,5]. Progress in the field of pseudocapacitive materials in the energy storage domain boosts the technology to the next level due to their inherent ability to respond by means of faradic redox reactions [6]. Transition metal oxides are among the classes of electrode materials capable of exhibiting different oxidation states that facilitate a high rate of faradic redox reactions, which enhance the electrochemical behaviour of the pseudocapacitor [7]. One of the most stable and abundantly available transition metal is iron [8]. Also, the microstructures of electrode materials influence the faradic redox reactions by means of their surface area.

Huang *et al* [9] used iron oxides and oxyhydroxides for fabricating anodes of batteries and supercapacitors, and reported excellent electrochemical characteristics [9]. Zhong *et al* [10] used heterostructured polypyrrole/hybrid iron oxide composite film to develop anodes for supercapacitors, and the resultant asymmetric capacitor exhibited a volumetric energy density of 0.44 mWh cm^{-3} at high power density 6.72 mW cm^{-3} [10]. Wang and Sun [11] synthesized carbon nanofibres based on iron oxide particles decorated with lignin as an electrode material, and the contribution of iron oxide particles in enhancing the supercapacitor output was reported. Hence, working on developing an electrode material with features like highly stable, load-fluctuation resistant, flexible, transportable and environmentally friendly characteristics is a need of the hour, which can be applied in numerous fields seeking highly efficient energy storage equipment [12].

The electrochemical performance of Fe is encouraging, and there is a need to further improve its specific capacitance, energy and power density ratings. Also, poor conductivity, slow kinetics and low electrochemical stability of the electrode materials are the major challenges to be faced. To overcome these issues, spinels (AB_2O_4 type) are among the most sought-after materials due to their superior electrical and electrochemical behaviour [13]. Co_3O_4 is one of the most exciting spinel compounds broadly studied for electrode application [14]. Since recent works explore the

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Research Article

Aluminium doped magnesium oxide thin films: A possible contender for transparent conducting oxides

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Oxide materials
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ABSTRACT

The aluminium-doped magnesium oxide (AlMgO) thin films were deposited on glass substrates using a simple and economical spin coating technique. The doping concentrations of the aluminium were changed from 2 % to 8 %. The X-ray diffraction studies revealed the development of MgO with an f.c.c. structure. A minor displacement of the XRD peaks towards higher diffraction angles and the absence of secondary phases indicated the replacement of magnesium ions by aluminium ions. The crystallinity of the films was found to be 4.7 nm, which was improved to 42.9 nm with the doping concentration of aluminium. The optical studies revealed high transmittance in the 400–800 nm region, and the bandgap of the films obtained 3.8 eV, which was decreased to 3.5 eV with aluminium doping. All the films exhibited n-type conductivity. The resistivity of the films was found to be 2.22 Ω cm, which was reduced to 0.17 Ω cm with aluminium dopant. The carrier concentration of the AlMgO films obtained in the range of 1.19×10^{20} to 10.9×10^{20} cm^{-3}.

1. Introduction

Over the past few decades, significant research has been done on non-metallic and metallic oxides. Among the oxides, magnesium oxide (MgO) has exhibited promising properties in device applications. It has an f.c.c. structure akin to that of NaCl and a higher bandgap [1–3]. Its excellent chemical and thermal stability, great electrical resistivity, and high transmittance in the visible region are well-known remarkable qualities of magnesium oxide [4,5]. Due to its superior characteristics, MgO can be used as transparent conducting materials, supercapacitors, memory devices, etc. [6–8].

Doped metal oxides exhibiting enhanced properties such as higher conductivity, improved visible light transmittance, and broader bandgaps are categorized as transparent conducting oxides (TCOs). Extensive research has explored the use of various dopants to enhance the optical and electrical characteristics of MgO films [9]. Notably, aluminium (Al) doping has demonstrated superior qualities that are beneficial for TCO applications. For a material to be considered an excellent transparent conducting oxide, it should possess a bandgap exceeding 3 eV, a resistivity below 10^{-3} Ω cm, and over 80 % visible light transmission [10,11].

In contrast, MgO finds utility as buffer layers to enhance solar cell efficiency. Additionally, MgO plays a role in the degradation of methylene blue, an environmentally hazardous dye [12,13]. It is a substitute for SiO_2 as an insulator due to its low leakage current and high breakdown voltage. Moreover, MgO is utilized to produce dielectric resonators [14,15].

The deposition process has significantly influenced the bandgap and resistivity of the magnesium oxide. Different methods are employed for synthesizing MgO thin films, such as chemical vapour deposition, spray pyrolysis, SILAR, Atomic layer deposition, Laser ablation, Radio-frequency Sputtering, and Spin Coater (Idris) [16–22].

Valanarasu et al., showed that MgO films can be prepared with a bandgap of >3 eV by the spin coating technique. Additionally, it has been noted to have a significant transmission in the visible region [23, 24]. Also, most of the oxides-based thin films have shown cubic phase with polycrystalline [25,26]. A suitable bandgap, electrical resistivity, and transmittance in the visible region might make it a strong

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Microwave-absorbing behavior of rare-earth-ion-doped copper manganese nanoferrites in X-band frequency

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ABSTRACT

In this study, the technology important $Cu_{0.5}Mn_{0.5}Fe_2O_4$ and $Cu_{0.5}Mn_{0.5}Fe_{1.80}RE_{0.2}O_4$ (RE = La, Gd, Nd, and Dy) nanoferrites were synthesized via sonochemical method and characterized to overcome the electromagnetic pollution problems. Crystalline, morphological, electrical, magnetic, and microwave-absorbing parameter were identified by doping of RE (La, Gd, Nd, and Dy) in $Cu_{0.5}Mn_{0.5}Fe_2O_4$ nanoferrites. The XRD analysis revealed a cubic spinel structure with a single-phase composition for $Cu_{0.5}Mn_{0.5}Fe_2O_4$ nanoferrites whereas $Cu_{0.5}Mn_{0.5}Fe_{1.80}RE_{0.2}O_4$ (RE = La, Gd, Nd, and Dy) nanoferrites had a cubic structure with the presence of a secondary phase. SEM images confirmed the spherical shape of the particle and the grain size within the range of 19.25–28.19 nm, with elemental stoichiometry confirmed by EDS spectra. The dielectric constant and conductivity of $Cu_{0.5}Mn_{0.5}Fe_{1.80}RE_{0.2}O_4$ nanoferrites were low at higher frequencies, which lead good candidates for microwave-absorbing technologies. The substitution of RE decreases saturation magnetization (43.38–23.96 emu/g) and squareness ratio values of prepared nanoferrites were less than 0.5. The SE_T values of the prepared nanoferrites were in the range of 32.31–41.81 dB. The minimal reflection loss (RL) values of $Cu_{0.5}Mn_{0.5}Fe_2O_4$ and $Cu_{0.5}Mn_{0.5}Fe_{1.80}RE_{0.2}O_4$ nanoferrites were less than 10 dB and which indicated that the prepared nanoferrites possessed great potential for applications as microwave-absorbing materials.

1. Introduction

Recently, the widespread proliferation of information technology has led to the development of modern communication devices such as tablets and mobile phones, which are used in many areas such as the military, automation, aerospace industry, and high-tech industries [1–5]. Although modern communication devices have brought us incredible advancements and convenience, they come with some concomitant problems. For example, electromagnetic interference (EMI) and radiation are exerting severe adverse effects on the environment and human health [1,6–8]. The design and manufacturing of modern communication devices pose foremost task for researchers due to EMI. To resolve these issues, researchers are striving to develop novel materials that absorb incident electromagnetic waves [5–9].

Such electromagnetic wave-absorbing materials have properties such as high absorption capacity, minimal thickness, good thermal stability, and lightweight nature [8,10–13]. Nanoferrite materials have gained prominence because of their electromagnetic wave-absorbing properties, excellent magnetic loss characteristics, cost-effectiveness, and stability [8,14,15]. A typical nanoferrite is a type of metal oxide material with ferromagnetic properties has along with higher dielectric properties, permeability, and resistivity at high frequencies. In addition, nanoferrites are good candidates for information delivery devices, data storage, magnetic composites, electromagnetic wave absorbers, and magnetic sensors [13–16].

Moreover, nanoferrite serves as a fundamental element in composite

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Investigations on the structural, vibrational, optical and photocatalytic behavior of CuO, MnO and CuMnO nanomaterials

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Abstract

CuO, MnO and CuMnO nanomaterials have been prepared using the chemical precipitation method. The structure of the nanomaterials has been confirmed using XRD analysis. Metal oxide vibrations have been identified and assigned to the vibrational band. The morphology of the prepared nanomaterials has been investigated in the SEM images. The optical band of the materials has been calculated using Tauc's relation from the UV-Vis spectrum. The photocatalytic nature of the prepared nanomaterials has been studied against Congo red and Malachite green dyes.

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1. Introduction

Nowadays, dyes are the most relevant pollutants that cause water pollution. These dyes may create complications for the environment and when these dyes are discharged into water bodies, they may increase their toxicity.

The occurrence of dyes in water may block the photosynthesis process in the plants in the water bed and lead to problems in the aquatic system [1]. In addition, toxic carcinogenic products will be released due to dyes in the water bodies.

All the harmful effects of dyes are generally due to their complex aromatic structure [2]. Malachite green is a dye that leads to cancer, mutations, chromosomal disorders, and respiratory toxicity [3]. This dye must be handled cautiously, especially at appropriate concentrations and low temperatures. Congo red dye is a benzene-based dye. This causes allergic reactions and its decomposition results in carcinogenic products [4]. It creates irritation in the skin, eye and gastrointestinal. Congo red badly affects blood factors and clotting and induces drowsiness, leading to respiratory problems.

Therefore, it is important to remove or degrade the dyes in industrial waste. Protection of water sources from environmental contamination is one of the major issues. Several techniques have been adopted; nevertheless, each one has its limitations.

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Development and characterization of zinc ion conducting biopolymer electrolytes based on cellulose acetate for primary zinc ion batteries

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ABSTRACT

Solid biopolymer electrolytes for zinc primary battery based on cellulose acetate (CA) and zinc chloride ($ZnCl_2$) have been prepared by solution casting technique with Dimethylformamide (DMF) as the solvent. X-ray diffraction analysis provides that biopolymer membrane 40 wt% of CA:60 wt% of $ZnCl_2$ shows very high amorphous nature. Complex formation between biopolymer CA with $ZnCl_2$ has been confirmed by FTIR measurements. Biopolymer membrane 40 wt% of CA:60 wt% of $ZnCl_2$ shows a high zinc ionic conductivity of 3.04×10^{-3} S/cm calculated from impedance measurements. Wagner's Polarization measurements indicates that charge carriers are ions and the highest zinc ionic conductivity membrane has got low glass transition temperature 35 °C determined by DSC studies. The electrochemical stability of the highest zinc ion conductivity membrane is found to be 2.15 V by LSV technique. The cyclic stability of the prepared membrane has been determined by cyclic voltammetry analysis. Transport parameters such as Diffusion constant (D), mobility (μ) and relaxation time (τ) have been calculated for the biopolymer electrolytes. A primary zinc ion battery has been constructed using zinc plate as anode, highest zinc ion conducting membrane as an electrolyte and MnO_2 as cathode shows an open-circuit voltage 1.55 V. The performance of the battery has been studied with various loads.

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AESSRA

REVIEW PAPER

The Effect of Cash Conversion Cycle on Company Earnings and Profitability

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ABSTRACT

Finance serves as the lifeblood of every business, and effectively managing finances stands as a crucial element for any company's sustenance. This study delves into the examination of how a Cash Conversion Cycle (CCC) influences a company's earnings. For this purpose, five companies from the Fortune 500 list are selected and ten years of data are extracted from their annual reports for analysis. Employing statistical methodologies, using a sample of firms from diverse industries, we employ regression analysis to examine how variations in the CCC affect profitability yardsticks like Return on Assets (ROA) and Return on Equity (ROE). Implications of this probe extend to financial managers, policymakers, and investors, emphasizing the paramountcy of efficient working capital management in enhancing firm profitability, earnings, and sustainability in competitive markets.

HIGHLIGHTS

- The CCC is widely recognized as one among the pivotal facets of finance within the realm of subject.
- By considering industry-specific dynamics, firm characteristics, and potential non-linearities, researchers can provide deeper insights into the mechanisms through which working capital management influences financial performance.
- Through this research, the aspiration is to provide actionable insights for financial managers, policymakers, and investors, highlighting the importance of maximizing the CCC to enhance the earnings and competitive edge of firms in the current dynamic business landscape.
- The research employs data covering a timeframe of ten years, focusing on the top five companies listed in the Fortune 500 for the year 2022.

Keywords: ROE, ROA, Profitability, Cash conversion cycle

The decisions regarding financial management made by organizations primarily revolve around working capital management (WCM) which stands out as crucial for all companies, given its profound influence on both overall profitability and liquidity (Appuhami, 2008; Murtala Zakari, 2016). Sound WCM is paramount for the survival and eventual expansion of organizations. Scholars in this field dedicate efforts to assessing the efficacy of managing inventories, accounts payable, accounts receivable, and cash, aiming to establish links between effective management practices and the firm's growth and development goals (Akinlo, 2012). WCM encompasses the allocation of money towards rotating assets, which constitutes a significant portion of total asset investments, along with decisions regarding the financing of these investments (Veli and Ozbek, 2015). The size of a

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Open Peer Review on Qeios

Qualitative Approach to Analyze Business Disclosures – A Content Analysis Perspective

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Potential competing interests: No potential competing interests to declare.

Abstract

The main purpose of this paper is to present various qualitative aspects, issues, and methodologies that have been involved in accounting and disclosure research. Specifically, matching to current research trend. This article outlines various key principles and issues involved in qualitative approach to undertake research based on business disclosures. As a result, the study outlines the main issues involved in disclosure research in an illustrative way by considering principles, procedures to be followed in employing qualitative approach. As an illustrative qualitative approach to analyze business disclosures, the study will help scholars make an informed choice when selecting a qualitative approach for their study. The paper demonstrates the potential of content analysis technique in business disclosure research by employing various illustrative examples that are related to current research.

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Keywords: Content analysis, accounting research, disclosure research, disclosure index, reliability, validity.

1. Introduction

Business disclosure is a key site of interest for qualitative researchers, and many scholars across the social sciences employ qualitative methods to study business disclosures (Hahn, and Lülfs, 2014). The accounting and business disclosures are key documents that speaks about the performance outlook of business organizations (Kavitha &

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Impact of Gender on the Various Aspects of Digital Payment System: A Banking Empirical Study from India

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Abstract

As digital payment systems continue to gain prominence in the modern economy, understanding the role of gender in shaping individuals' interactions with these systems becomes increasingly vital. This empirical study investigates the impact of gender on various aspects of digital payment systems, including adoption rates, usage patterns, perceptions, and barriers to adoption. Through a comprehensive analysis of survey data collected from a diverse sample of users, this research explores how gender influences individuals' preferences, behaviours, and attitudes towards digital payments. The findings shed light on gender disparities in access to and utilization of digital payment technologies, highlighting the need for gender-sensitive approaches to design, marketing, and policy-making in the digital finance domain. Ultimately, this study contributes to a deeper understanding of the intersection between gender dynamics and digital payment systems, offering insights to policymakers, financial institutions, and technology providers seeking to promote gender equality and financial inclusion in the digital era.

Keywords: *Digital Payment Systems, Banking, Gender, Perceptions, Barriers to Adoption.*

1.0 Introduction

Digital payment is a way to conduct business or make a purchase using an electronic medium, without using cheques or cash. It is even known as online payment or electronic payment. In the early 1990s, the Indian banking sector emerged in the field of technology. The banking industry has an impact on banks because it accounts for more than 80% of total assets in the Indian public sector (Gupta & Gupta 2020). The growth of online or digital banking over the past few decades contributed to the expansion of these types of payments. Digital Banking and payment processing devices are becoming more prevalent as technology, innovation, and the world as a whole advance. Cheque and cash transactions will make up a smaller and smaller percentage of total transactions as these technologies advance, get better, and offer ever more secure online payment methods.

PPIs issued as Wallets and Cards make up E-money in India. An economy like India, where there are a lot of cash transactions, could benefit from e-money (Kanojia and Lal, 2022). Card payments are the most preferred mode of online usage. In addition to these, there are other

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REVIEW PAPER

A Postmortem of Financial Frauds: The 5S Approach

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ABSTRACT

Modern world, saturated with innovations and digital technologies, opens numerous opportunities for development and convenience. However, along with these opportunities, the likelihood of becoming a target of fraud rises. Financial crimes are becoming more pronounced and sophisticated, utilizing new technical and social methods of influence. With these changes, existing risks, including fraud risk, have significantly increased. In spite of extensive endeavors to eliminate fraudulent actions, apparently fraud in its different forms persists and is escalating in both occurrence and magnitude. Identifying fraud schemes is a crucial aspect of fraud detection. Detecting fraud risks at an early stage can bolster investor protection, enhance investment returns, prevent costly legal battles, and promote efficient operation. This study concentrates on the various facets of fraud. It examines the pre and post-effects of fraud. It also involves extensive research on the available literature on financial and non-financial frauds and has come out with a conceptual model that helps to give an overall 360-degree view of the concept of fraud. This work gives a theoretical insight into fraud. It reveals a five-part comprehensive approach termed as the 5S approach to analyze and view the concept of fraud, namely the Segregation of fraud, Schemes used to commit these frauds, Stimulus for committing these types of frauds, the Significant Consequences or the resultant effects of fraud and finally the ways of reducing or countering these frauds or the specific remedies to negate or overcome these frauds.

HIGHLIGHTS

- Financial crimes or frauds are becoming more pronounced and sophisticated, utilizing new technical and social methods of influence.
- Despite extensive endeavours to eliminate fraudulent actions, apparently fraud in its different forms persists and is escalating in both occurrence and magnitude.
- Understanding the symptoms and causes of fraud plays a crucial role in both preventing and detecting fraudulent activities.
- A proper approach of systematically identifying these frauds and finding out the causes or motives and how to prevent these frauds from happening or likely reduction in the intensity of frauds is being discussed in this study with focus on the proposed 5S approach.

Keywords: Frauds, 5S approach, Schemes, Segregations, Stimulus, Significant Consequences, Specific remedies

In every organization that produces goods or provides services, management activities are inseparable (Hashim *et al.* 2020). Through effective management, all existing organizational resources can be planned, organized, directed, and monitored to achieve organizational goals in the right manner (Abbas *et al.* 2020). Currently, public and private sector organizations worldwide are facing rapid economic changes, such as globalization, advancing

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Federated Learning: The much-needed intervention in Heal

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Abstract:

As a transformational approach to health informatics, federated learning (FL) analysis without compromising patient privacy. In this conceptual paper, we explore that supports modern healthcare in the presence of data silos, regulatory compl conclusive demonstrations of FL's power to unite distributed datasets across insti improve diagnostics, predictive analytics, and personalized medicine, provide a cor Big Data. This technology prevents privacy risks and catalyses innovation for me

EAI Endorsed Transactions
on Internet of Things

Blockchain Technology for Manufacturin

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Abstract

With technology advancing rapidly, organizations must continuously develop to re technologies such as blockchain, artificial intelligence, machine learning, and cloud cor challenges of implementing blockchain technology in the manufacturing sector. Data interviews with production and design managers, as well as employees of organizat snowball sampling method was employed, and analysis was conducted using thelarge gr will have significant implications forleveraging blockchain in manufacturing. The study to opportunities and challenges within the technology organisation's environment, add findings are constrained by thescope of the data series, presenting longitudinal facts. To tac highlighted in the study, organizations should make use of this technology to enhance th

Keywords: Blockchain technology, Industry 4.0, Decision Making Model

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ORIGINAL RESEARCH

A Novel Multi-Modal Approach that Fuses Dermoscopic Images with Thermal Imaging in Pre-Emptive Identification of Diabetic Foot Ulcers (DFUs)

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Abstract
This research presents an innovative multi-modal approach that integrates dermoscopic imaging with thermal imaging data to enhance in pre-emptive identification of DFUs. The proposed methodology leverages the high-resolution visual details of dermoscopic images alongside the temperature distribution data captured by thermal imaging to create a comprehensive diagnostic tool. This fusion of modalities aims to address the limitations of each individual imaging technique—where dermoscopic imaging lacks thermal insights and thermal imaging lacks detailed surface information—thereby improving the early detection and diagnostic accuracy of DFUs.The approach employs an InceptionV3-based CNN combined with a SVM classifier to analyze the fused images. The integration of CNN and SVM enhances the model's capability to differentiate between healthy skin and early-stage ulcers. Numerous tests using the available datasets showed that the multi-modal fusion greatly improves the classification performance, achieving an accurateness of 97.1% and an overall accuracy of 97.3%. This research contributes to the field by providing a more accurate and early detection method for DFUs, potentially reducing the risk of severe complications such as infection and amputation.

Keywords Diabetic foot ulcer (DFU) · Multi-modal fusion · Dermoscopic imaging · Thermal imaging · InceptionV3 · CNN · SVM

Introduction

DFUs are comman complications of diabetes, leading to high morbidity and mortality rates [1]. Early detection and treatment are critical to preventing severe outcomes such as infection, amputation, and death. Traditional diagnostic methods, such as visual inspection and patient history, often prove insufficient for early detection [2]. This is because DFUs can develop gradually and without noticeable symptoms, making it difficult to identify them in their early stages [3]. Because of this, many may not notice that an ulcer is forming until it is more advanced, which raises the possibility of infection, amputation, and even death. Dermoscopic imaging provides high-resolution images of the skin surface, allowing for detailed analysis of skin lesions. However, it lacks information about underlying temperature changes, which can be indicative of early ulceration. Thermal imaging, in a way, captures temperature changes which indicates the sign of inflammation and tissue damage, but it does not provide the detailed visual signsessential for precise lesion identification [4]. This motivates the progress of a multi-modal approach that leverages the strengths of both imaging modalities.The primary aim of this proposed work is to develop and evaluate a multi-modal approach that fuses

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An Intelligent Climate Prediction using K-Means and Decision Tree

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ABSTRACT: Climate Estimation is a crucial application in meteorology, and more and more DM strategies used to boost the accuracy of. Decision tree application is the main topic of this work and K-means clustering algorithm in climate prediction. Using the decision tree technique, one may to classify weather patterns based on several factors, including humidity, windspeed, and temperature. The K-means is a method used to cluster similar weather patterns and identify trends. The results give that the mixture of DT and K-means clustering can effectively predict climate circumstances. The DT algorithm will categorize weather patterns with high accuracy, and the K-means algorithm helps in identifying patterns and trends in the data. The study also highlights the usage of data pre-processing and feature selection in enhancing the efficacy of the algorithms. The study's outcome demonstrates the potential use of DT methodologies in enhancing the precision of weather forecasting. The proposed approach can be employed to create more accurate and reliable forecasting systems, which may lead to significant consequences for various industries such as agriculture, aviation, and emergency services.

KEYWORDS: Decision Tree (DT) / judgement tree, Data Mining (DM), K-means

I.INTRODUCTION

Climate assumption is a is a crucial application in for a particular region ahead of time. Traditional strategies to weather forecasting, like the empirical method and the dynamical approach, Often, an amalgamation of analogue forecasting and computer modelling is used. However, there are disadvantages to these methods, and achieving accurate weather forecasts still provide a formidable obstacle. The increasing availability of large datasets and advances in data mining methods have produced new chances for enhancing the exactness of weather forecasting. Data mining algorithms, such as K-mean, decision trees have demonstrated encouraging outcomes in predicting weather conditions. As an illustration decision tree are a popular categorization algorithm in Climate Prediction to categorize weather patterns based on variables like temperature, wind speed, and humidity.

One may train these algorithms using large datasets to see trends and relationships between different weather parameters, enabling more precise forecasts. Decision trees are especially valuable in Climate Prediction because as they can accomplish handle both category and numerical data, and they provide a clear and interpretable prototype for the foundational relationships between weather parameters. The K-means algorithm, Conversely, clustering methods classify similar weather patterns together, enabling the data to be analysed for trends and pattern.

By combining these two techniques, it is feasible establishing a more accurate and reliable Climate Prediction system capable of predicting weather conditions contains a substantial quantity of precision. This research aims to look at applying decision trees and the K-means algorithm in weather forecasting. By evaluating the way these algorithms operate on large datasets, the study aims to ascertain the most efficient way to increase weather predicating accuracy. What follows from this inquiry will have significant ramifications throughout various industries, such as agriculture, aviation, and emergency services, which rely on accurate weather forecasts for decision-making and planning.

Accurate Climate Prediction can help these industries to get knowledgeable decisions, reduce losses, and improve overall efficiency. Therefore, this research aims to support ongoing efforts for the purpose of elevating the precision of Climate Prediction through advanced strategies for data mining.

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Sign Language Recognition for Hearing-Impaired People

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ABSTRACT: Communication gaps remain between hearing and deaf populations despite major technology developments, especially when reliable, real-time sign language communication is required. Effective communication is hindered by the availability, speed, and naturalness of traditional means like text-based communication and human translators. The objective for this research is to develop a dependable and accurate Sign Language Detection system which can convert gestures through written language in real-time, thereby overcoming this major communication barrier. The suggested system processes video or sensor data and uses sophisticated machine learning as well as computer vision to identify hand gestures, face expressions, and body language. OpenCV, which processes images and videos, and MediaPipe, which accurately tracks hands and recognizes gestures, are important technologies. With the application using advanced image processing algorithms, data augmentation, adaptive learning, and resilience, the framework contains engineered to function dependably in a variety of lighting and environment scenarios.

KEYWORDS: Sign Language Recognition, Real-Time Interpretation, Computer Vision, Machine Learning, OpenCV, MediaPipe, Convolutional Neural Networks, K-Nearest Neighbors, Random Forest Classifier

I.INTRODUCTION

Communication gaps between hard of hearing and hearing population still remain despite enormous technical developments, especially when accurate, instant gestures interpretation is necessary. Regarding accessibility, rapidity, and naturalness of touch, traditional approaches—like text-based communication and human interpreters—often fall short. A dependable, automatic system that can swiftly convert written through the sign words. The fundamental purpose of this study aims at construct a robust and accurate SLR system capable of translating gestures to written translation within actual time. This mission addresses a large communication barrier between deaf and hearing individuals by using advanced technology. The main objective is to build a prototype that could quickly and accurately recognize and interpret real-time motions using gestures. Machine learning as well as computer vision are needed to process video or sensor data that includes hand movements, facial expressions, and body language.

Sign language recognition systems need to work reliably in a range of scenarios and lighting conditions. The major objective here is to make the system strong enough to handle these variances without compromising accuracy. Adaptive learning, data augmentation that raise its diversity of the training dataset, and advanced image processing with OpenCV are among techniques it might be applied to ensure accurate results. Furthermore, by efficiently addressing several different environmental situations, models for machine learning like k-Nearest Neighbors (KNN) and Random Forest Classifier from the scikit-learn toolbox can be utilized to increase the robustness of the system. During the system's design phase, the end users should be taken into consideration. It should be simple to use for both those who are deaf and getting input from those persons who might not be familiar with it. This could mean having an interface that makes communication easy, having directions that are easy to follow, and having a simple setup process. By learning patterns of space CNNs can find patterns in the data greatly increase precision of gesture detection, improving the system's dependability and user-friendliness. The technology needs for being produced readily available and safe to ensure that be widely used. By increasing equality and availability, the creation of an efficient sign language recognition system might greatly improve communication for the deaf community. Through addressing the technical challenges and guaranteeing the system's flexibility to actual situations, this study makes a positive impact regarding building something more united and responsive society.

Cardio Disease Detection using ECG Images

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***Abstract*—Early detection is necessary for effective management and therapy for heart disease. An electrocardiogram (ECG) is a standard diagnostic technique for cardiac issues that records the heart's electrical activity. Recently, automated techniques for the diagnosis of heart disease are being invented due to the application of machine learning algorithms to ECG signals. Preprocessing, grouping, and feature extraction are the three primary phases of the suggested system. Mathematical changes are used to extract features from the pre-processed ECG data upon the artifacts and noise have been removed. Finally, a machine learning algorithm classifies the gathered characteristics as suggestive of either an abnormal or normal cardiac condition. The recommended approach has shown promising results in very accurate and reliable diagnosis of many heart disorders, such as arrhythmias, heart failure, and ischemia. The device could be used as a screening tool for cardiac disease, enabling early detection and timely treatment to improve patient outcomes. In the realm of cardiovascular medicine, the amalgamation of machine learning algorithms and ECG analysis represents a noteworthy advancement. By applying data-driven insights, this innovative approach has the capacity to notably change the early monitoring and treatment of heart illness. Through meticulous preprocessing, feature extraction, and classification, these systems, with their unparalleled accuracy in diagnosing. A range of heart disorders, pave the way for early intervention and Better health results. This technology not only increases diagnosis accuracy but also advances a proactive paradigm of healthcare delivery where personalised treatments and preventative measures serve as the cornerstones of heart care.**

Keywords —- Classification; CNN; Electrocardiogram (ECG); Heart Disease; Heart Failure; Preprocessing

I. INTRODUCTION

Cardiac disease is causes of morbidity and death worldwide, raising serious health concerns.To make sure that effectively treat heart disease and prevent serious cardiovascular events, It's important to identify the medical condition properly and earlier. Electrocardiography (ECG) is a diagnostic technology that is widely used, reasonably priced, and non-invasive. The ECG is still a vital component of cardiac diagnostics even with the development of new methods for diagnosis including cardiac magnetic resonance imaging (MRI), nuclear imaging, and Echocardiography. This is because the ECG is easily accessible and user-friendly in a variety of healthcare settings, such as emergency rooms, outpatient clinics, and remote locations.

A few number of difficulties in interpreting ECG signals, though. Confounding variables, age and gender, and the prerequisite for specific training can all make ECG analysis more difficult. In contrast, comorbid illnesses such as diabetes or hypertension can change ECG patterns and impact heart rate variability due to hormonal changes. If resources are scarce, it may be difficult to acquire the extensive training needed for accurate ECG interpretation. The aforementioned concerns highlight the pressing necessity for sophisticated, automated techniques to improve ECG-based cardiac illness identification and decrease reliance on proficient human translators.This field has a lot of promise, as shown by current developments in machine learning and deep learning. These methods can accurately recognise and categorise ECG signal characteristics automatically by utilising complex algorithms.Neural networks like as recurrent neural networks (RNNs) and convolutional neural networks (CNNs) have shown to be incredibly effective in processing and interpreting ECG data, often outperforming traditional methodologies. By democratising access to expert-level ECG analysis and boosting superior diagnostic tools, advances in artificial intelligence (AI) have the potential to completely transform the removal of cardiovascular disease. They also increase diagnostic precision. Furthermore, AI models are always updatable with fresh data, which gradually increases their precision and flexibility. Although ECG-based cardiac disease detection offers several advantages, but still remain issues that must be resolved. The integration of ECG data with other clinical information, individualised techniques, and the influence of demographic factors continue to be difficult to achieve. Furthermore, resolving concerns about data privacy, governmental permission, and healthcare professionals' acceptability is necessary to include AI-driven ECG analysis into standard clinical practice. It's also critical to prioritise ethical issues, such as guaranteeing impartial algorithms and protecting patient privacy. Additionally, to be able to guarantee these AI models' generalizability and dependability in various clinical contexts, thorough validation across a range of populations is required. However, combination of AI and ECG analysis has the potential to completely transform the personalised therapy and early identification of cardiovascular disorders, marking a substantial breakthrough in the domain of cardiac health. The potential for early identification and personalised therapy of cardiovascular disorders will only grow as machine learning algorithms and our knowledge of cardiac physiology expand. This gives motivation for lowering the worldwide burden of heart disease. Finally, this collaboration between technology and healthcare may result in more pro-

Vehicle Detection And Tracking System Using Machine Learning

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***Abstract*— This paper proposes a novel vehicle detection and tracking system designed to improve urban traffic management by employing advanced Machine Learning Modes and techniques and sophisticated image processing methods. The system integrates YOLOv4 for high-efficiency vehicle detection, Faster R-CNN for precise object localization, and Deep SORT with a Kalman Filter for effective vehicle tracking. Additional components include Haar Cascades for initial vehicle detection, Convolutional Neural Networks (CNNs) for vehicle classification, and the mixture of color histograms and clustering techniques for color detection. The system's performance was evaluated using a diverse set of urban traffic images and videos, demonstrating a vehicle detection accuracy, tracking precision and a real-time processing speed of frames per second. These findings validate the system's effectiveness as a robust tool for real-time traffic monitoring and management.**

Keywords— Vehicle Detection and Spotting, YOLO, Faster R-CNN, Deep SORT, Convolutional Neural Networks (CNNs), Real-time Monitoring.

I. Introduction

Urban traffic management is a multifaceted challenge that is often exacerbated by increasing vehicle volumes and the limitations of traditional monitoring methods. Conventional traffic observation techniques are frequently expensive, labor-intensive, and inefficient, particularly in high-traffic urban areas. With the advancements of the machine learning approaches or methodologies and computational methods, there are new opportunities to automate and enhance traffic monitoring and management processes. This exploration analysis emphasis on creating and developing a cutting-edge Vehicle Spotting and Tracking System that makes use of the modern algorithms to automate vehicle detection, classification, and counting, thereby offering a scalable solution for urban traffic management.

The proffered system aims to address the limitations of traditional traffic monitoring by integrating state-of-the-art Machine Learning i.e. expert systems Techniques for precise and real-time vehicle detection and tracking. By utilizing YOLOv4 for initial vehicle detection, Faster R-CNN for refined object localization, and Deep SORT along with a Kalman Filter for reliable vehicle tracking, the system provides a comprehensive solution for monitoring and managing urban traffic. This research seeks to design the structured system that not only recognize and classifies the vehicles but also provides real-time updates to support traffic management efforts and improve road safety.

II. Related Work

In the domain of the vehicle detection and tracking, many scores of techniques have been studied over the years. Early approaches primarily used regular and standard machine learning methods such as Support Vector Machine (SVM) and the Decision Trees for the vehicle detection tasks. These methods demonstrated that SVMs were more effective than Decision Trees for vehicle detection under various conditions, offering better performance in identifying vehicles.[1]

Subsequent research advanced to actual-time vehicle identification and tracking methods that incorporated techniques such as background subtraction and road line detection. These methods utilized algorithms like adaptive background subtraction and Harris corner detection to distinguish between moving vehicles and static objects, proving to be effectual for actual-time vehicles spotting and tracking.[2]

Recent advancements have seen the adoption of more sophisticated objects spotting models like YOLO-V4 and Deep SORT, which address obstacles such as vehicle occlusions and size variations. YOLO-V4's advanced object detection capabilities, coupled with Deep SORT's effective tracking mechanisms, provide high-level correctness in vehicle identification and tracking.[3]

Further innovations have presented deep machine learning methods or models of the expert systems such as YOLOv2, R-CNN, and Fast-RCNN for vehicle detection and tracking tasks. These models have displayed upgraded performance and achievements in locating and classifying vehicles, with Fast-RCNN proving particularly successful for accurate vehicle localization and classification.[4]

Latest work analysis also have examined into the integration of YOLO with Fast-RCNN to develop real-time traffic monitoring systems. This combined approach leverages YOLO for initial vehicle detection and Fast-RCNN for precise object localization, creating a comprehensive system for monitoring vehicle movements and calculating speeds.[5]

III. Methodology

A. *Data Collection*

For the creation and assessment of the vehicle detection and tracking system, a diverse collection of urban traffic video footage was gathered. This dataset includes images and videos from various traffic environments featuring various or

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Automated Kidney Stones Detection in X-Ray Images using YOLOv8

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ABSTRACT: A detection software using X-ray pictures with YOLOv8, noted for its real-time detection precision, was developed in response to the growing prevalence of kidney stones, which calls for accurate diagnostic methods. With thorough preprocessing and data augmentation, the model was trained on a varied Kaggle dataset, ensuring robustness across a range of imaging settings and patient demographics. Recall, precision, and F1-score are used to evaluate the model, which is integrated into a web service based on Streamlit that allows patients and medical professionals to upload X-ray images and get real-time diagnostic findings.This userfriendly interface, highlighting identified kidney stones with confidence scores, aims to reduce radiologists' workload and streamline diagnostics. Demonstrating machine learning's transformative potential in healthcare, this scalable solution enhances diagnostic efficiency and accuracy, improving management and outcomes of kidney stone cases. Future research will optimize the model, expand the dataset, and explore additional features, underscoring the critical role of ML in providing reliable, real-time medical insights.

KEYWORDS: Kidney stone detection, X-ray images, YOLOv8, Object detection, Machine learning.

I. INTRODUCTION

The global prevalence of kidney stones, medically termed nephrolithiasis, continues to rise, affecting approximately 10-12% of the population and posing significant public health challenges. These crystalline mineral deposits form within the kidneys and can traverse the urinary tract, leading to intense pain, repeated infections, and potential complications such as kidney damage. While effective, traditional diagnostic methods like ultrasound and computed tomography (CT) scans are hampered by high costs, radiation exposure, and the demand for specialized equipment and trained personnel. This underscores the urgent need for more accessible, efficient, and cost-effective diagnostic tools.

Recent strides in ML and AI, particularly in computer vision, offer promising solutions for revolutionizing medical diagnostics. Object detection algorithms, such as YOLO (You Only Look Once), are renowned for their real-time detection capabilities and high accuracy. YOLOv8, the latest iteration, builds on these strengths with enhanced speed and precision, making it an ideal candidate for medical imaging applications.

This research endeavors to harness the strength of YOLOv8 to develop a model specifically designed to detect kidney stones in X-Ray images. Leveraging a dataset sourced from Kaggle, containing meticulously annotated kidney X-Ray images, the model undergoes rigorous preprocessing steps such as normalization, augmentation, and resizing. These actions are essential to guarantee the model's flexibility in different imaging scenarios and patient demographics.

Thorough evaluation of the detection model's accuracy and dependability in clinical contexts is part of its validation process, which makes use of common measures like precision, recall, and the F1-score.To facilitate practical deployment, a user-friendly web interface is developed using Streamlit, enabling seamless interaction for medical professionals and patients. This interface allows users to upload X-Ray images and receive immediate diagnostic feedback, displaying detected kidney stones with bounding boxes and confidence scores. Integrating machine learning into healthcare exemplifies its transformative potential in enhancing diagnostic precision, reducing the costs associated with healthcare and, eventually, enhancing patient outcomes. Subsequent investigations will concentrate on improving the model even more, broadening the dataset to include a variety of instances, and investigating new aspects to enhance diagnostic skills.This interdisciplinary approach underscores the synergy between medical expertise and advanced computational techniques in addressing pressing healthcare challenges and advancing patient care.

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Beyond Spreadsheets: A Machine Learning Framework for Intelligent Inventory Optimization

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ABSTRACT: Managing inventory has long been a challenge for businesses of all sizes. Maintaining accurate information regarding different goods are typically a laborious task. Spreadsheets are a common tool used by small organizations to store data in their databases, but they can be corrupted or lost. Managing inventories is crucial. for businesses since it provides a greater variety of production techniques Using a collection of client shopping data, this research creates predictive models to precisely estimate sales prices in the e-fashion industry. The system uses a multiple analytics, such as linear regression and further ML techniques, to provide details regarding the latest profitable, un- interesting, and selling stocks. By providing an all encompassing a resolution for them, this strategy aids inventory managers in optimizing their functioning.

KEYWORDS: LR, RF regression,Decision Tree Regressor, Lasso Regression, Ridge Regression.

I. INTRODUCTION

Effective track of inventory is essential for maintaining operational effectiveness and satisfying consumer needs in the fast-paced corporate climate of today. For retail and ecommerce enterprises, the capacity to precisely forecast sales prices is essential to maximizing inventory levels, pricing policies, and total profitability. The primary objective of this research is to develop and evaluate predictive models that utilize historical data from an online fashion retailer spanning three years to forecast sales prices. Numerous factors, including product categories, sales volumes, geographic locations, and seasonal trends, are included in the information and have an impact on pricing dynamics. This study's main goal is to improve forecasting accuracy by utilizing machine learning techniques. This will help firms make well-informed decisions on inventory stocking and pricing strategies. The procedure includes thorough data preprocessing, the creation of several regression models, and exploratory data analysis (EDA) to find patterns and connections. The accuracy with which these models Reck Regression, LR, Decision Tree, RF regreesor, and Linear Regression can forecast sales prices is the basis for their evaluation. This study will evaluate several methods' predictive ability using measures like the R- squared score and RMSE for the purpose to determine. That have more beneficial technic for predicting sales prices in the context of managing inventories.

The results aid in improving pricing and inventory optimization decision- making processes, which in turn helps companies gain a competitive edge and experience long-term success in the retail industry. Businesses can improve pricing strategies, optimize inventory levels, and obtain insights into customer purchase behavior by utilizing predictive modeling techniques on datasets such as "customer shopping data." This research helps with strategic decision- making related to stock restocking, marketing campaign planning, and overall firm profitability in addition to facilitating accurate sales for ecasting. Businesses can strategically bundle products and improve shelf placements to increase sales and customer satisfaction by recognizing product linkages and customer preferences. By forecasting future sales trends based on historical data, the utilization of linear regression gives the system for managing inventory a new perspective Businesses can more precisely predict demand because to this predictive capabilities, which optimizes inventory levels and lowers carrying costs. Furthermore, incorporating an simple to use UI that is accessible through mobile apps. improves usability and guarantees decision-makers have access to real-time data, which is essential in the fast-paced business world of today. The purpose of this work is to create a comprehensive inventory handling system that uses cutting- edge data analysis techniques to produce insightful findings in addition to automating transaction recording and monitoring of stocks. The suggested solution aims to increase organizational productivity and profitability by lowering manual involvement, decreasing errors, and enhancing operational efficiency. The system's dedication to updating inventory procedures while maintaining dependability and scalability is emphasized by management. In

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Utilizing Neural Networks for Potato Crop Disease Surveillance

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ABSTRACT: Potatoes are the most widely consumed vegetable globally. Agricultural departments are coming around to this idea more and more. Given that potatoes are a vital commodity in world agriculture, plant health has a substantial impact on food security. Potato plant infections can be identified early on, which can increase yield and reduce significant crop losses. This research presents a DL approach based on identifying potato plant diseases using leaf photos. Diseases including septoria blight, late blight, and early blight can affect potatoes. CNN are utilized in the technique to classify photos of both healthy leaves and different plant illnesses. The dataset utilized for training the algorithm consists of photos from the ”Plant Village” collection that show typical plant diseases that harm potatoes. With the dataset, which contains photos of numerous common potato plant diseases, the suggested approach shows promise for precise classification and prompt correction. In ultimately, this will help to keep potato agriculture stable and secure around the world.

KEYWORDS: Potato Disease Detection, Machine Learning, Neural Network, Image Processing.

I. INTRODUCTION

Worldwide, potatoes are a vital crop for food production in many nations. Packed with vital minerals including potassium, fiber, and vitamins C and B6, they offer a host of health advantages. Fiber promotes digestive health and can lower blood cholesterol levels, while potassium helps sustain healthy muscles and heart function. The health of the brain and the immune system depend on vitamins B6 and C. With an astounding 48.2 million tons of potatoes produced in 2021,India is the second-largest manufacturer of potatoes within theentire planet. In this business, the town of Agra, Uttar Pradesh, is referred to as the ”Potato Bowl of India” because of its substantial contribution to the nations total output of potatoes. Experts currently use antiquated methods of disease recognition, which take a lot of time and are frequently unfeasible for large-scale farming operations. As a result, there is agrowing need for automated systems that can quickly and precisely identify plant diseases. Current Progress in CNNs, a type of profound understanding, has shown promise in taskslike an image categorization, object detection, and medical imaging. This study utilizes these advancements into evolve adependable system that uses leaf photos to identify diseases in potato plants.

Although potatoes are a staple crop in every country, illnesses like Alternaria solani’s early blight and Phytophthora infestans’ late blight cause large output losses. Early disease detection is essential for putting mitigation strategies into place and reducing financial and productivity losses. Expertise visually evaluating the plants is the traditional technique of detecting disease, but this method is sometimes impracticable due to time constraints and a shortage of expertise, particularly in remote farming areas.In lately, image processing tools have emerged as an accept- able substitute for ongoing plant health monitoring and early disease diagnosis. Since diseases manifest visible symptoms on the leaves, analyzing these patterns through imaging can effectively identify the diseases. Combining imaging techniqueswith machine learning provides a robust solution to improve agricultural productivity and ensure food security. Therefore, the goal of this effort is to employ image and machine learningtechnology to develop a precise and efficient approach to plantdisease detection.

II. RELATED WORK

The utilization of DL in conjunction with ML for plant disease diagnosis has attracted a lot of interest lately. Plant diseases may now be diagnosed with remarkable success thanks to these novel approaches, which often surpass

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Segmenting Clients for Enhanced Loyalty: A Comparative Analysis of Machine Learning Algorithms

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ABSTRACT: Sustaining client loyalty in today's cutthroat industry is difficult and calls for regular reinforcement of marketing tactics. In order to efficiently target customers and optimize organizational profitability, a methodical methodology is proposed in this study. The dataset is first split up into distinct clusters using a range of methods.Data is grouped together using clustering techniques based on shared characteristics. Mean Shift, Agglomerative, K-means, Mini Batch KMeans Clustering, Gaussian Mixture Model and DBSCAN are the algorithms that are employed.Following that, the result of these algorithms is utilized to divide up the clientele into groups and contrast them. To manage data and look for answers within ML algorithms, ML approaches are used. This strategy seeks to increase company revenues by precisely focusing on customers and providing support.

KEYWORDS: Client Loyalty, Clustering Techniques, Mean Shift, Agglomerative Clustering, K-means Clustering, Mini Batch K-means, Gaussian Mixture Model.

I. INTRODUCTION

In today's fiercely competitive business environment, maintaining and enhancing client loyalty is essential for organizational success. Effective marketing strategies that precisely target customer segments have a big influence profitability and market positioning. This study proposes a methodical approach to achieve these objectives through the use of clustering algorithms in data analysis. By employing techniques such as Mean Shift, Agglomerative, K-means, Mini Batch KMeans, Gaussian Mixture Model, and DBSCAN, this research aims to segment customer data into cohesive groups based on shared characteristics. These algorithms offer perceptions into the conduct of customers and preferences, facilitating the customization of marketing efforts to better meet individualized requirements. Through utilizing machine learning methodologies, this study seeks to optimize resource allocation, enhance consumer contentment, which will eventually encourage income development. Understanding these clustering techniques' outcomes, particularly the highest silhouette score achieved by K-means clustering, will guide businesses in formulating targeted marketing strategies that foster long-term client loyalty amidst competitive pressures.

II. RELATED WORK

The application of analysis of data for sorting customers is a central theme across multiple studies. Goncarovs [1](2018)ˇ highlighted the effectiveness of data-driven approaches in identifying different clientele groups within a financial institution,This can be applied to focused marketing campaigns and improving customer relationship management. Similarly, Bhade et al.[2](2018) presented a systematic approach to the division of customers and buyer targeting aimed at maximizing profit. Their study employed sophisticated instruments for analysis to optimize marketing strategies, the significance for understanding customer behavior for better returns on investment. Kansal et al. [3](2018) applied the K-means clustering algorithm to effectively segment customers, emphasizing its significance in marketing and business strategies. S¸. Ozan [4](2018) investigated several ML techniques for customer segmentation, offering a comparative analysis of different clustering algorithms such as K-means and hierarchical clustering. Ying et al. [5](2010) combined the Analytic Hierarchy Process (AHP) with clustering methods to enhance credit card customer segmentation, demonstrating the benefits of this integration for the banking sector.

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Control of Railway Gate Automation System using IOT

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ABSTRACT: The goal of this project is to streamline unmanned railroads and level crossing gates. This technology is utilized to prevent accidents occurring between road users. Many mishaps occur when manual controlling is done by untrained laborers who lack awareness and experience. Therefore, in order to be able to prevent such mishaps and preserve lives. This project aims to automate railway gate control and prevent accidents using Arduino and sensors. The Arduino Uno board is microcontroller based on the AT mega 328. The key sensor that we employ to measure an object's distance is the ultrasonic sensor. Arduino sensors are used in the circuits that regulate the releasing and shutting of the rail crossing gate system. RFID retrieves data from railway stations, relaying it to registered users, while an infrared radiation transmitter transmits train arrival information to a microcontroller.

KEYWORDS: Arduino UNO Micro-controller, Ultra-sonic sensor, Servomotors, Breadboard.

I.INTRODUCTION

The planning and execution of considerations for an auto- mated railway gate control system are presented in this study. The system detects trains and obstacles by analyzing reflected waves activates an alarm, and manages the light signal and gate operation. Once the train completely passes the level crossing the gate reopens the alarm ceases, and the indicator light switches to green. If an obstacle is detected on the the stuck signal is activated upon level crossing. The reduced equipment, lower cost, simpler design, and high efficiency of the proposed system demonstrate its effectiveness compared to existing solutions. A new IOT based automatic railway crossing system aims to eliminate human errors in operating gates, addressing the issue of extended waiting times for vehicles at railway crossing. This automated solution minimizes delays and prevents accidents, ensuring safer and faster trans- portation. Traditional railway crossing mechanisms, prone to errors and accidents, require innovative solutions to automate gate control and improve safety at level crossings, addressing the increasing volume of traffic and modern infrastructure demands. The Internet of Things (IOT) offers a promising solution for railway operations by integrating interconnected devices with sensors, enabling automation, Real-time communication, and detection of approaching trains. The paper discusses the development and implementation of an IOT-based control system for railway gates that operates automatically, aiming to reduce manual gate operation risks, accidents, and enhance efficiency and safety in railway transportation To prevent accidents at railway crossings and reduce delays, we propose a solution that automate the manual operations of the railway crossing system using IOT. Our system offers a smart highly accurate and reliable method for operating railway gates enhancing both safety and efficiency. This paper proposes an intelligent system for controlling railway gates to prevent accidents at level intersections. The system uses the Internet of Things (IOT) to enable seamless communication and operation without human intervention. It also enhances driver convenience by allowing them to monitor gate status through a mobile application. Utilizing ultrasonic detectors to detect approaching trains and communicates this information to Google Firebase via NodeMCU, triggering gate closure and opening. This cost effective, real-time system improves safety and mitigates risks associated with level crossing accidents.

II. LITERATURE SUREVY

In [1], "Automation of Railway Gate using Internet of Things (IoT)" by, Abinaya, M., and Thenmozhi Vidya uses LED, SERVO motor, IR proximity sensor, Rasbery pi, RFID Reader. This paper talks about the Internet of Things (IoT) and how an Railway Gate Controller used on an Automatic Basis. IoT makes it possible for networked devices with RFID and sensors to do automated tasks via TCP, UDP, and ICMP protocols. The controller's goal aims to automate level crossing railway gate operations, improving safety by cutting down on closing times and lowering

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Parking System using RFID

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ABSTRACT: The global population is growing in the present day. People who use cars increase in number in conjunction with the population. There are numerous problems brought on by the large number of automobiles, including traffic jams, pollution, and inappropriate parking. Roads become extremely congested when cars are parked on the side of the road, especially in cities. Hardware sensors are utilized through the structure to identify open slots and instantly notify drivers of them. IoT technology is a crucial factor in real-time data collecting and analysis, in addition to cost and travel time savings. This paper describes Parking System Using RFID which mainly uses RFID technology, primarily to automate and effectively manage the parking procedures. It keeps tabs on slot occupancy and recognizes cars through RFID tags. In the recommended arrangement, an Arduino UNO microcontroller is used. It is mostly utilized to build connections with interactive objects, such as digital devices and objects that can perceive and manipulate physical objects. This device includes an ultrasonic sensor that detects the existence of a vehicle.

KEYWORDS: RFID Module, Arduino, Ultrasonic Sensor, Servo Motor.

I. INTRODUCTION

In today's hectic urban environments, drivers may find it extremely stressful to find parking spaces, which may cause them to greatly delay their trips. Our idea uses RFID (Radio Frequency Identification) technology must put in place an effective parking system to deal with this widespread problem. The goal of implementing RFID in parking systems is to reduce labour costs, retain car records, and offer straightforward solutions to issues that arise in parking lots[8]. Our project's primary intent is to lessen parking congestion in cities by utilizing cutting edge smart technologies. Traditional parking systems are sometimes plagued by inefficiencies since they still rely on human operations and outdated methodologies. Our Parking System, a clever and effective substitute, is designed to improve the overall parking experience for drivers and parking lot management by optimizing parking spot utilization. Our system's primary originality is its use of RFID technology, which means that it is possible for cars to be automatically and contactlessly identified as they enter and exit parking lots. Every car has an RFID tag that connects to RFID scanners positioned thoughtfully across the parking lot. This setup makes it possible to track parking space occupancy in real-time and provides instant information on available spots. This instantaneous information is helpful to drivers since it makes it easy for them to find open spaces, which reduces the stress and time that come with looking for parking in crowded urban locations.

Beyond just being convenient, our Parking System has major positive effects regarding the surroundings and the economy. Our objective is to speed up the parking process to reduce traffic generated by automobiles searching for spots. This will assist in reducing the percentage of emissions that comes from moving vehicles that are idling and circling. Insightful information about real-time data also helps parking lot managers make accurate choices on the maintenance of their facilities.

II. RELATED WORK

In [1], Mohan P. Thakre describes a Internet of Things based smart vehicle parking system. The system utilizes an ESP12 Node MCU, RFID vehicle readers, RFID tags, an I2C module, and an LCD to manage and display parking information. The ESP12 Node MCU acts as the system's central unit, connecting to the web to provide real-time updates on parking slot status, which are displayed on the LCD. RFID readers at the ingress and egress locations scan RFID tags with vehicle and owner details. The I2C module ensures efficient communication between the sensors and peripherals within the system.

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Smart Plant Watering System using IOT: Arduino UNO-based Solution

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ABSTRACT: Many people are cognizant of the many ways in which plants are highly valuable to people. Among the most ex-pensive daily tasks related to planting is watering plants, whether they're in in gardens or at home. When they frequently forget supplying sufficient water to their plants in the thick of everyday duties, lots of people find it difficult to maintain their gardens. The deployment of modern irrigation technology allows for the efficient and controlled treatment of plants. This project uses an Arduino Uno, an LCD display, a relay module, and a breadboard to demonstrate an automated plant watering system with little assistance from humans, the modern technology is made to guarantee ideal soil moisture levels and healthier plant growth. Arduino controller receives real-time data from a moisture detection device that continuously measures amount of moisture in the soil. The Arduino triggers a relay module, which in turn drives a water pump to irrigate the plants, when humidity drops below a pre-set threshold Users can get real-time contribution to soil moisture levels and system condition from the liquid crystal screen. By avoiding overwatering this automated method not only saves water but also reduces the time and labor needed for manual plant care. The deployment of modern irrigation technology allows for the efficient and controlled treatment of plants. The planning and execution of an automatic drip irrigation systems to plant powered by an
Arduino is examined in this paper.

KEYWORDS: Arduino Uno, Relay module, Soil Moisture Sensor, Water pump.

I. INTRODUCTION

In order to make sure that plants get the right amount of water to grow, plant irrigation systems are crucial tools. The plant requires regular breeding procedure, such as watering along with a sufficient amount of direct sunlight, To be capable survive and thrive You want to have control on how much water gets to your plants, regardless of the weather—whether it's too hot and dry or too cloudy and damp. Long-distance passengers find challenging whenever they've got gardens or other plants in their houses. To efficiently manage plant hydration an Arduino microcontroller, soil moisture, and a relay module are integrated in an automated watering system. The Arduino receives data from the moisture sensor, which detects the soil's water content. After evaluating this data, the Arduino compares it to a pre-set moisture threshold. The Arduino triggers a relay component, which in turn drives a water pump to supply the plant, if the level of moisture falls below the threshold, The Arduino disables the switch on the relay then shuts the pump when the soil reaches the right moisture level. This machinery makes sure that plants get the exact amount of water they want in the ideal time promoting healthy growth while limiting overwatering and water waste. Through its reasonable cost, scalability, and user-friendliness, It might be utilized in several applications, spanning from commercial landscaping and agricultural areas to backyard plants and greenhouses. Those connected to missing a computerized mechanism for watering plants include uneven and ineffective watering, laborious maintenance, and a greater chance of human error that may end in overwatering or under watering. In addition, hand watering can lead to uneven water distribution, stress on plants from their surroundings, and difficulties in monitoring and adjusting care for various plant demands. These challenges may impair plant health and inhibit growth and yield.

II. RELATED WORK

In [1], "Automatic Plant Watering System" By, M. Mayuree,P. Aishwarya and A. Bagubali, uses GSM module, Arduino, moisture detector, and water level indicator. In this present work an automated irrigation system with a 6V pump driven by an L293D motor driver and an Arduino linked to a soil moisture monitor is discussed. The probe of soil moisture gauge, which is positioned near the plant roots, measures the soils' conductivity to ascertain the moisture content. The sensor's output pin turns high when the soil gets dry, which turns on the pump that waters the plant. The sensor's output pin stays low in wet soil, which prevents the pump from operating. When the surface is sufficiently

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Smart Greenhouse Monitoring System using IOT: Arduino UNO-based Solution

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ABSTRACT: As the agriculture has a significant part in the Indian economy, if we do not maintain Greenhouse farming plant health will be reduced, hence there'll be the loss of crop production. Manually maintaining of greenhouse monitoring is highly time and cost consuming. It is more convenient and effective for farmers with automated working environment using Arduino Uno. This system detects condition of soil such as humidity, soil moisture, and temperature. This study analyzes and alerts regarding the health of soil and crop conditions. This paper showcases an Arduino Uno greenhouse monitoring system that optimizes plant development conditions and maintains moisture of soil that uses LM35 temperature sensor and an LDR sensor to regulate soil moisture levels and improve plant development conditions. The system WiFi connectivity which permits real-time data transfer using IoT.

KEYWORDS: LM35 temperature sensor, LDR sensor, Arduino Uno, WiFi, IoT**.**

I. INTRODUCTION

India may greatly increase agricultural sustainability and output with greenhouse farming. A greenhouse is a closed environment that provides optimal conditions for plant growth and promotes plant growth by controlling indoor and outdoor environments [7]. However, due to manual and conventional techniques of greenhouse management, Indian farmers frequently face difficulties like inefficient resource utilization, irregular crop yields, and high operating expenses. These challenges are exacerbated by the requirement for exact environmental management to maximize crop development, which is frequently challenging to accomplish without automation and real-time monitoring. Using wireless sensor networks, the monitoring of the greenhouse environment can be not only simplified but can also contribute to production efficiency increase [6].

Consequently, the natural fertility of the soil is depleting and the soils are losing their resilience characteristics [8]. Among the biggest problems facing agriculture is the depletion of soil fertility, which is frequently brought on by wasteful resource usage and poor oversight. This problem can be solved by a smart greenhouse mechanism that can deliver precise management of water and nutrients by giving real-time data on soil conditions. By promoting sustainable agricultural methods, preventing excessive fertilizer usage, and maintaining ideal soil health, this approach increases crop yields while halting soil deterioration. The main cause of low yield per hectare is the low fertility of soil and less care to replenish it through green manure, fertilisers, fallowing, and scientific rotation of crops[8]. Poor soil fertility and inadequate replenishment techniques, such as crop rotation, fertilization, and green manuring, are the main causes of low crop yields per hectare. A solution is provided by an IoT-based greenhouse surveillance mechanism that keeps an ongoing eye on soil conditions and optimizes water and nutrient management. enhanced crop yields and sustainable farming methods result from this system's support of scientific crop rotation, efficient soil replenishment, and enhanced general soil health.

Farmers may precisely and efficiently manage resources by using an Internet of Things-based greenhouse surveillance system to deliver real-time insights into environmental conditions and soil health. In addition to promoting sustainable farming methods and improving soil fertility, this strategy opens the door for increased crop yields and more resilient agricultural systems. We can address these important agricultural issues and advance a more sustainable and fruitful future for greenhouse farming by integrating IoT technologies.

II. LITERATURE SUREVY

In [1], "IoT Based Automated Greenhouse Monitoring System" by Danita, M. & Mathew, Blessy & Shereen, Nithila & Sharon, Namrata & Paul. This system is set up to gather vital information on soil moisture, temperature, and humidity

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Thyroid Disease Detection using Machine Learning

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ABSTRACT: Thyroid disorders have a major influence on public health systems and are becoming a more pressing global health concern. For these illnesses to be effectively treated, accurate prognosis is essential. This research comprehensively assesses the predictive power of five popular machine learning (ML) algorithms: K-Nearest Neighbours (KNN), Decision Trees Classifier (DTC), Random Forest classifier (RFC), and Logistic Regression classifier (LRC) using a sizable dataset.

Simple binary result prediction is where logistic regression shines, but decision trees provide a systematic way to make decisions on a range of tasks. KNN improves the usefulness of new data in pattern recognition by classifying it according to how similar it is to existing data points. To increase accuracy, Random Forest integrates forecasts via several decision trees using ensemble learning. Thorough evaluations are conducted on each algorithm's performance; Decision Trees yielded the best accuracy at 99%, KNN at 93%, and Logistic Regression at 88%. Additionally, Random Forest performed admirably when it came to predicting thyroid problems.

This review highlights the usefulness among various machine learning techniques in healthcare settings, especially regarding enhancing patient care outcomes and diagnostic accuracy, additionally to closely examining their effectiveness. This project is to improve public health management strategies by equipping medical practitioners with trustworthy instruments for early thyroid problem identification and intervention through the advancement of predictive capacities.

KEYWORDS: Machine Learning, Decision Tree, KNN, Logistic Regression, Random Forest, Naive Bayes, Thyroid Disease Prediction.

I.INTRODUCTION

Thyroid diseases represent a significant global health concern, affecting millions worldwide, particularly prevalent among women aged 17 to 54. In India, approximately one in ten individuals suffers from thyroid disease, underscoring its widespread impact. Similarly, in Bangladesh, the condition affects about 50 million people, predominantly women, yet awareness remains inadequate in many regions.Located in the neck, the thyroid gland produces essential hormones T4 (thyroxine) and T3 (triiodothyronine), crucial for regulating metabolism, body temperature, and cellular function. Dysfunctions in hormone production lead to three main categories of thyroid conditions: Eu-Thyroidism (normal hormone levels), Hyper-Thyroidism (excessive hormone levels), and Hypo-Thyroidism (insufficient hormone levels).

Low T3 and T4 levels and increased TSH (thyroid-stimulating hormone) are the hallmarks of hypothyroidism, which can lead to symptoms including sadness, weight gain, and exhaustion. Conversely, hyperthyroidism is characterized by low TSH levels along with high T3 and T4 levels, which causes symptoms including anxiety, weight loss, and an elevated heart rate. If left untreated, these illnesses might result in serious side effects such as heart problems, infertility, and psychological difficulties. Given these ramifications, successful patient management and treatment depend on early identification and accurate forecasting. Effective as they are, traditional diagnostic techniques frequently need invasive procedures, which highlights. The requirement for effective non-invasive prediction tools to support early detection. Professionals in healthcare today possess sophisticated tools at their disposal thanks to the field of machine learning (ML) techniques, which can handle huge datasets and enhance the classification as well as forecasting illness. In this investigation, we assess the predictive power of five machine learning algorithms: K-Nearest Neighbors (KNN), Random Forest, Decision Trees, and Logistic Regression.

ARECANUT DISEASE DETECTION USING MACHINE LEARNING

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Abstract – Agriculture and farming, the backbone of many Countries that are developing, are necessary to ensure the safety of food and security. Arecanut, a commercially important crop, is prone to various kinds of illnesses that can have a major effect yield and quality. Deep learning techniques, particularly the YOLOv5 model, offer a promising solution for diagnosing these diseases. This study focuses on utilizing YOLOv5 to identify and classify three major diseases affecting arecanut: Koleroga (Mahali), Chukkeroga, and Split nut. A dataset comprising 548 images of both healthy and afflicted arecanuts was utilized for training and to evaluate the model. Among all the main challenges in this research was collecting a comprehensive dataset with images representing the different diseases affecting arecanut. This study's objective is to develop an accurate and efficient method for identifying illnesses early in arecanut crops. By implementing this YOLOv5-based model, farmers and agricultural experts will be able to promptly identify and classify diseases such as Koleroga, Chukkiroga, and Split nut, enabling timely intervention and disease management strategies. This will ultimately contribute to improved crop health, increased yields, and enhanced food security in regions where arecanut cultivation serves a vital part.

Keywords: Arecanut, betel nut, disease detection, YOLO, deep learning, object detection, classification, automated system, agricultural practices.

1. INTRODUCTION

Arecanut, additionally recognized as betel nut, is a vital crop with significant economic importance in many regions. However, arecanut plants are susceptible to numerous illnesses that may result in substantial damage to crop yield and quality. Timely and precise recognition of these diseases is necessary for the effective management of illnesses and ensuring the health of arecanuts. This study explores the application of the YOLOv5 Machine learning architecture to identify diseases in arecanut plants, specifically the classes "good", "koleroga", "chukkeroga", and "split nut". The algorithm analyzes images of arecanut plants, recognizing patterns that signify the existence of illnesses. YOLOv5 is a method of identifying objects that makes utilization of a single neural network to detect multiple objects within a given image. These models work by analyzing the images of arecanut and identifying patterns that show the existence of diseases. YOLOv5 is a system for identifying objects that utilizes a single neural network to identify multiple things within a
given data.

The current approach for finding illnesses in plants is simply observation the unaided eye can see and farmers have to closely examine each and every crop periodically to recognize illnesses, that is an extremely challenging and time-consuming task and which calls for increased manpower, adequately equipped laboratories and costly instruments and it is not possible for early recognition of the diseases and avoid spreading of disease. Thus, there's a requirement for an automatic disease detection system. Diseases that commonly affect areca trees include yellow leaf spot, stem bleeding, bud rot, Mahalidiease(Koleroga), and yellow disease, which is caused by continuous rainfall and climatic changes. To avoid this, we can use Deep Learning to detect disease.In this module dataset classified mainly as Healthy and Diseased arecanut, and diseased images are classified as Koleroga, Chukkeroga and Splitnut.Koleroga is resulting from the pathogen Xanthomonascampestris, which may cause nuts to wilt and turn yellow, stunted growth band eventually death of palm. Arecanut disease detection can be done by searching for a spot on the affected nuts. And the improper draiage will cause nut spit.

II. PROBLEM DEFINITION

The issue with Arecanut disease detection involves developing an algorithm to accurately identify the existence of unhealthy arecanuts identified asthe images taken on both good and bad arecanut images. This requires the utilization of computer vision strategies like image segmentation, utilizing deep neural networks and extraction of features to examine the visual characteristics of the arecanuts also categorize them and find their proper disease. The objective is to provide an effective and computerized an answer to the disease detection issue. This will support the earliest identification and treatment of diseases, which will increase crop yields and decrease crop loss.

The trained YOLO model should be capable of accurately detecting and classifying numerous illnesses that frequently impact arecanut plants. This includes distinction between ailing and well arecanut nuts. The system should operate in realtime, providing quick and reliable disease detection results to farmers and plant pathologists.

III. LITERATURE SURVEY

Classification of arecanut illness identification using the YOLO algorithm has gained attention recently as a promising approach for automating identification of diseases and also management in arecanut. Several studies have examined and the Artificial neural network techniques are applied, specifically YOLO, in this domain. The following literature survey gives a synopsis of some notable studies concerning the YOLO classification scheme for identifying the arecanut diseases:

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Fake Account Detection on Instagram

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ABSTRACT: The meteoric rise of social media has led to a proliferation of fake accounts, which can be used for illicit purpose like identity theft, phishing, and the propagation of misinformation. To deal with the matter of the surge in fake social media accounts, researchers have explored a several machine learning methods and algorithms to identify and detect these fraudulent profiles. These advanced analytical methods aim to differentiate genuine user accounts from those created for malicious purposes. This study's objective is to assess the efficacy of three wellknown machine learning algorithms. - Support Vector Machines (SVM), Logistic Regression, Random Forest - in identifying fake accounts. The proposed approach demonstrated significant improvements in detection accuracy, achieving over 90% precision and recall. The study analyzed user metadata, engagement patterns, and content similarity features to classify accounts as authentic or fake. Random Forest attained the maximum precision of up to 91.76% in a 2class (authentic vs fake) and 4-class (authentic, active fake, inactive fake, spammer) classification. The five key components were number of posts, followers, biography length, following, and link availability. Descriptive statistics revealed notable differences in user behavior between fake and authentic accounts. Leveraging machine learning and NLP techniques can substantially increase the false profile's accuracy identification compared to traditional methods. The findings highlight the efficacy of sophisticated algorithms for machine learning, particularly Random Forest, in detecting fake accounts with high precision by analyzing user metadata, engagement, and content features. This can help social networks and businesses mitigate the effect of fake accounts used for malicious purposes.

KEYWORDS: Machine Learning (ML), Support Vector Machine (SVM), Logistic regression

I.INTRODUCTION

The rampant proliferation of fake accounts on social media platforms, has become a pressing issue in recent times. These fake accounts can have serious negative impacts, including identity theft, phishing attacks, the dissemination of false or misleading information has become a growing concern in the digital age, and the manipulation of engagement metrics for brands and influencers. With estimates of over 1.7 billion fake accounts throughout social media networks, the necessity for robust and trustworthy detection techniques has grown more crucial and urgent.

Precise identification of fraudulent accounts is vital for preserving a trustworthy and secure digital atmosphere for social media users. However, manually identifying these accounts is a time-consuming and resource-intensive process that is not scalable for the sheer volume of fraudulent accounts on platforms such as Instagram has changed into a significant challenge. ML algorithms in this particular context can serve as a pivotal tool in bolstering detection capabilities and strengthening the overall security of social networks. Many ML algorithms have demonstrated encouraging outcomes in identifying and flagging fraudulent accounts on social media networks. SVM have been employed to classify and identify malicious applications on Facebook, attaining impressive accuracy levels in the process. Logistic regression, when integrated with techniques like median imputation and maximum probability approximation, has also demonstrated strong performance in detecting fake accounts on Instagram, with an accuracy rate of 90.8%.Random Forest, a ML algorithm, has grown to be among the most often used strategies in order to identify and identifying fake accounts on social media platforms., has achieved even higher accuracy rates of up to 92.5% when used with k-fold cross-validation.

Additionally, leveraging these algorithms can improve the identification of fake accounts by analyzing the quantity of fans and accounts followed. SVM techniques can indeed be valuable for feature extraction, selection, and data preparation in fake account detection. Logistic regression is also useful for assessing the profile completeness, presence of a bio, profile picture, account age, and verification status, as these can be indicative features for identifying fake accounts. Combining these approaches can enhance the robustness and precision of the detection mechanism.

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EV Station Search and Slot Booking

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ABSTRACT: The Main strategy for developing a sustainable Transportation system which involves electric vehicles (EVs). However, there are numerous difficulties connected with adopting electric vehicles. Usually, customers face a lot of issues like extended charging times and limited information on the availability of EV supply stations while using an EV, which makes it difficult for them to accept the new technology. To tackle this kind of issue, integrating ICT-based solutions will help deal with the great consequences of EV drivers. This paper is about a web application that has been proposed for EV drivers to understand the technology and make their lives better. The web application enables EV drivers to book a charging spot based on their preference and the availability of EVSS. The test findings will support the importance of charging reservation advances to reduce EV driver's anxiety issue.

KEYWORDS: Electric vehicles (EVs), ICT-based solutions, EV charging infrastructure

I.INTRODUCTION

By adopting electric vehicles (EVs) into sustainable Transportation systems is important for reducing greenhouse gas emissions and promoting clean air in urban areas. The white-spread adoption of EVs has the potential to significantly reduce the environmental impact of transportation, which is currently one of the largest contributors to Greenhouse gas emissions globally. However, the adoption of EVs faces several challenges that makes it difficult in acceptance. One of the primary concerns of EV drivers is the available and accessibility of charging infrastructure. There is a very less number of charging station and the time it takes to fully charge and EV can lead to anxiety, making it difficult for drivers to plan their trips and ensure that they will have a sufficient charge to reach their destinations.

Another significant challenge is the information of charging station availability. EV drivers often struggle to find charging stations near their locations, which may result in anything related to frustration and inconvenience. This lack of transparency and visibility can also make it difficult for EV drivers to plan the trips and ensure they have access to charging stations when needed. Furthermore, the Limited information of charging station availability can also lead to a trust issue among EV drivers, making to adopt to EVs as their primary mode of transportation.

To solve or overcomes such challenges, the integration of ICT based solutions is essential for supporting EV drivers with information on charging station availability, insurance them to plan their trips more effectively, and reduce anxiety. Additionally, ICT base solutions can also provide EV drivers with information on the location and availability of charging stations, facilitating their ability to connect with find charging stations near their locations.

One such ICT based solution is the internet-based program developed within the EV project. This web application enables EV drivers to book charging slots based on their preference as well as the present situation of EV support station availability.

The web application is designed to support the IOE semantic architecture, which enables continuous communication between different systems and devices. This allows the application to integrate with various charging stations and provide EV drivers with a comprehensive view of charging station availability. The application also enables EV drivers to book charging slots beforehand, which might lessen tension and make it simpler for them to plan the day.

The test findings of the web application highlight the importance of changing the reservation system to reduce EV drivers anxiety issues. The test results show that the application significantly reduces anxiety among EV drivers, making it simpler for them to plan their work and ensure they have sufficient charge to reach their destination and fully film their