MANGALORE INSTITUTE OF TECHNOLOGY AND ENGINEERING

(An ISO 9001: 2015 Certified Institution)

(Affiliated to Visvesvaraya Technological University Belagavi)

Badaga Mijar, Moodabidri-574225, Karnataka

3.3.2 Number of Papers Published per Teacher in the Journals notified on UGC website during the last Five Years

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Academic Year 2019-20

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Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
1	Increasing the Silicon Solar Cell Efficiency with Transition Metal Oxide Nano-Thin Films as Anti-Reflection Coatings	**Raghavendra Sagar** and Asha Rao	Physics	Materials Research Express	2053-1591	60
2	Influence of A-site Substitution on Dielectric and Impedance Behavior of Mn3O4 Spinels	**Nayana Acharya and Raghavendra Sagar**	Physics	Ferroelectric LettersSection	0731-5171	61
3	The Significant Role of Molecular Dipole Arrangements on the Second and Third-order Nonlinear Optical Properties of a Furan Based Chalcone	S. Satheeshchandr, **Anthoni Praveen Menezes**, H.P. Sarveshwara, A. Jayarama	Physics	Physica B: Physics of Condensed Matter	0921-4526	62
4	Comparative Study on Structure, Dielectric and Electrical Properties of Cobalt- and Zinc-Substituted Mn3O4 Spinels	**Nayana Acharya and Raghavendra Sagar**	Physics	Applied Physics A -Materials Science & Processing	0947-8396	63
5	Investigation on Structural, Optical and Electrical Properties of Nd Doped Titania Films and Application of Optical Model	Akshayakumar Kompa , **Chaitra U** , Dhananjaya Kekuda , Mohan Rao K	Physics	Materials Science in Semiconductor Processing	1369-8001	64

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
6	Hybrid Core-Shell Nanostructure made of Chitosan Incorporated Polypyrrole Nanotubes Decorated with NiO for All-solid-state Symmetric Super capacitor Application	**H Vijeth,** SP Ashokkumar, L Yesappa, M Vandana,H Devendrappa	Physics	Electrochimica Acta	0013-4686	65
7	Growth of 3-Dimentional MoS2-PANI Nano fiber for High Electrochemical Performance	H Ganesha, S Veeresh, YS Nagaraju, M Vandana, SP Ashokkumar, **H Vijeth**, H Devendrappa	Physics	Materials Research Express	2053-1591	66
8	Synthesis, Characterization of Some 6/8 Substituted 2-Chloro-3- Formyl Quinoline Incorporated,3-Thiazoles/1,3-Benzothiazoles and Their Biological Studies	**Vineetha Telma D'Souza,** Janardhana Nayak, Desmond Edward D' Mello, Dayananda P	Chemistry	International Journal of Advanced Science and Technology	2005-4238	67
9	Corrosion Inhibition of Zinc in 0.1 M Hydrochloric Acid Medium with Clotrimazole: Experimental, Theoretical and Quantum Studies	**A.M. Guruprasad,** H.P. Sachin, G.A. Swetha, B.M. Prasanna	Chemistry	Surfaces and Interfaces	2468-0230	68
10	Corrosion Inhibitive Capacity of Vanillin-Based Schiff Base for Steel in 1 M HCl	G Bhanuprakash, B M Prasanna Santhosh **A.M. Guruprasad,** R S Malladi	Chemistry	Journal of Failure Analysis and Prevention	1547-7029	69

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
11	Comparative Study of Removal Efficiency of Cationic Dyes by Chromolaenaodorata Weed Powder	**Ashwini A Kamath,** Nandini R, Vishweshwara M	Chemistry	International Journal ofAdvanced Science and Technology	2005-4238	70
12	Influence of Hall on the motion of a Newtonian Fluid through a Porous medium in an inclined Planar Channel with Peristalsis	P Gangavathi, **S Jyothi**, M V Subba Reddy, P Yogeswara Reddy	Mathematics	Journal of Adv. Research in Dynamicaland Control Systems	1943-023X	71
13	Effect of Chemical Reaction of First Order and Micro rotation on Fluid Flow in a Vertical Channel	**Y. Ramarao, S Jyothi**, Shreedevi Kalyan	Mathematics	International Journal of Mechanical and Production Engineering Research and Development	2249-6890	72
14	Computation of stability Derivative for a wing for specific heat ratio=1.66 for Hypersonic Flow	**Shamitha, Asha Crasta** S A Khan **, P Vasavi**	Mathematics	International Journal of Mechanical and Production Engineering Research and Development	2249-6890	73
15	Micro-Structural Evolution Analysis and Assessment of Tribological Behavior of Nickel Alloy Reinforced with SiO2 and Al2O3 Hybrid Metal Matrix Composites	Vidyasagar Shetty, Vijay Kumar , **G.Purushothm.**	Aeronautical Engineering	International Journal ofMechanical and Production EngineeringResearch & Developments	I 2249-6890	74

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16	Effect of SiO2 and Al2O3 on Mechanical Properties of ASTM A 494 M Grade Nickel Alloy Hybrid Metal Matrix Composites	Vidyasagar Shetty , Vijaya Kumar, **G.Purushotham**	Aeronautical Engineering	Journal of Mechanical Engineering Research & Developments	1024-1752	75
17	Study Of Free Vibration Characteristics Of Hybrid Polymer	**Ajith Kumar,** Vishwaretha K R, Shivaji LamaniI, KiranKumar MV, Vinod	Aeronautical Engineering	International Journal of Mechanical and Production Engineering Research & Developments	2249-6890	76
18	Utilization of Agriculture Waste Embedded Composite Wall Panels as Alternative Building Materials: A Concept of Lightweight Structures	B S Keerthi Gowda, **G L Easwara Prasad**, Velumurugan Ramachandran	Civil Engineering	Journal of Structural Technology	2581-950X	77
19	Experimental Studies on Structural Characteristics of Solid Concrete Block Masonry with Partial Replacement of Sand by Quarry Dust in Mortar	**Ganesha Mogaveera**, Vidyashree M**,** **Umesh S S,** Sherman Jain	Civil Engineering	International Journal of Advanced Science and Technology	2005-4238	78
20	Study On Strength of Geopolymer Concrete	Navyashree B R, **Ganesh Mogaveera**	Civil Engineering	International Journal of Advanced Science and Technology	2005-4238	79

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21	Removal Of Heavy Metals From Leachate Using Natural Detritus Shells	**Jayaprakash M C,** Trupti, Niveditha S P, D Venkat Reddy	Civil Engineering	International Journal ofAdvanced Science and Technology	2005-4238	80
22	Reduction Of Floods Caused By Rain Using Infiltration Wells and Rain Reservoirs In Padang City	Bambang Istijono, **Jayaprakash M C**, DVenkat Reddy	Civil Engineering	International Journal ofAdvanced Science and Technology	2005-4238	81
23	Performance Of Concrete By Partially Replacing Fine Aggregate with Gbs And Cement With Fly Ash	**Sagar S**, Kalappa U.P, Jyothipriya G.S, Umar Mohd Nousheen	Civil Engineering	International Journal ofAdvanced Science and Technology	2005-4238	82
24	Analytical Studies on Behaviour of High Raised Frame Structures Subjected to Wind Loads	**Darshan M. M, Suraj M. Shet**	Civil Engineering	International Journal of Advanced Science andTechnology	2005-4238	83
25	Development of Rainfall Intensity-Duration-Frequency (IDF) Curve for Some Parts of Coastal Region of Karnataka	**Sushmitha G S, VinodG, Vinutha S**	Civil Engineering	International Journal ofAdvanced Science and Technology	2005-4238	84

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26	A Study on the Impact of Climatic Changes in the Coastal Regions of Karnataka	**Vinod G, Sushmitha GS**	Civil Engineering	International Journal ofAdvanced Science and Technology	2005-4238	85
27	Taxonomy of DDoS Attacks and Performance of DDoS Attack DetectionApproaches	**Ravinarayana B, Nagesh H. R**	Computer Science & Engineering	Solid State Technology	0038-111X	86
28	An Approach to Download Data from the Cloud Efficiently Through Multiple Parallel Links by Applying Divide and Conquer Technique	**D.R.Annappa Swamy,** M.R.Rashmi , **T. Shreekumar**	Computer Science & Engineering	Solid State Technology	0038-111X	87
29	An Active Appearance Model based Face Recognition from Surveillance Video	**T.Shreekuma**, K. Karunakara	Computer Science & Engineering	Test Engineering andManagement	0193-4120	88
30	Application of Fisher Yates Data Shuffling and RSA Encryption in Transform DomainVideo Steganography	**Laxmi Gulappagol,** KB Shivakumar	Electronics & Communication Engineering	Bioscience Biotechnology Research Communication	0974-6455	89

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31	Application of Robust Engineering Approach for DC Motor Controller Design	**Vinayambika S Bhat,** Shreeranga Bhat Gijo E. V	Electronics & Communication Engineering	International Journal of Advanced Science and Technology	2005-4238	90
32	Review on Bio-Signal Processing Software Packages	**Ramalingam H M,** Nagesh H R, Pallikonda Rajashekharan M	Electronics & Communication Engineering	International Journal of Advance Research, Ideas and Innovations in Technology	2454-132X	91
33	Image Processing based Early Detection of Pest in Agriculture to Increase the Crop Yield	**Srikrishna Shastri C,** Arpitha, Denold Jason	Electronics & Communication Engineering	International Journal of Advanced Science and Technology	2005-4238	92
34	Tactile Braillie Display Using Relay Switch	**Ranjith H D, RishmaMary George,** Anjani	Electronics & Communication Engineering	International Journal of Advanced Science and Technology	2005-4238	93
35	Adaptive Wireless Charging System for Electric vehicles	**Sathisha,** Ninadha Venugopal, **Padma Prasada**	Electronics & Communication Engineering	International Journal of Advanced Science and Technology	2005-4238	94

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36	A Novel Architecture of 32 bit Modulo 2n-1 Adder	**Uday J,** Rajithkumar BK	Electronics & Communication Engineering	International Journal of Advanced Science and Technology	2005-4238	95
37	Solving the Data Security Problems for Medical Image Using Dog-Crow Optimization Algorithm	G.Jayahari Prabhu, B.Perumal, **P. SanjeeviKumar**	Electronics & Communication Engineering	International Journal ofAdvanced Science and Technology	2005-4238	96
38	Flipped Classroom : An Effective ICT Tool for Facilitators and Remote Location Learners	A. Padmaja, **Swapna Srinivasan**, Sheetal Bhongle	Electronics & Communication Engineering	Journal of Engineering Education Transformations	978-1786357441	97
39	Production Enhancement and Sustainment through Lean Six Sigma Strategy	Shreeranga Bhat, Gijo E. V, **Vinayambika S Bhat**	Electronics & Communication Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249–6890	98
40	Analysis of Buck Converter: A Comparative Study Based on Fuzzy Logic and Internal Model Control Techniques	Rumana Ali**, Vinayambika S Bhat**	Electronics & Communication Engineering	International Journal of Advanced Science and Technology	2005-4238	99-100

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41	Survivability Techniques Implementation by using Simulation Methods	Chandra Singh, **Nischitha N** Sai Venkatramana Prasada G S, Harish MB, Lanlyn Samuel Dsouza, Shashank A G	Electronics & Communication Engineering	Test Engineering andManagement	0193-4120	101
42	Experimental Study of High Performance Computing in Three Tier Architecture for E-Health Care Application	**Ramalingam H M,** Nagesh H R, Pallikonda Rajasekaran M	Electronics & Communication Engineering	International Journal of Advanced Science and Technology	2005-4238	102
43	Email Client Automation with RPA	Akshay P N, Nisarga Kalagi, Deeksha Shetty, **Ramalingam H M**	Electronics & Communication Engineering	Electronics & Communicati on Engineering	2394-5125	103
44	Thin Film Transistors For Display Applications: A Review	**Ganesh V N,** Shantharama Rai C	Electronics & Communication Engineering	International Journal of Advanced Science and Technology	2005-4238	104
45	Coal Mine safety Monitoring Device	**Rishma Mary George,** Mahita Bangera, Abhishek A., Zaid Mohammed.	Electronics & Communication Engineering	Journal of criticalReviews	2394-5125	105

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46	The Growth of Semiconductor Thin Layer on Silicon Substrate Using Sol-Gel Method	**Ganesh V N ,** Shantharama Rai C, Jayarama A	Electronics & Communication Engineering	Solid State Technology	0038-111X	106
47	Real time Object Detection for Autonomous Vehicles	**Ganesh V N,** K Aishwarya Shetty, Melrine Aquila Saldanha, Muzna Nazhath, Namrata Arun	Electronics & Communication Engineering	International Journal of Engineering & Technology	2395-0072	107
48	An Efficient Kannada Language Based Agricultural Helpline System for Agriculturist Using IoT	**Anjani Hegde, Rishma Mary George, Ranjith H D ,Nischitha L, Bhargavi K Rao**	Electronics & Communication Engineering	International Journal ofGrid and Distributed Computing	2005-4262	108
49	Review on Power Reduction Techniques in Low Power VLSI Design	**Taranath H B,** VelenRuben Aranha, Rajesh Kamath	Electronics & Communication Engineering	International Journal of Advanced Science and Technology,	2005-4238	109
50	Identifying the stabilizing regions of PI Controller based on frequency specifications for a lab scale distillation column	R. Janani, **Vinayambika S Bhat**, Indiran Thirunavukkarasu, V I George	Electronics & Communication Engineering	International Journal ofDigital Signals an Smart Systems	2398-0311	110

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52	Significance of Injection Pressure on Overall Performance of Common Rail Direct Injection Engine using Dairy Scum Oil Methyl Esters	M.Nandeesh, **C.R. Rajashekar,** R. Harish Kumar, N.R. Banapurmath	Mechanical Engineering	International Journal of Ambient Energy	1725-785	112
53	Characterization of Aluminium Iron Intermetallic Produced by Stir Casting Route	**Mohan Kumar, Neelakantha V Londe, Harold D Souza**	Mechanical Engineering	International Journal of Vehicle Structures & Systems	0975-3060	113
54	Optimization of Wire EDM Process Parameters for Medical Grade Nickel Titanium Shape Memory Alloy	Vinayak N Kulkarni, V N Gaitonde, K S Nalavade, MrityunjayDoddamani, **Gajanan M Naik**	Mechanical Engineering	Strojnícky časopis – Journal of Mechanical Engineering	0039-2472	114
55	Dry Sliding Wear Characteristics of Multi-Walled Carbon Nanotubes Reinforced Al-Si (LM6) Alloy Nano Composites Produced by Powder Metallurgy Technique	**Shivaramu H T, Vignesh Nayak U ,** Umashankar K S	Mechanical Engineering	Materials Research Express	2053-1591	115

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56	Significance of the Type of Reinforcement on the Physico Mechanical Behavior of Short Glass Fiber and Short Carbon Fiber –Reinforced Polypropylene Composites	**Sridhar D R,** Varadarajan Yellampalli Srinivasachar	Mechanical Engineering	Engineering Reports-Wiley online library	2577-8196	116
57	Study on fracture Toughness of Layered structure for Fail Safe Design.	**Mohan Kumra, Neelakantha V Londe**	Mechanical Engineering	Solid Sate Technology	0038-111X	117
58	Enhancement Of Mechanical Strength By Solid Reinforced Composite Tube – A Safe-Fail Design	**Mohan Kumar, Neelakantha V Londe, Lokesha M,** Harold J, Sohan Naik	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249–6890;	118
59	Fracture Toughness Measurement Of Aluminium And Steel inserted Aluminium Using Numerical Method	**Mohan Kumra, Neelakantha V Londhe**	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	1757-899X	119
60	Fracture Characterization Of Sisal / Banana Hybrid Composite Reinforced Polyester Composites	Premkumar Naik, **Neelakantha V Londhe**, Laxman Naik, Sreenivas S, Girish H N	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249-6890	120

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61	Mechanical and Wear Characteristics of MWCNTs/LM25 Nano Composites Fabricated Through powder Metallurgy - AN Investigation	**Shivaramu H.T,** Prashantha D.A, Vignesh Nayak U, Umashankar K.S	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249–6890	121
62	The Effect Of Machinability Parameters On AISI 4340 (En-24) Steel Using Taguchi Technique	**Gautam S Shetty**	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249–6890	122
63	Consequence Of Injection Pressure And Number Of Nozzle Holes On The Overall Performance Of Diesel Engine Operated On Dairy Scum Methyl Esters Blend B20	M. Nandeesh**, C.R. Rajashekar** & R. Harish Kumar	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249–6890	123
64	Experimental Investigation On The Mechanical Properties Of Hybrid Composite Leaf Spring	**Aveen K P, Vikrant Kannath, NeelakanthaV Londe, Gagan G Amin, Imaad Salim Shaikh**	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249–6890	124
65	Impact Of Nano Material Added Biodiesel On Combustion, Performance & Emission Of Ci Engine - A Review	K S. Sudeep Kumar**, C R. Rajashekhar,** H V. Ramyarani	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249–6890	125

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66	Design And Fabrication Of Pedal Operated Groundnut And Maize Stripper	**Bhanuprakash H S,** Vinay Kishore Vora, Manisha S, Puneeth Shetty, Rakshith Kotian, Bryal Keith Albert, Irfan J Shek	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249–6890	126
67	Mechanical Characterisation Of Seashell, Aluminium And Fly Ash Filler Addition In Glass Fibre Reinforced Polymer (Gfrp)	**Yajnesha P Shettigar, Aveen K P, Ruben Obed D'souza**	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249–6890	127
68	Grey Based Taguchi Method To Optimize Mechanical Properties Of Short Glass Fiber And Short Carbon Fiber Reinforced Polypropylene Composites	**Sridhar D R,** Varadarajan Y S	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249–6890	128
69	Two Plane Mass Balancing Of Rotor By Using Vibration Response Of The Bearings	**Madhusudhan B, Swaroop, Anudeep**	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249–6890	129
70	Corrosion Inhibition Study On Aged 18ni 250 Grade Maraging Steel In Phosphoric Acid And Nitric Acid Solution Using 1, 2, 3 Benzotriazole	**Purandara Naik,** Jagannath Nayak	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249–6890	130

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72	Fault Detection in Bearings using Advanced Signal Processing Technique	**Kiran Kumar MV, Sujesh Kumar M Lokesha,** UmashankarK S, **Ajith**	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research & Developments	2249-6890	132
73	Comparative Study of Mechanical Properties of Titanium Alloy Fabricated By DMLS with Casted Titanium Alloy and Natural Teeth.	S M. Shahabaz, Nagaraja Shetty, **S. Divakara Shetty** Nanjangud Subbarao Mohan	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249-8001	133
74	Trajectory Tracking of a 3-DOF Helicopter by LQR Based PID Controller	**K. Praveen Shenoy, Ashwini T. P**	Mechatronics Engineering	International Journal of Advanced Science and Technology	2207-6360	134
75	Random Forest Algorithm Based Strain Analysis on Composite Materials using Digital Image Processing	**Ashwini T. P,** Balachandra Achar H V, **K. Praveen Shenoy**	Mechatronics Engineering	International Journal of Advanced Science and Technology	2207-6360	135

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76	Review on the Influence of Fused Deposition Modelling and Injection Moulding Techniques on Enhancement of Mechanical Properties of Abs Material.	Suraj Louis D'cunha, Nagaraja Shetty, **Divakara Shetty S**	Mechatronics Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249-8001	136
77	A Review on Polymer Processing Technology of Thermoplastic Materials.	N. Hariharanath, Nagaraja Shetty, **Divakara Shetty S**	Mechatronics Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249-8001	137
78	Surface Roughness Analysis in the Drilling of Carbon Fiber/Epoxy Composite Laminates using Hybrid Taguchi-Response Experimental Design.	S.M. Shahabaz, Nagaraja Shetty, **S Divakara Shetty,** S.S. Sharma	Mechatronics Engineering	Materials Research Express	2158-5849	138
79	Biogas From Cattledung As A Source Of Sustainable Energy : A Feasibility Study	**K Abhaya Kumar,** Prakash Pinto, Iqbal Thonse Hawaldar, **B.RPradeep Kumar**	Master of Business Administration	International Journal Of Energy Economics & Policy	2146-4553	139

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1	Effect of Gadolinium on the Dielectric and Pyroelectric Behavior of Ba(Zr0.52Ti0.48)O3 Ceramics	**Raghavendra Sagar,** R.L, Raibagkar	Physics	Ferroelectric LettersSection	0731-5171	140
2	Microstructure and Transport Properties of Multiwall Carbon Nanotubes Reinforced Barium Zirconium Titanate Ceramics	**Raghavendra Sagar** R L Raibagkar	Physics	Bulletin of MaterialsScience	0250-4707	141
3	Surface Modification of Silicon Solar Cell using TiO2 and Ta2O5: Fabrication and Characterization	**Raghavendra Sagar** Asha Rao	Physics	Applied Physics A - Materials Science & Processing	0947-8396	142
4	Structural and Electrical Studies of Nano crystalline Mn3O4	**Raghavendra Sagar**	Physics	Ferroelectric LettersSection	0731-5171	143
5	Synthesis and Antimicrobial Studies of (E)-N-((2-Chloro-6-SubstitutedQuinolin-3-yl)Methylene)-4- (Substituted Phenyl)-6-Phenyl-2H-Thiazene-2-Amines	Janardhana Nayak, P. Dayananda, **Vineetha Telma D'Souza**	Chemistry	Chemical Data Collections	2405-8300	144

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6	Adsorption and Inhibitive Properties of Seroquel Drug for the Corrosion of Zinc in 0.1 M Hydrochloric Acid Solution	**A.M. Guruprasad,** H. P. Sachin, G. A. Swetha, B. M. Prasanna	Chemistry	International Journal of Industrial Chemistry	2228-5970	145
7	Rizatriptan Benzoate as Corrosion Inhibitor for Mild Steel in Acidic Corrosive Medium: Experimental and Theoretical Analysis	G. A. Swetha, H. P. Sachin, **A.M. Guruprasad,** B. M. Prasanna	Chemistry	Journal of Failure Analysis and Prevention	1547-7029	146
8	Effect of Sweep Angle and a Half Sine Wave on Roll Damping Derivative of a Delta Wing	Renita Sharon Monis, Aysha Shabana, **AshaCrast**a, S.A. Khan	Mathematics	International Journal of Recent Technology and Engineering	2277-3878	147
9	Estimation of Damping Derivatives for Delta Wings in Hypersonic Flow for Straight Leading Edge	Renita Sharon Monis, **Asha Crasta,** S.A. Khan	Mathematics	International Journal of Mechanical and Production Engineering Research and Development	2249-6890	148
10	Damping Derivative Evaluation in Pitch for an Ogive at High Mach Numbers	Renita Sharon Monis, Aysha Shabana, **AshaCrast**a, S.A. Khan	Mathematics	International Journal of Innovative Technology and exploring Engineering	2278-3075	149

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11	An Effect of Sweep Angle on Roll Damping Derivative for a Delta Wing with Curved Leading Edges in the Unsteady Flow	Renita Sharon Monis, **Asha Crasta,** S.A. Khan	Mathematics	International Journal of Mechanical and Production Engineering Research and Development	2249-6890	150
12	Estimation of Stiffness Derivative of an Ogive for Specific Heat Ratio 1.66	Aysha Shabana, RenitaSharon Monis, **Asha Crasta,** S.A. Khan	Mathematics	Test Engineering and Management	0193-4120	151
13	Analysis of Damping Derivatives for Delta Wings in Hypersonic Flow for Curved Leading Edges with Full Sine Wave	Renita Sharon Monis, **Asha Crasta,** Mohammed Faheen, S.A. Khan	Mathematics	International Journal of Engineering and Advanced Technology	2249-8958	152
14	Study of Mechanical Behavior for Tamarind Shell Powder and Coconut Coir Fiber Epoxy Composite for Aerospace Application	**G. Purushotham, Yathin K.L**	Aeronautical Engineering	International Journal of Trend in Scientific Research and Development (IJTSRD), International Open Access Journal, Volume 3, Pg 941-949	2456-6470	153
15	Improvement of Structural Robustness Against Progressive Collapse of the Structure using In-Fill Walls	B S Keerthi Gowda, V Lokesh; **G L Easwara Prasad**	Civil Engineering	Journal of Structural Technology	2581-950X	154

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16	Studies on the Structural Characteristics of Laterite Blocks and Masonry in puttur area of Karnataka	**Ganesha Mogaveera,** G Sarangapani	Civil Engineering	Journal of Geotechnics and Engineering Structures	2454-909	155
17	Research on the Strength Parameters of Poly Propylene Fiber Reinforced Concrete and Steel Fiber Reinforced Concrete	**Ganesha Mogaveera, Umesh S S,** AnandVR	Civil Engineering	International Journal of Recent Technology and Engineering	2277-3878	156
18	Assessment of Road Safety Audit of NH-69, Karnataka State, India	**Jayaprakash M C**, Shreyas K S, Vikram MC, Manasa Nair	Civil Engineering	International Journal of Innovative Technology and Exploring Engineering	2278-3075	157
19	Experimental Investigation on Strength Characteristics of Lead Slag in Concrete	**Akshaya Krishna N,** Chethan Kumar	Civil Engineering	Journal of Emerging Technologies and Innovative Research	2349-5162	158
20	Physico-Chemical Study on Extent of Water Quality Deterioration in the Lakes of Mangaluru City	**Shashikumar**,Narendra Kumar,Savitha Yadahalli, PrajwalS.S, Hemanarasimhanag D N	Civil Engineering	Journal of Emerging Technologies and Innovative Research	2349-5162	159

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
21	Identifying the Faces from Poor Quality Images/Video	**T. Shreekumar,** K. Karunakara	Computer Science & Engineering	International Journal of Innovative Technology and Exploring Engineering	2278-3075	160
22	Face Pose and Illumination Normalization for Unconstraint Face Recognition from Direct Interview Videos	**T. Shreekumar,** K. Karunakara	Computer Science & Engineering	International Journal of Recent Technology and Engineering	2277-3878	161
23	Multicast Communication using Different Group Key Managements	Ranjan Kumar H S, **Ganesh Aithal**, Surendra Shetty	Computer Science & Engineering	International Journal of Recent Technology and Engineering (IJRTE)	2277-3878	162
24	Generation of Pseudo Random Number Sequence from Discrete Oscillating Samples of Equally Spared Objects and Application for Stream Cipher System	Sudeep K B, **GaneshAithal**	Computer Science & Engineering	Concurrency computing practice and experiments WILEY publication	1532-0634	163
25	Secure RSA Variant System to Avoid Factorization Attack using Phony Modules and Phony Public key Exponent	K R Raghunandan, **Ganesh Aithal**, Surendra Shetty	Computer Science & Engineering	International Journal of Innovative Technology and Exploring Engineering (IJITEE)	2278-3075	164

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
26	Skin Disease Recognition Using Texture Analysis	**Ganesh V N,** Vibha, Prajwitha J Puthran, Fidelia Chaitra Siri , Varnasri Jain M	Electronics & Communication Engineering	International Journal of Engineering Research & Technology (IJERT)	2278-0181	165
27	Analysis of PID Control Algorithms for Transfer Function Model of Electric Vehicle	**Vinayambika S Bhat,** Akshitha G. Shettigar, Nikhitha, NidhiDayanand, K. P.Vishal Kumar	Electronics & Communication Engineering	Journal of Recent Technology and Engineering	2277-3878	166-167
28	Modeling of Audio effects for Music and Voice Synthesis	**Dony Armstrong D'Souza,** V. Veena Devi Shastrimath	Electronics & Communication Engineering	IEEE Digital Explore	978-1-5386-7809-1	168
29	Secured Video Steganography in DWT/DCT Domains based on Multiple Objects Tracking using H.264 Algorithm	**Laxmi Gulappagol,** K. B. Shivkumar	Electronics & Communication Engineering	International Journal of Recent Technology and Engineering	2277-3878	169
30	Arecanut Grade Analysis using Image Processing Techniques	**Pushparani M.K,** . D Vinod Kumar, AbdullaGubbi	Electronics & Communication Engineering	International Journal Of Engineering Research & Technology NCRACES	2278-0181	170

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
31	Brain Tumor Detection using Hidden Markov Chain Algorithm in Image Processing	**Pushparani M.K,** D Vinod Kumar, AbdullaGubbi	Electronics & Communication Engineering	International Journal Of Engineering Research & Technology RTESIT	2278-0181	171
32	Application of Raspberry-Pi model for Plant Disease Detection	Ranjitha B N, Bhagappa, Harshith U**, Pushparani M K**	Electronics & Communication Engineering	International Journal Of Engineering Research & Technology RTESIT	2278-0181	172
33	Anti-Theft Control System	**Ranjith H D,** Anusha B, Arfha Fathima, Fathima Muhammed Iqbal, Hafeeza Jinan	Electronics & Communication Engineering	International Journal of Engineering Research & Technology	2278-0181	173
34	Power Theft Detection using GSM	Rekha R Patil, Shwetha, Thrupthi, Vaishnavi S Shetty, **Sanjeevi Kumar P**	Electronics & Communication Engineering	International Journal of Engineering Research & Technology	2278-0181	174
35	Generator Monitoring using Android Phone	**Bhargavi K Rao,** Rajeshwari, Pradeep M, Ranjitha, Sathwik	Electronics & Communication Engineering	International Journal of Engineering Research & Technology	2278-0181	175

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
36	Kannada Speech Recognition Enquiry System for Farmers	**Anjani,** Ranjitha V P, Pooja, Manjunath Acharya, Ganesh Kamath	Electronics & Communication Engineering	International Journal of Engineering Research & Technology	2278-0181	176
37	Helious Helmet	**Sahana Devali,** Akshatha, Ashwini, Bhakthi Shetty, Nishchitha	Electronics & Communication Engineering	International Journal Of Engineering Research & Technology RTESIT	2278-0181	177
38	Covert Communication based on Symlet and Daubechies Wavelets	**Laxmi Gulappagol,** K. B. Shivkumar	Electronics & Communication Engineering	International Journal of Recent Technology and Engineering, Application and Management	2454-9150	178
39	Review of Different Fuzzy Logic Approches for Prioritizing Software Requirements	**Raghavendra Devdas**, G.N Srinivasan	Information Science & Engineering	International Journal of Scientific & Technology Research	2277-8616	179
40	Impact of Mobile Learning in the Cloud on Learning Competencies of Engineering Students	**Ramananda Mallya K,** Srinivasan B	Information Science & Engineering	International Journal of Online and Biomedical Engineering	2626-8493	180

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
41	Effect of annealing and ageing treatment on pitting corrosion resistance of fine-grained Mg-8%Al-0.5%Zn alloy	**Gajanan M Naik,** S Narendranath, S. S. Satheesh Kumar, Sandeep Sahu	Mechanical Engineering	Journal of The Minerals, Metals & Materials JOM	1047-4838	181
42	An Experimental Investigation of Microwave Developed Nickel-Based Clads for Slurry Erosion Wear Performance Using Taguchi Approach	Ajit M. Hebbale, Ravindra I. Badiger, M. S. Srinath, **Gajanan M Naik**	Mechanical Engineering	Metallography, Microstructure, and Analysis	2192-9262	182
43	Dry Sliding Wear Behaviour of Multi Walled Carbon Nanotubes Reinforced Aluminium Composites Produced by Powder Metallurgy Technique	**Shivaramu H T,** Umashankar K S	Mechanical Engineering	Materials Research Express	2053-1591	183-184
44	Application Potential of Fuzzy and Regression in Optimization of MRR and Surface Roughness during Machining of C45 Steel	Santhosh Madival, Mohammed Riyaz , Manjunath Lingappa Halappa, **M Lokesha**	Mechanical Engineering	Periodica Polytechnica	1819-6608	185
45	Portable Groundnut Stripper	**Bhanuprakash H S,** Harish D S, Karthik G C, Sahebagoud. Sanganagoudar	Mechanical Engineering	International Research Journal of Engineering and Technology	2395-0072	186

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
46	Computational Analysis of Thermal Behavior within a Scraped Surface Heat Exchanger	**Rajesh S C,** GauthamKrishnan, Sreehari p,Akhil Naryanan K, Sibin S Nair	Mechanical Engineering	International Journal of Trend in Scientific Research and Development	2456-6470	187
47	Investigation of Machinability Characteristics on C45 Steel Alloy while Turning with Untreated and Cryotreated M2 HSS Cutting Tools	Santosh, Mohammed Riyaz Ahmed, **M. Lokesha,** Manjunath L. H	Mechanical Engineering	ARPN Journal of Engineering and Applied Sciences	1819-6608	188
48	Investigation of machinability characteristics on C45 steel with cryogenically treated M2 HSS tool using statistical technique	Santosh Kumar, Mohammed Riyaz Ahmed**,** **M.Lokesha** , Manjunath L H	Mechanical Engineering	International Journal for Simulation and Multidisciplinary Design Optimization	1779-6288	189
49	Investigation of Mechanical Properties and Applications of Polylactic Acids—A Review	**S Divakara Shetty** Nagaraja Shetty	Mechatronics Engg	Materials Research Express	2158-5849	190
50	A Review on Metallic Dental Materials and Its Fabrication Techniques	Tejas Gupta, Siddhanth Shetty, Nagaraja Shetty, **Divakara Shetty S**	Mechatronics Engg	International Journal of Mechanical and Production Engineering Research and Development	2249-8001	191

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
51	A Literature Review on Processing and Testing of Mechanical Properties of Hybrid Composites using Graphene/Epoxy with Alumina	**Divakara Shetty S** Nagaraja Shetty	Mechatronics Engg	International Journal of Mechanical Engineering and Technology	0976-6340	192
52	Accident At Vidyalaya school - An Ethical Dilemma	**Jayadeva Prasad Moleyar**	Master of Business Administration	Emerald Emerging Markets Case Studies	2045-0621	193
53	Determinants and Dimensions of Corporate commitment to Social Responsibility: A study with reference to Large Scale Units in Karnataka	**Jayashri Shetty**	Master of Business Administration	International Journal ofAsian Economic Light	2277-7741	194
54	Trends and Status of Corporate Social Responsibility in Karnataka: An Empirical Study	**Jayashri Shetty**	Master of Business Administration	International Journal ofIndian Economic Light	2277-3142	195

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3.3.2 Number of papers published per Teacher in the Journals notified on UGC website during the Academic Year 2017-18

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
1	Structural and Vibrational Characteristics of a Non-Linear Optical Material 3-(4-Nitrophenyl)-1-(Pyridine-3-yl) Prop-2-en-1-one probed by Quantum Chemical Computation and Spectroscopic Techniques	Ram Kumar, T. Karthick, PoonamTandon, Parag Agarwal, **Anthoni Praveen Menezes**, A. Jayarama	Physics	Journal of Molecular structure	0022-2860	196
2	A Study of effect of dye structure on polyelectrolyte Induced metachromasy	**Nandini R**	Chemistry	Journal of Chemical and Pharmaceutical Sciences	0974-2115	197
3	Synthesis and Characterization of Biologically Important (E)(2Chloro/Hydroxy-6/8-Substituted Quinolin-3-yl)-N- [5-(4-Substitued Phenyl)1, 3, 4-Thiadiazol-2-yl] Methanimines	**Vineetha Telma D'Souza, Janardhana Nayak**	Chemistry	Journal of Chemical and Pharmaceutical Sciences	0974-2115	198
4	Synthesis of Quinoline Containing Pyrazolone Derivatives and their Biological Studies	**Vineetha Telma D'Souza, Janardhana Nayak, Shivaprasad ShettyM, Dayananda P Anil Kumar S H**	Chemistry	Journal of Chemical and Pharmaceutical Research	0975-7384	199
5	Synthesis, Characterisation and Antimicrobial studies of 4, 6-Disubtuted Phenyl - (5-Subsutied Phenyl -1, 3, 4-Thiadiazol-2-yl) -1, 4, 5, 6-Tetrahydro Pyrimidine-2-Thiols	Dayananda P, Janardhana Nayak ,Ramesha Bhat, **Vineetha Telma D'Souza**	Chemistry	International Journal of ChemTech Research	0974-4290	200

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
6	Corrosion Inhibition of Mild Steel by Capacitabine in Hydrochloric Acid Medium	**A.M. Guruprasad, H.P. Sachin, G.A. Swetha**	Chemistry	Asian J. Chem.	0970-7077	201
7	Use of Seroquel as an Effective Corrosion Inhibitor for Low Carbon Steel in 1 M HCl	G. A. Swetha, H. P. Sachin, **A.M. Guruprasad,** B. M. Prasanna, K. H. Sudheer Kumar	Chemistry	Journal of Bio- and Tribo-Corrosion	2198-4220	202
8	Computation of Stability Derivatives of an Oscillating Cone for Specific Heat Ratio =1.66	Aysha Shabana, Renita Sharon Monis, **Asha Crasta,** S.A. Khan	Mathematics	IOP Conf. Series: Materials Science and Engineering	1757-899X	203
9	Estimation of Stability Derivatives in Newtonian Limit for an Oscillating Cone	Aysha Shabana, Renita Sharon Monis, **Asha Crasta,** S.A. Khan	Mathematics	IOP Conf. Series: Materials Science and Engineering	1757-899X	204
10	Effect of Semi Vertex Angle on Stability Derivatives for an Oscillating Cone for Constant Value of Specific Heat Ratio	Aysha Shabana, Renita Sharon Monis, **Asha Crasta,** S.A. Khan	Mathematics	International Journal of Engineering & Technology	2227-524X	205

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
11	The Computation of Stiffness Derivative for an Ogive in Hypersonic Flow	Aysha Shabana, Renita Sharon Monis, **Asha Crasta,** S.A. Khan	Mathematics	International Journal of Mechanical and Production Engineering Research and Development	2249-6890	206
12	Hall Effects on Hydro magnetic Flow of a Jeffrey Fluid in an Asymmetric Channel with Peristalsis	**Jyothi S,** Gangavathi.P, M. V. Subba Reddy	Mathematics	Journal of Advanced Research in Dynamical and Control Systems	1943-023X	207
13	Effect of First Order Chemical Reaction on Fully Developed Natural Convection of Micropolar Fluid in a Vertical Channel	Sridevi Kalyani, **RamaraoY,** Patiyal Mallikarjun N	Mathematics	Journal of Applied Science and Computations	1076-5131	208
14	Dual Survival	**Srinath R, Sahana D S**, Ashik I Ruther, Chandini	Aeronautical Engineering	International Journal for Research in Applied Science and Engineering Technology	2321-9653	209
15	Design of an unmanned aerial vehicle with long range and endurance	Yathin K L, **Praneeth HR,** Sundeep Jangir, Suraj Kumar, Camilla Wilfred	Aeronautical Engineering	International Journal of Technical Innovation in Modern Engineering & Science	2455-2585	210
16	Design and Fabrication of Pneumatically actuated Emergency Exit System in Aircrafts	**Praneeth H R**, Yathin K L, Punith J Reddy, J Adarsh, Soumyashree N,Vikas Pawar	Aeronautical Engineering	International Journal of Advanced Research in Science, Engineering and Technology	2350-0328	211

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
17	Fault Diagnosis in Belt Drive Transmission using Wavelet Spectrum	**Sujesh Kumar, M. Lokesha,** Akshatha G K, Balaji KN, N Raghavendra, Uma Shankar	Aeronautical Engineering	International Journal of Innovative Research in Science, Engineering and Technology	2319-8753	212
18	Study and Analysis Of Modification Of Rotor Configuration In A Notar Helicoptor	**Srinath. R, Sahana D. S.,**Shreyas Kammar, Shwetha	Aeronautical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249-6890	213
19	Experimental Investigation on Micro Truss Reinforced Roofing System	**Umesh S.S**., A.V. PradeepKumar **Ganesha Mogaveera**	Civil Engineering	International journal of civil Engineering and Technology	0976-6308	214

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
20	Comparative Study of Different Configuration of Roof Truss for an Industrial Truss	**Yashwanth M K** , DivyaShree M , Shreyas K S	Civil Engineering	International Journal of Emerging Trends in Engineering and Development	2249-6149	215
21	Desalination Approach of Seawater and Brackish Water by Coconut Shell Activated Carbon as a Natural Filter Method	**Jayaprakash M C,** Poorvi Shetty, Raju Aedla D Venkat Reddy	Civil Engineering	International Journal of Trend in Scientific Researchand Development	2456-6470	216-217
22	Planning and Implementation of Rain Water Harvesting System in MITE, Moodabidri, Karnataka-Geological and Hydrogeological in Puts Typical Analysis	**Jayaprakash M C,** Poorvi Shetty	Civil Engineering	Journal of Water Resources and Pollution Studies	2581-5326	218
23	Investigation on Cost Effective Slab System having Different Types of Micro Reinforcement	**Mr.Umesh S S,** AVPradeepkumar	Civil Engineering	International Journal of Civil Engineering & Technology	0976-6308	219
24	A Study on behavior of V and Trapezoidal Type of Folded Plate Roofs for Fixed and Hinged Boundary Conditions	**Mrs.Roopalaxmi Yadoor,**Y R Suresh	Civil Engineering	International Journal of Engineering & technology	2227-524X	220

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
25	Application of Soft Computing Techniques in Breakwater-A Review	**Anusha Jain** SubbaRao	Civil Engineering	International Journal of Scientific & Engineering Research	2229-5518	221
26	Strength characteristics of C-shaped equal legged RC columns and Rectangular columns using Pu–Mu interaction diagram	**Suraj shet,** Sabyath Shetty, Shanmukha shetty	Civil Engineering	International Journal of Applied Engineering Research	0973-4562	222
27	Analysis of Pu-Mu Interaction Diagram of C-Shaped Equal Legged RC Column Developed using ETABS and Analytical Method	**Suraj Shet**, Sabyath Shetty, Shanmukha Shetty	Civil Engineering	International Journal of Engineering & Technology	835-839	223
28	Alternative foundations for residential Buildings	**Ganesha Mogaveera,** Anand V R, **Umesh S S**	Civil Engineering	International Journal of Scientific & Engineering Research	2229-5518	224
29	A Video Face Recognition System with Aid of Support Vector Machine and Partical Swarm Optimization (PSO-SVM)	**T. Shreekumar,** K. Karunakara	Computer Science & Engineering	Journal of Advanced Researchin Dynamical and Control Systems	1943-023X	225

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
30	Design of Centralized Robust PI Controller for a Multivariable Process	**Vinayambika S. Bhat,** I.Thirunavukkarasu, S.Shanmuga Priya	Electronics & Communication Engineering	Journal of Engineering Science and Technology	1823-4690	226-227
31	Decentralized PI controller with Decoupler for the Distillation Column	Santhosh Kumar P L, S.Selva Kumar, I. Thirunavukkarasu, **Vinayambika S. Bhat**	Electronics & Communication Engineering	International Journal of Pure and Applied Mathematics	1311-8080	228-229
32	Experimental Validation of PI Controller Based on Pole Placement for a Batch Distillation Column	Santhosh Kumar P L, S.Selva Kumar, I. Thirunavukkarasu, and **Vinayambika S Bhat**	Electronics & Communication Engineering	International Journal of Pure and Applied Mathematics	1311-8080	230-231
33	Identifying the Stabilizing Region of PID Controller Using Polytopic Polynomial Approach for Pilot Plant Binary Distillation Column	**Vinayambika S Bhat, I.** Thirunavukkarasu, S. Shanmuga Priya, Janani R	Electronics & Communication Engineering	International Journal of Pure and Applied Mathematics	1311-8080	232-233
34	Experimental Implementation of CDM based Two Mode Controller for an Interacting 2*2 Distillation Process	Janani R., I. Thirunavukkarasu, **Vinayambika S Bhat**	Electronics & Communication Engineering	International Journal of Pure and Applied Mathematics	1311-8080	234-235

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
35	Decentralized PI Control Design for a Pilot Plant Distillation System Using LMI Approach	Revathy Priyadharshini.K, S.Selvakumar, I Thirunavukkarasu, Sheesha.C, **Vinayambika S. Bhat**	Electronics & Communication Engineering	Journal of Advanced Research in Dynamical & Control Systems	1943-023X	236-237
36	Predictive Control Algorithm Based on Integral Action-Design and Implementation on a Conical Tank System	**Vinayambika S Bhat ,** I.Thirunavukkarasu , S. Shanmuga Priya, Shreesha C	Electronics & Communication Engineering	EDP Sciences	2261-236X	238-239
37	Smith Predictor Based PI Controller Design for a Batch Distillation Column	Santhosh Kumar. P. L, I. Thirunavukkarasu, S. Selva Kumar, **Vinayambika S. Bhat**	Electronics & Communication Engineering	International Journal of Pure and Applied Mathematics	314-3395	240-241
38	Remote Temperature checking Gadget Utilizing A Numerous Patients - Organizer Set plan Approach	Rahul A, **Malini Suvarna, Sathisha**	Electronics & Communication Engineering	International Journal of Engineering Research & Technology	2278- 0181	242
39	Mobile Learning in the Cloud: New Stage for Knowledge Management	**Ramananda Mallya K,** B Srinivasan	Information Science & Engineering	International Journal of Computer Science and Engineering	2347-2693	243

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
40	Effect of Injection Timing on the Utilization of B20 Blends of Dairy Scum Oil Methyl Esters (Dsome) Fulled Diesel Engine	M Nandeesh, **C. R. Rajashekar,** N.R. Banapurmath	Mechanical Engineering	European Journal of Sustainable Development Research	2542-4742	244
41	Investigating the Role of Fatty Acid Methyl Ester Composition on Engine Performance and Emission Characteristics	B. Jeeva, **C. R. Rajashekar**	Mechanical Engineering	International Journal of Vehicle Structures and Systems	0975-3060	245
42	Experimental Investigation On Accelerated Biodiesel Oxidation For Karanja Oil Methyl Ester	Jeeva Balu, **C. R. Rajashekar**	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249–6890	246
43	Studies on Effect of Graphene Nanoparticles Addition in Different Levels with Simarouba Biodiesel and Diesel Blends on Performance, Combustion and Emission Characteristics of CI Engine	B. M. Paramashivaiah, N.R. Banapurmath, **C. R. Rajashekar,** S. V. Khandal	Mechanical Engineering	Arabian Journal for Science and Engineering	2193-567X	247
44	Fabrication Methods, Recent Developments and Applications of Carbon-Carbon Composites (CCC)-A Review	Sunil Kumar B V, **Neelakantha V L,** Surendranathan A.O, Gururaja Rao J	Mechanical Engineering	International Research Journal of Engineering and Technology	2395-0072	248

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
45	Condition Monitoring of a Round Bar with a Defect Using Vibration Analysis	**Neelakantha V londhe,** Muhammed Siraj U.M, Adnan Ashraf, Jabir V.P, Roshil Rose	Mechanical Engineering	STM JOURNAL, Trends in Machine Design	2455-3352	249
46	Studies on Effect of Injection Pressure of Graphene Nanoparticles added Simarouba Biodiesel Blend Fuel on CI Engine Performance and Emission.	B.M. Paramashivaiah, **C R Rajashekhar**,	Mechanical Engineering	Fronteiras: Journal of Social, Technological and Environmental Science	2238-8869	250
47	Mechanical and Wear Characteristics of ZrSiO4 Reinforced Aluminium Metal Matrix Composite	**Ramesha V,** Prasad T.B,Vighnesha Nayak, Neelkant V L	Mechanical Engineering	International Journal of Civil, Mechanical and Energy Science	2455-5304	251

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
48	A review: Mechanical Properties of HSS Steel by deep Cryo-Treatment	Santosh, Manjunatha L H, **Lokesha M**, B S Ajaykumar	Mechanical Engineering	IOP Publishing IOP Conf. Series: Materials Science and Engineering	1757-8981	252
49	The Performance Optimization of Deep Cryogenically Treated M2 HSS Tool in Turning of C45 Steel for Hardness and MRR	Santosh, Mohammed Riyaz Ahmed,Manjunatha L.H,**Lokesha M,** Ajay Kumar B.S,Praveen Digge	Mechanical Engineering	International Journal of Mechanical and Production Engineering Research and Development	2249-6890	253
50	Fuzzy Logic And Regression Modelling Of Machining Parameters In Turning Using Cryo-Treated M2 HSS Tool	Santosh , Manjunath L.H, Mohammed Riyaz Ahmed, **M Lokesha**	Mechanical Engineering	International Journal of Mechanical Engineering and Technology	0976 – 6340	254
51	Detection of Intruders in Warehouses using Infrared based Thermopile Sensor Array	**Akshaya D Shetty,** Glenson Toney	Mechatronics Engineering	IOP Publishing IOP Conference Series: Materials Science and Engineering	1757-8981	255

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
52	Design of Effective Hydraulic Braking System for Formula Motorsport Car	Vinay kumar ManjunathNaik, Ramesh K M, **Sathyanarayana, M Lokesha**	Mechatronics Engineering	IOP Publishing IOP Conf. Series: Materials Science and Engineering	1757-8981	256
53	Design of Efficient Powertrain System for a Motorsports Race Car using a Bike Engine	Ramesh K M, Vinay kumar Manjunath Naik, **Sathyanarayana, M Lokesha**	Mechatronics Engineering	IOP Publishing IOP Conf. Series: Materials Science and Engineering	1757-8981	257

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3.3.2 Number of papers published per Teacher in the Journals notified on UGC website during the Academic Year 2016-17

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
1	A Comparative Study of Metachromasy Induced by Anionic Polelectroytes in Toluidine Blue	**Nandini R,** Vishalakshi B	Chemistry	Science Journal of chemistry	2330-0981	258
2	Polyelectrolyte induced metachromasy: Effect of Binding Sites	**R Nandini**	Chemistry	Journal of Chemical and Pharmaceutical Research	0975-7384	259
3	Pressure and its Derivative with respect to Piston Mach Number for an Oscillating Cone	Aysha Shabana, RenitaSharon, **Asha Crasta,** S.A. Khan	Mathematics	IOSR Journal of Mechanical and Civil Engineering	2320-334X	260
4	Supersonic Flow Analysis and Evaluation of Damping Derivative	Renita Sharon, Aysha Shabana, **Asha Crasta**, S.A. Khan	Mathematics	IOSR Journal of Mechanical and Civil Engineering	2320-334X	261
5	Estimation of Stability Derivative of an Oscillating Cone in Hypersonic Flow	Aysha Shabana, RenitaSharon, **Asha Crasta,** S.A. Khan	Mathematics	International Journal of Recent Research Aspects	2349-7688	262

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
6	Peristaltic Flow of a Conducting Newtonian Fluid in an Inclined Channel under the Effects of Hall Current	Gangavathi.P, M. V. Subba Reddy, **Jyothi.S**, Yogeswara reddy P	Mathematics	International Journal of Engineering Research in Computer Science and Engineering	2394-2320	263
7	Performance Study of Yattria Stabilized Zirconia and Gadolinium Zirconate Coating for Nickel Base Alloy for Turbine Application	**G.Purushotham**	Aeronautical Engineering	Indian Journal of Advances in chemical science	2320-0928	264
8	Bio-Inspired Study and Build-Out of New Airfoil for the Design of Basic Aircraft.	**Sahana D S, Srinath R**	Aeronautical Engineering	International Journal Of Innovative Science And Research Technology	2456-2165	265
9	Energization of Boundary Layer Over Wing Surface By Vortex Generators	**Srinath R, Sahana D S**	Aeronautical Engineering	International Journal Of Innovative Science And Research Technology	2456-2165	266
10	Aerodynamic Analysis of Forward Swept Wing Using Prandtl-D Wing Concept.	**Srinath R, Sahana D S**	Aeronautical Engineering	International Journal of Engineering Trends and Technology	2231-5381	267

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
11	Comparative Study on Properties of GGBS Based Geopolymer Concrete with Plain Cement Concrete	**Yashwanth M K , G L Easwara Prasad, TejusM V**	Civil Engineering	International Journal of Emerging Trends inEngineering and Development	2249-6149	268
12	Experimental Investigation on Water Transport Phenomenon Between Laterite Blocks and Mortar in Laterite Blocks Masonry	**Ganesha Mogaveera , Umesh S S**	Civil Engineering	International Journal for Science and Research in Technology	2395-1052	269
13	Desalination Approach of Seawater and Brackish Water by Coconut Shell Activated Carbon as a Natural Filter Method	**Jayaprakash M C,** PoorviShetty, Raju Aedla, D Venkat Reddy	Civil Engineering	International Journal of Earth Sciences andEngineering	0974-5904	270
14	A Study on Hardness Attributes of Banana and Jute Polyester Composites	Megha BE, B S KeerthiGowda, **G L Easwara Prasad**	Civil Engineering	International Journal of Engineering Research in Mechanical and Civil Engineering	2456-1290	271
15	Generation of Maximum Length Non-binary Key Sequence and its Application for Stream Cipher based on Residue Number System	Sudeep K B, **GaneshAithal**	Computer Science & Engineering	Journal of Computational Science	1877-7503	272

Sl. No.	Title of paper	Name of the author/s	Department of the Teacher	Name of Journal	ISSN/ISBN Number	Page No.
16	High Performance Computation of Big Data: Performance Optimization Approach towards a Parallel Frequent Item Set Mining Algorithm for Transaction Data based on Hadoop Map Reduce Framework	Guruprasad M S, **NageshH R**, Swathi Prabhu	Computer Science & Engineering	International Journal of Intelligent Systemsand Applications	2074-9058	273
17	A Survey on Key(s) and keyless Image Encryption Techniques	Ranjan Kumar H.S, Fathima SafeeriyaS.P, **Ganesh Aithal**	Computer Science & Engineering	Cybernetics and Information Technologies	1311-9702	274
18	Design and Implementation of Decentralized PI Controller for Pilot Plant Binary Distillation Column	**Vinayambika S Bhat,** I.Thirunavukkarasu, S. Shanmuga Priya	Electronics & Communication Engineering	International Journal of Chem Tech Research	2455-9555.	275-276
19	Local Transient Model of a Pilot Plant Distillation Response	**Vinayambika S Bhat,** S.Shanmuga Priya, I. Thirunavukkarasu, R. Russell Rhinehart	Electronics & Communication Engineering	International Journal of Pure and Applied Mathematics	1311-8080	277-278
20	Extended Predictive Controller for a First Order Process with Dead Time Model	Bharath K Udupa, I.Thirunavukkarasu, Dayananda Nayak, **Vinayambika S Bhat**	Electronics & Communication Engineering	International Journal of Pure and Applied Mathematics	1311-8080	279

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21	Accurate Classification of Remote Sensed Data for Land use/ Land Class of Mangalore Coastal Region	**Srikrishna Shastri C,** Ashok Kuma T, Shiva Prakash Koliwad	Electronics & Communication Engineering	IEEE Xplore	978-1-5386-3243-7	280
22	Data Logging of Processed Real Time Signal by Bluetooth and User Friendly GUI in Java Platform	**Bhargavi K Rao,** Shashank M Gowda	Electronics & Communication Engineering	IEEE Xplore	978-1-5090-3704-9	281
23	Design and Simulation of Kalman Filter for the Estimation of Tray Temperatures in a Binary Distillation Column	Sree Latha Chopparapu, V. I. George, I. Thirunavukkarasu, **Vinayambika S Bhat**	Electronics & Communication Engineering	International Journal of Pure and Applied Mathematics	1311-8080	282
24	Design and Implementation of MSC based Multi-loop PID Controller for Pilot Plant Binary Distillation Column	**Vinayambika S Bhat,** I. Thirunavukkarasu, Janani.R	Electronics & Communication Engineering	IEEE Xplore	978-1-5090-4967- 7	283-284
25	Facial Land Mark Detection and Locatiozation Using Point Distribution Model	Jayashree S katagihalli, **Srikrishna Shastri C**, Naveen S Pagad	Electronics & Communication Engineering	International Journal of Advanced Research in Computer Science and Electronics engineering	2277-9043	285

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27	On-Chip Waste Heat-Driven Absorption Cooling	S. Manu, **T K Chandrashekhar**	Mechanical Engineering	International Journal of Sustainable Engineering	1939-7038	287
28	A Review on Automatic Fault Detection and Diagnosis in a Single Point Cutting Tool Using Wavelet Analysis	Santosh, **M Lokesha**, Prof L. H. Manjunath	Mechanical Engineering	International Journal of Advances in Scientific Research and Engineering	2454-8006	288
29	Millennium Development Goals and Corporate Social Responsibility of Large Scale Units in Karnataka	**Jayashri Shetty**	Master of Business Administration	International Journal of Trend in Research and Development	2394– 9333	289

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3.3.2 Number of papers published per Teacher in the Journals notified on UGC website during the Academic Year 2015-16

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1	Structural, Thermal, Linear and Nonlinear Optical Studies of an Optical Limiter Based on Reverse Saturable Absorption	**Anthoni Praveen Menezes,** S. Raghavendra, A. Jayarama, H.P. Sarveshwara, S.M. Dharmaprakash	Physics	Journal of Molecular structure	0022-2860	290
2	Effect of Aspect Ratio with Roll Moment Derivative of a Delta Wing in Supersonic Flow	**Asha Crasta,** S.A.Khan	Mathematics	International Journal of Advances in Engineering Research	2231-5152	291
3	Estimation Of Surface Pressure Distribution On A Delta Wing Curved Leading Edges In Hypersonic/Supersonic Flow	**Asha Crasta,** S Pavitra, S.A.Khan	Mathematics	International journal of energy,environment and Economics, Nova Science publishers	1054-853X	292
4	Estimation of Aerodynamic Derivatives in Pitch of a Wedge in Hypersonic Flow	S Pavitra, S Lavanya, S. A. Khan**, AshaCrasta**	Mathematics	Indian Journal of Science and Technology.	0974-6846	293
5	Analysis of Variation of Stiffness Derivative with Mach Number and angle of attack in Supersonic Flow	**Asha Crasta, Aysha Shabana, Renita Monis, S.A. Khan**	Mathematics	IOSR Journal of Mechanical and Civil Engineering	2320-334X	294

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7	Experimental Investigation of Buckling Strength Comparison Between Metallic and CFRP Sandwiched Composite Panel	G.Purushotham	Aeronautical Engineering	International Journal of Civil, Mechanical and Energy Science, Infogain Publication, Vol. 2,Issue-2, pp 21-26	2455-5304	296
8	Effect of Chilling on Soundness, Micro Hardness and Ultimate Tensile Strength of Nickel Alloy-Fused Silica Metal Matrix Composite	G. Purushotham, Joel Hemanth	Aeronautical Engineering	International Journal of Civil, Mechanical and Energy Science (IJCMES) Infogain Publication, Vol. 2, Issue-2, pp 21-26	2455-5304	297
9	CFD Analysis of Box Wing Configuration	Sahana D S, AbdulAabid	Aeronautical Engineering	International Journal of Science and Research	2319-7064	298

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11	Message Transformation Designer for Messaging System Using Streaming Transformation for XML(STX)	Ms Rjani M V, **Annappa Swamy D R**	Computer Science & Engineering	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	300
12	Smart Shopping Using Augmented Reality on Android OS	Ashwitha D, **Manjunath A S**	Computer Science & Engineering	International Journal of Engineering Research and General Science	2091-2730	301
13	Particle Swam Optimization based Identification of Face Images from Video	**Shreekumar T, Karunakara K.**	Computer Science & Engineering	International Journal of Advanced Computational Engineering and Networking	2320-2106	302
14	Integrity Auditing and Secure Deduplicating the Dataon Cloud Storage	Lohith Kumar K K, **Ashwin Kumar M**	Computer Science & Engineering	International Journal of Advanced Research in Computer and Communication Engineering	2278-1021	303

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15	A Novel based Approach for Pose estimation and Normalization using Multi-Class SVM and Affine Transformation for Face Recognition	Shilpa R, **Shreekumar T**	Computer Science & Engineering	IOSR Journal of Computer Engineering	IS2278-0661	304
16	Local Binary Pattern and Local Linear Regression for Pose Invariant Face Recognition	Raju Dadasab Patil, **Shreekumar T**, Karunakara K	Computer Science & Engineering	International Journal of Science Technology and Engineering	2349-784X	305
17	Analysis of TCP Outcast problem in Data Center Network and Mitigating it using DCTCP	Rajashree, **Nagesh H R**	Computer Science & Engineering	International Journal for Scientific Research and Development	2321-0613	306
18	An A3P Approach Towards Image Privacy Policy Recommendation on Content Sharing Sites	Mrs. Swapna R, **Nagesh H R**	Computer Science & Engineering	International Journal of Advanced Networking &Applications	0975-0282	307
19	Survey Paper on Data Lake	**Surabhi D Hegde, Ravinarayan B**	Computer Science & Engineering	International Journal of Scienceand Research	2319-7064	308

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20	Text Document Annotation and Retrieval Based on Content of the Document and Query Workload	Arunima P V, **Ravinarayan B**	Computer Science & Engineering	International Journal of Science and Research	2319-7064	309
21	Detecting Malicious Posts in Social Networks usingText Analysis	Neeraja M, **JohnPrakash**	Computer Science & Engineering	International Journal of Science and Research	2319-7064	310
22	Classification of Chemical skin Burn using SVMMethod	**Malini Suvarna, N Venkategowda**, L Deepak	Electronics & Communication Engineering	IEEE Xplore	978-1-4673-7667-9	311
23	Identification of Land Cover Changes in the Coastal Area of Dakshina Kannada District, South India during the Year 2004-2008	J Jayanth, T Ashok Kumar, ShivaprakashKoliwad, **SrikrishnaShastri C**	Electronics & Communication Engineering	The Egyptian Journal of Remote Sensing and Space Science	1110-9823	312
24	An Experimental Study on Implementation of Centralized PI Control Techniques on Pilot PlantBinary Distillation Column	**Vinayambika S Bhat,** I. Thirunavukkarasu, S. Shanmuga Priya	Electronics & Communication Engineering	International Journal of ChemTech Research	0974-4304	313-314

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26	Design and Implementation of an Embedded Device to Detect Military Fratricide Crisis	**Padma Prasada , Sathish Shetty**	Electronics & Communicati onEngineering	IEEE Xplore	978-1-4673-6726-4	316
27	Advances in Classification Techniques for Semi Urban Land Features using High Resolution Satellite Data	**Srikrishna Shastri C,** Ashok Kumar T, Shivaprakash Koliwad	Electronics & Communicati onEngineering	International Journal ofAdvanced Remote Sensing and GIS	2320-0243	317
28	Arduino based real time driver drowsiness detection and mobile alert system using Bluetooth,	Lestin Jills Joseph, **M.Lokesha**	Electronics & Communicati onEngineering	International Journal of Engineering And Computer Science	2319 -7242	318
29	Crucial Role of Molecular Planarity on the Second Order Nonlinear Optical Property of Pyridine Based Chalcone Single Crystals	**Anthoni Praveen Menezes,** A. Jayarama, SeikWengNg	Physics	Journal of Molecular structure	0022-2860	319

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31	Effect of Angle of Attack on Stiffness Derivative of an Oscillating Supersonic Delta Wing with Curved Leading Edges	**Asha Crasta,** S.A.Khan	Mathematics	IOSR Journal of Mechanical and Civil Engineering	2278-8697	321
32	Effect of Angle of Attack on Damping Derivative of a Delta Wing with Full Sine Curved Leading Edges	**Asha Crasta,** S.A.Khan	Mathematics	International Journal of Emergency Trends in Engineering and Development	2249-6149	322
33	Effect of Aspect Ratio with Angle of Attack of an Oscillating Hypersonic Delta Wing with Straight Leading Edges	**Asha Crasta,** S.A.Khan	Mathematics	Mathematical Sciences International research Journal	2278-8697	323
34	Fabrication and Evaluation of Corrosion Behavior of Nickel Alloy Metal Matrix Composite with Influence of Chills	**G.Purushotham, Joel Hemanth**	Aeronautical Engineering	Advanced Materials Research	1662-8985	324

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36	Performance based Seismic Evaluation of Industrial Chimneys by Static and Dynamic Analysis	**Sagar S, Basavaraj Gudadappanavar**	Civil Engineering	International Research Journal of Engineering and Technology	2395-0072	326
37	Comparative Study of Flat Slab and Conventional Slab Structure using ETABS for Different Earthquake Zones of India	Mohana H.S, KavanM.R	Civil Engineering	International Research Journal of Engineering and Technology	2395-0072	327
38	Probabilistic Study of Tensile Property of Coir FiberReinforced Polymer Matrix Composite	**Keerthi Gowda B S, G L Easwara Prasad,** Velmurugan R	Civil Engineering	International Journal of Advanced Materials Science	2231-1211	328
39	Studies on the load carrying capacity of PlainCement Concrete Arches	**Ganesha Mogaveera, Sarangapani G**	Civil Engineering	International Journal of Earth science and Engineering	2103 -2107	329

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41	User Authentication in the Mobile Cloud	**Ramananda MallyaK,** A Kannammal	Information Science & Engineering	Research India Publications	0973-4562	331
42	A Comparative Study on Control Techniques of Non-Square Matrix Distillation Column	**Vinayambika S Bhat,** S. Shanmuga Priya, I. Thirunavukkarasu	Electronics & Communication Engineering	International Journal of Control Theory andApplications	0974-5572	332-333
43	Security Enhancement On LEACH Protocol From HELLO Flood Attack in WSN Using LDK Scheme	Mayur S, **Ranjith HD**	Electronics & Communication Engineering	International Journal of Innovative Research in Science,Engineering and Technology	2319-8753	334
44	Verilog based design of High Performance Data Access AMBA Memory Controller	Shobha R Hadimani, **Panchami**	Electronics & Communication Engineering	International Journal of Advances in Electronics and Computer Science	2393-2835	335

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46	Solar Powered Multi-Level Water Pumping SystemFor Remote Areas	**Ravikumar R , Ashwini T P , MaliniSuvarna**	Electronics & Communication Engineering	International Journal of Advanced Scientific and Technical Research	2249-9954	337
47	Design of digital FIR filter using MCM Technique	Acharya Nikunj K , **Taranath H B**	Electronics & Communication Engineering	International Journal of Research	2348-795X	338
48	Memory Architecture Quad Core Risc Processor onAltera FPGA De Nano Board	**Venkategowda N,Ajay Pinto,Basavaraju**, Naveena Pai G,Shivaraj HG	Electronics & Communication Engineering	IEEE Computer Society	978-1-4799-1797-6	339
49	Novel memory Architecture Dual Core Processor onaltera FPGA DE Nano Board	**Venkategowda N,Ajay Pinto,**Naveena Pai G,Shivaraj HG	Electronics & Communication Engineering	International Journal of Engineering Research & Technology	2278 -0181	340

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52	Studies on Design of Cyclone separator with TriChambered Filter Unit for Dust Removal in RiceMills	**T.K. Chandrashekar**, R Harish Kumar, T.B. Prasad, **C.R. Rajashekar**	Mechanical Engineering	International journal of Mining, Metallurgy and Mechanical Engineering	2320-4060	343
53	Investigation of Mechanical Properties of AlFeIntermetallic Composite	Varadaraj S , Mohan Kumar, **NeelakanthaV Londe**	Mechanical Engineering	International Journal of Engineering Research & Technology	2278-0181	344
54	Fault Detection and Diagnosis in Gears Using Wavelet Analysis Techniques and Comparison ontheir Diagnostic Capability	**M Lokesha, M.C. Majumder, K.P. Ramachandran**	Mechanical Engineering	Journal of Applied Mechanics and Materials, Volume: Manufacturing Science and Technology VI, Trans Tech publications	978-3-03835-543-4	345

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56	PLC Based Pneumatic Punching Machine	Suddep Kelaginamane, **Sridhar D. R**	Mechanical Engineering	Journal of Mechanical Engg and Automation	2163-2405	347
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58	Experimental Comparison of E-glass Fibre Reinforced Thermosetting and Thermoplastic Composites for Tensile Strength	**Srinivas K. R, Prem Kumar Naik, Somanath B**	Mechanical Engineering	International Journal for Scientific Research and Development	2321-0613	349

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60	Flexural Behaviour of Coconut Shell/Epoxy Composites Subjected to Accelerated Ageing	**Sunil Kumar ,Vinay D R, Saviraj A S, Prem Kumar Naik**	Mechanical Engineering	American Journal of Materials Science	2333-4665	351
61	Elastic Buckling Response of Equilateral TriangularTubes under Uni-Axial Compression,	**Saviraj A.S, Vinay D R, Sunil Kumar S**	Mechanical Engineering	Journal of Mechanical Engineering and Automation	2163-2405	352
62	Automatic Gas Stove with Advanced Safety Features	**Neelakantha V Londe**	Mechanical Engineering	International Journal of Recent Contributions from Engineering, Science & IT	2197-8581	353
63	Security Integrated System Using 3 DOFRobotic Lamps Along With SMS Alert	Priya S Nanral, **Lokesha M**	Mechanical Engineering	International Journal of Electrical and Electronics	2301-380X	354

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64	Fault Detection and Diagnosis in Gears Using Wavelet Analysis Techniques and Comparison on their Diagnostic Capability	**M. Lokesha,** M.C. Majumder, K.P. Ramachandran	Mechanical Engineering	Manufacturing Science and Technology Applied Mechanics and Materials scientific .net	1662-9795	355
65	Fault Diagnosis in Belts using Time and Frequency based Signal Processing Techniques	Abdulrahman Abdulshakoor Al Bulushi, G.R. Rameshkumar **M. Lokesha**	Mechanical Engineering	International Journal of Multidisciplinary Sciences And Engineering,	2045-7057	356

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PAPER

Increasing the silicon solar cell efficiency with transition metal oxide nano-thin films as anti-reflection coatings

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Abstract

Herein, we report the study on RF-sputtered transition metal oxide thin films of Zinc oxide, Magnesium oxide, and Aluminum oxide as an antireflection coating on silicon-based solar cells and their influence on energy conversion. The transmission spectrum of all sputtered metal oxides was studied using a UV-visible spectrophotometer. The phase formation and microstructure analysis of these sputtered oxides were studied using glass for the destructive test along with the device. The x-ray diffraction and cross-section scanning electron microscopy of sputtered glass confirmed a single-phase structure along with nearly equal desired deposition thickness. The thicknesses of sputtered films were estimated using variable angle ellipsometry and the same was confirmed from cross-section scanning electron micrograph. The chemical composition and oxidation state of thin films deposited on glass were established from x-ray photoemission spectroscopy. The ability of a fabricated device deposited with the antireflection layer in converting photon energy to electrical energy was studied using a solar simulator under 1 sun condition. The ability to collect charge carriers of the anti-reflection coated device as a function of wavelength was also studied using quantum efficiency measurement.

1. Introduction

In recent times, transition metal oxide (TMO) thin films have gained immense interest among researchers due to their superior optical and electrical properties [1]. TMOs offer themselves as excellent candidates for electrical and optoelectric applications due to the wide range of work function values around 3–7 eV and noticeable p- or n-type semiconductivity [2, 3]. The wide range of work functions in TMO enables them for using as an antireflection coating (ARC) on photovoltaic devices to improve photon to electron conversion (PEC) efficiency [4]. The ARCs are characterized by broad bandgap along with wide optical transmission ranging from700 to 1000 nm, and surface roughness [5]. Hence, ARC's developed in nanometer thickness can enhance the PEC efficiency of solar cells by increasing light trapping in the active region [6].

Nanostructured TMOs like ZnO, MgO, Al$_2$O$_3$ thin films offer exciting optical and electrical behavior when deposited in nano-level thickness [7–9]. Due to surface inhomogeneities and limited lattice periodicity, the TMOs at nanometer thickness exhibit good optical transparency, along with an appropriate refractive index [10]. Thus, they readily respond to any physical changes, which greatly affect the optical and surface conductivity of the nanostructures. The TMOs with inhomogeneous microstructure, when deposited on a photovoltaic device, creates a textured surface and thereby traps photons of light, leading to a broadband suppression in reflection. The TMO used as ARC are wavelength sensitive and reduce the reflection of incident radiation due to interference [11].

Among them, ZnO is an attractive material with superior dielectric behavior in the nanometer range and also used as transparent conducting oxide when doped with a small quantity of Al$_2$O$_3$ [12]. However, both ZnO and Al$_2$O$_3$ are also used as ARCs due to their better electrical and optical behavior including good optical

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Influence of A-site substitution on dielectric and impedance behavior of Mn$_3$O$_4$ spinels

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ABSTRACT

In this paper, we report the influence of A-site substitution on dielectric and electrical behavior of Mn$_3$O$_4$ based modified spinels at room temperature. All the three spinels substituted with Mn, Zn and Co at A-site showed slight decrease in relative permittivity (ε') and dissipation factor (tanδ) in the studied frequency range of 40 Hz to 8 MHz. However, the influence of A-site substitution was noticeable because of it dominant influence on relative permittivity and dissipation factor over pure Mn$_3$O$_4$ spinel. The relative permittivity increased from $\sim$ 16 to 95 after substitution of Zn in A-site whereas the substitution of Co increased the magnitude upto 40. Similar trend was observed with tan δ measurement after A-site substitution. The frequency dependent impedance measurement revealed the better conducting behavior of pure and modified spinels because of its low impedance range and better frequency dependent ac-conductivity.

1. Introduction

Spinels are classes of functional ceramic materials with AB$_2$O$_4$ structure either in cubic or tetragonal form of crystalline structure [1]. These spinels have a special ability to hold both divalent and trivalent cations, separated by oxygen positional parameter either in A or B site of spinels. In spinels, normally cation occupies 1/8 of the tetrahedral site and 1/2 of octahedral site whereas oxygen ions occupy at face centered position in each cell within the one complete AB$_2$O$_4$ unit cell comprising total of 32 oxygen ions [2].

In general, the conduction mechanism in spinels is dominant by hopping mechanism where electrons hop between the cation sites [3]. The presence of multivalent cations within the spinel unit cell facilitates the hopping and thereby contributes to electrical conductivity. However, some of aluminum based spinels exhibit low electrical conductivity because of uniquely trivalent and strong octahedral site preference energy [4]. On the contrary, manganate (Mn$_3$O$_4$) spinel compounds have superior electrical conductivities because of multiple valence states. Normally, manganese is stable as Mn^{2+}, Mn^{3+} and Mn^{4+}. On tetrahedral (A) sites, Mn^{2+} is dominant while on octahedral sites Mn^{3+}

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The significant role of molecular dipole arrangements on the second and third-order nonlinear optical properties of a furan based chalcone

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ABSTRACT

In this article, we report an experimental investigation on second and third-order nonlinear optical (NLO) properties of an efficient chalcone material 1-(5-methyl furan-2-yl)-3-(4-nitrophenyl) prop-2-en-1-one (MFNP) along with other characterization techniques. The synthesized material is confirmed through FT-IR and FT-Raman spectroscopic techniques. Single-crystal XRD study showed that the crystal belongs to the triclinic crystal system crystallizing in the P1 space group which is a non-centrosymmetric crystal form. From UV-VIS-NIR spectroscopy, the crystals were found to possess less absorbent in the visible region. Furthermore, the crystal exhibits excellent thermal stability up to 136 °C. The intermolecular interactions in the crystal were identified by obtaining the Hirshfeld surface and the related 2D finger plots. The second harmonic generation (SHG) efficiency of MFNP is three times the standard KDP crystals. Using a continuous-wave laser beam z scan experiment was performed and the "nonlinear refractive index (n_2)", "third-order nonlinear absorption coefficient (β)" and "second-order molecular hyperpolarizability(γ_h)" were calculated for MFNP. The estimated threshold value for optical limiting was found to be 1.85 kJ/cm^2. The excellent experimental results show that MFNP is a very useful material especially in the field of optical power limiting applications.

1. Introduction

Organic nonlinear optical (NLO) materials have attracted much attention in recent times due to their ease of synthesis, manipulation of molecular structure and large NLO responses which makes them suitable for various technological applications such as optical computing, optical data storage, optical limiting, frequency modulation, electro-optic devices, etc [1]. Among the different types of organic NLO materials subjected to investigation, chalcones have proved to be potential candidates for device applications as these materials exhibit a high degree of nonlinearity. A chalcone molecule consists of two phenyl rings interconnected by a conjugation bridge [2]. The electronic delocalization in the chalcone molecule can be altered to the highest degree by substituting suitable electron donor and/or acceptor groups at the end of this highly polarizable conjugated bridge. This structural modification will help to establish noncentrosymmetric crystal structures that are considered necessary for the second harmonic generation (SHG) [3]. In addition to this, the replacement of the benzene ring at the benzoyl arm of the chalcone by pyridine ring or thiophene ring has proved to be a

wise move in altering the electronic delocalization and thus improving the second and third-order optical nonlinear response of these molecules [4–7]. Among these, several molecules with thiophene ring at the benzoyl arm crystallized in centrosymmetric crystal form and hence did not show any second-order nonlinearity [6–8]. It is well understood that the strength of the electron donor groups at the end of the conjugated bridge plays an important role in the formation of enantiomorphic crystal structures. Another crucial factor in increasing the optical nonlinearity of the chalcone molecules is a change in direction of charge transfer through the molecule [9,10]. Further, Satheeshchandra et al. reported a furan based bromo substituted chalcone, BBP with good SHG response of 2.03 times that of KDP with considerably good third-order nonlinearity [11] whereas the thiophene based bromo and nitro substituted chalcones, 2AT4B and 2AT3N did not show any SHG [8]. Considering the above facts and since furan is a sturdy electron donor than thiophene [12], a furan based chalcone is designed with a nitro group placed at the para position of the phenylene moiety. To increase the conjugation length and to increase the electron-donating strength of furan, a methyl group is attached to the furan ring. This strategy forms a molecule with

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Comparative study on structure, dielectric and electrical properties of cobalt- and zinc-substituted Mn_3O_4 spinels

Nayana Acharya[1] · Raghavendra Sagar[1]

Abstract

In this paper, we report the comparative study of single-phase crystalline Mn_3O_4, $CoMn_2O_4$, and $ZnMn_2O_4$ spinels prepared by a wet chemical co-precipitation technique. The absence of impurity peaks in the X-ray diffraction pattern of all prepared spinels endorses the formation of highly pure and single-phase spinels with the tetragonal crystal structure. The highest intensity peak for Mn_3O_4 was observed at (211) direction plane, and the same was followed by $CoMn_2O_4$ and $ZnMn_2O_4$ with a slight decrease in the angle of diffraction. The microstructure features observed from scanning electron micrographs reveal irregular-shaped nanosized grains with an average grain size of ~ 100 nm. The dielectric studies carried out from room temperature to 500 °C show high dielectric loss at elevated temperatures endorsing better conducting behavior. The DC-conductivity measurement substantiates the negative temperature coefficient of resistance behavior where resistivity decreases with an increase in temperature. The activation energy calculated using Arrhenius relation was 0.58 eV for Mn_3O_4, whereas it is 1.1 and 1.4 eV for Co- and Zn-substituted Mn_3O_4 confirming semiconducting nature of substituted spinels at higher temperature region.

Keywords Spinels · Structure · Microstructure · NTCR behavior · Electrical properties

1 Introduction

AB_2O_4-based spinels are one among the most interesting structural ceramic compositions due to their wide ranging application in energy storage, sensor systems, magnetic data storage, catalysis, etc. AB_2O_4 structure consists of a divalent ion in A (tetrahedral) site and di- or trivalent ions in B (octahedral) site [1–4]. Among many spinels, manganese-based spinels have attracted great attention due to their significant use in commercial negative temperature coefficient (NTC) thermistors [5]. Also, manganese-based spinels are extensively probed for their potential use in applications such as protective coatings for SOFC interconnects, electrodes for supercapacitors, catalysts and gas sensors due to their high temperature sensitivity, swift response and low cost [6].

Mn_3O_4 attracts huge attention due to its tunable chemical and physical properties, which mainly depend on slight variation in lattice parameters of crystal structure and grain size [7–9]. However, its structural stability could be easily distorted with a small variation in temperature. The substitution of homo- or hetero-valance ions in Mn_3O_4 is one of the most common and simplest ways to improve structural stability against any small variation in temperature and thereby tailor the electrical properties only at higher temperatures. Thus, substituents considerably improve the dielectric behavior due to structural stability in lower temperatures and exhibit semiconducting nature at higher temperatures. The semiconducting nature in higher temperature regions is due to the distortions of ions in both tetrahedral and octahedral sites of Mn_3O_4 spinels [10].

Many researchers have reported the influence of ions substitution by partial replacement of metal ions such as Ni, Co, Zn, Fe and Cu in tetrahedral site of manganese-based spinels [11–17]. Martin et al. [18] reported the influence of Cu substitution in Mn_3O_4, which exhibited spinel structure with electrical resistivity of ~ 150 Ωm, which is quite high compared to pure Mn_3O_4. Magdefrau et al. [19] reported the electrical behavior of $Mn_{1.5}Co_{1.5}O_4$ with spinel structure with improved electrical conductivity at higher temperatures. Xu et al. [20] studied Cu-doped Mn–Co spinel as a protective coating on

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Investigation on structural, optical and electrical properties of Nd doped titania films and application of optical model

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ABSTRACT

The effect of dopant concentration and temperature on the structural, optical and electrical properties of TiO_2 (Titania) thin films deposited through sol-gel spin coating was investigated. The X-Ray Diffractometer was used for phase analysis, UV–Vis spectrometer and Ellipsometer techniques were used for the optical measurements and Hall effect was used for the electrical characterization. Annealing temperature and dopant concentration were chosen as the parameters in the present study. The optical band gap marginally increased from 3.40 eV to 3.43 eV with increase in dopant concentration for the films annealed at 350 ˚C. The increasing trend was also observed for the films annealed at 450 °C with the optical band gap in the range 3.34 eV–3.39 eV. Using ellipsometric measurement, thickness and optical constants were obtained and we compared the refractive index values with those obtained from PARAV software. For Nd doped films, a single oscillator model was tested by using the refractive index values from ellipsometric measurement. The carrier density and plasma frequency were calculated using the Wemple Di Domenico (W-D) model. The electrical properties indicate decreased resistivity from 10^3 Ωcm to 10^1 Ωcm and increased carrier density from 10^{15} cm^{-3} to 10^{17} cm^{-3} with increase in annealing temperature. Similarly, with increase in dopant concentration at a given annealing temperature, we have observed a decreased resistivity compared to the prestine samples. However, the carrier density increased marginally with increase in dopant concentration.

1. Introduction

One of the most important properties of the Titania (TiO_2) is the optical properties at nano level and can be identified using different spectroscopic techniques. The optical property plays a vital role in major application like photocatalytic activity. Due to their nano-scale structure, a number of factors such as volume, shape, surface functionality, doping and interactions with other materials are strongly influenced [1]. Among the various transition metal oxides, Titania is most effective photocatalyst due to its wide indirect band gap nature with anatase phase [2–4]. Titania has also been extensively used in applications such as optical coatings, gas sensor, waveguides, biomedical devices, capacitors, transmitters and memristors [5–7]. These are all realised because of the properties like high transparency, chemical stability, large energy gap, high dielectric constant and refractive index [8–10]. Moreover, it's a cost effective, non-toxic material that possess good electrical properties and photo stability [11]. The wide band gap of this material makes it valuable in visible region for phototcatalytic application. The bandgap of titania (~3.4 eV) can be further enhanced through doping Nd. And the large bandgap of doped titania introduces various energy levels within the bandgap making it valuable in UV, visible or infrared (IR) region for photocatalytic application depending on the energy transfer mechanism involved.

Now a days rare earth doped metal oxides have gained more attention due to their enhanced optical properties from UV to IR region [12]. The metal oxide doped with rare earth is found to exhibit new and interesting properties. The optical properties of most of the rare earth doped oxides fall in visible and near infrared (IR) region, which is useful for applications like optoelectronics and photovoltaics [13]. For such purposes rare earth elements are more effective as dopant. Doping these elements with metal oxides such as titania enhances the photon activity of the material suitable for optoelectronic applications. Generally lanthanides are most effective due to their partially filled 4f electronic orbits and excess number of energy levels [11,14,15]. This property cause shift in absorption edge towards visible region and increased oxygen vacancies [16–18]. Furthermore, these will aid to capture electrons and

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Hybrid core-shell nanostructure made of chitosan incorporated polypyrrole nanotubes decorated with NiO for all-solid-state symmetric supercapacitor application

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ABSTRACT

Nickel oxide (NiO) is a promising electrode material in supercapacitor (SC) applications, but the poor electronic conductivity and weak electrochemical stability of NiO limits the fast charge/discharge rate and long-time reuse. Herein we report a core-shell nanostructure formed by NiO nanoparticles decorated on polypyrrole nanotube (PNT) through a chitosan (CS) layer (NiO/CS-PNT), as a supercapacitor electrode material. The PNT is synthesised using a self-degradable soft-template approach. The one dimensional (1D) nanotube structure gives increased surface area to polypyrrole (PPy). The inevitable aggregation of the NiO nanoparticles is reduced by the incorporation of CS, thereby increasing the surface area of the active material and bringing the higher electrochemical performance. NiO/CS-PNT core-shell nanostructure is found to have a large surface area, low charge transfer resistance (R_{ct}) and high specific capacitance (C_{sp}) as compared with that of NiO/PNT and pure PNT. Besides, an all-solid-state symmetric supercapacitor (SSC) was fabricated with NiO/CS-PNT as positive and negative electrode, which shows high power density (PD) of 4045.69 Wkg^{-1} at an energy density (ED) of 27.80 Wh Kg^{-1}. Also, an outstanding cyclic stability was found with capacitance retention of 84.90% even after 10,000 cycles. The results demonstrate that the NiO/CS-PNT core-shell nanostructure is a favourable electrode material for supercapacitors.

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1. Introduction

The growth in the use of the portable electronic devices and a need for tremendous energy consumption leads to the manufacturing of high-performance energy storage devices. Among various kinds of existing energy storage systems, SCs are a kind of energy storage devices which occupies a significant position by bridging the gap between conventional capacitors and batteries. They have recieved significant attention due to their high PD, fast recharge capacity, long cycle life, environmental friendliness and low cost [1,2]. SCs are broadly classified into electrical double-layer capacitors (EDLCs) and pseudocapacitors, based on the charge storage mechanism they follow. EDLCs store charge by the diffusion and accumulation of ions at the interface between electrode and electrolyte, leading the SC to possess high PD, high cyclic stability

and low capacitance [3–5]. Carbon materials such as graphene, carbon nanotube and activated carbon are the materials used in EDLCs. Pseudocapacitors store charge by fast and reversible faradaic reactions at the surface or near the electrode surface and hence show better capacitance and ED compared to EDLCs [6]. Metal oxides, hydroxides and sulfides such as RuO_2 [7], NiO [8], MnO_2 [9], Ni $(OH)_2$ [10], MoS_2 [11] and conducting polymers like PPy [12] and polyaniline [13] are the materials used in pseudocapacitors. Among various transition metal oxide pseudocapacitive materials, NiO is considered as one of the most important electrode material for high-performance SCs, as it owes a high C_{sp}, easy preparation, and exhibits different kinds of morphologies [14–16]. But, the pure NiO often suffers from low conductivity and weak electrochemical stability which makes it inappropriate for the use in high C_{sp} supercapacitors [17]. Numerous methods have been successfully established to overcome these drawbacks and to increase the electrochemical performance of the pseudocapacitive materials. One of the emerging concepts among these is to fabricate core-shell heterogeneous nanostructured composite materials. It has been

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PAPER

Growth of 3-Dimentional MoS$_2$-PANI nanofiber for high electrochemical performance

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Abstract

The preparation of few layered 3D material Molybdenum/Polyaniline (MoS$_2$/PANI) nanofiber (NF) composite synthesis via a hydrothermal process. MoS$_2$/PANI nanofiber composite was characterized via Fourier-transform infrared (FT-IR) spectra to study the chemical functional group and their interaction, and optical properties examine by the UV-visible spectra. Formation of nanosheet and 3D hierarchical flower morphology was examined through Field emission scanning electron microscopy (FESEM), and the elemental analysis examined through Energy- dispersive x-ray (EDX), and Transmission electron microscopy (TEM). XRD studies show the properties of crystalline nature of the nanocomposite. Binding energy and composite elemental identified states measured through x-ray photon spectroscopy(X-PS). The Electrochemical technique was used to investigate cyclic voltammetry, and electrochemical catalytic activity evaluated from EIS which obtained resistance is 137.52 Ω, 66.40 Ω, and 15.25 Ω respectively. Linear sweep voltammetry, CV oxidation peak reached maximum oxidation current is 2.72×10^{-4} Amperes, and curve appeared between -4.5 to 4.5 Volt. Finally MoS$_2$-PANI-1 Nanofiber composite is prominent material for electrochemical performance.

1. Introduction

Recently, conducting polyaniline nano composites have paid an important role in the sensors and energy storage devices [1]. Conducting polymers (CPs), like polypyrrole (PPy), polyaniline (PANI), polythiophene (Pth), and poly (3, 4-ethylenedioxythiophene) are having high electrical conductivity, and power density maybe deserved to use in sensors, and electrochemical devices [2–5]. Among all, PANI is exhibits high electrical conductivity because polymer contains conjugate alternatively double and single bond or π-electron in their backbone may able to showing the metallic or semiconducting properties, so it is called 'synthetic metal' Alan MacDiarmid's *et al* reported [6]. If polymer associated with nanocomposite enhanced its large surface area and power density may in favors of electrochemical properties, high specific capacitance, and good environmental stability. Various one-dimensional materials were observed different morphology nanorods, nanotube, and nanofibers which offers several potential applications in various fields such as electrochemical sensors, [7] super capacitors, solar cell, and solid state batteries.

Currently, highly active electrocatalyst materials are graphene quantum dots, multi walled carbon nanotubes, di-nickel phosphide, and molybdenum disulfide shows as a promising catalytic performance investigated in the hydrogen evolution reaction [8, 9]. In recent years hierarchical nanostructure has become a hot topic due to electrochemical behavior of electrode materials are significantly dependent on their morphology, size and structure MoS$_2$ nanosheets are layered transition metal dichalcogenide constructed S-Mo-S three layers atoms arranged by weak Vander Waals forces, in which covalent bond strongly attached to Mo and S atoms, and variable oxidation state [10]. MoS$_2$ have attracted significant attention in the area of electrochemistry and biochemistry, MoS$_2$ which as anode transition metal sulphide material, this material intrinsically less ion conductivity exhibit, when doped with conductive polymer increases the conductivity

Synthesis, Characterization of Some 6/8 Substituted 2-Chloro-3- Formyl Quinoline Incorporated,3-Thiazoles/1,3-Benzothiazoles And Their Biological Studies

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ABSTRACT

A new series of Ethyl 2- {(E)- [(2-chloro- quinolin - 3-yl) methylidene]amino} -4-methyl -1, 3- thiazole -5- carboxylate / (E)-1- (2-chloro quinolin -3-yl)-N-(5-nitro -1,3-thiazol - 2- yl)methanimine / (E)-N- (1,3-benzo thiazol-2-yl)-1- (2-chloro quinolin-3-yl) methanimine were obtained by the reaction of 6/8-substituted-2-chloro-3-formyl quinolines and ethyl amino-methyl-thiazole-carboxylate / nitro-thiazol-amine / benzothiazol-amine. The novel chloro-formyl quinoline-1,3-thiazole/1,3-benzothaizole series were proved by Mass, NMR and IR spectroscopy. The novel quinoline -1,3-thiazole /1,3-benzothaizole derivatives showed antimicrobial activities. The series showed tremendous biological activiies.

Keywords: Antibacterial, Antifungal, Benzothiazole, Quinoline, Thiazole.

INTRODUCTION

Quinoline derivatives are known to contribute to various pharmacological effects. Also the quinoline nucleus found in several natural products shows a varied biological activity. The substituted quinoline exhibit antimalarial [1], antibacterial [2, 3], antifungal [4], antiviral [5], receptoragonists [6], antineoplastic agents [7] and antituberculotic [8] etc.

1,3-Thiazole is a aromatic compound containing nitrogen and sulphur. 1,3-Thiadiazole and is derivatives are used in the cure of allergies [9], hypertension [10], inflammation [11], diabetes [12], anesthetic [13], analgesic [14], cancer [15], tuberculosis [16] and HIV [17].

By the above clarification and miscellaneous biological activities thiazoles, provoked to do the reactions between thiazole and 6/8/sustituted-chloro-quinoline-aldehyde.

MATERIALS AND METHODS

Chemicals utilized from Sigma Aldrich and Spctrochem Chemicals Pvt. Ltd. IR spectra
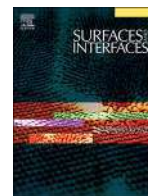
1904

Corrosion inhibition of zinc in 0.1 M hydrochloric acid medium with clotrimazole: Experimental, theoretical and quantum studies

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ABSTRACT

Clotrimazole an antifungal drug was investigated for its corrosion inhibition action on zinc metal in 0.1 M HCl solution. Corrosion rate was determined by weight loss, potentiodynamic polarization and impedance spectroscopic techniques. Electrochemical methods (EIS and polarization) have reported inhibition efficiency of up to 90% for 500 ppm concentration of clotrimazole. Data obtained from both chemical and electrochemical studies showed that the corrosion rate of Zn decreased with increase in inhibitor concentration and also with temperature. Tafel polarization measurements showed that clotrimazole acts as mixed type of corrosion inhibitor and its adsorption on the zinc surface obeys Langmuir isotherm. Thermodynamic activation and quantum chemical parameters were calculated and discussed to describe the mechanism of adsorption. These results were supported by FTIR spectral study of corrosion product formed on the zinc surface in the presence of clotrimazole. Contact angle measurements show increased hydrophobicity of zinc surface, while SEM images of zinc surface confirmed considerable decrease of surface inhomogenities in the presence of clotrimazole.

1. Introduction

Destruction or deterioration of a metal caused by the surrounding environment is called as corrosion. Among non ferrous metals zinc is one of the important metal used for various industrial applications. Corrosion of zinc is affected by both alkaline and acid solution and it is more severe in solution having pH lower than 6.0 and higher than 12.5, while within this range the corrosion is very slow [1–3]. Industrial processes involve the extensive use of acids for different purposes like pickling, descaling, acid cleaning and so forth. Because of this zinc metal will undergo rapid corrosion.

The use of inhibitor is one of the widely used effective techniques in humid conditions to counter the loss of metal from its surface. Inhibitors are organic or inorganic compounds which when added to corrosive environment of metal, will either chemically react with the metal surface and forms a barrier or physically cover the metal surface by adsorption. It has been observed that adsorption depends mainly on the electronic structure of the molecule as well as the surface morphology of the metal [4]. It has been shown that organic compounds

contain heteroatoms with high electron density, such as phosphorus, nitrogen, sulphur, and oxygen as well as those containing multiple bonds which are considered as adsorption centres, are effective as corrosion inhibitor [5–7]. Most of the organic inhibitors are expensive, toxic and have negative effect on the environment; these properties restrict its use to inhibit the metal corrosion [8]. Therefore the use environmentally safe and non toxic corrosion inhibitor to control the corrosion of metal is the need of the present day.

Extensive studies have been made over the years in the field of corrosion, which has led to consider drugs as inhibitors [9–15]. Several drugs like ziprasidone [16], erythromycin [17], ketosulfone [18], guaifenesin [19], floctafenine [20], atenolol [21] were reported as good corrosion inhibitors for zinc surface in acid corrosive medium. A few antifungal drugs like fluconazole [22–24], isoconazole, itraconazole, ketoconazole [24], clotrimazole [24–26], had been reported as corrosion inhibitors on mild steel and aluminium metal surface. But none of them have been tested for corrosion of zinc metal surface. This made us to test clotrimazole as corrosion inhibitor for zinc metal surface. The work carried out by Suraj B Ade et al. [24] and I.B. Obot et al. [25,26]

Corrosion Inhibitive Capacity of Vanillin-Based Schiff Base for Steel in 1 M HCl

G. Banuprakash · B. M. Prasanna · B. M. Santhosh · A. M. Guruprasad · R. S. Malladi

Abstract The inhibitive action of novel vanillin-based Schiff base for corrosion of steel in 1 M hydrochloric acid solution was evaluated by experimentally at the temperature range of 301–331 K. The computed inhibition efficiency of the inhibitor increases with the increasing its concentration as on 10 to 50 ppm. At the same time, inhibition efficiency decreases with the increasing temperature as on 301 to 331 K. Therefore, the increasing inhibition efficiency was attributed to the adsorption of inhibitor molecules onto the steel surfaces, and decreasing inhibition efficiency is because of desorption of inhibitor molecules from steel surfaces to the solution. The electrochemical polarization measurements proposed that the examined vanillin-based Schiff base as an inhibitor in nature, which reduces the corrosion of steel, decreases both anodic and cathodic reactions. In this study, the adsorption of the inhibitor complies with the Freundlich adsorption isotherm and depending on that, they chose compound as a corrosion inhibitor for steel in 1 M HCl through the mixture of physisorption and chemisorption. At long last SEM pictures show the visual thought of the development of the defensive layer onto the steel surfaces, which hinders the corrosion.

Keywords Vanillin · Schiff base · Electrochemical · Inhibitor

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Introduction

Continuously the metals are considered as imperative in our day-to-day life because of their boss mechanical and thermal stability. Consequently, metal is utilized in different mechanical and construction applications [1]. Be that as it may, shockingly metal prompts loss in its weight because of a characteristic procedure of corrosion in destructive media [2]. In this manner, the corrosion of metals prompts economic loss for a nation and effects on health issues of industry workers. So, it is necessary to control the corrosion of metal by satisfactory, practically acceptable, eco-friendly, and cost-effective methods for all intents and purposes.

The corrosion inhibitors are commonly heterocyclic organic compounds, which are having electron-rich species such as N, S, O, and π electrons in heterocyclic rings existing in the molecule [3–5]. Through these, the inhibitor molecule adsorbed onto the electron-deficient steel surfaces via the adsorption process. Earlier a variety of sorts

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Comparative Study of Removal Efficiency of Cationic Dyes by Chromolaena Odorata Weed Powder

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Abstract

In the present study the dye removal efficiency of a cationic dyes namely Malachite green(MG) and Rhodamine Blue (Rh B)onto the activated surface of Chromolaena odorata weed(COW) powder is studied and compared in batch mode. COW powder is activated first by acidifying and then by carbonization and surface analysis was carried out by Scanning Electron Microscope before and after the adsorption. Various parameters like initial Dye concentration, adsorbent dose, pH, and contact duration have been investigated in case of both dyes to evaluate the optimum conditions for greater adsorption rates. Highest Colour removal percentage of MG was found to be93% (at a contact time of 40 min) and 71.23% for Rh B (contact time

45 min).The experimental data was analyzed using Langmuir and Freundlich isotherm. Results prove that Freundlich isotherm model fits best for adsorption studies. The kinetic studies concluded that the kinetic data of adsorption studies best fitted to pseudo – first-order model. Experimental data clearly shows that activated COW powder acts as a potential adsorbent for the adsorption of MG when compared with Rh B Dye.

Keywords: Chromolaena odorata weed powder, Freundlich isotherm, Malachite Green, pseudo – first-order model,. Rhodamine Blue

1 Introduction:

Pollution of water resources by various types of dyes is an universal issue especially in textile industry where dye effluents in large quantities are discharged from the dyeing techniques. It is estimated that 10-15% of the dyes are released into the water resources [1].

Effluent water from textile industry comprises of dyes in both dissolved and suspended form, causes severe health problem due to its synthetic origin and complex structure. Due to the catastrophic effects of water contamination, it has become very important to focus ourselves on different ways of water treatment owing to the importance of pure water for the existence of mankind. The removal of color from textile effluents was extensively studied with advanced electrochemical techniques. Among these methods, the adsorption process, acts as a best technique for the elimination of toxic compounds from textile effluents.[2,3] Though Activated carbon is the most widely used adsorbent material in industrial and environmental applications due to its highly micro-porous morphology, high internal surface area and porosity, the cost associated with the regeneration process of activated carbon is reducing its demand for an extent.. Hence from past 3 decades a successful attempt has been done to use low cost, easily available biomass adsorbents for the removal of coloring matter from wastewater. A number of studies have been carried out successfully for removal of dyes by various types of biomass materials.[4] When we look into recent literature, the adsorption of Methylene blue using Platanus has been reported [5]. In[6] the removal Percentage of crystal violet using Rutaceae vila carbon (RAC) and Vilvam Carbon (VC) has been studied. The removal of dye   Grey BL using mango leaves powder was discussed in [7].The removal of Methyl Orange (MO) from aqueous solution was studied using a new nonconventional and eco-friendly adsorbent, spent tea leaves [8] .In [9], Adsorptive removal of methylene blue from its aqueous solution

Influence of Hall on the Motion of a Newtonian Fluid through a Porous Medium in an Inclined Planar Channel with Peristalsis

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Abstract--- The magneto hydrodynamic flow of a liquid in a strait with flexible, in a pattern constricting walls (peristaltic flow) is of concern in correlation by means of convinced troubles of the progress of conductive anatomical fluid flows, e.g., the blood, apparatus which are used to transfer blood and necessitate for research on the process of a peristaltic MHD compressor. Agrawal et.al (1984) considered the consequence of affecting magnetic ground on blood stream. Agarwal.et.al considered a plain statistical representation for blood throughout a uniformly divided strait by means of elastic surface fortifications executing peristaltic impressions as wave. The outcome discovered shows, swiftness of the fluid rises as change happens in magnetic field.

Keywords--- Magnetic Field, Porous Medium, Peristaltic Motion.

I. Introduction

The magneto hydrodynamic flow of a liquid in a strait with flexible, in a pattern constricting walls (peristaltic flow) is of concern in correlation by means of convinced troubles of the progress of conductive anatomical fluid flows, e.g., the blood, apparatus which are used to transfer blood and necessitate for research on the process of a peristaltic MHD compressor. Agrawal et.al (1984) considered the consequence of affecting magnetic ground on blood stream. Agarwal.et.al considered a plain statistical representation for blood throughout a uniformly divided strait by means of elastic surface fortifications executing peristaltic impressions as wave. The outcome discovered shows, swiftness of the fluid rises as change happens in magnetic field. The peristaltic stream of a MHD fourth rank flow in a planer channel has deliberated by "Hayat et al" (2007). Ali et al. (2008) have investigated the effect of slip condition on the "peristaltic stream" of a Newtonian flowing with variable viscosity with influence of "magnetic field". peristaltic motion of a Carreau fluid which is non linear, along with effect's of a magnetic field in a leaning simple strait was studied by Subba Reddy and Gangadhar (2010). Subba Narasimhudu and Subba Reddy (2017) have studied the "Hall effects on the peristaltic flow of a Newtonian fluid in a channel". Eldabe (2015) considered the Hall Effect and its influence on a third order fluid with peristalsis and in presence of porous with heat and mass transfer.

On basis of the above observations, we deliberate the outcome of hall on the peristaltic stream of a Newtonian fluid all the way through a porous intermediate in an inclined planar strait with the postulation of elongated wavelength. One of the closed outline explanation is found for axial velocity and pressure gradient. The property of diverse budding parameters on time-averaged volume flow rate is discussed along with the plots.

II. Geometric Representation (Mathematical)

We think about the peristaltic pumping of a conducting Newtonian fluid flow during a porous medium in a waterway with inclination α of half-width a. A longitudinal train of progressive sinusoidal impression takes place on the superior and inferior walls of the channel. On confining our conversation to the 0.5 part of the waterway as revealed in the Fig.1.

EFFECT OF CHEMICAL REACTION OF FIRST ORDER AND MICROROTATION ON FLUID FLOW IN A VERTICAL CHANNEL

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ABSTRACT

This paper presents the effect of material parameter and chemical reaction on the fluid flow in the vertical channel using boundary, interface conditions. Region-I contains micropolar fluid and region-II contains isotropic homogeneous porous material. Physical properties of the fluids are constant. Analytical solution for linear velocity, microrotation velocity, temperature and concentration are obtained for suitable boundary and interface conditions. The effects of different physical parameters such as material parameter, mass Grashof number, thermal Grashof number and concentration parameter etc. are shown graphically. Increasing chemical reaction parameter, material parameter results in the suppression of the fluid flow in both regions, and also increase in conductivity ratio, width ratio, and viscosity ratio enhances the flow field, both in the presence and in absence of microrotation parameter. The results are in good agreement with the results of Chamkha [1] and Umavathi. [2], in the absence of polar fluid.

KEYWORDS: Chemical Reaction Parameter, Micro Polar Fluid, Vertical Channel & Viscous Dissipation

Original Article

I. INTRODUCTION

Navier stokes equations failed to explain the behaviour of the fluids with suspended particles such as polymeric fluids and colloidal fluids etc. To study these types of fluids, Erigen [3, 4] introduced micopolar and thermomicropolar fluids. These fluids attracted several researchers because of its applications in material processing, engineering problems, air conditioning and nuclear reactors. A good amount of research work is carried out by many authors on the flow of micropolar fluids on various geometries. Chamkha et al. [5] studied the flow of micropolar fluids for free convection in vertical channels for fully developed flows. Free convection of micropolar fluids with different wall temperatures in the vertical channel was studied by Cheng [6]. Analytical results were presented by Rashidi et al. [7] to study the effect of radiation on the flow of micropolar fluids using a porous medium. MHD flow of micropolar fluid using heat source or sink over a stretching surface was analyzed by Mostafa et al. [8]. Ashmawy [9] examined the effects of slip boundary conditions for free convective, micropolar fluid flow in parallel plates. Velocity increases and microrotation decreases for increasing the slip parameter. Ferdowsa and Liu [10] analyzed the convective flow of magneto-micropolar fluid through the vertical plate.

Recently, Mishra et al. [11] studied convective micropolar fluid for a shrinking sheet with the heat source.

Computation of stability derivative for a wing for specific heat ratio= 1.66 for hypersonic flow

Abstract

The flight performance of aircraft relies on aerodynamic non-dimensional parameters like the drag coefficient, lift coefficient, and the moment coefficient of the aerospace vehicles. The knowledge of these properties is supremely necessary for optimal design, and thus the aerodynamics and the performance of the aerospace vehicles are characterized so as to relate general airplane design and performance to a standard ballistic atmosphere as the reference for all the computations while evaluating the dynamics and control. Since re-entry includes movement through the atmosphere, the entry performance relies on the ambient atmospheric properties. Air under normal conditions behaves very much like a perfect gas. The specific heat ratio for the air as the perfect gas is 1.4. This study focuses attention on variations on γ while the stability derivatives are computed, one such endeavor is made to study the stability derivatives of the wing for γ=1.66. The results show a reduction in its numerical value with k, the level of inertia, and an increment when the angle of incidence increases, leading to a substantial change in the numerical value. At Lower Mach numbers, a considerable change in magnitude for stability derivatives has been observed, but for higher Mach numbers, the change is negligible, thus holding the Mach number Independence principle. As regards the change in the Damping derivative at various pitching locations, at first, its value decreases attain a minimum value, which is the location of the center of pressure, and after that shows a sudden increase. Further, when the ꙮ value is varied from 1.4 to 1.66, a difference of 20% in magnitude is observed in the stability derivatives.

MICRO-STRUCTURAL EVOLUTION ANALYSIS AND ASSESSMENT OF TRIBOLOGICAL BEHAVIOUR OF NICKEL ALLOY REINFORCED WITH SiO₂ AND Al₂O₃ HYBRID METAL MATRIX COMPOSITES

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ABSTRACT

Hybrid Metal Matrix Composites (HMMCs) enhances the main properties like wear resistance and good microstructure, as well as it saves weight. Reinforced hybrid metal matrix composites attract because it enhances wear resistance properties. Many researches are going on in material science field to strengthen the wear resistance properties of the materials and improve the quality of the material. The present research work carried out to fabricate the SiO_2 and Al_2O_3 reinforced Nickel based alloy. Reinforcement is added in matrix with 9% in weight SiO_2 (Constant) and range 3% to 12% in weight Al_2O_3 in steps of 3% in weight. Induction furnace is used to melt the composites; the composites are machined and tested after casting. Evaluation of microstructure, wear resistance of hybrid metal matrix (Monel M-35-1+SiO_2+ Al_2O_3) is done and analyzed. From results, it is clear that the $SiO2$ and Al_2O_3 added with Nickel alloy shows good microstructure and reduced wear properties of composites.

KEYWORDS: Nickel Alloy; SiO_2; Al_2O_3; & Stir Casting

Original Article

EFFECT OF SiO$_2$ AND Al$_2$O$_3$ ON MECHANICAL PROPERTIES OF ASTM A 494 M GRADE NICKEL ALLOY HYBRID METAL MATRIX COMPOSITES

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STUDY OF FREE VIBRATION CHARACTERISTICS OF HYBRID POLYMER COMPOSITES

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ABSTRACT

Composite materials are acquiring the importance in the field of aerospace, submarines, and sport equipment due to high strength and stiffness to weight ratios, high durability and fatigue life, and high corrosion resistance. The performance of a hybrid composite material depends upon the free vibration properties. It is therefore essential to establish the material performance under various configurations. In this study, the effect of hybridization on free vibration characteristics of eight layered laminated composite beams consisting of various combinations of fibres was examined. Plain woven basalt (B), carbon (C) Kevlar (K), and Glass (G) were used as reinforcement with epoxy resin (LY556) for hybridization. The laminated composites were fabricated having a symmetric stacking sequence at 2 MPa compression and 100° C temperature using hot press mould. Free vibration characteristics, namely natural frequency and damping factors of the composite beams were experimentally determined by carrying out modal analysis. In addition, effects of boundary condition and hybridization on natural frequencies were examined using ANSYS and compared with experimental results. It is found that free vibration characteristics are dependent on the stacking sequence and materials of fibers used in the composite beams.

KEYWORDS: Laminate Composites, Hybridization, Free Vibration, Natural Frequency & Damping Factor

Original Article

1 INTRODUCTION

In the recent years, composite materials have developed more rapidly than metals in structural applications. They are increasingly being used as an alternative for metallic materials mainly because of their high strength to-weight ratios, and other tailor made properties like good fatigue and wear resistance, directional properties and corrosion resistance and longer durability. The studies on the mechanical and dynamic behavior of composite materials is very important for today's composite researchers since they are used as preferable structures in aerospace, marine, and automotive structures.

The free vibration characteristics such as natural frequency, mode shape, damping factor are the key factor that influence the dynamic performance of composite material [1]. To predict the possibility of resonance of the structure it is inevitable to determine the natural frequencies and mode shapes for the composites. Since resonance causes the failure, composite structures, their reduction has become an important issue. The resonant amplitudes of vibrations are influenced by the damping associated with each mode. Fibre reinforced composite materials have higher damping than the conventional materials due to viscoelastic behaviour, damping due to damage and fibre matrix damage. Thus, it is essential to fully characterize the free vibration behaviour of fibre reinforced polymer composites in order to effectively reduce and control vibrations in composite structures.

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Utilization of Agriculture Waste Embedded Composite Wall Panels as Alternative Building Materials: A Concept of Lightweight Structures

B S Keerthi Gowda, G. L. Eadswara Prasad, R. Velmurugan

Abstract

Engineered way of disposal of agriculture wastes needs skilled laborers and high-cost machinery for its treatment. Performing these activities is always an economic burden on agriculture practitioners. This is one reason that the young generation are less oriented towards agriculture firm. Less and delayed income growth compared to commercial industry economic growth is one of the other reasons. The advantageous way of improving the economic status of farmers is by providing value-added prices to their crops and agriculture bi-product wastes. In the present study, agriculture wastes like sisal/coir fibers are utilized as reinforcement in polymer matrix composite panels. These are proposed to utilize alternative building materials. This study clarifies that there will be noticeable weight loss in buildings which leads to the development of lightweight structures. Economy wise, mass housing constructions by adopting the present proposed technique achieve fast construction and less budget.

Full Text:

PDF

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03/04/2021   View of Experimental Studies On Structural Charecteristics Of Solid Concrete Block Masonry With Partial Replace...

← Experimental Studies On Structural Charecteristics Of Solid Concrete Block Masonry With Partial Replacem ⤓

Experimental Studies On Structural Charecteristics Of Soli Masonry With Partial Replacement Of Sand By Quarry I

Ganesha Mogaveera[1] , Vidyashree.M[2], Umesh S S[3] and Sher

Abstract

Now a day the construction cost is increasing because of increase in the cost c attempt has been made to partially replace sand by quarry dust in a mortar, construction can be reduced. The main aim of this paper is to study the effects of sand by Quarry Dust on the strength of solid concrete block masonry. N construction of foundations, walls and other structural components. The mix used for mortar & tested for its flow value. It is observed in flow test that replac dust in different percentages like 0%, 5%, 10%, 15%, 20%, 25%, 30%, 35% workability of mortar has initially decreased and further increased with incre Mortar with good workability is chosen for the construction of masonry. replacement increases the water-cement ratio also increases because of abs masonry prism test and shear bond test was also conducted at 28 day: 0%,20%,25%,30% and 35% of sand by quarry dust.. It is observed that replac quarry dust in mortar posses maximum compressive and shear bond strength.

Keywords: *Solid concrete block masonry, Quarry dust, Masonry prism test an*

I. INTRODUCTION

Solid concrete block masonry is made of blocks in its bond together with mo technology and building crafts were done with Masonry. The basic advantage of lies in the fact that in load bearing structures it performs variety of functions su sub-dividing space on affording fire and weather protection etc. Solid concrete t have also been constructed to study the load carrying capacity. Theby-product of process of a concentrated material to use as aggregates for concreting purpose is especially as fine aggregates. In quarrying activities, the rock has been crush during the process the dust generated is called quarry dust and it is formed as pollution. So in construction worksquarry dust should be used to minimize cost save construction materialand the natural resources. From uniform mixture material (such as fine aggregate) and water makes a paste of required consistenc used to bind a masonry units. Different types of mortar cubes and mortar with and quarry dust content is tested for its compression and elastic properties.

Mortar works as the glue to holds everything in the structuretogether.

II. OBJECTIVES OF STUDY

Study On Strength Of Geopolymer Concrete

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Ganesha Mogaveera, Head of Civil Engineering Department, MITE,

Abstract:

In this research, study has been conducted about strength parameters on geopol results are compared with the strength properties of conventional concrete of M3 of Sodium Hydroxide and Sodium Silicate are used as alkaline solution with molarity 12M. The investigation resulted that there is increase in strength wi percentage rather than increment in GGBS percentage in concrete. When compo concrete, the strength gained is more in Fly Ash-GGBS based geopolymer conci

***Index Terms**: Fly ash, GGBS, compression, split tensile, flexural, Alkaline s*

I. INTRODUCTION

Ordinary Portland Cement (OPC) is the most commonly used binder ma practices. There is a need to reduce the ill effects of using OPC has brought about type of binder known as Geopolymer binder. Geopolymer concrete (GPC) is concrete and it has the potential to reduce the global carbon dioxide emissions an be an environmentally friendly and pollution free construction material. In this strength of geopolymer concrete using flyash and GGBS with the alkaline solutic by varying proportions of materials in concrete.

II. EXPERIMENTAL WORK

Compressive Strength Test
The cubes and cylinders were tasted after the curing period of 14days and 28day tested in 3000KN capacity compression testing machine.

Split Tensile Strength Test
This test on concrete cylinder evaluates tensile strength when develops cracks u

Flexural Strength Test
Flexural strength test evaluates the tensile strength of concrete indirectly. unreinforced concrete beam or slab to withstand failure in bending.

III. RESULTS

Removal Of Heavy Metals From Leachate Using Natural

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Abstract

In India, rapid industrial improvement has come about over a quick time period of water. The presence of inorganic pollution inclusive of toxic heavy metals due to their non-biodegradability, mobility and toxicity. Thus, the develo substances able to removing of toxic heavy metals from infected water. The sorp includes metal immobilization in infected water, has obtain interest within because it offers benefits including high efficiency and occasional running pric environmental friendly while as compared to conventional standard methods. "I contents of calcium carbonate (85-95%); their reuse has the potential to : pollution while acting as a cost effective material for the immobilization of hed and soil". Further, eggshells & seashells additionally embody $CaCO_3$ and are c is ample and less expensive to achieve.

Keywords: *Leachate, Eggshells, Seashells, Low cost adsorbent, Eco-friendly.*

1. Introduction

Water performs an essential role in the global economy. Approximately 70% by people is for agriculture. Fishing in salt and freshwater bodies is a primary su elements of the sector. Large portions of water, steam and ice are used for h industries and houses. Water is a top-notch liquid media for a huge sort of chem it is widely utilized in business processes, cooking and in washing. Water is many leisure and different types of ecology, along with swimming, fishing, boat

The water resources are becoming depleting in positive places, and its availabil and social difficulty. Presently, about a billion people around the globe rout water. "Most countries accepted the goal of halving by 2015 the number of peo

Reduction Of Floods Caused By Rain Using Infiltration V Reservoirs In Padang City

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Abstract

Many area in Padang City has experienced the changing of land use from agric offices and settlements. This paper aims to evaluate the existing drainage perform capability of the area to absorb rain. The objectives were achieved by analyzing observations, and conducting soil tests. It was found that many office buildings wells, water retention ponds, and many parking lots do not function properly t order to mitigate the flood, 241 infiltration wells need to be installed along Khat research is expected to be used as a reference by the government of Padang City.

Keywords: *Urban areas, flooding, drainage, infiltration wells, rain reservoirs*

1. INTRODUCTION

The increased development of the city results in changes in the land use. This is Open land that originally functioned as a water catchment area has now been housing and business center areas. The same thing has happened in the Kh Padang. The surface runoff in urban areas increases with shorter concentra reduced water catchment areas.

The city drainage network in the Arterial road of Khatib Sulaiman area is e system built by the Central Government cg. River Basin Offices and it fr capacity.

The construction of office buildings and business buildings that do not p infiltration increases the amount of surface water. The existing city and road able to accommodate the surface runoff on the main roads of the city if the ra than 3 hours. Every rainy season, sediment cleaning is done in the main and s this is not optimal. Examples of the inundation and flood conditions that occur i area can be seen in Fig. 1 below.

"Performance Of Concrete By Partially Replacing Fine With Gbs And Cement With Fly Ash"

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Abstract

Concrete is most indisputable material being used in infrastructure gro
It is globally known building material in all type of civil engineering structure
there is huge demand for concrete in turn increases environmental issues.
alternative measures for concrete. Cement, sand which are the prime material u
an important role in mix design. Construction industry is a largest user of ma
has led to reduction of good quality of sand. This situation led to discover nev
Therefore the aim of this research is replacing sand with granulated blast furn
consumption of sand. And addition to this there is environmental pollution in
due overuse of cement which produces carbon dioxide in large amount led to
solution for this cement is partially replaced by fly ash. In this investigat
replacement of GBS in various % (5, 10,15,20,25,30,35,40,45,50) with water c
cement by partial replacement of fly ash in constant 20
%. Different tests were conducted for fine aggregate and GBS sample. Differe.
varying percentage replacement of fine aggregate have to be obtained for M3
compressive strength and split tensile tests conducted for the concrete with
GBS and fly ash. This aims at the comparison of strength between the norr
convectional concrete.

Key words –Concrete, GBS, fly ash, Fresh properties , Hardened Properties.

1. Introduction

Concrete is commonly viewed as the most generally utilized material on
element of concrete, fine total, coarse total and water. It tends to be formed into
stage. The overall amount of fixing controls the property on concrete in wet sta
stage. Aggregate is a general class of coarse particulate material utilized in d
sand, rock, and squashed stone. Aggregate serves as reinforcement that pro

Analytical Studies on Behaviour of High Raised Frame Subjected to Wind Loads

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ABSTRACT

For design of tall buildings, wind load analysis plays a crucial role. The core objecti' determine the effect of the lateral load i.e. wind load subjected to multi storey structur depend on shape configuration and height of the structure theoretically/analyticall; Analysis (FEA). Maximum storey drift, and maximum storey displacement are the par its behaviour in all wind zones.A precise plan of residential apartment building with dif for present study. An unreinforced building without openings is modelled using softwa subjected to different seismic zones as well as basic wind speeds and analysed.

Keywords: *ETABS, Storey Drift, Storey Displacement*

1.　　　Introduction

Abundant research work had been carried out throughout the world on brick masonry observed that the practice code for both load and non-load bearing masonry wallsa structure constructions that are done after industrial revolution. As per much experime the masonry load bearing walls and infill walls the importance of brick masonry walls v guidelines are included in design codes

It is concluded from various research on the load bearing walls its behaviour depends properties of the individual materials brick and mortar.

Out of all material properties of materials constituting the walls, the mechanical prop properties are the main constituents in effecting the behaviour of masonry walls subjec The combined or effective properties of brick masonry also plays a major significant behaviour. Hence there is a need of understanding the parameters on which seismic bearing masonry wall depends

2.　　　Literature review

03/04/2021 View of Development of Rainfall Intensity-Duration-Frequency (IDF) Curve for some parts of Coastal Region of Kar...

← Development of Rainfall Intensity-Duration-Frequency (IDF) Curve for some parts of Coastal Region of Karι ⬇

Development of Rainfall Intensity-Duration-Frequency (I some parts of Coastal Region of Karnataka

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Abstract:

IDF relationship is one of the most commonly used tools in water resources e planning, designing and operating of water resource projects against desig variation in rainfall intensity and pattern, it is creating a distress for hydr planners. So, in this project an attempt has been made for the development of IDF parts of coastal region of Karnataka. As coastal region is one the flood suscept are required for the proper design and planning of urban drainage system an measures against high extreme flood condition. IDF relationship gives the proba extreme rainfall values which is utilized for the proper design of drainage syste collected from KSNMDC (Karnataka State Natural Disaster Monitoring Cen period of eight years from 2010 to 2018 for the different rain gauge stations (Dakshina Kannada, Uttara Kannada and Udupi districts). Using these dataset an IDF equation is developed in the current study. IDF curves are derived u; rainfall by Gumbel Extreme Value Distribution, Log Pearson Type III and Emp

Index Terms: *Gumbel Distribution, Log-Pearson Type III, Rainfall Durati Return Period.*

I. INTRODUCTION

Rainfall Intensity-Duration-Frequency (IDF) curves are graphical representat

A Study on the impact of climatic changes in the coasta Karnataka

Vinod G, Sushmitha G S

Abstract:

A study on the effect of climatic changes in the coastal regions of Karnatak Dakshina Kannada and Udupi districts being the study area. The objective of the impact of climatic changes on the rainfall, temperature and relative hur determination (R^2) was calculated on the basis of scatter plots which were p relationship between the three parameters i.e. Average Rainfall, Average Tem Relative Humidity. Results concluded that the average rainfall decreased betwe average temperature showed a gradual increase. However, the average Rela remained the same. The change analysis of land use land cover spanning over c was calculated which showed an increasing trend in built up areas in urban as there was a significant decrease in forest cover (evergreen & deciduous). agricultural land usage and decrease in water bodies were also recorded to sor

Index Terms: Rainfall Duration, Rainfall Intensity, Relative Humidity, T polygon, ArcGIS, Landuse, Land cover.

I. INTRODUCTION

Dakshina Kannada is a district covered by the Western Ghats on the east a Arabian Sea on the west. The geographical area is 4770 km² extending betwe latitude and 74.583 & 75.558 east longitude. It has an elevation of 1,115 m abov number of west flowing rivers are Kumaradhara, Gurupura, Netravathi, Payasw

Udupi is a coastal city in Karnataka. It has a geographical area of 68.23 km² ex north latitude and 74.74 east longitudes. Udupi has an elevation of 27 m above i

Climate variability is defined as the variations in the mean state of the clima spatial scales beyond that of individual weather events. The climatic parame temperature and relative humidity are subjected to variability on all time inter-annual, decadal, centennial, etc. Therefore, it is essential to assess these p see the variation. In this context, it is essential to understand the past trends in Karnataka, so as to develop suitable adaptation strategies in vulnerable areas.

LOCATION

The areas selected for the current study are Dakshina Kannada and Ud information related to study area is taken from the Ground water information

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Taxonomy of DDoS Attacks and Performance of DDoS Attack Detection Approaches

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Abstract— *Distributed Denial of Service (DDoS)attacks are the predominant security threat faced by the Internet user, that causes bandwidth depletion and exhausting the target's resource. The development of new processing technologies has helped the attackers to produce large scale powerful DDoS attacks. There different attack detection methods which are developed using various techniques. In spite of the availability different attack detection methods the existing literature reports shows that attack increases and it leads to economic losses. This paper presents the taxonomy of DDoS attack and different DDoS defence strategies proposed by researchers. Finally the paper presents the performance metrics of various methods used in the detection of DDoS attack.*

Keywords--- *DDoS, Machine Learning, Support Vector Machine, Long Short-Term Memory, Recurrent Neural Network, Genetic Algorithm*

I. INTRODUCTION

DDoS attack is an attempt of malicious user to deny the service to the legitimate users by band width depletion and exhausting the target's resources. Globally DDoS attack is a severe problem among the internet users. The attackers identify vulnerability computers connected to the internet and uses them as Bots or Zombies. The attacker creates a network called Botnets of Bots or Zombies to launch DDoS attack. The Zombies in the Botnet unknowingly participate in the attack. The cumulative traffic of zombies exhausts the resources. Low-rate DDoS attacks are disturbing and tougher to interpretation because the traffic appears to be normal for the detecting system employed for detecting the attack [1]. High-rate DDoS attacks are quickly predictable with the principal detection approaches. Majority of the DDoS attack seen nowadays are flooding attacks. The attacker identifies the vulnerabilities in the operating system, protocols and applications to launch the flooding attack against the target system. The model of the DDoS attack is shown in Fig. 1.
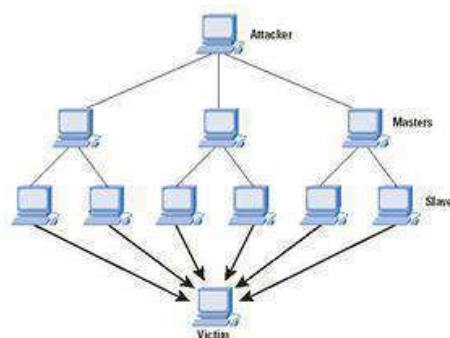
An Approach to Download Data from the Cloud Efficiently Through Multiple Parallel Links by Applying Divide and Conquer Technique

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Abstract— Web innovation and the utilization of Cloud computing is expanding and Number of mobile users also increasing exponentially. The Internet is growing with an exceptionally good performance with new technologies. In spite of the fact that the data download rate is relatively high nowadays it is additionally possible to enhance the performance of data or file download by sharing the work among number of clients. In this paper we address the file transfer from web to client with an approach of sharing the file transfer in a divide and conquer fashion. As the cell phones are picking up prevalence, all the versatile clients endeavor to download enormous records through their cell phones because of good web network. Downloading is time consuming when a single device is used to download a bigger size file, one may not finish the process with the mentioned possibilities. Even if we have additional resources like other idle mobile devices and additional Internet connections, it is still unused most of the times. To fasten the downloading speed, shared we propose a novel shared download manager in this work. To download a Larger file instead of downloading it in a single device, the proposed method splits the file into more parts and these parts can be downloaded in parallel using the available resources then the can be merged into a single file .

Key words : Cloud, WEB, URL.

I. INTRODUCTION

In internet each and every file will be stored on separate servers where each server has a specific IP address. These IP addresses will be represented by domain name which is called as URL. Each file can be located by specific URL called download URL. So, in order to download a file, we need to enter the download URL. While we download a file from the URL, it will be stored in a single system and it will use only one internet connection. So, this traditional method will not make use of the idle resources which increases the time for downloading that file eventually it will not take much time if additional resources are used [1].

A single person doing an work is always time consuming but doing the same work with more than one person in a distributed manner will always be recommended and will reduce the time taken to complete the work. For example, the work is to move documents from one shelf to another shelf. Let us consider if one person does this work which increases the time and also the workload. If the same work is carried out by three people will definitely reduce the time by three times faster than that is being taken by a single person. This distribution concept is used in the proposed work.

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An Active Appearance Model based Face Recognition from Surveillance Video

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Abstract:
For the past few years, the Face Recognition (FR) is becoming active research area in the field of Face Identification and verification. The Deep convolutional neural networks (CNNs) are extensively becoming popular in the field of FR in recent years but works with labelled datasets containing very large number of training samples. It is also difficult task to collect large number of Face images for training the model. Decision tree (DT) and-Nearest Neighbour (K-NN) performs better when the training set is small and computationally expensive when the training samples increases. In order to overcome the problem of low recognition and high computation complexity of Face Recognition (FR) space, this research paper proposes a Support Vector Machine (SVM) based FR to recognize the faces from video frames and still images. During the SVM training, the parameters are optimized with particle swarm optimization (PSO) technique , which enhances the FR rate. In this method initially, the noise is eliminated from the probe image using Adaptive median Filter (AMF) and then the feature vector is generated using the combination of Active Appearance Model(AAM) and the shape model. The recognition performance is analyzed on UPC Video Database, YouTube Face Database(YTF),ORL database and Yale B face sets . The main application of this research is to identify Faces from Poor quality surveillance video as well as still images.

I. INTRODUCTION

Human identification using Face biometric can be a method of confirming one or more individuals particularly from still or video images using a stored database [1] [2] [3]. Face Recognition (FR) finds a number of applications in human-computer interactions, authentication and verification and security surveillance [4]. FR is broadly classified into two categories, feature-based methods and appearance-based methods [5]. The Human facial parts are considered as very significant geometrical constraints and are acceptably used in feature-based methods. For example, elastic bunch graph matching is a well-known face recognition method comes under feature based method [6] while active appearance model [7], based on appearance-based method. In appearance based methods the intensity or intensity-derived parameters are utilized for recognition [1] [8].

The primary two stages of a face recognition technique are face detection and face identification [4][9][10]. Initially in the face detection phase, the presence of face image(s) in a given input image/video is located. Then it is used to recognize the person from the database of the registered individuals, shows the reasonable significance of having both face detection and face recognition methods[9][11][12]. The important characteristics in face recognition are the variations in illumination, pose, identity [10], facial expression, aging, hair style, make-up, scale etc. The variation in pose and

Application of Fisher Yates Data Shuffling and RSA Encryption in Transform Domain Video Steganography

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ABSTRACT

Internet source and digital media tools have become daily requirements of the society. A major problem in digital communication is secured data transmission. Steganography is a technique of hiding confidential data in the media files such as audio, images and videos, in a cover model to provide secured communication. Video steganography process is an authenticated communication to hide secret information from unauthorized user(s) through a video file as cover medium. In this article, an architecture is developed to hide input secrete image into a cover video. The secret image is encrypted by RSA algorithm, further continued with data shuffling by using Fisher Yates algorithm. Then Discrete Cosine Transform is applied to generate 8*8 blocks. On the other side, video is discretized into frames which are applied with DCT to form 8*8 blocks which are embedded with earlier generated blocks that results in a stego-video. Performance analysis is also carried out to enhance embedding capacity, imperceptibility, robustness and security.

KEY WORDS: COVER VIDEO, DCT TECHNIQUE, FISHER-YATES DATA SHUFFLING ALGORITHM, RSA, STEGO VIDEO.

INTRODUCTION

Data communication is extremely challenging in the present era. Competition among the Nations has insisted the communication to be more secured and robust. Hence a lot of research has been carried out to develop secured data transmission through three major techniques such as Cryptography, Watermarking and Steganography. Steganography is a technique in which the sensitive

data is hidden inside a picture, text or video records and transmitted to receiver. Video steganography under transfer domain has wide spread applications in data hiding. Bit Length Replacement Steganography Based on DCT Coefficients (BLSDCT) where the payload MSB is embedded into the cover image using segmentation, DCT and coherent bit length is one of the safest data hiding techniques. The payload from the stego image is retrieved by using adaptive reverse procedure of embedding (K B Shiva Kumar et al., 2010).

Cover object is media file in which data is hidden whereas hidden data is called payload or secret data. The unified data file obtained after embedding the payload into the cover image is called the stego image. The hidden data in the stego object cannot be recognized by a Human Visual System (HSV). In ancient periods the Greek historian Herodotus was the first one to develop steganography. Steganography can be classified into three types based

Application Of Robust Engineering Approach For Dc Motor Controller Design

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Abstract

This article presents the application of robust engineering to the design of a controller for DC motor application. The objective of the research is to control the speed of the DC motor using robust engineering approach. The Taguchi's Robust Engineering approach is used to design controllers for DC motors. The initial range of the controller is identified using the Internal Model Control approach. Both, noise and control parameters, are accommodated in the experimentation. The optimal value of the Proportional-Integral-Derivative (PID) controller derived from the Taguchi Robust Engineering resulted in faster settling time. The Internal Model Control (IMC) based PID design approach and the Taguchi- based PID design approach for controllers are compared for both nominal plant models along with ±10% uncertainty in all the process parameters. The results prove the effectiveness of the robust engineering to design a DC motor controller using Taguchi method. Eventually, a regression equation is proposed based on the results of the study to facilitate academicians and researchers to delve deeper in the field.

Keywords: Internal Model Control, PID Control, DC Motor, Taguchi Robust Engineering, Settling Time

1. INTRODUCTION

The DC motor is popular in industry control application, because of some of its good characteristics such as high starting torque, better performance, linear control, etc. [1-2]. It is also a commonly used machine in electrical systems in homes, vehicles, and trains, and in process control [3]. An effective control of the DC motor is necessary to achieve a stable and satisfactory performance. Several conventional and adaptive control algorithms are presented in literature [4]. Even though several advanced control strategies have been proposed in recent articles, the Proportional-Integral-Derivative (PID) is used by 90% of the process control industry [5]. Properties such as easy tuning, robustness, and simplicity are the major characteristics, which attracts most of the process industries in adopting the conventional PID controller [6-7].

Robust design is the need of the hour, not only to reduce product failures, but also to reduce the overall product development cycle time. To ensure high reliability of the product, robust engineering demands consideration of both controllable and noise parameters of the product known as robust parameter design [8]. Taguchi's robust engineering is one such methodology, which addresses the requirement by robust optimization of the parameters [9-10]. Also, it is one of the best suited methodology for accommodating devise sensitivity through simulation [11]. Thus, the work adopts Taguchi's robust engineering methodology including noise parameters and delineates its application in optimizing the PID parameters for a robust performance. Thus, the focus of the work is to control the speed of the DC motor using the robust engineering approach. The article presents academic literature in the next section, followed by research methodology, research results, and conclusion.

Review on bio-signal processing software packages

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ABSTRACT

Bio-signal processing and analysis holds great significance in present day medical practice. In recent years, many processing techniques and different algorithms have been developed to help doctors to find new information added in bio- signals which is not easily noticeable in the raw data and hence aid in diagnosis of any ailments. Bio-signal processing is a rapidly evolving field with new processing technique coming out every other day which in turn makes it more and more difficult to be up to date. Signals format, algorithms implementation and comparison, artifacts and various other aspects make the learning of this field a long-drawn process, and in many situations plenty of software components are required to process or visualize bio-signals. In this paper we discuss open sourced, bio signal processing software packages that offer a variety of bio-signal processing algorithms: domain transforms, filtering, wave detection, basic operators, exchange signals format readily in their modules. The objective of this paper is to become an easily referable tool shed that discusses various options of software packages in brief for medical practice or biomedical educational purposes and to evaluate its compatibility with any architecture.

Keywords: *Bio-signal Processing; Software Packages; BioSPPy; Ecgkit; Kubios HRV; WFDB Package; BioSig*

1. INTRODUCTION

Biomedical signals are used for monitoring of physiological actions of organisms, ranging from growth to differentiation, to neural cardiac rhythms, to tissue and organ images. Biomedical signals give useful information by means of biomedical signal processing. Biologists can find new patterns in or a whole new biology and physicians can identify or monitor illnesses with the help of biomedical signal processing [1]. This paper demonstrates the implementation of different software packages namely on physiological signal like ECG, heart rate and skin temperature which are some common physiological reference signal. In recent years, a variety of signal processing software packages are available, which can easily be integrated with any architecture to help the caretakers make decisions. In view of this, different software packages with varying forms of bio-signal analysis methodologies and algorithms for signal processing are discussed and tested. For this study large collections of recorded physiologic signals from Physio Net were used.

1.1 BioSPPy

BioSPPy is a bio signal processing toolbox written in Python whose Attractiveness is in part based on the accessibility of a wide variety of open-source software libraries. Each one is adjusted for precise types of signals and files which further leads to ideal time consumption in any kind of signal processing [2]. The BioSPPy toolbox specifically, brings together numerous pattern recognition and signal processing algorithms dedicated for the analysis of biomedical signals like BVP, ECG, EDA, EEG, EMG, Respiration and is able to do filtering and frequency analysis.

1.2 BioSPPy LIBRARY

The library, like mentioned earlier, is open-source and it is handy both for non-profitable and profitable usages. It covers a variety of functions required for biomedical signal processing. The syntax of these functions is noticeably simplified with respect to ideal use of biomedical signals. The library, using command "import" can be called from the Python environment.

Toolbox is further defined into modules namely: biometrics, plotting, clustering, metrics, signals.bvp, signals.ecg, signals.tools, signals.eeg, signals.emg, signals.eda, signals.resp, storage and utilse.

Module "biosppy.biometrics" provides classifier interfaces for identity recognition i.e. biometrics applications. The module "biosppy.clustering" provides various unsupervised machine learning (clustering) algorithms. Module "biosppy.metrics" provides pairwise distance computation methods. Module "signals.ecg" offers electrocardio- gram processing, while "signals.resp" offers

Image Processing based Early Detection of Pest in Agriculture to increase the Crop Yield

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Abstract-

Agriculture is one of the main sources of economy in countries like India. It provides food for all living beings and also helps mankind to spend healthy life. Survey conducted by many researchers found that large money is spent to safeguard the crops grown by the farmer annually. Insects and pests harm the crops and they affect largely for the overall growth of the crop. One method to protect the crop is detecting the pest in the early stage. Timely examination of crop will help to monitor the health of crop. Suitable can be taken if pest attack is detected beforehand so that large loss can be minimized. If a system is developed to detect the pest is at an early stage the use of amount of pesticides can be reduced and it also helps in choosing the required pesticide. This field has become a great source for research and lot of work is carried out for automatic pest detection. The existing method of examining the fields using bare eye which is tough and impractical. To examine the total field, many human experts are needed which is very expensive and time-consuming. Hence, an automatic detection scheme is needed which can inspect the crops to find pest attack and hence classify the type of pest on crop. To solve these issues an automatic pest recognition method using image processing technique using MATLAB is presented in this article.

Keywords—Image acquisition,pest control,clustering etc.

I. INTRODUCTION

Agriculture is considered to be one of the most important sources for human existence on Earth. Agricultural land mass is more than just a feeding source in today's world [5]. India is an agricultural country and economy of country is highly dependent on agricultural produce. As per the study conducted by the ACCI India, per annum nearly Rs.50,000 crore amount is lost due to pests and diseases, which is significant in a country where a minimum of two hundred million Indians head to bed hungry every night. About 78% of the farmers in India have less access to essential resources. Therefore, the farmers are unaware about the use the required quantity of inputs in their crops which is very much required for increasing the crop productivity. Also, many farmers are unaware about the quantum of fertilizer required for their agriculture field. Also, the farmers may also be unaware about the pesticide/insecticide to be used for the diseased crop. Farmers are spending lot of money for the safety of crops and agricultural products. It has become a major reason of concern to protect the crops from pests, which finally leads to widespread damage and huge loss of crop produce. Several manual techniques are being used for pest monitoring. Manual techniques for pest detection includes black light traps and sticky traps. Therefore, examining the crop field manually is a time consuming process and less economical. These methods require high man power and hence expensive. One technique for pest monitoring is the use of sticky traps, on which pests get stuck when they come in contact with it. A camera is used to capture the image of the sticky trap. This image is then processed to get pest density estimates by taking the typical pest count on the leaves. But these manual techniques are seen to provide inefficient results and are also proved to be a danger for the environment and human life. Sticky traps and black light traps are being used by farmers but these methods are not much effective and also causes harm to environmental friendly insects. So, farmers prefer to use broad-spectrum

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Tactile Braillie Display Using Relay Switch

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Abstract:

A system has been developed for allowing blind people to access unlimited documents by using a tactile Braille display device with relay switch. The proposed system presents a machine which renders the text from a document as tactile Braille cells. The implementation of refreshable Braille tactile displays is designed using relay switches and its advantageous features in the fabrication which is easy in the implementation and less cost. The tactile cell in the system of Braille device is based on tactile sensation, which changes the visual sensation of the person's with sight. The tactile sensation is achieved using fingertips running over the round-tipped pins mounted over the movable part of the relay switch. The system first acquires an image of the set type document using a camera, then character from the image is recognized using OCR. The recognized characters are coded and then send to the tactile board.

Keywords: *Braille cell, Braille display, Relay switch, OCR.*

I. INTRODUCTION

In this modern era, visually impaired and blind people are facing a lot of challenges to read documents properly. The primary requirement of every visually impaired person is to interact with society and to build their career in workspace [1]. Nowadays blind people are well trained to give input to the computer using the keyboard. However, to visualize output requires device like speed synthesizers and Braille displays system [2].

Recently, several advanced technologies have been introduced to provide helping hands to the visually impaired people. Visually impaired people are highly dependent on Braille language to recognize alphabets, digits and symbols which helps them in understanding the script. Braille is a tactile script method which is widely used to educate and train blind and visually impaired people [2].

The standard Braille representation of alphabets is shown in the Fig 1. However, the traditional methods use embossed paper to represent Braille language. A refreshable Braille display system is designed in order to overcome the concerns like cost, portability etc. addressed in the conventional approaches. In this approach relay switches are used to simulate ordinary Braille display. In this design, each character represented by six dots made up of metals or plastic
pins and these dots can be vertically moved upwards or downwards [5]
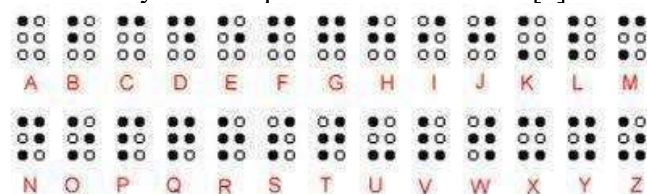

Fig 1: Standard Braille display to represent English alphabets

Adaptive Wireless Charging System for Electric Vehicles

Sathisha, Ninadha Venugopal, Padma Prasada

Abstract
Fossil fuels are finite resource and India has plans to make a major shift to electric vehicles by 2030 to beat pollution. One of the promising replacement to the conventional transportation system is the expansion of electric vehicles which are affordable costing and autonomous capabilities. Major challenges expected in this mode of transportation is battery charging, it is inconvenient to use charger and wire. The main goal of the proposed work is to develop a novel charging system using inductive wireless power transfer technology. This method is suitable for the stationary charging of electric vehicles with reduced loss. This proposed method is having high potential alternative attributes to charge electric vehicles. Wireless power delivery and efficiencies are affected by the spacing factors between primary and secondary coils. This approach ensures the maximum power delivery by designing an alignment system, which assists the driver in parking the vehicle without any alignment errors.

Index Terms: *Autonomous, Electric Vehicles, Wireless Charging System, Wireless Power Transfer*

I. INTRODUCTION

Multiple number of electric motors are deployed in Electric Vehicles (EVs) for generating propulsion. On - board batteries, solar panels or an electric generators are used to supply necessary power to an EVs. In the mid 19th century EVs are emerged as one of the promising mode of transportation, with many advantages over conventional mode of transportation systems. For 100s of years modern IC engines are presiding method of proving required thrust in conventional vehicles and electric energy was being used only in trains, small scale vehicles. With the technological advancement during the early 21st century, new era has begun looking for renewable energy and EVs saw an important revival. There are 3 classes of Electric vehicles, out of those Battery Electric Vehicle (BEV) is purely electric vehicle where electrical energy is used for propulsion. BEVs store electricity on-board using battery packs of higher capacity, it is used to supply electricity to all the devices and electric motors. Electric charging outlets are to be used for charging the on-board batteries. Maintenance of Plug-in HEV(PHEV)s are cheaper than conventional petrol or diesel-powered vehicles. In comparison with the gasoline vehicles, EVs demand minimal routine maintenance. PHEVs are similar to HEVs except the use of electricity for propulsion instead of fuel. Higher battery capacities are provided in PHEVs, equipped with a compact IC engine. PHEVs can be driven to recharge outlets for re-fueling. External electrical sources like wall sockets are used to recharge a plug-in Electric Vehicle [1].

II. METHODOLOGY

A. Literature Review

Authors over viewed on static and dynamic techniques of charging the electrical vehicle wirelessly [1]. In [3], the author explains about the various technologies to charge the electric vehicle with the help of inductive coupling. A cost effective prototype model of WPT system using air coupling method is presented by the authors in [4]. The system proposed consists of two copper wire coils, arranged in series on the same axis. One of the coil can be placed under the road surface, while the receiver coil in

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A Novel Architecture of 32 bit Modulo 2^n-1 Adder

Uday J, Rajithkumar B K

Abstract

Addition is a operation in which timing consideration is very important in all modern processing units.There is lot of scope for designing efficient and fast adders. Here a new architecture presented for addition of modulo 2^n-1 adder, which allows a highly efficient combinational circuits for modulo 2^n-1 adder implementation in Cryptography and network security.

The modulo architectures are implemented on Nexys 4 DDR, A Vertex-7 field-programmable gate array (FPGA) using Vivado design suit. The results of the new architecture is compared with other proposed architecture, it shows that, the new architectures is better in terms of Look Up Tables, Power utilization and Slices utilized .

Keywords : *Modular 2^n-1 addition, VLSI, Cryptography*
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I. INTRODUCTION

Modulo arithmetic operators plays very import role in cryptography. It also used in applications like Residue Number Systems[3],Fault-tolerant computer systems[4], etc

To implement fast, efficient modulo 2^n-1 adder, many adder structure were proposed. In [2], parallel prefix based architecture is implemented, which contain one extra prefix level to circulate the carry as end-around. In [5], implemented the modulo2^n-1 architecture which recirculate the carry within in the prefix level. In[6], proposed modulo 2^n-1 adder architecture, aiming that to simplify the area complexity of the prefix structure.

Here a new, efficient modulo 2^n-1 architecture using H operator is introduced .
.

II. PARALLEL PREFIX ADDER

The output of the system depends on the initial input then it is called *prefix* and execution of operation is takes place in *parallel*, these kind of adder is called parallel prefix adder .

Parallel Prefix Adder is categorized into three major parts, namely the pre-processing, carry graph and post-processing, shown in Fig.1. The pre- processing part will generate the propagate (p) and generate (g) bits. The carry generator will generate the carry's of generation and propagation, using parallel prefix tree architecture. This process will be done in parallel which reduces the time. Post processing will generate the sum and carry
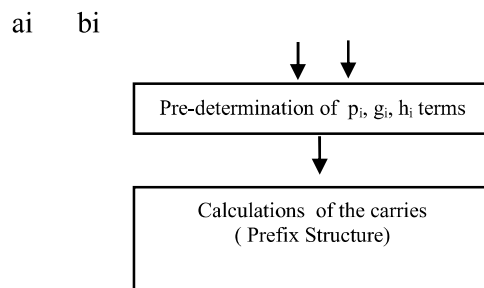
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Solving the Data security problem for Medical Image using Dog-Crow Optimization algorithm

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Abstract
Security is the one of the significant thing for transmitting the restorative information. Since it contains some extra data of patients. Medical Imaging Data Security is a Necessary system for secure or safeguards the sensitive information and their related data are put away and transmitted over the Open Public Networks. Numerous cryptographic calculations are accessible, and they fall under symmetric, asymmetric and some other procedures. To choose an algorithm for secure information correspondence, the algorithm must to give higher Privacy, security and better effectiveness. Here in the data security for Medical Imaging, A Novel Metaheuristic optimizer named Dog-Crow Optimization Algorithm, The Dog-Crow Optimization Algorithm is based on the intelligent behaviour of the Dog and the Crow. The algorithm which works based on the idea that Crow Search mechanism for hiding their food and Warning alert with excess energy and Hunting Instinct of the Dog Search Mechanism. Dog-crow Optimization is used to scramble the restorative medical data with Low Convergence rate and Entrapment. And also the Dog-Crow optimization is used to overhaul the keys. The results obtained by Dog-Crow are compared with the results of various algorithms. Simulation results expose that using Dog-Crow may lead to finding capable results compared to the other existing algorithms. The presentation of the future methodology is assessed utilizing different estimates such as PSNR, entropy, MSE and CC.

Keywords: Cryptography, Medical Imaging data Metaheuristic Optimization.

I.INTRODUCTION

With the Innovation in the field of Medical Imaging technique, Security is a basic requirement for all applications to protect data while stored and transmitted over open area networks[1].With the extensive enhancements of Communication and Technologies, Medical Imaging and Digital Image application can trade over the internet Digital images occupy a large part of our daily communications Encryption of sensitive data is necessary, encryption algorithms designed to protect data and ensure confidentiality and

Flipped Class room : An effective ICT tool for Facilitators and Remote location Learners

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Abstract: The flipped classroom is a new type of teaching model produced under the modern information society. It subverts the traditional teaching mode. It is better to achieve students' independent cooperation to explore the learning model that greatly enhances the interaction between teachers and students. The reform of teaching methods in colleges and universities also has important significance. This requires understanding of effective teaching methods to manage the transition from the traditional to the flipped learning. Keeping in view the reforming teaching and learning approach, authors have designed a course on flipped class room and studied the engagement of participants on the gnomio cloud platform. This paper's main objectives are,

- To familiarize the facilitator with teaching-learning scenario with Flipped Classroom Model.
- To Design an out-class activity and in-class activity.
- To Design a Flipped-classroom activity with Blended Learning Strategy

Participation of individual learner ability on the course and transition pattern of engagement of learners in knowledge quiz, Reflection Quiz and assimilation quiz have been analyzed. Perception of the learners also has been analyzed. The paper would be highly beneficial to all the faculty members in designing their courses and in getting to know the learning capabilities of teachers.

Keywords: Flipped Class room, remote learners, in class activity and out class activity

Introduction: In traditional teaching learning process, only transmission of information takes place. In such a case the teacher gives lecture and the student act as a listener. Flipped classroom is a technique which creates a platform to the students in sharing their thoughts in this classroom and the teacher acts as a facilitator resulting in the student becoming an active learner. To overcome the limitations of traditional teaching leaning process, we use flipped classroom. Most common problem in traditional classroom is that the teacher is teaching but the students do not pay attention to the lecture. During question-answer session, the topper and a few more students involve but rest of the class remains silent. Here we are using ICT based techniques to change traditional classroom into flipped classroom. Also, by using flipped classroom technique we can identify the ability of students with respect to completion of different tasks. Flipped classroom is a leaner-centric teaching process. In this, some activities are conducted inside the class and some are conducted outside the classroom. The activities which are conducted outside the classroom are done with the help of ICT tools. In traditional classroom, teachers are not available to solve the problems of students after their lecture time but with the help of ICT tool we are able to design flipped classroom and teachers are available for students whenever they need help. As teachers, we can easily provide notes to students and they are free to discuss their doubts at any time. ICT based tools are done in WordPress, which means we can create a website and interact with students. Moodle is the best ICT tool for designing subject specific class. Google classroom also creates class for students and we can post different assignments and activities for students. Studies have shown that faculty & students today are utilizing educational videos as a tool for learning everything from changing a tyre to the latest technologies. Abstract topics that once seemed difficult to teach and learn are now more accessible and understandable. Thanks to the availability of educational videos!

Methodology
The moodle course in WordPress is designed as part of the FDP Design Activity in IITBombayX: FDP301x Mentoring Educators in Educational Technology, in which, participants for the course were from the same FDP. The course involves the following activities that are to be

PRODUCTION ENHANCEMENT AND SUSTAINMENT THROUGH LEAN SIX SIGMA STRATEGY

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ABSTRACT

The purpose of this article is to ascertain Key Performance Indicators (KPI) and Critical Success Factors (CSFs) to enhance and sustain production in a Small Scale Industry through the Lean Six Sigma (LSS) Strategy. The paper delineates a case-study in a step-by-step manner based on LSS strategy with minimum financial investments and optimum utilization of the available resources. The Define-Measure-Analyze-Improve-Control (DMAIC)methodology is adopted bythe research to deploy the LSS strategy. Statistical software MINITAB is used to interpret the result. The research will help to enhance the baseline status from 50,000 to 10,000 parts per million opportunities. This will subsequently assist in the reduction of wastes and enhance productivity. The rework of the gap between the leaf plate assembly, which was of major concern to the industry is reduced. The project is limited because the findings are based on a single case study and cannot be generalized. But, the methodology, lessons learned, and managerial inferences can be extended to similar industries. The research unearths that even novice users and industries can successfully deploy LSS methodology through a streamlined approach and reap the rewards in time.

KEYWORDS: Lean Six Sigma, Small Scale Industry, Production, Sustainment, DMAIC

Original Article

1. INTRODUCTION

India is a developing country, even though it is facing economic turmoil. Moreover, the manufacturing sector is one of the major contributors to the development of the Indian economy. In the last two decades, it was reported that the manufacturing sector contributed nearly 25 percent to the Indian GDP(Mehta and Rajan, 2017). Having said that however the manufacturing sector is facing challenges due to the open trade policy and the start-up policy. The manufacturing sector is also hindered with challenges in productivity, performance, cost, continuous improvement, and sustainment(Gijo et al., 2014).In addition, it is confronting inflation, fuel cost, deficit budget, and depreciation of face value of the Indian currency. Research reports that it is high time and the right time to reinforce the system of Indian Small Scale Industries (SSIs) as they are the backbone of the country's economy(Singh et al., 2010). Also, it was reported that quality product is of concern among the SSIs in India, which restricts them from entering the global market and from increasing their market share. Moreover, globally it has been as certained and culminated that quality products at an affordable price is one of the major performance indicators to be competitive in the market (Mittal et al., 2018).

Analysis Of Buck Converter: A Comparative Study Based On Fuzzy Logic And Internal Model Control Techniques

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Abstract

Converter circuits are universally used in electronic systems to procure steady, stabilized output voltage from a provided input voltage. The performance of the structure relies on the type of control technique used. The focus of the article is to analyze the closed loop response of a buck converter circuit using Fuzzy Logic Control (FLC) and Internal Model Control (IMC) techniques. In the present study, the transfer function model of the buck converter is considered for the IMC design, whereas the FLC design is based on the general knowledge of the converter circuit. The design procedure is evaluated, and the comparisons are tabulated. The MATLAB/Simulink software is used to depict the converter's closed loop performance. The simulation results exhibits the competence of the FLC over the IMC technique. From the study, it is observed that the FLC gives non-oscillatory output voltage compared with the IMC.

Keywords: *Buck Converter, Fuzzy Logic Control, Internal Model Control, PID Control, Membership Function, Performance*

1. INTRODUCTION

DC-DC converters are expansively employed in state-of-the-art telecommunications, domestic applications, industrial, DC motor drive, electric vehicles, and various electronic devices [1-3]. They help in transforming the voltage level of the DC sources, especially the buck converter, boost converter, and buck-boost converter [1, 2]. The present world is habituated to electronics equipments, devoid of which survival becomes challenging. Therefore, the development of error free, fast response, and efficient devices is essential [4]. There are different circuit configurations to convert unregulated voltage to regulated voltage of required magnitude based on application [3]. Buck converters are universally employed step-down voltage regulators because they have simple circuits and are compact in size. For the designing of a closed loop control and stability analysis, the mathematical modelling of the DC-DC converter is necessary. Several techniques for modelling of converters are presented in research, and the state space averaging technique is commonly used as it is simple and effortless [4, 5]. The designing of these types of converters is laborious for electrical engineers due to user demands and its intrinsic nonlinear nature [5]. The nonlinear behaviour is due to the presence of switching and circuit components, which in turn affect the stability of the DC-DC converters. To ascertain the stability of the converters, the design of a controller is necessary. Researchers have suggested various controllers to improve the stability and efficiency of the converter [6, 7]. Controllers are grouped based on the application of the converters, namely, analogue and digital controller. Researchers suggest efficient control techniques as Fuzzy Logic Control (FLC), neural network control, Proportional Integral Derivative (PID) control, Internal Model Control (IMC) etc. [8].
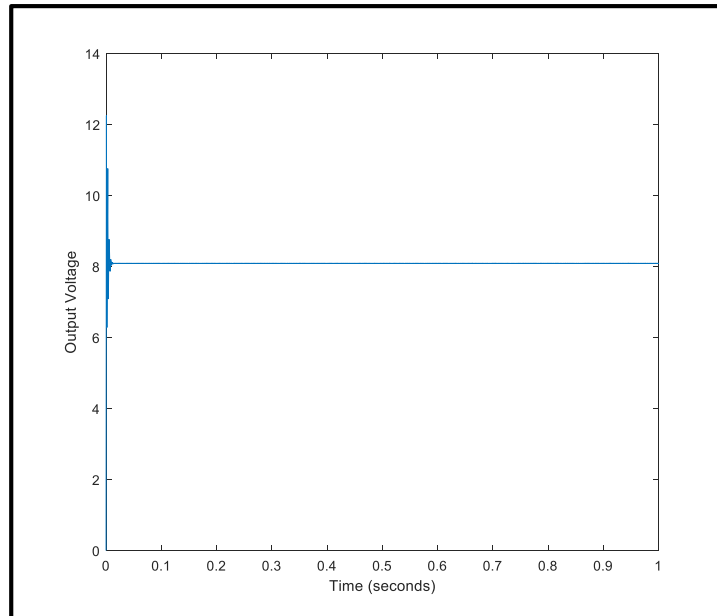
Fig. 8: Servo response of IMC-PID Controller

Table 3: Transient Parameters Evaluated for FLC and IMC

Transient parameters	FLC	IMC
Settling time	0.025s	0.033s
Rise Time	10.30ms	253.203µs
Overshoot	2.336%	50.758%

7. CONCLUSION

In this research article, the buck converter circuit is developed with the aid of the state space averaging approach. The FLC and IMC controllers are designed to avoid the problems of unstability in the converter. The FLC is comparatively easy to adapt as it does not involve the modelling of the converter. The transient response of the controllers is analyzed, and it was observed that the FLC provides efficient control action with better rise time, overshoot time, and settling time compared with the IMC.

ACKNOWLEDGEMENT

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Survivability Techniques Implementation by using Simulation Methods

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Abstract

optical network Survivability is important concept when it comes to fault detection and fault recovery. It also plays a very important role in detecting the shortest path and to route the data in that data path and data traffic management. Due to increase in industries and consumers, demand for the high data rate increases, to fulfill the demands the concept called Traffic Demand Distribution (TDD). Here the data is sensitive, if the system fails to maintain the data because of path fault it may incur huge lose in communication field. It leads to users will experience poor service and also optical survivability fails to maintain QoS. By considering this drawback, survivability techniques to serve the data to pass through desired data path is implemented. This paper further describes the TDD and survivability techniques to overcome failure.

Keywords: DCS (Digital Cross Connectivity), DP (Diverse Protection), MSONS (Multiperiod Synchronous Optical Network Survivability), APS (Automatic Protection Switching).

1. Introduction

Network survivability determines the network capability to visualize whether or not the network is in a position to produce higher quality of service, even once the failure occur in network. If the desired resources aren't allotted before then it's tough to recover the occurring failure, in survivability sure set of techniques are followed to arrange consequently to assign resources so as to beat failure. Network failure arises not solely as a result of natural bad luck, failure arises as a result of fault in network parts like switches, routers and different deployed parts and recovery of failure in these cases is a few extent tough however failure is recovered. Survivability have 2 techniques like restoration and protection. The necessary feature is that the ability to supply sensible service at the time of failure. On survivability side its definition is maintained equal on the standard attributes line reliableness, affordability and security. Survivability is accomplished by two techniques protection technique and restoration technique, where in protection techniques required resources are assigned when failure in working path occurs protection path take over the function of working path. In restoration techniques the data is routed in the working path of the network itself no extra resources are assigned.

2. Survivability Classification

Optical survivability techniques are classified based on the allocation of path resources in optical network

[1] Protection

[2] Restoration

Protection: In protection technique the resources are pre reserved. If any fault occur these reserved resources take over the functions need to be

Experimental Study of High Performance Computing in Three Tier Architecture for E-Health Care Application

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***Abstract*:**

The technological advancements in the field of Bio-informatics provided various methods and architectures for continuous monitoring of health status of different patients to prevent from life threatening events. Various systems available in healthcare monitoring require highly skilled professionals, major systems are in use have sensors with wires for data acquisition, causing discomfort to the patients while monitoring. It also requires more labor works to collect, analyze and store the medical information. Such systems provided a limited number of services at high maintenance cost. To resolve these issues and enable physicians to work more efficiently, best among all technologies need to be integrated. Our proposed concept would help to reduce response time in emergency situations by utilizing Wireless Sensor Network to monitor patients with the integration of best available technologies. This paper is based on the experimental study of high performance computing in a multi layered architecture which includes the integration of Wireless-Sensor with grid and cloud computing.

Keywords*—sensor grid; e-Health; cloud, High performance computing;*

1. Introduction

Healthcare monitoring systems are one of the most critical and important diagnostic systems in the serious care units of hospitals providing continuous display and interpretation of the patients' vital functions. The need for continuous health monitoring is essential in life threatening situations of a patient or in a critical physiological state. Most of the people in the world do not have the opportunity to get optimum healthcare which is limited by its cost and accessibility. The past few decades have seen major advancement in medical field [2]. Wireless Sensor Network is rapidly emerging as an important area in mobile computing. Various sensors attached in the patient's body will measure the physiological signs and transmit the data through a mesh network to the central server [3]. Wireless Sensor Network research has recently gained unprecedented momentum in both industries and academics, especially for its potential applications in medical field [15], [19]. The amount of sensors used in real time monitoring will continuously measure and transmit the sensory data to the central server, as the complexity of the

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EMAIL CLIENT AUTOMATION WITH RPA

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ABSTRACT: In today's internet era Electronic mail (Email) is a widely used communication channel commonly used to control customer inquiries such as complaints, feedbacks, reviews, and suggestions. With an increase in the number of customers, there is a significant increase in the emails being received daily, which needs to be segregated, to ensure that a proper reply is sent to all the senders in an organization and to prevent overwhelming and messy email accumulation. Now, the problem with the traditional method is that a manual workforce team cannot sit and segregate every email as the humongous amount of emails get generated daily. Apart from that it is quite a tiresome job and cannot be done by a single employee or a team of employees. So, the businesses industry and other industries can simply automate the email processing task of segregating common emails into specified folders as per the organization's requirements. The proposed system is a smart email client prototype that automates the task of email segregation and routing and by providing fixed reply using Robotic process automation (RPA) that runs on UiPath software.

KEYWORDS: Robotic Process Automation, Electronic mail, Identification.

I. INTRODUCTION

More than half the global population uses email application. The email communication services have become an inexorable part of human lives. In the year 2019, the number of email users reached the 3.9 billion mark. In 2020 it is expected that the number of email users to rise to 4 billion. The predicted user growth rate for the next four years is 3 percent, which is around 100 million users more each year. So, in 2023 the number of email users worldwide should be approximately 4.3 billion [11].

The number of emails sent and received per day, even in a midsize organization, is large and requires huge storage size. With the recent development of technologies that can store and manage big data, these high volume emails can be handled effectively. But managing the mail for taking cognitive decisions on hourly, or even daily, basis requires a lot of manual effort and high overhead cost. In addition to huge volume, the variety in its content (subject matter of discussion) may require human agents to possess knowledge in various domains to be able to manage these emails.

Given the workload that emails generate, there has been a longstanding desire to automate various aspects of email processing. Suppose a support Organization that needs to answer thousands of emails that get bombarded at their inboxes for a response, then that organization could get away from such a situation and have RPA look after them. Emails can be segregated into groups and responses to such emails can be given by the RPA solution whereas the critical ones which are not ascertained into a group can be handled by the respective personnel.

Due to the increase in the number of incoming emails, the user needs more efficient work on how to respond to the query. Some of the other aspects that need to be dealt with are tagging and prioritizing incoming emails, moving incoming emails to different locations, labeling emails with richer data as sender or receiver, Sending emails only at a particular time or context, Sending an email to only the right people.

II. LITERATURE SURVEY

This study provides a hypothesis that CBR methodology can be used to solve the email overload problem. Real-world email data sets have been analyzed to investigate the potential for applying CBR. The analysis shows that future questions could be mapped by utilizing similar previous questions and reusing the answers given to them[1].

This study sheds light on the opportunities for automating email processing. Email management consumes significant effort from senders and recipients. Some of this work might be automatable. A mixed-methods need-finding study done to learn: (i) what sort of automatic email handling users want, and (ii) what kinds of information and computation are needed to support that automation[2].

This study gives an insight into, a novel end-to-end system for automatically generating short email responses. The core of the system is state-of-the-art deep LSTM models that can predict full responses, given an incoming

Thin Film Transistors For Display Applications:
A Review

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Abstract

Display devices playing vital role in presentation of information in visual, there are plenty of display device technologies are used to represent the visual information in its own way, the electronic display devices are the one prominent area of improvement based on the modern electronic improvements. The technological advancements in the semiconductor industries and the modern physics leads to provide the various improvements in the thin film transistor-based display devises. The uses of TFT based display devices in various electronic gadgets gives the scope of improvements in the solid-state display devices. This paper deals the comparative study of various technologies and the scope of improvement in the thin film-based display devices.

Keywords—*Thin film based transistor display, solid state display, Amorphous, ZnO, Thin-Film Transistò rs, MISFET*

I. INTRODUCTION

The TFT display technology is one variant of Active matrix LCD to improve the quality of image. In the TFT panel design, the new Thin Film semiconductor technology uses the small transistor switches and capacitors in all the pixels of the display panel. By using film deposition methods like plasma deposition, sputtering, photolithographic and etching techniques IC designs are made. More over similar principle used in the monolithic chip fabrication, transistor design, capacitors and on a glass substrate metal addressing lines are deposited to make the required structures. The various types of machineries are utilized here and is considered for the process in Traditional fabrication.

The widely used conventional addrè ssing line architecture in thin film transistor panel, is a column "data" driver to parallelly to provide and maintain the required potential voltages for each pixel, which is enabled and selected by a horizontally scanning driver circuit. The driver circuit for scanning makes the TFT to be on which in turn switches on and charges the capacitor on that row consisting of each pixel. If TFT is turned off, the capacitor holds the charge in the pixel at the needed potential voltage (i.e polarizing -> conductivity -> illumination) levels up to the next refresh cycle. Due to the active TFT's being on in the pixel matrix, which may be called as an Active Matrix TFT display panel device.

Since every pixels are isolated from each other, as soon as the switch of the TFT turns off, No pixel interference problems for Amorphous TFT panels, and isolating the column lines with respect to

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COAL MINE SAFETY MONITORING DEVICE

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ABSTRACT
Safety monitoring systems and personnel positioning systems are essential to save hundreds of people's life in coal mining sectors. The conventional coal mine safety monitoring systems widely uses wired network to transmit the signals. Coal mining workers are facing accident with poisonous gas leakage, fire explosion, flood while mining, pressure variation and it is impossible to lay only on cable-based safety systems. Hence, the present study developed a sophisticated wireless coal mine safety monitoring device with gas, temperature, fire, and pressure monitoring sensors. The design used STM32 microcontroller and gives an alert when the parameters exceed the desired levels. Experiments show that the designed system is highly stable in performance, precise in measurement and aids in improving mine safety. Hence, implementation of the proposed model can reduce the accident rate to a greater extent in mining sectors.

KEYWORDS
Wireless sensor network, monitoring sensors, safety devices, sensor-based systems

I. INTRODUCTION
Coal being one among the primary resource of electric power generation and it boosts the rapid growth of the industrial sector in India. Coal has immense demand and through which accounts 70% of the total power generation in the country. Currently, a total of 493 coalmines are active in India [1]. The importance of coal in the energy sector is indispensable. The working environment in a coal mine always puts its inhabitants into a life-threatening hazardous situation. Coal mines have accounted for the highest number of casualties due to accidents in mines [2] and highest fatal accident rate reported from India [3]. Over the past few years, there is enormous increase in exploitation zones where numerous unseen threats are obscured out. The presence of highly inflammable and poisonous gases is reported from coalmines. There is a high chance for the leakage of poisonous gases such as carbon monoxide, methane, and explosive natural gases. Further, flooding in the coalmine, collapsing of mine stones, toxic gases arising from mine fires, mining-induced seismicity cases also reported. There is high demand for safety apparatus to protect the coalmine workers from these disasters. Usage of accurate and sophisticated apparatus will protect the coalmine workers from such incidents, can minimise chances of catastrophic accidents to occur and accident rate can be reduced significantly. Hence, the present study aims to design a sophisticated system with a sensor to alert the coalmine workers.

II. PROBLEM STATEMENT
Approximately thousands of workers die in coal mining due to the various types of accidents. The given graph (Fig. 1) shows a trend of deaths that occurred from 2002 to 2017 in India, the USA, and other Western countries. It is observed that Indian underground coalmining has experienced more fatal accidents than other countries [3].

Fig 1. Fatal Accidents from 2002 to 2017 occurred in India, the USA, and other Western countries [3].
   The conventional safety precaution system currently used is a wired network system. As expansion underground increases, it became difficult to install these monitoring systems. Also, the installation of these

The Growth of Semiconductor thin layer on Silicon Substrate Using Sol-Gel Method

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Abstract

The semiconductor galliumnitride (GaN) thin film was efficiently grown on the Sisubstrate with sol-gel method. The gel is prepared from gallium-citrate-amine crystals. These crystals are formed from a solution contains Ga +3 ions and citricacid(CA). The gel is placed on the substrate and then the substrate. The gel layers obtained are then rotated at a rate of 1100rpm programmable furnace. Deposition temperatures varied at 800°C, 900°C, and respectively 1000°C in a nitrogen gas environment within 2 hours. The results were characterized by XRD measurement. Surface morphology and cross-section of the film observed by SEM imaging, and film composition was determined by EDX characterization. Characterization Result showed that all GaN thin films deposited on the silicon substrate had polycrystalline orientation. The crystal quality of the GaN film formed is influenced by the deposition temperature. Its observed that by increasing the deposition temperature can improve quality of deposited GaN film crystals.

Keywords: GaN thin-film, SiliconSubstrate, Spin-coating technique.

1. INTRODUCTION

Semiconductor GaN seems to be a material that has a wide energy band gap with direct transition structure (Eg=3.45eV at room-temperature). It has high mechanical strength, transport properties good electricity and a good fit in the heterostructure with InGaN and AlGaN make this nitride being the prominent candidate for a variety of applications. To date, the GaN layer isdeposited on top of Al_2O_3 substrate is anactive material which is very important for electronic and optoelectronic devices, like ultraviolet photodetectors, light emitting diodes and laser diodes that operate at wavelengths visible light, transistor devices, displays, data storage devices that have high mobility available to operate at high temperature, high frequency and high power [4,10]. Some researchers have successfully deposited a thin layer of GaN on top of various types of substrates such as Al_2O_3, 6H-SiC, ZnO, SiC, Si, and so on [2,5], using various deposition techniques, such as reactive radio-frequency (RF) sputtering, plasma assisted molecular beam epitaxy (PA-MBE),metal organic vapor phase epitaxy (MOVPE), metal organic chemical vapor deposition (MOCVD), plasma

Real Time Object Detection for Autonomous Vehicles

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Abstract - *The number of road accidents has been enormously increasing with the number of vehicles on road. Road accidents occur for a variety of reasons. Often, drivers are distracted while behind the wheel, taking their focus away from the road. In other cases, drivers can become tired after spending multiple hours at the wheel, resulting in preventable errors. Sometimes, accidents occur for a combination of reasons, from bad visibility to unsafe road design, or other drivers lack caution. While the causes of accidents can vary, the consequences are often the same, resulting in everything from vehicular and property damage to serious injuries. The project implements an efficient means to detect the object using haar cascade classifiers and python programming.*

Key Words: **Accidents, Haar, Python, Object detection, Autonomous vehicle**

1. INTRODUCTION

Vehicle accidents are unfortunately very common in India and the majority of these road crashes are caused by human error. While some are relatively minor, thousands of lives are taken every year by these horrible car crashes. A serious road accident happens every minute in India and almost 16 people die every hour.

Automation is very much into use and the process of automation is being used in different fields including vehicle automation. There is always a scope to make human efforts put into to be reduced and the same is the case with the autonomous vehicle. With the increase in the number of vehicles on the road, the rate of accidents is also increasing every passing day. The project intends to develop an algorithm for autonomous vehicle which helps detect traffic sign boards, pedestrians and other vehicles. The autonomous vehicles present today have features such as obstacle detection but by making use of lidar, radar, and ultrasonic sensors to track objects in the environment. The objective is to create Haar feature-based cascade classifiers by training the system with an appropriate amount of traffic related information in order to detect vehicles, pedestrians and traffic signs in real-time. Thus the system in addition to driving assistance/collision avoidance, could further find its application in tracking and recognition. The algorithm is highly efficient and quick since haar classifier makes use of the concept of integral

image creation which reduces the computations involved in calculating haar features. The higher granularity filters can be used for an efficiency of up to 98%.

1.1 Objective of Work

This paper aims to develop an algorithm to detect traffic sign boards, pedestrians and other vehicles on the road to ensure that the driver can have a smooth and comfortable drive. The project here intends to effectively detect the same by using modern tool of deep learning called haar and the programming language used here is python.

1.2 Advantages of Real Time Object Detection

1) The system will help in identifying the traffic sign boards and alert the driver about the same. This helps in following the basic traffic rules.

2) The pedestrian detection algorithm will alert the driver of any pedestrians and avoid unnecessary collisions.

3) Vehicle detection algorithm provides navigation assistance and also helps in avoiding collision with other vehicles by alerting the driver at the earliest.

2. LITERATURE SURVEY

This study describes a novel system for the automatic detection and recognition of text and symbol in traffic signs. Search regions with in the image must be defined. In this particular region locate a large number of candidates, which are then reduced by applying constraints based on temporal and structural information. This problem can be divided in two stages. First stage will be detection of region and second will be character recognition. The detection stage exploits knowledge of the structure of the scene, the size and location of the road in the frame. Once a potential traffic panels has been located, the next stage attempts to recognize text and symbols within the region. For the purpose of text detection MSER is used and for recognition purpose optical Character Recognition method is used. Automatic testing using XML files provide better accuracy [1].

This study describes a novel concept of a trainable similarity measure which alleviates these shortcomings. The similarity is based on individual matches in a set of

An Efficient Kannada Language Based Agricultural Helpline System for Agriculturist Using IoT

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Abstract

The majority of the population in India depends on agriculture as a primary income source. In overall national growth agriculture plays a major role. To fulfill the food-grain need of the society farmers need to know the type of crop, soil, water resource, fertilizer and market. Depends upon local resource availability and market condition farmers have to cultivate grains. The system developed to provide give information about each crop of farmer interest. The developed system adopted the local (Kannada) language for communication, so information can be conveyed easily.

Keywords: *IoT, Agriculture, Speech recognition, crop, farmer, speech conversion*

1. Introduction

In India, 58 percent of the total population depends on agriculture as a primary income source. By survey, India is the second-highest producer of crops and textile raw materials. Agriculture is one of the income sources for the Indian economy. In the village, agriculture employs people. It also supplies raw materials for many of the small scale industries, so it improves the financial system produced by industry.

Ministry of Agriculture and Government of India introducing many schemes for the agriculturist to yield. All the information regarding the government scheme will be made available on the internet for any time reference. But some of the farmers in rural places are not aware of website usage, the information uploaded may not reach to them. The system developed that gives the enquired details through a voice message so the knowledge may reach all.

In the developed system person asking for the specific crop details orally and the information regarding it made available over the speaker. The most important thing here is the proposed system gives guidance in local (Kannada) language. So the details about crops, fertilizer, market conditions, and government schemes can easily reach to the interested agriculturist.

2. Methodology

Figure 1 shows the experimental arrangement of the help desk, voice input is given into the computer through a microphone in Kannada language. The user specifies the crop name as the input. In the database each crop indexed with a number. Once an input voice signal converts into text it matches the database and corresponding index displayed on the screen. Suppose text

A Review on Power Reduction Techniques in Low Power VLSI Design

Taranath H B, Velen Ruben Aranha, Rajesh Kamath

Abstract

The paper investigates different techniques used for the reduction of power in VLSI design at different levels of abstraction. The field of computing devices and wireless communication system seamlessly requires the ability to perform complex functionality with higher computation speed and with minimal power consumption. Hence, recent VLSI designs mainly focus on optimizing speed and computation ability, which automatically inherit the power dissipation in the form of dynamic power dissipation and leakage power. These powers are an important fraction of the total power dissipation of integrated circuits. Many cogent power reduction techniques are surveyed which involve reducing dynamic power using supply voltage reduction, reduction of threshold voltage, various power gating techniques. This paper also includes future challenges the blend of traditional and present power reduction techniques.

Index Terms: *Low Power, Dynamic Power Dissipation, Leakage Power, Power reduction.*

I.   INTRODUCTION

Multi million gates on a single chip, with the design of such a smart system, there is a need of bringing more efficient devices which are smaller in size and which also consume less power. Today they are manufactured at a very high rate and now they consume a space lot more than they used to. The foremost concern of VLSI engineers was Area, Performance and Cost. Power has always been a secondary concern. Current trend has given more weightage to Area, Power and Performance (Delay) due to portable communication devices. The high-speed computation devices with complex functionality is a growing trend which also demands a low power consumption.

The objective of this paper is intended to provide a background and outlook for people who are interested in developing low power design technology.

II.   POWER DISSIPATION

Power management is important in VLSI Design because of the costs associated with packaging and cooling of chips, standby time and battery life, to achieve Digital noise immunity and more over Environmental concerns.

The power consumption in a device is categorized into two distinct components, one is dynamic, some of the time called switching power, and another one is static: in any case called leakage power. When the process geometries are smaller than 90nm, leakage power is observed to be the ruling consumer of the total power consumption. For larger devices, the major contributor to the power dissipation has been the switching power. Different effective power reduction strategies at different levels of abstraction can be effective in minimizing both types of power dissipations.

The total power dissipation depends on various parameters such as value of capacitance, switching activity. Other important parameters such as supply voltage, and the structure of transistors are also important contributors.

Total power is the sum of the dynamic (in other words Switching power and Short-circuit power) and Static power (also known as Leakage power)

Total Power = $P_{switching} + P_{short-circuit} + P_{leakage}$

Switching power and short-circuit power are the factors that add up to result as Dynamic power.

Identifying the stabilising regions of PI controller based on frequency specifications for a lab scale distillation column

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Abstract: The aim of the study is to design and implement decentralised PI controller for a lab scale distillation column based on the frequency specifications. Designing an effective PI controller for an MIMO process is a challenging task because of the loop interaction and system with dead time. In order to eliminate these interactions between the control loops, an ideal decoupling technique is implemented and first order plus dead time model is obtained for each decoupled subsystems. By plotting the boundary locus for each subsystems based on the desired gain and phase margin in (k_p, k_i) plane a wide range of PI values are obtained. Also, the performance measurement calculations were compared and tabulated for various values of k_p and k_i with the boundary locus. In this present research the pressure and temperature near the bottom of the column is considered. It is also shown that the system become unstable when the value of PI controller is selected outside the boundary locus.

Keywords: boundary locus; decentralised controller; gain margin; phase margin.

Robust design of proportional integral controllers: a Taguchi-grey approach

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Abstract: This paper aims to apply a statistical approach for a robust design to determine the optimum levels of proportional integral (PI) controllers by considering the noise parameters in the control engineering arena. Taguchi's robust engineering methodology and grey relational analysis (GRA) methodology are utilised for multi-objective optimisation of the process parameters. Taguchi method is effectively applied to ensure the robustness of the controller designed under the set range of model parameter uncertainties, which cause undesirable variation in the PI controller's performance. The ascertained optimal parameters from the Taguchi-Grey approach are subjected to simulation analysis to determine the settling time and performance indices. During the study, it is reconfirmed that statistical tools' application assists in developing a robust controller design in a structured manner. Moreover, it is observed that the approach helps in multi-objective optimisation by accommodating both control and noise parameters in the control system design.

Keywords: robust design; PI controller; performance index; Taguchi method; grey relational analysis; simulation; multi-objective optimisation; noise parameters; Servo response; regulatory response; first-order-plus-time-delay.

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Significance of injection pressure on the overall performance of common rail direct injection engine using dairy scum oil methyl esters

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ABSTRACT

The advantages of common rail direct injection engine, including more power, less noise and vibration, lower specific fuel consumption, precise injection timing and control over the mass of fuel injection, make the engine more popular and adoptable in all the transport vehicles by the automotive manufacturers across the world. The production and use of dairy products across the world is increasing rapidly and much of the scum obtained during the processing of dairy products is unused and discharged to atmosphere as a waste product which further leads to an adverse effect on the environment and grubby surroundings. The present study aims to use the dairy scum methyl esters in common rail direct injection engine for its adaptability and evaluate the engine performance in comparison with diesel fuel. Injection pressure is primarily the vital factor which persuades the performance of the engine, as the atomisation of the fuel depends on it. Hence, in the current study the injection pressure is augmented in the range 600–1000 bar by keeping the injection timing stable. The results revealed that the augmentation of pressure curved to raise the brake thermal efficiency and lessen the emissions.

Nomenclature

BTE:	Brake thermal efficiency
DSOME:	Dairy scum oil methyl esters
CR:	Compression ratio
IT:	Injection timing
IP:	Injection opening pressure
CA:	Crank angle
HRR:	Heat release rate
ECU:	Electronic control unit
DSOME B20:	DSOME Biodiesel 20% by volume
CRDI:	Common rail direct injection
HC:	Hydrocarbons
CO:	Carbon monoxide
NOx:	Nitric oxide
BTDC:	Before top dead centre
CO_2:	Carbon dioxide
ppm:	Parts per million
HSU:	Hartridge smoke unit
N:	Revolutions per minute
W:	Load

1. Introduction

The biodiesel is thought to be significant as a substitute fuel for diesel engines and is essential nowadays as the conventional diesel reserves are limited in source and commercial users for various applications are increasing significantly. At the same time the government has imposed stringent environmental regulations to minimise the harmful pollutants. In this context, the researchers are concentrating on exploring the various properties, performance of the biodiesel obtained from different sources and their effect on the environment prior to wide adoption in practical applications.

Khan et al. (2018) established that biodiesel production can be accomplished by a single-step transesterification process from Pongamia pinnata, Jatropha curcas, Calophyllum inophyllum oil to meet the energy demands in the present situation and biodiesel is widely employed in diesel engines to face the problem of environmental pollution and limited sources of diesel fuel. The authors Jaikumar, Bhatti, and Srinivas (2019) explored that the compression ratio is the vital factor which persuades the overall performance of the engine, using biodiesel obtained from Niger seeds. The blend ratio B20 showed overall good performance compared to the diesel with regard to brake thermal efficiency (BTE), heat release rate, peak pressure, unburnt hydrocarbons and CO. Duda et al. (2018) employed biodiesel from swine lard and turkey lard oil in CRDI engines. The authors reported that higher injection pressure leads to an increase in specific fuel consumption than that of diesel. As a result a considerable drop in brake thermal efficiency (BTE), HC, CO and CO_2 were noticed, whereas NOx emission was found to be increasing.

Khandal et al. (2018) in their experiment used the nozzles with different diameter holes with Honge oil biodiesel by varying

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Characterization of Aluminium Iron Intermetallic Produced by Stir Casting

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ABSTRACT:

Iron is the most common impurity found in aluminium. It has a high solubility in molten aluminium and is therefore easily dissolved in the liquid state of aluminium, however its solubility in the solid state is very low. The low solubility of iron in the solid state is accompanied by decreased ductility as a result of the formation of intermetallic phases like AlFe and/or AlFe$_3$. These intermetallic phases increase the strength of the aluminium alloy. They also enhance corrosion resistance. Intermetallic phases based on the high activity of aluminium have very attractive properties such as low density, high melting point, high thermal conductivity, excellent oxidation, hot corrosion resistance and good mechanical properties. In the present work, the formation of intermetallic of Aluminium and Iron is obtained by preparing the intermetallic by stir casting route. The tensile properties, hardness and topography are explored. The ultimate tensile strength was found to be enhanced by around 30% when the volume fraction of Iron in the intermetallic increases from zero to 6%. The average hardness was found to be increased from 62VHN to 69 VHN.

KEYWORDS:

Aluminium; Intermetallic; Ultimate tensile stress; Hardness; Scanning electron microscopy; Topography

1. Introduction

Pure aluminium is weak having a tensile strength between 90 to 140 MPa, however, wrought aluminium in its alloyed form has higher strength and is similar to structural steels. It is mainly used for electrical conductors and for domestic products. However, for structural use it has to be strengthened by alloying. Aluminium alloys are used extensively in making mechanical parts due to its high specific strength (strength/density). The main usage of aluminium alloys is in applications requiring lightweight materials as in aerospace industries and in automotive industries. The second important property of aluminium is its resistance to corrosion. Aluminium has a strong protective oxide layer which prevents continues corrosion of the base material. Therefore, a lot of work is done to achieve better properties of aluminium by alloying, heat treatment and other processes. On the other hand, aluminium has a big disadvantage of having a low melting temperature which put limits on the temperature range of applications [1].

Iron is the most common impurity found in aluminium. It has a high solubility in molten aluminium and is therefore easily dissolved in the liquid state of aluminium, however its solubility in the solid state is very low (~0.04%). The low solubility of iron in the solid state is accompanied by decreased ductility as a result of the formation of intermetallic phases like AlFe and/or AlFe3. These intermetallic phases increase the strength of the aluminium alloy. They also enhance corrosion resistance [2]. Intermetallic phases based on

the high activity of aluminium have very attractive properties such as low density, high melting point, high thermal conductivity, excellent oxidation, hot corrosion resistance and good mechanical properties. Intermetallic compounds have potential use in systems requiring excellent behaviour of materials in aggressive environments such as steam generators and coal-fired gas turbine. It has high resistance to high temperature oxidation and lower density compared to conventional Fe and Ni based alloys [3-5]. High temperature strength and superior oxidation resistance makes intermetallic materials exceptional candidates for use in high temperature component design. It provides not only longer equipment service-life but the potential to operate at above normal temperatures. Promising applications include heat-treating fixtures, transfer rolls for hot metal processing, forging dies and radiant burner tubes [6-7]. In this study the Aluminium Iron composite is manufactured by stir casting route and the cast material is subjected to various mechanical characterization tests.

2. Experimental work

The base material used in this study is the commercially available pure aluminium (Al6061) having the composition as shown in the Table 1. The electrolytic iron powder (grade: PM-300) used is collected from SERENA INC, Bangalore, India. The iron powder composition is shown in Table 2. The appearance of powder is Amorphous, lustreless and grey in colour. A calculated amount of commercially pure aluminium is charged into the crucible and melted in the electric furnace.

OPTIMIZATION OF WIRE EDM PROCESS PARAMETERS FOR MEDICAL GRADE NICKEL TITANIUM SHAPE MEMORY ALLOY

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Abstract: Nickel Titanium (NiTi) alloys are the class of smart materials classified under shape memory alloys. The traditional machining of these alloys is hard because of various inherent mechanical characteristics of these alloys. Therefore, non-traditional machining process such as wire electro discharge machining (WEDM) has been employed for machining of such alloys. The present study is focused on multi-performance characteristic simultaneous optimization of WEDM process parameters, in which three system control factors, namely, pulse on time (T_{ON}), pulse off time (T_{OFF}) and wire feed (WF) are considered for simultaneously maximizing material removal rate (MRR), while minimizing surface roughness (SR) and tool wear rate (TWR). The simultaneous optimization is performed using Taguchi's Quality Loss Function. Analysis of means and analysis of variance have been carried out to identify the significance level of each system control factor. The different levels of settings and the optimized setting have been analysed using scanning electron microscope images for surface morphological studies. The multi-response optimization investigations revealed that T_{ON} is the major contributing factor and optimal performance values were obtained at T_{ON} of 125μs, T_{OFF} of 25μs and at WF of 4 m/min.

KEYWORDS: Nickel Titanium; shape memory alloys; Simultaneous optimization, Quality loss function

1   Introduction

Nickel-Titanium(NiTi) or Nitinol alloys are the unique group of shape memory alloys (SMA), which are in continuous demand from last decade due to advanced material characteristics such as higher corrosion resistance, shape memory effect, super elasticity, biocompatibility etc [1,2]. As these alloys have different types of properties, they are successfully used in variety of applications in the area of defence, aerospace, automobile and especially in biomedical engineering [3]. These NiTi SMAs possess high ductility, high strength, poor thermal conductivity followed by higher tool wear and hence non-traditional machining processes are much preferred over traditional machining for such alloys [4]. Wire electro discharge machining (WEDM) is one such non-traditional machining and electro-thermal process used to machine hard and conductive materials [5]. WEDM is a preferred choice of researchers and industry people for machining hard and conductive materials with complicated and intricate shapes [6,7]. NiTi SMA is also hard and conductive material that requires a non-contact type machining for retaining its shape memory effect even after machining process [8]. As the NiTi SMA, WEDM process, and the related testing facilities

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PAPER

Dry sliding wear characteristics of multi-walled carbon nanotubes reinforced Al-Si (LM6) alloy nanocomposites produced by powder metallurgy technique

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Abstract

The present work involved the production of Metal Matrix Composites (MMCs) of Aluminium Silicon (Al-Si) alloy reinforced with Multi Walled Carbon Nano Tubes (MWCNTs) using Powder Metallurgy (PM) process. MWCNTs with concentrations of 0, 0.25, 0.5, 0.75 and 1.0 wt% were used. Validation of dispersion nature, existence and chemically stable of MWCNTs carried out using Transmission Electron Microscope (TEM), X-ray Diffractometer (XRD) and Energy Dispersive Spectrum (EDS) for fabricated composites. Sliding wear investigations were investigated in accordance with the ASTM G99-95a standard. Test variables such as sliding distance, load and speed were examined. Under a given load with sliding distance, the wear rate was found to reduce by varying disc rotation speed between 250 to 750 rpm. The rate of wear is dropped suddenly with the increment in sliding distance from 500 m to 1000 m. However, for 1500 m sliding distance, the wear rate increased linearly for all nanocomposites. The reinforcement of 0.25 wt% and 0.5 wt% of MWCNTs shown lower wear resistance and further addition of 0.75 wt% MWCNTs shown enhanced wear resistance but the addition of reinforcement of above 0.75 wt% resulted in slightly higher wear rate. The wear resistance enhanced due to the excellent properties of reinforcement particles. The Scanning Electron Microscope (SEM) was used for identifying the kind of wear mechanism.

1. Introduction

In the present market, most of the production engineering sectors choose Aluminium [Al] alloys for light weight applications due to its lower density. These alloys are chemical resistant, better ductile and strengthened material than pure soft silver color Al. The automobile, aircraft and some other engineering segments have shown restraints to use of Al alloys due to its limited strength, rigidity, wear and friction resistance. Recently, Al and Al alloy-based composites, particularly Al nanocomposites were developed to accomplish the need for required mechanical properties, thermal performance, wear resistive, low denser, low energy consumption in manufacturing and ease to make any required component profile [1, 2]. Mechanical ball milling route improved particle refinement in Al-Si alloys. The Si substance enriched the mechanical properties in terms of lengthening the limits of solid solubility. This led to better uniform distribution causing higher strength in alloys. Milling and rolling were also found to dissolve Si elements effectively into Al. Currently, Carbon Nano Tubes (CNTs) are being explored as reinforcements to be added to Al alloys. CNTs have higher specific strength and stiffness properties. The collective techniques of particle refinement, alloying and MWCNTs reinforcement have been reported to offer strength coupled with ductility [3]. The literature reviewed shows that for effective distribution of CNTs in the Al matrix, a high energy mechanical ball milling fabrication technique is used. This method,

RESEARCH ARTICLE

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Significance of the type of reinforcement on the physicomechanical behavior of short glass fiber and short carbon fiber-reinforced polypropylene composites

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In the present work, short glass fiber (SGF) and short carbon fiber (SCF)-reinforced polypropylene (PP) composites are fabricated using twin-screw extrusion and injection molding techniques. The SGF and SCF are reinforced as a single and hybrid reinforcement into the PP matrix with the same weight percentage (wt%) and the obtained composites are characterized for physicomechanical properties. It is observed that the tensile and flexural strength and modulus of elasticity of PP are improved by increasing the weight percent of reinforcement in the composite. The highest value is observed for composite with 30 wt% of SCF reinforcement; hybrid composite with 10 and 20 wt% of the mixture of SGF and SCF proves to outperform the other composites with the same weight percent of SGF and SCF added individually. The notched Izod impact strength of SGF + PP composite at 30 wt% is found to be the highest amongst all. Furthermore, the increased presence of SCF improved the tensile and flexural properties; however, it was not able to improve the impact strength significantly.

KEYWORDS
hybrid composites, mechanical properties, polypropylene, short carbon fiber, short glass fiber

1 | INTRODUCTION

Polypropylene (PP) is a semicrystalline engineering thermoplastic, widely used in automotive parts, home appliances, extruded profiles, packaging industry, construction, etc., due to its low cost, low density, easy processibility, and well-balanced mechanical, physical, and chemical properties.[1-14] However, its use is limited in many engineering applications where good mechanical and thermal properties are required, due to its low Young's Modulus, strength, and thermal conductivity.[2] In order to provide a cost-effective solution, research in the last decade has mainly focused on reinforcing the PP with short fibers to improve its mechanical and thermal properties. The hybridization of fibers in the polymer matrix can increase the mechanical properties of single fiber-reinforced composites and reduce its limitations in many engineering applications.[3] A number of researchers have investigated the effect of glass and carbon fiber (CF) reinforcement on the PP matrix. Unterweger et al[6] studied the characterization of CF surfaces and their impact on the mechanical

Study on Fracture Toughness of Layered Structure for Fail Safe Design

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Abstract-

The aim of the current work is to test the development of a failsafe design. The design consisted of dual layer structuredround bar fabricated by press fitting. Mode II fracture toughness was measured with circumferential notch test pieces subjected to shear force. Two sets of test pieces were prepared. The first set was made up of dual layered Al6061T6 alloy. The second set was made with Al6061 T6 alloy as outer layer and inner layer was made with AISI1045 steel. A rod of Al6061T6 alloy is also subjected to shear to determine fracture toughness. Fracture toughness values are calculated using modified Kienzler and Herrmann'sequation. The measuredfracture toughness values indicated an improvement of 18% in the case of Al6061T6 alloy dual layered structure and 33.33% in the case of AISI1045 steel inner layer and Al6061T6 alloyouter layer structure.

*Keywords:*Fracture toughness; Mode II fracture; layered structure; shear test.

1. Introduction

Fracture is the major failure mode in mechanical structures which lead to breaking down of components without any prior indication before the estimated safe working life. Many researchers have conducted extensive work on fracture mechanics to understand the phenomenon and developed many theories. But still many areas are left unexplored. Determination of fracture toughness is a significant approach to estimate the fracture strength of the materials. Researchers have established many ways to measure the fracture toughness of the materials. But these methods suffer a major problem that, they require very expensive equipment and accurate preparation of the specimens and require lot of time and cost. To overcome these problems many researchers have developed nonstandard methods to measure fracture toughness which are economical in terms of time and money, but achieved good approximation of the results. In most of the real life applications this approximate values are sufficient [1-6]. The fracture process consists of two phases, first steady state of crack growth which spans over the safe life of the component and the second unsteady fracture which usually occurs suddenly. There are well developed standard practices and specimen requirements to measure the fracture toughness are explained in ASTM E399 [4]. Kienzler and Hermann [7] developed a numerical approach to measure the Mode I fracture toughness using energy conservation in elementary beam theory and obtained the results very well matching with the results obtained by other standard methods. Ricci and Viola [8] developed the equations for all three modes of fracture toughness for a T-section beam with an edge crack and extended it for a rectangular cross section of the beam. According to this study, the extended equations of stress intensity factor for rectangular cross section of the beams subjected to shear is given by Equation (1).

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ENHANCEMENT OF MECHANICAL STRENGTH BY SOLID REINFORCED

COMPOSITE TUBE – A SAFE-FAIL DESIGN

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ABSTRACT

The failures due to fatigue are dangerous phenomenon because such failures tend to cause sudden breakdown of structures. The fatigue failures are premature in nature which not only causes functional damage to the structures, but also leads to the wastage of huge amount of material, the natural resource. Hence it is essential to address this issue with improved mechanical properties of the materials leading to safe-fail design. Over the years many techniques are engineered for the development of safe-fail design. The present work discusses about such a safe-fail design, wherein the enhancement of fatigue life is attempted by inserting a stronger material inside a weaker material. The various mechanical properties are explored and presented. The results showed the improvement in the overall mechanical properties of this composite structure of two materials.

KEYWORDS: Fatigue, Aluminium, Bending, Composite, Safe-Fail

Original Article

INTRODUCTION

Fatigue failure is a phenomenon in which a component fails due to repeated loading. Repeated loading condition in a component arrives when the stresses in it due to the load applied fluctuate between maximum and minimum values. In case of static loading condition the load is applied gradually giving sufficient time for the strain to develop. Whereas in case of repeated loading this does not holds good. Hence, machine member subjected to repeated loading have been found to fail at stresses which are very much below the ultimate strength and very often below the yield strength. Fatigue failure usually begins with a small surface crack, undetectable with naked eyes and grows rapidly deeper causing the component to fail [1-5].

Bayram et al. investigated three types of material whose fracture toughness tests were previously performed by using circumferentially notched round bars, namely 1) a dual-phase steel with three different morphologies, 2) an Al-Zn-Mg-Cu wrought alloy and 3) Al-Si cast alloys with three different Si contents, in terms of accuracy and reliability of the testing method. With using stress concentration factors, which were associated with the bluntness of the notch, correction factors for the fracture toughness calculations were derived. They have concluded that the corrected fracture toughness values were found to be close to the uncorrected ones. Furthermore, they also have emphasized that circumferentially notched cylindrical specimens can be readily used for rapid determination of fracture toughness of metallic materials because the specimen preparing and the test procedures are straightforward [6].

Bayram et al. studied 0.1 % C steel which has three different microstructures (using three different heat

Fracture Toughness Measurement of Aluminium and Steel Inserted Aluminium Using Numerical Method

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Abstract: - The aim of the current work is to test the possibility of improvement of fracture properties of a shaft fabricated by press fitting a rod inside a tube and explore the effect of interface on the crack propagation. Measurement of Mode II fracture toughness is considered for this purpose. In this study numerical method developed by Yong Li and Viola based on Kienzler and Herrmann's method by conducting a simple shear test on round bar specimen is adopted. Round bar specimens with a circumferential notch are subjected to shear test. Three specimens are prepared using Al6061T6 alloy tube inserted with rod of three different materials A6061T6 alloy, commercial pure Copper, and AISI1045 steel. Also a plain rod of Al6061T6 alloy is tested under shear to compare the results. Shear tests are conducted on Universal Testing Machine and fracture toughness values are calculated using modified Kienzler and Herrmann's equations. The results indicated an improvement of 18% in the fracture toughness values in the case of A6061T6 alloy rod inserted A6061T6 alloy tube compared to the fracture toughness of plain A6061T6 alloy rod. And when steel rod is inserted inside the A6061T6 alloy tube an improvement of 33.33% in the fracture toughness.

Keywords: Fracture toughness; Mode II; layered shaft; shear test; Al6061 alloy

1. Introduction

Fracture is the major failure mode in mechanical structures which lead to breaking down of components without any prior indication before the estimated safe working life. Many researchers have conducted extensive work on fracture mechanics to understand the phenomenon and developed many theories. But still many areas are left unexplored. Determination of fracture toughness is a significant approach to estimate the fracture strength of the materials. Researchers have established many ways to measure the fracture toughness of the materials. But these methods suffer a major problem that, they require very expensive equipment and accurate preparation of the specimens and require lot of time and cost. To overcome these problems many researchers have developed nonstandard methods to measure fracture toughness which are economical in terms of time and money, but achieved good approximation of the results. In most of the cases this approximate values are well sufficient [1, 2].

2. Earlier Work

2.1 Stress Intensity Factor – KI

The analytical procedure used for Linear elastic fracture mechanics relates the distribution of stress field and its magnitude near the crack tip, the stress applied to a specimen, orientation, size, and shape of a crack. In fracture mechanics, the stress intensity factor K means the stress field ahead of the crack tip in a structural member. The unit of parameter K is MPa√m, which indicates that it depends on the nominal stress (σ) in the member and the size of the crack. Hence different members with cracks or defects can be loaded to different values of K. Fracture of the materials have been classified into three major modes, called opening mode or Mode I, shearing mode or Mode II, and tearing mode or Mode III. The Fig. 1 illustrates the three modes of fracture [3].

Original Article

FRACTURE CHARACTERIZATION OF SISAL / BANANA HYBRID COMPOSITE REINFORCED POLYESTER COMPOSITES

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ABSTRACT

In the study, fracture and behavior of water absorption of sisal/banana hybrid composite fiber reinforced composites is investigated. Composites laminates were fabricated by hand layup and vacuum bagging method. For water absorption behavior each laminate having resin mixture and 6 plies of fabrics to achieve 5 mm thickness as per designation by different layers. For fracture characterization behavior each laminate consists of 16 plies to achieve thickness of 10 mm. The preparation of specimen and analysis was done according to ASTM standards. Water absorption and fracture toughness tests on these laminates were carried out. It was absorbed that maximum water absorption characteristics found in LA laminates. Maximum fracture toughness found in LI laminates.

KEYWORDS: *Banana and Sisal fabrics, Polyester Matrix Composites, NaOH solution*

1. INTRODUCTION

Now a day's natural fibers are familiar because of its advantages in terms of low price, low density, bio-degradable and easily processed. Premkumar naik *et al.* [1] investigated the areca fibers reinforced with phenol formaldehyde (PF) and concluded that composite plate of 300ml PF found tensile strength is maximum, 500ml PF found better moisture absorption resistance and 400ml PF found maximum bending stress. Laxman Naik *et al.* [2] studied the property of tensile strength of hybrid composite of sisal / glass fiber reinforced materials and concluded that, tensile strength of the only glass materials and hybrid of sisal / glass composites gives maximum strength compared with composites reinforced with sisal only. Premkumar naik *et al.* [3] studied the fracture & mechanical properties of hybrid of banana/sisal composite reinforced with polyester resin, he concluded that maximum tensile strength found in LD laminate and maximum fracture properties found in LG Laminates. Wong *et al* [4] worked on the fracture behavior of short bamboo fiber, highest fracture toughness was attained at 10mm/50 vol. % fiber composites and improved about 340 % compared to neat polyester. Avci and co worker [5] studied glass fiber reinforce concrete polyester by "Linear Elastic Fracture Mechanics (LEFM)". Specimen of "Single Edge Notch (SEN)" was applied and "Three Point Bending" test is loaded. In load displacement curve, confirm that raising both fiber content & resin

MECHANICAL AND WEAR CHARACTERISTICS OF MWCNTs/LM25 NANOCOMPOSITES FABRICATED THROUGH POWDER METALLURGY – AN INVESTIGATION

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ABSTRACT

In the current investigation, Aluminum Silicon LM25 alloy was taken as matrix material to which multi walled carbon nano tube nanoparticles with 0.0, 0.25, 0.5, 0.75, 1.0 and 1.5 wt.% concentrations were added as reinforcements to obtain composite material. The powder metallurgy technique process was adopted to fabricate nanocomposites. The fabricated nanocomposites were characterized using X-Ray Diffractometry and Energy Dispersion Spectroscopy. X-Ray Diffractometry was used to obtain the chemical compounds formed in the material while EDS was used to obtain the chemical composition and to ascertain the presence of MWCNT in the wear tested samples. Mechanical properties like density, hardness and elongation were obtained. Fracture mechanisms were identified using Scanning Electron Microscope. The better hardness and Young's modulus were obtained for 0.5 wt.% of MWCNTs reinforced nanocomposites in compare to other MWCNTs wt.% concentrations. The wear experiment was conducted in accordance with the G99-95a ASTM standard on a pin on disk wear testing apparatus. Wear nature was investigated for the applied loads of 10, 15 and 20N at disc speed of 750 rpm and traversing distance of 1500m. It was found that 0.75 wt.% MWCNT reinforcement showed enhanced mechanical properties and reduced wear rate due to increased hardness and lubrication properties of reinforcement.

KEYWORDS: Aluminium-Silicon alloy (LM25), Multi Walled Carbon Nano Tube (MWCNT), Wear, & Powder Metallurgy (PM)

Original Article

1.0 INTRODUCTION

Naturally available materials include wood and stone. From the engineering perspective, these materials find limited applications. Man Made materials such as steel and Aluminium (Al) have significantly improved the scope of the application of engineering from simple utensils to aircrafts. However, they have also met with challenges, particularly from the standpoint of weight of the designed components particularly for aerospace and automobile applications. In addition to this requirement, the material used must be stronger, durable and reliable to perform its intended function efficiently [1].

Al has been traditionally used owing to its availability, better specific strength compared to steel, formability and lower energy per ton of production comparison with steel. However, automotive, aerospace and several other engineering sectors opposed to utilize of Al and Al-Si alloys due to its narrow rigidity, strength and reduced friction and wear resistance [2-7].

THE EFFECT OF MACHINABILITY PARAMETERS ON AISI 4340 (EN-24) STEEL

USING TAGUCHI TECHNIQUE

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ABSTRACT

In the present project work, an effort has been made to optimize the turning process of AISI 4340 (EN 24) steel by using the statistical technique, called as Taguchi technique to study the effects of machining parameters like cutting speed, feed and depth of cut on the surface roughness and material removal rate. The experiments were planned and conducted as per the Taguchi's L9 orthogonal array, and the turning operations were carried out in dry cutting conditions by using high-quality multilayer-coated Titanium carbide tool insert. The aim was to establish a correlation between cutting speed, feed, and depth of cut with the surface roughness and material removal rate, and the correlations were obtained by means of multiple linear regression. The results have shown that all the selected parameters were highly contributing. The error generated in the experiments was comparatively very less than the contributing factors. The analysis of variance (ANOVA) revealed feed as the most influencing parameter for the surface finish and for material removal rate the study showed all the selected factors were almost equally contributing. Further, confirmatory tests were performed to make a comparison between the experimental results and the predicted results using the regression equation.

KEYWORDS: Taguchi L9 Array, AISI 4340, EN-24 Steel, ANOVA, Regression Analysis, Design of Experiments, Surface Roughness & Material Removal Rate (MRR)

Original Article

1. INTRODUCTION

Machinability is defined as, ease with which a tool is able to remove metal from the workpiece. The precise meaning of machinability is evolved with advancement of technology. The machining process of removing metal to form or finish a part can be done either with conventional methods like milling, drilling, turning etc. Or with less traditional methods that use electricity, heat, or chemical reaction (e.g. Electric discharge machining, electrochemical machining, chemical machining). In traditional machining, turning is most widely used process for machining (Cylindrical objects). In the current scenario of growing demand for products, the productivity also needs to be high. Hence, it is important to have high material removal rate. Quality is also a very significant parameter. Surface roughness is a measure of irregularities on the surface of machined products. It is necessary to have low Surface roughness. Hence, the relation between the two parameters has become very important in machining process. In this project, AISI 4340 (E.N-24) Steel is chosen as study materials which widely are used in automobile transmission systems, aircraft landing gears, structural parts and so on.

2. EXPERIMENTAL DETAILS

The materials that we used for our machining test is AISI 4340 Steel or EN-24 Steel. The material was tested for hardness, density and after machining them according to specifications; surface roughness and MRR tests were conducted. The specimens were initially 4.5m long rods of diameter 32mm which were extruded. The rods were cut into 4 smaller rods of approximately 1.12m long using band saw machine as shown in figure 1a. The smaller rods

CONSEQUENCE OF INJECTION PRESSURE AND NUMBER OF NOZZLE HOLES ON THE OVERALL PERFORMANCE OF DIESEL ENGINE OPERATED ON DAIRY SCUM METHYL ESTERS BLEND B20

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ABSTRACT

The diesel engine is widely used for transport and stationary applications. The main drawbacks of diesel engine are the emissions of oxides of carbon and nitrogen to the environment which indirectly cause many serious health issues. Keeping these factors in view the present study is carried out on diesel engine fuelled with scum methyl esters (SME) and its blend. Presently injection pressure (IP) and injector with different holes are the parameters considered for study and their influence on the performance of the engine. Results showed overall better performance with injector having five holes with enhanced injection pressure. It is perceived that the thermal efficiency slightly improved with decreased CO, HC and smoke as the injection pressure is increased. On the other hand hydrocarbon (HC) and carbon monoxide (CO) showed increased tendency compared to diesel operation.

KEYWORDS: Injection Pressure; Scum Methyl Ester; Pollutants; Heat Release Rate, Peak Pressure

NOMENCLATURE: CR: Compression Ratio; BTE: Brake Thermal Efficiency; IOP: Injection Opening Pressure; CA: Crank Angle, SME: Scum Methyl Esters.

Original Article

1. INTRODUCTION

Compression ignition (CI) engines are popular due to its higher thermal efficiency, robust nature. Hence diesel engines are widely used for power generation and agriculture applications. In the current energy situation, life of fossil fuels has gotten to be restricted due to its depleting nature. Therefore, major interest is given for innovate diesel engine with advanced technologies at a quicker rate. Because fast consumption of regular fuels, increasing costs of fossil fuel and stringent emissions norms, utilization of environmentally friendly fuels (bio fuel) are complete substitution to diesel fuel is the need of an hour. Researchers have reported that, diesel engine emits larger smoke and nitric oxide emissions. These are harmful and hence can be overcome by utilizing bio fuel rather than fossil fuel. On the other hand, diesel fuel is expected to exhaust with in a period of 50-60 years. In this context, the world is looking for diesel engine fuelled with renewable energy sources with nominal changes in engine components in conjunction with conventional diesel fuel or substituted compactly in engines. Some of the investigations shown that the biodiesel blend up to 50% can be used with preheating up to 65°C to reduce the viscosity which helps to improve atomization of the fuel. By promoting the use of biodiesel the burden on the Indian economy can be reduced, also indirectly helps farmers to grow various plants required to produce biodiesel in their farms to improve the individual economic condition.

EXPERIMENTAL INVESTIGATION ON THE MECHANICAL PROPERTIES OF HYBRID COMPOSITE LEAF SPRING

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ABSTRACT

Leaf springs are the oldest suspension components used in automotive sector. Most of the vehicle production company has expressed its interest in replacing steel leaf spring with that of composite leaf spring because of its high strength to weight ratio and good corrosion resistance properties. In this work, a Hybrid Composite Leaf Spring (HCLS) fabricated with alternate layers of carbon/glass/epoxy and 10% of flyash which were subjected to various mechanical tests. A HCLS is a bi-directional Carbon/Glass fiber reinforced polymer with flyash as a filler, fabricated with similar geometrical properties to that of the metal leaf steel spring using hand layup technique. A considerable reduction in weight was obtained in comparison to the steel spring. Hybrid composite material composed of Glass/Carbon/Epoxy/filler subjected to the load and found that HCLS had good strength and stiffness and inferior in weight.

KEYWORDS: Hybrid Composite Leaf Spring (HCLS), Glass Fibre, Carbon Fibre, Epoxy & Flyash

Original Article

INTRODUCTION

With a need to sustain natural resources and economize energy, reduction of weight is one of the fundamental areas into which the vehicle manufacturer focuses in the present situation. Most of the manufacturers uses carbon steel for leaf spring, replacing metal leaf with hybrid composite, which is an ideal step in weight reduction. The introduction of composite materials has made it possible to reduce the weight of the leaf spring without any reduction in the load-carrying capacity and stiffness [1]. The auto sector has shown keen interest in replacing the leaf springs of steel with composite made of Fibre Reinforced Polymer (FRP) composites, which possess lower modulus of elasticity, lower density and lighter in weight in comparison to steel [2,3]. The superior composites materials such as Graphite, Carbon, Kevlar, Glass, with appropriate resin are widely used as of their high specific strength and high specific modulus [4]. Complex mechanical characterization, high fabrication cost and difficulty in their rework and repair are some limitations of the composite materials [5]. Jeffery et.al [6] studied the behavior of static, fatigue of steel as well as composite multi leaf spring using the software of ANSYS V12. They found that leaf spring from composite has lower bending stress and higher fatigue than steel spring and also, they found E-glass/epoxy has better performance than vinyl ester. Metal matrix and carbon epoxy composites are used in automobile sector for manufacturing interior and exterior parts. The application of composite materials is ever growing in all segments. The increase in demand for vehicles with fuel efficiency and components that are lighter in weight are the major factors that increases the need of composite components in the automobile sector. M. Raghavedra et.al [7] conducted Modeling & Analysis of laminated composite leaf spring using FEA under the static load condition. K P Aveen et. al [8] compared the mechanical properties of composite material with flyash and Aluminium powder as a filler found composite material

IMPACT OF NANO MATERIAL ADDED BIODIESEL ON COMBUSTION, PERFORMANCE & EMISSION OF CI ENGINE - A REVIEW

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ABSTRACT

Bio-diesel is a sustainable, renewable and alternate fuel for C.I. Engines. Biodiesel fuelled engine produces less torque compared to diesel fuelled engine and higher brake specific fuel consumption (BSFC) as it has lower heating value compared to diesel. Brake Power and brake thermal efficiency of biodiesel fuelled engine also decrease. Biodiesel produces less CO and unburned THC but increased CO_2 and NOx. In the present work, reports about the impact of Nano material added Biodiesel on Combustion, Performance and Emissions of C.I. Engine, published by highly rated journals in scientific indexes, have been cited. The addition of Nano material to biodiesel increases brake engine torque & power, and decreases the brake specific fuel consumption. The Nano material added biodiesel improves combustion characteristics, increases the cylinder pressure and heat release rate compared to neat Biodiesel and Diesel. The Nano material added biodiesel reduces CO, HC and smoke opacity emission but increases the $CO_2$and NOxemissions.

KEYWORDS: Nano Materials, Brake Power, Ignition Delay, Brake Thermal Efficiency, BSFC, CI Engines & Emissions

Original Article

1. INTRODUCTION

The CI engines are extensively applied in automobiles, marines, construction equipments and trains, because of their dependable operation. In the present day condition, 80% of total energy needs are fulfilled by fossil fuels of which 58% is shared by transportation sector which plays major role in the economic growth of a country [1]. The fossil fuel resources are decreasing faster than expected, at the same time their adverse effects on environment such as ozone hole, climate change and global warming are increasing every day. Due to energy crises and depleting fossil fuel reserves, the demand for alternative fuels is increasing [7].

The important alternative fuel available is biodiesel. This can be prepared from non-edible and edible oils. Non- edible oils are recommended as they are sustainable biodiesel alternate fuels. Jatropha, Pongamia, Jojoba, Linseed, Mahua, Neem, Cottonseed, Deccan, linseed, Kusum, Rubber seed and Orange are the non-edible crops used in biodiesel preparation [8]. The biodiesel has few disadvantages such as higher density, poor atomization, lesser fuel economy, lesser cloud & pour point, and higher NOx emissions compared to diesel [4]. These disadvantages can be overcome by modifying the biodiesel by adding Nanomaterials.

The Nano materials addition to biodiesel increases torque, power available at brakes & thermal efficiency and decreases BSFC. Nano material addition to biodiesel also increases heat release rate & peak cylinder pressure and reduces ignition lag. It also has impact on exhaust emissions. The emissions of HC, CO and smoke are decreased but the emissions of NOx and CO_2 are increased. However the use of Nano material in biodiesel has positive impression on combustion, performance and emissions of C.I. Engine.

DESIGN AND FABRICATION OF PEDAL OPERATEDGROUNDNUTAND MAIZE STRIPPER

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ABSTRACT

This project aims at design and fabrication of "Pedal Operated Groundnut and Maize Stripper''. The proposed project is intended to separate the groundnuts from the groundnut plant and corn from cob of maize. The machine has one slider, Groundnut removing tool, Maize tool, Sieves (with holes of 10 mm dia.), Shaft, Pedal to rotate drum. In this machine the groundnut plant will feed to the tool with the help of pedal movement manually. Then the rotating groundnut tool will separate the groundnuts from the plant by cutting their smooth roots. Later the groundnuts will drop on the inclined metal plate which has several holes, then all the wastage will go out through the holes and only good quality groundnuts will come out. And then there is a maize tool attached to one end of the shaft so as the groundnut tool rotate the maize tool also rotate, with the help of that rotation the corn is separated from the cob. Nowadays a farmer needs to buy two separate machines for removing groundnut and maize but with use of this machine which is a combination of both groundnut and maize stripping, Farmer can overcome labour problem and the cost of labours which is quite more nowadays. This machine helps to cut short the labours required that is one or two people can do the work of six to seven, Thus making it more economical and a time saving machine. It is very small in size and it has less weight so it is very easy to carry machine from one place to other. Hence this machine will be most helpful to our farmers to get more profit.

KEYWORDS: Groundnut Pods, Groundnut Plants, Maize Pods, Maize Cob, Groundnut And Maize Strippers, Pedal Operated, Sieves Etc

Original Article

MECHANICAL CHARACTERISATION OF SEASHELL, ALUMINIUM AND FLY ASH FILLER ADDITION IN GLASS FIBRE REINFORCED POLYMER (GFRP)

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ABSTRACT

We know that glass fibre and epoxy composite is one of the cheapest and readily available materials for day today life application. So improve the basic properties of the same is quite often and must. Therefore in this study we are fabricating a GFRP with seashell, fly ash and aluminium as filler material to improve its basic properties without increasing its cost. The Lapox L-12 as the epoxy resin with K-6 hardener is used to bind the composites. Total three test specimens were prepared with variation of filler materials for each combination. The fibre to resin ratio maintained constant for all the samples. The overall properties are determined by tensile and three point bending test. The results are compared to predict the best percentage and combinations.

KEYWORDS: K-6, Lapox L-12, GFRP

Original Article

GREY BASED TAGUCHI METHOD TO OPTIMIZE MECHANICAL PROPERTIES OF SHORT GLASS FIBER AND SHORT CARBON FIBER REINFORCED POLYPROPYLENE COMPOSITES

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ABSTRACT

In the present investigation short glass fiber, (SGF) and short carbon fiber (SCF) reinforced Polypropylene (PP) composites were fabricated and characterized their mechanical properties. The experiments were designed according to Taguchi's (L9) orthogonal array to optimize the experimental runs. The grey-based Taguchi approach has been used for multiple mechanical performance optimization of composites. The analysis of variance (ANOVA) was applied to determine the significant parameter that affects the mechanical performance. The results indicated that the fiber weight fraction and reinforcement are the significant factors influencing the mechanical behavior of PP composites. However, the weight percent of the reinforcement is the most significant factor in deciding the mechanical behavior.

KEYWORDS: Polypropylene, Glass Fiber, Carbon Fiber, Taguchi Design & Grey Relational Analysis

Original Article

INTRODUCTION

Polypropylene (PP) is an engineering thermoplastic, extensively used in many applications such as automotive, extruded profiles, packaging industry, home appliances etc., due to its excellent mechanical, chemical, and physical properties [1-6, 7-14]. However, its use is only limited to low strength and temperature applications due to its low strength and thermal conductivity [2]. In the last decade, research is mainly focused on reinforcing PP with short fibers to improve its mechanical and thermal properties. The hybrid fiber reinforcement in polymer matrix can improve the mechanical properties and reduces its limitations in many engineering applications [3].

A number of researchers have investigated the effect of glass and carbon fiber reinforcement on PP matrix. Christoph Unterweger et al. [6] studied the characterization of carbon fiber surfaces and their impact on the mechanical properties of short carbon fiber reinforced polypropylene composites. He reported that fibersurface properties and coupling agent used in the composite have majoreffect on the fiber/matrix interaction, which improves the mechanical properties. Gamze Karsli et al. [7] investigated the effect of hybrid carbon nanotube/short glass fiber reinforcement on the properties of polypropylene composites. He found that the glass fiber and carbon nanotube reinforced hybrid composites showed better tensile strength and modulus values compared to only glass and carbon nanotube reinforced composites. Rezaei et al. [10] reported the effect of fiber length on thermomechanical properties of short carbon fiber (CF) reinforced polypropylene composites; the longer CFs showed better thermomechanical properties than shorter CFs in CF/PP composites. Fu et al. [11] studied tensile properties of short-glass-fiber- and short-carbon-fiber-reinforced polypropylene composites. He reported that mean glass and carbon fiber lengths decrease with increasing fiber volume fractions and the combined effect of fiber volume fraction and fiber length determines the final tensile properties of the composites. Aslan et al. (15) studied

TWO PLANE MASS BALANCING OF ROTOR BY USING VIBRATION RESPONSE OF THE BEARINGS

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ABSTRACT

Vibration is always a serious issue because of its potential to make failures in bearings and other related machine parts. When it comes to the rotors which are rotating and high speed this may turn into a really serious issue if neglected. So, monitoring the vibration values periodically is very much necessary to reduce such failures. Vibration in a rotary system can be caused by various valid reasons out of all which the vibration caused due to mass imbalance stand out because of its intensified effects. The top gas recovery turbines which are used to extract the power available at the furnace top in a typical iron making process, these turbines are reaction type which uses the pressure available at the furnace top to convert it into useful energy. Such a turbine was taken as the case of study. During the previous experimentationwhich tried to mass balance the generator rotor using single plane mass balancing yielded a parallax effect, i.e. the plane considered for the mass balancing yielded a lower value of vibration after mass balance, but the opposite plane gave a higher valve than normal, that particular problem of parallax effect is solved using two plane mass balancing in this paper.

KEYWORDS: Mass Balancing, High Speed Rotating Equipment & Vibration Response

Original Article

CORROSION INHIBITION STUDY ON AGED 18NI 250 GRADE MARAGING STEEL IN PHOSPHORIC ACID AND NITRIC ACID SOLUTION USING 1,2,3 BENZOTRIAZOLE

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ABSTRACT

18 Ni 250 grade maraging steel is a potential high strength steel for advanced technologies such as aerospace, nuclear, and sporting goods. Phosphoric acid and Nitric acid solutions are used in pickling of delicate and precision items where re-rusting after pickling has to be avoided. The present work addresses the study of corrosion behaviour and inhibition using 1,2,3 benzotriazole of aged 18 Ni 250 grade maraging steel in phosphoric acid and Nitric acid medium at higher concentration by Potentiodynamic Polarization Technique. The corrosion rates were determined in 1M, 1.5M and 2M by Tafel extrapolation technique in the temperature range 30˚C-50˚C with different concentrations of inhibitor. The results indicate that the corrosion rate increases with increase in acid concentration and temperature. Inhibition efficiency of 1,2,3benzotriazole was found to increase with the increase in 1,2,3 benzotriazole concentration and decrease with the increase in temperature. The activation energy Ea and other thermodynamic parameters ($\Delta G˚$, $\Delta H\#$ and $\Delta S\#$) have been evaluated and discussed. The standard free energy of adsorption $\Delta G˚ads$ values indicates that the adsorption is of mixed type. Scanning electron microscopy (SEM) study confirmed the formation of an adsorbed protective film on the metal surface.

KEYWORDS: Maraging Steel, Acid Solutions, Organic Inhibitor, Polarisation, Adsorption

Original Article

COMPARATIVE STUDY OF SIGNAL PROCESSING TECHNIQUES FOR THE DIAGNOSIS OF FAULT IN BELT DRIVES

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ABSTRACT

The machines are inherently having some kind of vibration in them. This vibration can be a language of the machine to communicate its problem with the outside world. The present work is an attempt to use this vibration signal to identify the fault and prevent the breakdown of the system. This needs a tool for analyzing the signal. In this paper, we have used two kinds of wavelet transform to analyze the signal. The Belt drive is fabricated and used as a system to generate required vibration signal. The system consists of a motor, fixed with a belt using pulleys. Initially the belt is run in a healthy condition and the signals are collected. This healthy signal will act as a reference for analyzing all other types of signals, obtained after inducing the fault in the system. Several experiments are carried out to check the effectiveness of the technique. Now in this paper, a comparative study is made between two types of wavelet functions, namely Morlet wavelet function and Mexican Hat wavelet function. The belt is induced with three kinds of faults, namely loose, side cut in 2mm and side cut in 4mm. The amplitude of the vibration was found to be maximum for side cut in 4mm condition. This is analyzed by two kinds of wavelet functions and the Mexican hat wavelet function was found to be more sensitive for this particular work.

KEYWORDS: Wavelet Function, Belt Drive, Signal Processing, Predictive Maintenance

Original Article

1 INTRODUCTION

Man has made his life easy by making use of machines. These machines are having many moving parts and they need to be serviced. This maintenance work includes lubrication, cooling, cleaning, inspection etc [1]. This improves the safety and reliability of machines. This needs a regular inspection and action has to be taken, when there is any fault identification. This troubleshooting technique varies from machine to machine and company to company. However, the main objective of the maintenance is to obtain uninterrupted workflow. But unfortunately, it is not possible to achieve it. Because no system in nature can work without taking a break. Many researches has been taken place to overcome this problem and the scientists and engineers have come up with various types of maintenance techniques. Mainly there are three types of maintenance techniques, namely Breakdown or Reactive maintenance, Preventive or Periodic maintenance and Predictive or Condition based maintenance [4, 5]. Among all the three types of technique, the Condition based maintenance is considered as advanced and cost effective [7]. It helps in saving the time and money.

The condition-based maintenance requires a property to be identified in the machine, which indicates the health of the system [9]. This may be classified into many categories. Wear Debris Monitoring, Spectrophotometer Oil Analysis Program (SOAP), Temperature Monitoring, Non Destructive Test (NDT) are some of the techniques

Original Article

FAULT DETECTION IN BEARINGS USING ADVANCED SIGNAL PROCESSING TECHNIQUE

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ABSTRACT

A Bearing is one of the essential components of rotary machines and has been commonly used in various industrial applications, such as shaft mounting, to minimize friction as well as to promote relative motion between the two mating parts, etc. The detection of early fault conditions from bearings is very important factor. Various means of carrying fault detection are available, such as vibration monitoring, debris monitoring, temperature monitoring, soap techniques, non-destructive testing, etc. The analysis of vibration signals may be one of the techniques commonly used to inspect the condition and find faults in bearings. The vibration analysis was used as a predictive diagnostic technique for the diagnostic of the system. By following correct signal processing methods, changes in vibration signals due to faults can be identified to help maintain a stable bearing state. With proper detection and analysis of machine vibration data, machine failure can be calculated and predicted. This paper gives a relative study of the different techniques used to find fault in bearings based on the vibration analysis method.

***KEYWORDS:** Bearings, Wavelet, Signal Processing*

COMPARATIVE STUDY OF MECHANICAL PROPERTIES OF TITANIUM ALLOY FABRICATED BY DMLS WITH CASTED TITANIUM ALLOY AND NATURAL TEETH

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ABSTRACT

In the present work, titanium alloy (Ti-6Al-4V) is fabricated using direct metal laser sintering technique for dental crown restoration. Tensile, compression, shear tests are carried out as per ASTM standards and are compared with casted titanium alloy & natural teeth. Fatigue analysis is also conducted to study the fatigue life of Ti-6Al-4V. The investigation reveals that Ti-6Al-4V fabricated by direct metal laser sintering shows superiority in terms of tensile, compressive and shear strength by 7.7%, 14.78% and 51.59% respectively when compared with casted titanium alloy and natural teeth. The investigation also reveals that the fatigue strength of Ti-6Al-4V alloy manufactured through direct metal laser sintering technique is higher.

KEYWORDS: Dental Crown Restoration, Direct Metal Laser Sintering, Titanium Alloy, Casting Method & Natural Teeth

Original Article

1. INTRODUCTION

To restore damaged tooth dental crown is one of the prosthetic restorations used. The extensively decayed and cracked teeth are permanently cemented using these dental crowns. The name crown was given because the restoration is made for the "crown" part of a natural tooth (Rosenstiel & Land, 2015; Ida et al, 1985). Crowns are customizable to fit over different shape and size of teeth. Different restoration materials are used for developing crowns. They are broadly classified into three types of materials, a) all-metal restorations, (b) all-ceramic restorations, and (c) metal-ceramic restorations (Mahalaxmi, 2013).

There are different types of biomaterials used for replacing bone and teeth based on their superior mechanical properties, also due to their processing ability. Some of the materials being austenitic stainless steels (Aslam et al, 2016), cobalt–chromium alloy(Ghani et al, 2016) and titanium (Ti) and titanium alloys (Trevisan et al, 2018; Damborenea et al, 2017; Takeuchi et al, 2019). But, in case of dentist implant titanium and its alloys are particularly used for the advantageous of high specific strength, good corrosion resistance, light weight and good biocompatibility (Contreras et al, 2002; Shibo et al, 2006). However, their entire physical property depends upon

Trajectory Tracking of a 3-DOF Helicopter by LQR Based PID Controller

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ABSTRACT

Linear Quadratic Regulator (LQR) technique has been known to provide optimal controlled feedback to improve closed-loop stability of process-control systems. In this article attitude control problem has been investigated for a 3-Degree of Freedom (3-DOF) benchmark laboratory system involving high nonlinearities, parametric uncertainties and strong inter-axis couplings. This article describes the 3DOF helicopter system's mathematical model and then illustrates an approach to formulate the controller design.A simple approach has been explainedto obtain PIDtuning parameters from matrix that has gain values of the LQR controller. The controller design simulation results show that the control technique which has been investigated provides static and dynamic performance over multipoint operations, therefore providing better closed-loop stability and responsive control for the 3-DOF helicopter system in comparison to conventional PID control algorithms.

Keywords: 3-DOF, LQR, PID, helicopter, simulation, controller, modeling

1. INTRODUCTION

The 3-DOF helicopter is used as astandard laboratory system for designing andimplementing helicopter control algorithms. The system can be typically considered as a higher order multi-input, multi-output (MIMO) system having highly nonlinear characteristics due to strong channel coupling and uncertainties because of which attitude control becomes quite challenging. Since the system describes the motion of a helicopter in in three axes, that is elevation/roll, travel and pitch, 3-DOF helicopter system is quite useful for academic and research application.

The 3DOF helicopter system (see Fig. 1) comprises of the base on which an arm has been secured. The arm has the frame of the helicopter on one corneranda balance blocktowards the other. The arm has the capability to roll around the axis of pitch and also roll around the axis of

Random Forest Algorithm Based Strain Analysis on Composite Materials using Digital Image Processing

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Abstract - **For engineers, knowledge of strain analysis is crucial as it has a critical role in several engineering designs and practical work. Condition monitoring of various composite structures is very crucial in engineering in the wind, civil, aviation, and auto sectors. This article provides comparison study of strain analysis of jute material using conventional method, Digital image correlation, regression analysis and random forest algorithm. The result shows that mean square error obtained using random forest algorithm is $3.8*10^{-4}$ which is least in comparison to contact- basedmethod.**

Keywords: Strain analysis, Jute material, Digital image Correlation, Regression analysis, Random forest algorithm. Jutematerial,

1. INTRODUCTION

To engineers, knowledge of strain measurement is critical as it has a crucial role in many several technical designs and practical work. When systems and models are becoming more and more complex than before, an accurate measurement of strain is most important, as a wrong result could lead to a disastrous accident and could also result in loss of lives [1]. Condition monitoring of various composite structures is very crucial in wind, civil, aviation sectors. Nevertheless, by taking into consideration, the geometry and scale of the systems, it can become difficult to evaluate critical points. Conventional methods such as strain gages are frequently used to quantify elongation, but these conventional methods cannot provide full-field data but only display the measurement data at a few distinct locations [2].

And the contact points of tool create unwanted stress concentration to the specimens, and conventional methods are also dependent on external environmental factors like humidity, temperature [3]. Also, their expenses and complexity create improper measurements. To improvise the conventional techniques of the strain measurement method, as Digital Image Processing had been introduced. Digital Image correlation is used to find the strain distribution,

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The outcome obtained in the above method is found is compared with the two-machine learning algorithm.

Geosynthetics are plastic based polymeric materials and employed in a range of geotechnical application. One amongst those innovations is that the introduction of geosynthetics into the sector of engineering science. The use of geosynthetics is, still novel within the civil industry. Continuous strain response throughout testing of geosynthetics provides reasonable and clear understanding of the specimen characteristics. The exact cause of the deformation zone is crucial and becomes very necessary with in the presence of seams in a geosynthetics. Such variable strain zones are unknown in traditional mechanical strain determination systems, may identify the reasons in the field and incorrect strain determination, and may either result in unconservative layout design or potential catastrophic failures. New developments in building industry growth are aimed at bringing geomaterial design and installation works into practice. They will greatly decrease resource consumption as the lifespan is up to120 years, and they also have several unique properties such as: high strength and lower levels of deformability, resistance to water spills; bio-stability; ultraviolet resistivity, and also resistance to alkaline and acidic spills; temperature tolerance and longevity [15].

REVIEW ON THE INFLUENCE OF FUSED DEPOSITION MODELLING AND INJECTION MOULDING TECHNIQUES ON ENHANCEMENT OF MECHANICAL PROPERTIES OF ABS MATERIAL

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Original Article

ABSTRACT

Plastics play a very important role in the day to day life. Acrylonitrile Butadiene Styrene (ABS) is one amongst the highly used plastic polymers in the world. ABS has good mechanical properties. Properties can be further improved by blending it with other plastics or reinforcing it with other materials. There are many ways to manufacture ABS products. This study takes into consideration two processes- Fused Deposition Modelling (FDM) and Injection Moulding (IM). FDM is one of the fastest-growing fields in manufacturing. Injection moulding is used for repetitive and large-scale production when compared to FDM. This study aims to provide brief information on FDM and IM techniques for improving the mechanical properties of ABS parts.

KEYWORDS: Acrylonitrile Butadiene Styrene (ABS), 3D Printing, Fused Deposition Modelling (FDM) & Injection Moulding (IM)

1. INTRODUCTION

Plastics have become a very important part of human life. They have become part and parcel of our routine. Plastics are used in everything from toys to car bodies. Plastics are thermoplastics and thermosetting plastic. Thermoplastics can be heated and cooled to take shapes a number of times. Thermoplastics can be separated from wastes and melted and recycled. Plastics have strengths lower than that of metals but they have lower density and higher strains at failure. In some cases, plastics will have higher strength per unit weight than metals [1]. Blending different plastics can improve the properties of plastics. Plastics are composited with other materials to improve their properties. These are called polymer matrix composites.

Additive Manufacturing (AM) technique is directly fabricating components by adding materials. AM is growing because of its versatility as the years pass. Its advantages vary from complex designs to low-cost production [2]. Its ability to produce geometrically complex parts makes this process a potential method for low volume production and for customised functional parts [3]. It is a new integrated manufacturing technology that involves a variety of disciplines [4]. In some sectors, AM is already being used for fabricating actual components and assemblies [5]. Though Computer-Aided Design (CAD) modelling has helped in converting ideas into pictures, AM has made it lot better by helping convert the idea into a working prototype. The earlier ways of making a prototype

A REVIEW ON POLYMER PROCESSING TECHNOLOGY OF THERMOPLASTIC MATERIALS

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ABSTRACT

Polymer processing is a manufacturing process that turns the raw polymer material into finished products of desirable shape, microstructure and characteristics which can withstand various environmental or working conditions. Usually, thermoplastic resins are given as raw material in the form of pellets that look like balls. When these polymer pellets are heated above their glass-transition temperature, these flows along with the defined shape prescribed and solidify to room temperature. The microstructure is decided by the cooling rates according to the applications of these polymers. There are two kinds of polymers, thermoplastic polymers and thermosetting polymers. Thermoplastic polymers become flexible at high temperatures and solidify on cooling. In case of thermosetting plastic, they liquefy on heating and they form infusible cross-linkage plastic and they continue to solidify on heating and they retain their shape even after repeated heating and cooling cycles. Polymer processing can be studied in terms of various types of processes like extrusion, injection moulding, calendering etc. The general method of shaping the raw material (polymer) to a finished product includes a series of pre-shaping and post-shaping operations besides shaping operation. This review covers the important applications and different methods to fabricate thermoplastic polymers such as Polytetrafluoroethylene (PTFE), Polyethylene terephthalate (PET) and Polyvinyl chloride (PVC).

KEYWORDS: Thermoplastic Materials, Mechanical Properties and Shaping Operations.

Original Article

1. INTRODUCTION

The process which is adopted for polymer should be feasible by taking all the parameters into account like cost, advantages and disadvantages of those processes. We may have more than one process to adopt for a polymer and we need to be clear about which among them is better by taking parameters related to particular industrial conditions. There are three processes involved in polymer processing. They are operations preceding shaping operation, shaping operations and Post shaping operations. Pre-shaping operations involve heat softening which is a rate decisive step in the processing of polymer which depends on the thermal and physical properties of the polymer like polymer's melting temperature and viscosity. Pressurization and pumping process includes moving the melt to the shaping operation which usually is a function of polymer rheological characteristics and the final step is dispersing additives and removing contaminants. Shaping operations includes techniques like extrusion, injection moulding, calendering etc. Extrusion is a process which is used to fabricate products of a fixed cross-section. In extrusion, the raw material is heated and it is allowed to pass through the die using the pressure of the ram. In the injection moulding, molten raw material is allowed to flow through the cavity and it is solidified to obtain the required shape. In the calendering process, the raw material is allowed to run through the rollers to obtain the

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Surface roughness analysis in the drilling of carbon fiber/epoxy composite laminates using hybrid Taguchi-Response experimental design

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Abstract

The carbon fiber reinforced polymer composite has made a substantial impact on the manufacturing sectors owing to its excellent mechanical, thermal and corrosion resisting properties. The surface roughness mainly depends on the machining parameters while drilling of carbon fiber reinforced polymer composite laminates. The study concentrates on the impact of uncoated and titanium nitride coated solid carbide drills on minimizing the roughness that is generated while making holes in bi-directional carbon fiber reinforced polymer composite by optimizing the drilling constraints [spindle speed (A), feed rate (B), point angle (C) and drill diameter (D)]. Experimental studies are carried out using Taguchi L_{27} orthogonal array. The investigation discloses that the drill diameter is one of the most influencing cutting parameters followed by spindle speed and feed rate. The response surface methodology is chosen as a tool for predicting and optimizing the process parameters. The investigation also discloses that the experimental and the predicted results of surface roughness are closely matching with each other. The surface morphology illustrates that titanium nitride coated solid carbide drills minimize the surface roughness compare to that of uncoated solid carbide drills.

1. Introduction

Drilling is one of the most tirelessly used machining processes to form bolted or riveted assemblies exclusively for automobile and aircraft industries. Nowadays, the manufacturers have generally preferred the carbon fiber reinforced polymer (CFRP) composite materials over the conventional materials for different structural applications owing to their excellent mechanical properties such as the higher value of stiffness, lightweight, resistance to corrosion and high specific strength [1, 2]. It was reported that more than 50% of the structural components in Boeing 787 were made up of composites [3].

It is well known that the surface roughness is one of the important parameters normally considered for measuring the surface quality of the products. Since the surface finish of the drilled holes is a main concern in the structural components, the surface roughness (R_a) has received serious attention amongst all the performance characteristics. Further, surface roughness also considered as one of the most serious limitations for the choice of machines and machining parameters in process planning [4–6]. Because of this reason, development in research has been carried out for optimizing the cutting conditions in the drilling of composites to get a precise surface roughness. The proper selection of tool and its geometry and cutting parameters also has a considerable impact on surface roughness.
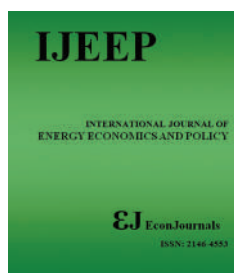
Biogas from Cattle Dung as a Source of Sustainable Energy: A Feasibility Study

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ABSTRACT

Many studies have stated that the usage of traditional cooking fuels like firewood, dung, and coal has caused many unfortunate deaths in India. The alternative fuel sources like LPG and electricity are in scarce and. Today, researches in the area of biofuel or bioenergy are of prime interest to many researchers to contribute to sustainable energy sources. Bioenergy from cattle dung is one such area, particularly for a country like India where dairy farms is a major supplier of feedstock. In this study, using logistic regression methodology, we have analysed the socio-economic factors influencing the adoption of biogas digesters among dairy farmers in Karnataka, India. The study revealed that the number of cattle and family size are the key factors for biogas adoption and poor knowledge of the family size and cattle ratio is the key hurdle. Using cross-tabulation and some basic mathematical analysis, we concluded that the optimal number of cattle for one adult in a family is 1.

Keywords: Sustainable Energy Source, Biogas, Cattle Dung, Dairy farmers, Socioeconomic Factors, India
JEL Classifications: Q4, P28

1. INTRODUCTION

The energy crisis and green environment are demanding for a carbon-neutral and efficient source of energy (Mohapatro et al., 2014). Increasing crude prices has resulted in expensive LPG and firewood has become a costlier source of energy owing to increased demand from industries. Biogas is an alternative source of energy for cooking in rural India. Harsdorff (2014) and Hemme et al., (2003) states that India is the largest producer of milk and cattle dung in the world. Biogas is a source of renewable energy generated from the organic wastes of animals. Cattle dung is the major source of animal waste used in rural India to generate biogas. In 1950s country had a large number of cattle, however, the production of milk was not self-sufficient. Oxen and buffaloes were used in the agricultural fields for the farming process, hence a good amount of dung or animal wastes were available. However, increased use of technology in farming has reduced the dependence on animals

in the agricultural fields, which has resulted in the reduced yield of the dung. So the generation of biogas in rural India is decreasing. Hence, today biogas from animal waste in rural India is dependent on cattle dung generated at dairy farms. According to Mittal et al. (2018), the availability of feedstock is also a major hurdle for the development of biogas energy among households in India.

Some empirical studies on biogas revealed that cattle dung generated at the dairy farm is the best raw material input for the biogas plant. Nandiyanto et al. (2018) suggest, that a combination of dairy farming with a biogas plant is more profitable for rural households. Today the Indian dairy sector stands first in terms of milk production and contributes 20% of the world's total production (Pant et al., 2019). Farmers in India have witnessed many initiatives from the government to boost the milk production in the country, such as key village scheme (KVS), intensive cattle development project (ICDP) and operation flood (OF) (Pandian

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Effect of gadolinium on the dielectric and pyroelectric behavior of $Ba(Zr_{0.52}Ti_{0.48})O_3$ ceramics

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ABSTRACT

The microstructure, dielectric and pyroelectric properties of pure and Gd^{3+}- doped barium zirconium titanate in the form of $Ba(Zr_{0.52}Ti_{0.48})O_3$ and $(Ba_{1-x}Gd_x)(Zr_{0.52}Ti_{0.48})O_3$ ($x = 0.1$ and 0.2) were studied in this work. These ceramics were synthesized from solid state reaction method at $1050\,°C$. The patterns obtained from x-ray diffraction revealed the formation of perovskite phase with tetragonal crystal symmetry. As the concentration of Gd-ion increased, the value of temperature dependent dielectric constant varied whereas the Curie temperature of the ceramics shifted towards higher temperature side. The ceramic sample doped with $Gd = 0.1$ exhibited diffuse phase transition whereas other one showed relaxor like behavior. This result is attributed to unsystematic decrease in average grain size due to doping of Gd-ions. The temperature dependent pyroelectric current was negative at $\sim150\,°C$ for pure ceramics and at $\sim200\,°C$ for Gd-doped ceramics. This negative pyroelectric current represents the primary pyroelectric effect within that temperature.

1. Introduction

Since many decades there has been extensive work to understand the electrical behavior of barium zirconium titanate (BZT) in various compositional formulations. The potential application of BZT includes commercial capacitors, thermistors and tunable devices [1–3]. As is well known, the addition of small amount of isovalent Zr^{4+} to the B- site of barium titanate (BT) provides more chemical stability to the compound due to it higher ionic radii, which imports various physical properties to the ceramics including electrical and dielectric properties [4–9]. The change in electrical and dielectrical behavior is mainly depended on amount of substitution of Zr^{4+} ions [10–15]. The fewer amounts of reports are available on Zr-rich Barium titanate solid solution. However in lead based compounds Zr-rich solid solutions are more reported.

As is well known, doping is one of the common method to tailor the structure and thereby improve the electrical behavior of the materials, rare earth ions are one among them which greatly influence the electric and dielectric properties of the

Microstructure and transport properties of multiwall carbon nanotube-reinforced barium zirconium titanate ceramics

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Abstract. The influence of multiwall carbon nanotubes (MWCNTs) reinforced on microstructures and their transport properties on pure and cerium-substituted barium zirconium titanate (BZT) ceramics are reported in this study. The MWCNTs were prepared by a low-temperature sonochemical/hydrothermal method using dichloromethane as a carbon source. These MWCNTs were mixed with the as-prepared ceramic powders before heat treatment to obtain a reinforced product. The scanning electron micrographs reveal the successful incorporation of carbon nanotubes in BZT ceramics. The temperature-dependent direct current (dc)-resistivity was less for MWCNT-reinforced ceramics in contrast to that of pure ceramics. The decrease in the dc resistivity was due to the superior electrical behaviour of MWCNTs, which act as a connector between ceramic grains. The Seebeck coefficient of cerium-substituted-BZT improved after reinforcing the MWCNTs.

1. Introduction

After successful investigation of various rare earth ion-substituted barium zirconium titanate (BZT) samples in the form of $(Ba_{1-x}Re_x)(Zr_{0.52}Ti_{0.48})O_3$ (Re = Gd, Sm, Ce, Pr, Ho and Nd) in our previous studies, while in this paper we report the influence of multiwall carbon nanotube (MWCNT) reinforcement in BZT ceramics. MWCNTs being a polymorphic form of carbon have fascinated many researchers due to their excellent mechanical, electrical, thermal and chemical properties [1–4]. On the other hand, BZT is an important material for many electronic device applications due to its tunable electrical and dielectric performance unlike chemically and thermally unstable strontium and lead-based perovskites [5–8]. However, the extreme insulating behaviour of BZT at room temperature limits its extensive use in various applications only in thermistors and dielectric resonators [9]. Hence, reinforcing a conducting phase can be a better initiative to improve the transport properties of BZT ceramics. Thus, carbon nanotubes (CNTs) can be considered as a promising constituent for reinforcing in the BZT matrix, which offers high-electrical performances unattainable from host BZT ceramics.

CNT-reinforced ceramics have become fascinating materials for intense research due to their exciting structural configurations. Most of the attempts have been made to improve the mechanical properties of composites through incorporating CNTs [10]. Also, many researchers reported the improved electrical behaviour with different volume fractions of MWCNTs reinforced in the ceramic matrix. The electrical resistivity from 0.1449 to 0.2752 Ωcm of MWCNT/BaTiO$_3$ nanocomposite ceramics was found to enlarge progressively as the amount of MWCNT added increased from 0 to 3 wt% [11]. Martin Michalek *et al* [12] reported the enhancement of electrical conductivity from 10^{-12} S m^{-1} in the pure alumina to 2.7×10^{-1} S m^{-1} in the composites containing 2 vol% of MWCNTs. MWCNTs were used effectively to convert electrically insulating alumina into electrically conducting composites and follow a power law of percolation with a low value of percolation threshold of 0.45 wt% [13]. The reported experimental result shows that the electrical conductivity of the composites increases with the CNT contents and decreases in the range of the conductivity of semiconductors. The nanocomposite with the highest CNT content has an electrical conductivity of 3336 S m^{-1} at near room temperature, which is about 13 orders of magnitude increase over that of pure alumina [14]. The direct current (dc) conductivity (σ_{dc}) of MWCNT addition in 3 mol% yttria-stabilized tetragonal polycrystalline zirconia composites demonstrated a typical percolation behaviour with a rule, ln $\sigma_{dc} \propto f^{-1/3}$, where f is the weight fraction of the conducting component showing tunnelling conduction responsible for the lower

1

Surface modification of silicon solar cell using TiO_2 and Ta_2O_5: fabrication and characterization

Raghavendra Sagar[1] · Asha Rao[2]

Abstract

We report the fabrication and characterization of surface modified silicon solar cells with the deposition of amorphous tantalum oxide (Ta_2O_5) and crystalline titanium oxide (TiO_2) nanolayers of thickness 54.9 nm and 69.82 nm, respectively, as antireflection coating (ARC) using RF-sputtering technique. The thickness of the films measured by variable angle spectroscopic ellipsometry and scanning electron microscopy is in close agreement. The transmittance measurement as a function of wavelength of incident light showed that the thin-films deposited have lowest effective reflectance in the wavelength range of 380 nm–570 nm indicating reduced light reflection and enhanced light trapping as observed from UV–Vis measurements. Illuminated current–voltage measurements showed an increase in the short circuit current density (J_{sc}) and an increase of 1.54% in the efficiency of the antireflection-coated cells. Results of the External Quantum Efficiency measurement as a function of wavelength for the solar cells with ARC is also presented in this paper.

1 Introduction

Increasing the performance of the Silicon solar cells by modifying the p–n junction with hetero-structure and metal oxide semiconductor structure have been some of the routes, since years. [1–4]. The deposition of high quality Antireflection coating (ARC) in the solar cells also plays a vital role in improving the efficiency of the cells by increasing the light trapping within the cell and allowing more photons to interact with cell structure, thereby improving the conversion capability of the solar cell [5, 6]. High quality ARCs must be designed accurately on mono- and multicrystalline silicon solar cell surfaces to minimize the loss of optical absorption and also for the passivation of the surface dangling bonds acting as recombination centers [7, 8]. It is reported that the silicon without ARC would only transmit about 70% of IR and 50% of UV portions of the sunlight into the cell structure [9]. Although other factors such as recombination, poor contacts, etc., influence the solar cell efficiency, overall performance of an actual Si solar cell is limited by light trapping conditions [10]. ARCs are of great importance to get low solar cell reflectance. To achieve lowest reflection of a single wavelength of incident radiation, the ARC may consist of a single-layer antireflection, satisfying the conditions like (a) square root of the refractive indices of the materials constrained the coating equal to the refractive index of the ARC, and (b) thickness of ARC equal to one quarter of the wavelength [11].

Bare silicon has a high surface reflection of over 30%. Hence, light trapping mechanism is essential for the enhancement of incident light absorption. This requirement can be fulfilled by two mechanisms, namely, diffraction or scattering—which can change the direction of incident photons so that as much as photons can propagate at higher angles with prolonged path length within the cell and the other is, coupling of incident photons provided with the guided mode in the active region of solar cell with a confinement of light [12, 13]. In simple words, once the incident photons enter into the device their mean residing time in active region must be long enough and should be absorbed before escaping the device.

The most widely used materials for antireflection coating in silicon solar cells are titanium dioxide (TiO_2), tantalum oxide (Ta_2O_5), tin dioxide (SnO_2), zinc oxide (ZnO), silicon nitride (SiNx), and zinc sulfide (ZnS) [14–19]. Among them,

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Structural and electrical studies of nanocrystalline Mn_3O_4

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ABSTRACT

In this paper, we report synthesis, structural, microstructure and electrical study of Mn_3O_4. Manganese oxide in the form of Mn_3O_4 was prepared by co-precipitation technique using manganese nitrate as source at the calcination temperature of $400\,°C$. The crystal structure has been refined by least squire fitting method using powder X-ray diffraction data. The structure refinement showed the formation of single phase with no any secondary phases. The lattice parameter and cell volume has been calculated manually from standard equations and verified by UNITCELL software program. The particle size was also determined from the XRD pattern using Scherrer's equation. The microstructure of calcined and sintered sample was characterized by scanning electron microscopy. The temperature dependent dc conductivity of the Mn_3O_4 pellet was studied in the temperature range between room temperature to $500\,°C$. The conductivity of this spinal was very less at room temperature and increased with increasing temperature exhibiting negative temperature of coefficient of resistance behavior with activation energy 0.91eV.

1. Introduction

Nanocrystalline metal oxides are widely used in many practice applications including catalysis, energy storage, magnetic data storage, sensors, and ferrofluids due to their excellent physical and chemical properties [1]. Among them, nano-sized tetramanganese oxides (Mn_3O_4) have been widely used as the active material in electrodes of alkaline rechargeable batteries, telecommunication, and energy due to its superior electrochemical behavior [2]. These superior electrochemical behaviors of Mn_3O_4 find potential applications in many fields due to its element abundance, low cost, less toxicity, and electrical characteristics [3].

The crystal structure of the haussmanite Mn_3O_4 shows a tetragonal distorted spinel structure due the presence of Mn^{3+} in the octahedral site and the cooperative Jahn–Teller effect. The critical concentration of distorting ion such as Mn^{3+} in the octahedral site is close to 55%. Mn^{2+} ions occupy the tetrahedral sites [4]. The cation valences in Mn_3O_4, have been the subject of several discussions. Some authors assume the formula $Mn^{2+}[Mn^{2+}Mn^{4+}]0_4$, where the ions between square brackets are on the octahedral sites of the spine1 lattice. However, much more evidence has been presented in

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Data Article

Synthesis and antimicrobial studies of (E)-N-((2-chloro-6-substituted quinolin-3-yl)methylene)-4-(substituted phenyl)-6-phenyl-2H-1,3-thiazin-2-amines

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ARTICLE INFO

ABSTRACT

Twelve novel (E)-N-((2-chloro-6-substituted quinolin-3-yl)methylene)-4-(substituted phenyl)-6-phenyl-2H-1,3-thiazin-2-amines were synthesized by the reaction of 6-substituted- 2-chloro quinoline-3-carbaldehydes with 4-substituted phenyl-6-phenyl-6H-1,3-thiazin-2-amines. The structures of some of the compounds were characterized by FT-IR, NMR and Mass Spectral analysis. Synthetic compounds were also screened for their antifungal and antibacterial activity. Most of them showed significant activity comparable with that of the standard.

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Specifications Table

Subject area	Synthetic organic chemistry
Compound	Quinolino-thiazines
Data category	Synthesis, FT-IR, ^{1}H-NMR, ^{13}C-NMR, Mass spectra.
Data acquisition format	Spectroscopy
Data type	Analyzed
Procedure	(E)-N-((2-Chloro-6-substituted quinolin-3-yl)methylene)-4-(substituted phenyl)-6-phenyl-2H-1,3-thiazin-2-amines were synthesized. These compounds were characterized and subjected for antibacterial and antifungal activities.

1. Rationale

Derivatives of thiazines are antitubercular [1], and antibacterial [2] agents. Moreover, thiazine derivatives can be used for gastrointestinal disorders [3] or diabetes [4] prevention. Condensed heterocyclic systems possessing thiazine ring have been reported as antioxidants [5], analgesic, anti-inflammatory agents [6], or calcium channel modulators [7]. The derivatives of quinoline has been found to possess antimalarial [8], antibacterial [9,10], antifungal [11], antiviral [12], receptoragonists [13], antineoplastic agents [14] and antituberculotic [15] etc. These observations gave us additional motivations for the combina-

RESEARCH

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Adsorption and inhibitive properties of seroquel drug for the corrosion of zinc in 0.1 M hydrochloric acid solution

A. M. Guruprasad[1] · H. P. Sachin[2] · G. A. Swetha[3] · B. M. Prasanna[4]

Abstract

Inhibition action of seroquel on corrosion of zinc in 0.1 M HCl solution was investigated using weight loss, electrochemical potentiodynamic polarization and impedance spectroscopic techniques. Corrosion inhibition efficiency showed the positive effect with increase in concentration of inhibitor and with the increase in temperature. Results obtained from all the methods are in good agreement with each other. Inhibition effect of inhibitor is due to the adsorption of seroquel molecule on zinc surface from bulk of the solution and the process of adsorption follows Temkin's adsorption isotherm. Potentiodynamic polarization studies revealed that seroquel acts as a mixed type of inhibitor. Corrosion inhibition mechanism is explained by activation and thermodynamic parameters. Surface morphology of the corroded metal was studied by scanning electron microscopic studies and FT-IR spectrum of the corrosion product further confirms the process of adsorption of seroquel on metal surface.

Introduction

Corrosion is a spontaneous surface phenomenon results in deterioration of metal or alloys when it interacts with surrounding environment. Zinc is one of the most important non-ferrous metals with numerous industrial applications and is mainly used for the corrosion protection of steel [1]. The corrosion of zinc is affected by both alkaline and acid solution and it is more severe in solution having pH lower than 6.0 and higher than 12.5, while within this range the corrosion is very slow [2, 3]. Under destructive condition, Zn metal suffers from corrosion which gives the rust with white color [4]. Industrial processes such as scale removal and cleaning of zinc surfaces with acidic solutions expose zinc to corrosion. Due to this, zinc material becomes unsuitable for industrial applications [5–8]. It has been found that one of the best methods of protecting metals against corrosion involves the use of inhibitors [9, 10]. These are substances that reduce the corrosion of metallic materials by controlling the metal dissolution [11]. Efficiency of an inhibitor is mainly dependent on its ability to get adsorbed on the surface of metal which involves replacement of water molecule at a corroding interface [12].

Inhibitors are organic compounds containing heteroatoms like nitrogen, oxygen, phosphorus and sulfur in its structure [13–22]. Most of the commercial inhibitors are toxic in nature; therefore, replacement by environmentally benign inhibitors is necessary [11]. Presently, there is a trend to replace existing inhibitors such as chromates and cyanides because of their harmful effect to the nature [6].

The majority of the inhibitor used to control the corrosion of zinc was considered to be toxic, and solubility of inhibitor is a major problem in the corrosive medium. So the focus is to use non-toxic medicinal compound to inhibit the corrosion of zinc. Corrosion of Zinc was inhibited using several inhibitor-like guaifenesin [23], ketosulfone [24], floctafenine [25], atenolol [26], *N*-arylpyrroles [27], anisidines [28], erythromycin [29], and hexamine [2]. The use of

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Rizatriptan Benzoate as Corrosion Inhibitor for Mild Steel in Acidic Corrosive Medium: Experimental and Theoretical Analysis

G. A. Swetha · H. P. Sachin ⬤ · A. M. Guruprasad · B. M. Prasanna

Abstract Inhibition action of rizatriptan benzoate on corrosion of mild steel in 1 M HCl was evaluated through weight loss, potentiodynamic polarization and electrochemical impedance spectroscopic techniques. Corrosion study was conducted at different concentrations of inhibitor and at different temperatures. Inhibition action of the inhibitor on mild steel corrosion was found to increase with increase in concentration and also with increase in temperature. Polarization studies showed that the rizatriptan benzoate is a mixed type of inhibitor. Results obtained from chemical and electrochemical studies are in good agreement with one another. Inhibition action of the inhibitor is explained by adsorption process, and it follows Langmuir adsorption isotherm. The thermodynamic parameters calculated are in good agreement to say the process of adsorption is spontaneous. Surface analysis of the metal samples was studied by scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy and atomic force microscopic techniques (AFM). SEM and AFM analysis further confirms the strong adsorption of the inhibitor on the mild steel surface, thereby mitigating the corrosion rate in aggressive media.

Keywords Drug corrosion inhibitor · Rizatriptan benzoate · Hydrochloric acid · SEM · EDX · AFM

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Introduction

Corrosion is an electrochemical process which results in decay of metals or alloys by the environment which is quite difficult to control completely [1]. Mild steel is widely used in industries for various practical applications due to its significant mechanical properties such as high tensile strength, malleability, ductility and also easy availability [2, 3]. Acid solutions are commonly used in various industrial activities, namely chemical descaling, pickling, industrial cleaning and acidizing [4–7]. Preventing the corrosion rate of steel plays a key role in various industries commonly in chemical and petrochemical industries due to aggressive nature of acid solutions which has remarkable effect on metallic materials. Use of inhibitors to protect metallic materials against corrosion has been found to be more useful method particularly in acid environment [8]. Organic compounds containing heteroatoms such as O, N and S were found to be good corrosion inhibitors in acid environments [9–11]. The constructiveness of these organic compounds as corrosion inhibitor is attributed in terms of their molecular size, molecular mass, structure, adsorptive capacity and the presence of heteroatoms [12]. Inhibition tendency of the inhibitors on the metal corrosion has also influenced by their electronic structure under certain

Effect of Sweep Angle and a Half Sine Wave on Roll Damping Derivative of a Delta Wing

Renita Sharon Monis, Aysha Shabana, Asha Crasta, S. A. Khan

ABSTRACT— This paper presents the effect of sweep angle on a roll of damping derivative of a delta wing with half sine wave for an attached shock case in supersonic/hypersonic flow has been studied analytically. The Ghosh Strip theory is replicated. By combining this with the similitude at high-speed flows lead to giving a piston theory. The initial conditions for the applicability of the theory are that the attached wave must be attached with the leading edge of the wing. The results of the present study reveals that with the increments in the sweep angles; it results in continuous decrease in the roll damping derivative, it is also seen that the magnitude of the decrement for lower sweep angle is considerable as compared to the higher values of the sweep angles due to the drastic change in the surface area of the wing. Roll damping derivative progressively increases with the angle of attack; however, with the increase in the inertia level of the flow, it results in the decrement in the damping derivative and later conforms to the Mach number independence principle. Effect of the leading edge bluntness and viscous effects are neglected. Results have been obtained for the supersonic/hypersonic flow of perfect gases over a wide range of angle of attack, planform area for different Mach numbers. In the present study, attention is on the effect of sweep angle of the wing on roll damping derivative at a different angle of attack and inertia level has been studied. In the contemporary theory, Leeward surface is taken along with shock waves attached with the leading edge.

Keywords — Delta wing, Hypersonic, Leeward surface, Sweep angle.

I. INTRODUCTION

Ghosh [1] has developed a 2D large deflection hypersonic similitude. The resulting piston theory is not restricted to slender shapes as in the cases of Lighthill's [2] and Miles [3] piston theories. Ghosh's piston theory [4] has been applied to oscillating plane ogives to predict C_{m_q}. The similitude was extended to non-slender cones/quasi cones, and a new kind of piston motion, called conico-annular piston motion was given by Ghosh [5]. Oscillating delta wings at significant incidence was treated by Ghosh [6]. Etkin [7] and Levin [8] have shown the separate effects of the pitch rate and incidence rate on the pitching moment. The plane piston theory of Ghosh [9] was applied with the inclusion of wave reflection effect to obtain a converged solution for $C_{m_{\dot\alpha}}$ non-slender wedges/plane ogives with the rate of α in hypersonic flow. Ghosh [10] has given a unified hypersonic similitude, and a consequent piston theory which is valid for wedges/quasi-wedges for any Mach number greater than 1 and $E \leq 0.3$ provided bow shock is attached. Hui et al. [11] have studied the problem of stability of an oscillating flat plate wing of arbitrary plan form placed at a specified mean angle of attack in supersonic/ hypersonic flow by applying strip theory. During the derivations of the theory, it is assumed that at each spanwise station the flow is independent of the location of the strips, and the flow remains two-dimensional. with the shock being attached. To assess the overall stability the moment derivatives due to the pitch rate as well as incident rate should be evaluated. In the present work, the unified similitude of Ghosh [12] along with the extended theory of Crasta & Khan [15]-[20] is combined with strip theory to obtain the unsteady moment derivative for a wing whose front edge is straight.

In this paper, the authors have attempted to study the Stiffness derivative with different pivot positions (h), which gives accurate results in comparison with the theory developed, by Liu as well as Crasta & Khan.

Ghosh [1] has developed a 2D large deflection hypersonic similitude. The resulting piston theory is not restricted to slender shapes as in the cases of Lighthill's [2] and Miles [3] piston theories. Ghosh's piston theory [4] has been applied to oscillating plane ogives to predict C_{m_q}. The similitude was extended to non-slender cones/quasi cones, and a new kind of piston motion, called conico-annular piston motion was given by Ghosh [5]. Oscillating delta wings at significant incidence was treated by Ghosh [6]. Etkin [7] and Levin [8] have shown the separate effects of the pitch rate and incidence rate on the pitching moment. The plane piston theory of Ghosh [9] was applied with the inclusion of wave reflection effect to obtain a converged solution for $C_{m_{\dot\alpha}}$ non-slender wedges/plane ogives with the rate of α in hypersonic .Ghosh [10] has given a unified hypersonic similitude, and a consequent piston theory which is valid for wedges/quasi-wedges for any Mach number greater than 1 and $E \leq 0.3$ provided bow shock is attached. Hui et al. [11] have studied the problem of stability of an oscillating flat plate wing of arbitrary plan form placed at a specified mean angle of attack in supersonic/ hypersonic flow by applying strip theory. During the derivations of the theory, it is assumed that at each spanwise station the flow is

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ESTIMATION OF DAMPING DERIVATIVES FOR DELTA WINGS IN HYPERSON
FLOW FOR STRAIGHT LEADING EDGE

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ABSTRACT

Accurate estimation of the aerodynamic stability derivatives of airplanes is essential to evaluate the performance of aircraft, whether civilian or military. Theoretical prediction methods for the dynamic stability derivatives at high angle attack have not advanced, and in the present paper, an attempt has been made to study the effect of damping derivat for delta wings for different angles of incidence, and the Mach number for a wing whose leading edge is straight. In paper, the flow is considered to be unsteady flow and also considering the effect of the Leeward surface along with shock waves and the expansion waves. The theory developed in the present paper considering the unsteady effects, results have been estimated for speed flows for air assuming the air to behave as perfect gas for a range of angle incidence and the inertia level. The results show that for Mach number M = 7 and above the damping derivatives beco independent of inertia level. Increase in the damping derivatives is substantial when the angle δ is increased from 5 to degrees.

KEYWORDS: Damping Derivative, Straight Leading Edge, Delta wing & Hypersonic

1. INTRODUCTION

Computation of stability derivatives or dynamic stability derivatives has often been considered as cri parameters to predict the trajectory of the aircraft, missiles, rockets, aircraft bombs, and its dynamic stability control results. Given the increased interest in supersonic/hypersonic flow, it is crucial to able to estimate aerodynamic stability parameters in pitch, roll, and yaw for the wings, wedges, and cones as the individual ide as well as the complete unit when assembled with the aircraft. With the growth in wind tunnel facilities, availab of the enormous computational power due to the vast development in a fast processor has led the research simulate the flow field instead go the wind tunnel tests straight away, due to the cost involved. Despite all t developments, analytical methods to estimate the stability derivatives still is a convenient and essential too estimate the aerodynamic derivatives initially and have an idea to optimize the design of the aerospace vehicles hence reduce the cost involved in experimental tests. Given the above, the present analytical methods are hand optimize the design before the models are fabricated for the wind tunnel tests.

With the increased usage of neutrally stable aircraft and sophisticated airframes, there is increasing den within the aerospace community to improve the accuracy in its estimate and understanding of the aerospace vehicl

Ghosh [3]–[6] has developed a 2-D hypersonic similitude which is valid for the large angle of incid and developed the associated piston theory; it includes Light hill[1] & Milne's [2] piston theories. Ghosh extended the large deflection similitude to non-slender cones, quasi cones, and also for wings provided the sl

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Damping Derivative Evaluation in Pitch for an Ogive at High Mach Numbers

AyshaShabana, Renita Sharon Monis, Asha Crasta, S. A. Khan

Abstract—In this paper, the formulae for damping derivative for an ogive with the suppositions of a curve on the conical nose. The damping derivative in pitch is assessed for a broad scope of the inertia levels and the flow deflection angle. The outcome indicates that there is a progressive increase in the damping derivative with an increase in the flow deflection angle. When the inertia level is increased from M = 5 to 9, the damping derivative value diminishes, it becomes independent of inertia level, and later any increase in the Mach number does not yield any change in the magnitude of the damping derivatives, and that indicates the attainment of the Mach number independence principle. It is found from the results that when ogive is superimposed, the positive slope is useful, whereas, the negative slope does not yield any useful results, hence must be avoided in the design of the nose part of the aerospace vehicle design. Due to both either positive or negative slope, there is a considerable shift in the Centre of the pressure of the nose, which is right from the dynamic stability point of view. When the slope increased beyond λ > 10, the pressure distribution is such that the magnitude of the damping derivatives attains very peculiar behavior, and this trend is not acceptable. Hence, such a high value of the λ must be avoided.

I. INTRODUCTION

The study assesses strength subsidiaries in pitch motion for axi-symmetric Ogives wavering at high Mach numbers. The "nose cones" are regularly non-thin and obtuse at Mach number greater than 10. The purpose behind such a setup is the issue of streamlined body aerodynamic high-temperature issue, and henceforth the associated problems associated at such speeds. In spite of the fact that the present study isn't for gruff bodies with segregated stuns when a hypothesis is created for the ogives with a sharp nose, it would then be able to be reached out to progressively down to earth shapes to join the gruffness.

It is genuinely intriguing to take note that the investigation of hypersonic streams, which was limited to slim bodies and low approaches, ought to accomplish a phase of non-thin shapes and everywhere approach streams; promising an underlined advancement of productive future high Mach number frameworks.

Ghosh (Ghosh, K., 1977) built up another hypersonic comparability with the joined bow shock and Mach number after the shock being significant and more noteworthy (i.e., M > 2.5). This comparability was substantial for the compression side of an airfoil with enormous stream avoidance. His work was reached out for wedges whose surfaces are planar or non-planar by Crasta and Khan to figure out streamlined contributing minute subsidiaries, both Supersonic (Ghosh, K., 1984) and for Mach number M > 5 streams (AshaCrasta and S. A. Khan, 2014, AshaCrasta and S. A. Khan, 2014).

The huge redirection comparability of (Ghosh, K., 1977) has been stretched out by Ghosh, K., 1984, for symmetric bodies for an attached shock case. Identicalness with another circular motion with pivotal symmetry has been built up. The body of the revolution of 2-D wedge results from the transformation of a wedge around the streamwise pivot position, which is independent of each other (Ghosh, K., 1977) produces a vertically symmetric conical-annular space. It is later shown by Ghosh, K., 1984 that the stream past a cone or semi cone is proportional to a cylinder movement in this conical-annular space, which is known as the similitudinal plane. Despite the fact that Ghosh, K., 1984 gives the expressions for the closed-form solution for the flow over cones, he gives a solution dependent on the likeness for a cone. The arrangement gives an even thickness layer of the compressed in the form of oblique shock waves. Henceforth the steady thickness type of the unstable condition for the conservation of energy is utilized to estimate the pressure distribution on the cone surface as far as the cylinder Mach number is significant. Results are gotten for hypersonic stream for an ideal gas over wavering cones and ogives of various Mach numbers and semi-edges. Khan et al. (2019,2019a) used the finite element method to optimize the flow and aerodynamic effect over a two-dimensional wedge. Waqar et al. (1996 and 1998) study the wraparound projectile motion and the associated stability issues. Bashir et al. (2017) computed the six-degrees-of-freedom trajectories to evaluate the aerodynamic derivative in pitch, yaw, and roll. They concluded that in the case of wraparound projectile motion, there is always an out-of-plane moment due to the unbalances force created due to the concave and convex surfaces present in a plane. This unbalanced force and hence, the moment is undesirable for the stability of the aerospace vehicles.

AN EFFECT OF SWEEP ANGLE ON ROLL DAMPING DERIVATIVE FOR A

DELTA WING WITH CURVED LEADING EDGES IN UNSTEADY FLOW

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ABSTRACT

This paper presents the results of an analytical study to account the effect of the sweep angle of a delta wing whose leading edges are curved on roll damping derivative at various angles of attack and the amplitude of the full sine waves. In the present theory, the effect of Leeward surface has been taken into consideration with the attached shock case at the leading edge. For a detached shock case, this theory will not be valid. Results have been obtained for the hypersonic flow of perfect gases over a wide range of angle of attack and the Mach number. The results indicate that the roll damping derivative decreases with a sweep angle, but increase with the increase in the flow deflection angle δ as well as with Mach M.

KEYWORDS: Curved Leading Edge, Delta Wing, Hypersonic & Sweep Angle

Original Article

1. INTRODUCTION

The intangible desire to explore the space has become universal and designing the spacecraft is on the top priority. With the requirement of high-performance aircraft, the importance of research has been shifted to the field of hypersonic flow. At the preliminary design stage, the knowledge of aerodynamic load and stability derivatives facilitating the design process of delta wings is of the most important aspect. In this regard, the present study has been taken up to relate the influence of the angle of sweep on damping stability derivative due to the rate of roll of a delta wing whose edges are curved.

Ghosh [1] has developed a 2D large deflection hypersonic similitude. The resulting piston theory is not restricted to slender shapes as in the cases of Lighthill's [2] and Miles [3] piston theories. Ghosh's piston theory [4] has been applied to oscillating plane ogives to predict C_{m_q}. The similitude was extended to non-slender cones/quasi cones, and a new kind of piston motion, called conico-annular piston motion was given by Ghosh [5]. Oscillating delta wings at large incidence was treated by Ghosh [6]. Etkin [7] and Levin [8] have shown the separate effects of the pitch rate and incidence rate on the pitching moment. The plane piston theory of Ghosh [9] was applied with the inclusion of the wave reflection effect to obtain in closed form C_{m_α} for non-slender

Estimation of Stiffness Derivative of an Ogive for Specific Heat Ratio 1.666

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Abstract:
This paper focusses attentionon studying the effect of the flow medium on the aerodynamic characteristics of the ogive at significant inertia levels. Accordingly, the hypersonic similitude is used to findanalytical expression to evaluate the pressure dissemination on the exterior of the ogive and hence, finally to get the stiffness derivatives for Mach quantities from M = 5 to 15, and the streamricochetdirections in the range from 100 to 250. This study considers two values of the λ = 5, and 10 are for the ogival shape of the nose. The γ value considered is 1.666. Using this value of the specific heat ratio the expression for rigidityderived for an ogive through the assumption that the gas is in-viscid and ideal, the indication is semi-steady, and the front noseapproach of the ogive is to such an extent that the inertia level behindhand the tremorM2after the shock M2 ≥ 2.5 . The consequencesdesignate that with the rise in the Mach number since M = 5 to M = 15, initially the magnitude of the stiffness derivative and later with superfluousrise in the Mach (M), it befitsself-regulating of inertia level and Mach independence principle has revisited. When the λ = 10, there is a swing of the midpoint of force towards the leading edge.

I. INTRODUCTION:

The knowledge of firmness derives in the arena due to the proportion of terrain, and the rate of the angle of attack is of prime importance. The prediction of their numerical values is of utmost importance. During the flight, whenever there is an increase in the angle of attack, this would results in a pitch up moment. Under these circumstances, to bring back the aerodynamic object to its equilibrium position, the stiffness derivative shows asignificantpart. The magnitude of the stiffness is dependent on the center of gravity of the object, the stressspreading on the apparent,and the position of resultant center of stress, which decides static margin in case of the aerodynamic vehicle. The present work assesses strength subsidiaries in terrain for non-thin axis-symmetric Ogives wavering in hypersonic stream. At hypersonic speediness, the "frontpinecones" regularly have a low L/D ratio; usually, the nose is blunt and obtuse. The tenacitybehindhand such anoperation is the issue of streamlined bodies, the extraordinary temperature created at the nose, which is significant that may lead to ablation of the surface material. In spitefulness of the statement that the contemporary work

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Analysis of Damping Derivatives for Delta Wings in Hypersonic Flow for Curved Leading Edges with Full Sine Wave

Renita Sharon Monis, Asha Crasta, Mohammed Faheem, S. A. Khan

ABSTRACT--- In this study, an attempt is made to evaluate the effect of first arched ends on the damping derived due to the pitch rate aimed at the variable sine wave bounty, flow deflection angle δ, pivot position, and the Mach numbers. Results show that with the escalation in the bounty of the complete sine wave (i.e., positive amplitude) there is an enlightened escalation in the pitch damping derivatives from h = 0, later in the downstream in the route of the sprawling verge it decreases till the location of the center of pressure and vice versa. At the location where the reasonable force acts, when we consider the stability derivatives in damping for the rate of pitch q, there is a rise in the numerical tenets of the spinoffs. This increase is non-linear in nature and not like for position near the leading edges. The level of the stifling derivatives owing to variations in Mach numbers, flow bend approach δ, and generosity of the sine wave remained in the same range.

KEYWORDS: Damping derivative, Delta wing, Hypersonic.

I. INTRODUCTION

This paper deals with the parametric calculations and analysis of high-speed flow for a wing with a leading arched edge. The wing having curved leading edges have got innumerable advantages over the wing having a straightforward foremost edge. In the case of a delta wing with a straight leading edge has a linear distribution of the wing surface area. However, the wings having arched leading edge, as in the present case, where we are replacing a straight leading verge by a full sine wave. When the heft of the sine wave is positive, this will lead to the shifting of a considerable area towards trailing edge, and this shift will depend on the bounty of the sine wave. The shift in the space towards the trailing edge will result in a considerable shift in the position of the standard force location, resulting in more massive moment arm or the higher restoring moment. Hence, this arrangement of the arched front verge of the wing enhances damping derivative magnitude in pitch, which marks remarkable improvements in the dynamic stability derivative. This increase in the damping derivative has its importance at the design stage of high-performance fighter planes at high supersonic Mach numbers. Hence, these days, all the fighter planes are using delta wing or cropped delta wing due to its superiority during the dynamics conditions. Hence in this study for the aircraft at supersonic speeds, wherein numerical computations, by geometrical variations, are explored and compared with the results of the delta wings having the straight leading edge. While a vehicle involvements a modification in both due to pitch rate and direction of attack concurrently, the twinkling derivative due to the rate of pitch proportion and incidence rate have to be estimated discretely to evaluate the whole permanency.

Ghosh's (X) unified supersonic/hypersonic similitude is being used to cultivate an unstable piston philosophy for a forecast of moment derivatives of an oscillating delta wing with a shock wave being attached at the front edge. Hui et al. (IX) have deliberate the problematic of permanency of a fluctuating plane plate annex of indiscriminate planform positioned at a specific callous incidence of attaching at high-speed flow by relating band principle. Ghosh (III) has established a two-dimensional huge refraction hypersonic similitude, which includes the piston model not limited to slim forms, the case of Lighthill's (I), and Miles (II) piston philosophies. Fluctuating delta wings at substantial prevalence were studied by Ghosh (V).

The 2-D piston philosophy of Ghosh was used with the insertion of wave echo consequence for blunt wedges/plane ogives for high-speed flow (VII). His research was reached out to swaying blunt wedges by Crasta and Khan to figure the efficient subsidizing tiny subsidiaries, for both low and high inertia levels (Ghosh, K., VI) and extreme inertia levels streams (Asha Crasta and S. A. Khan, XI-XX). The consequence of stiffness derived due to the pitch rate for a delta wing with the straight and arched foremost verge for extraordinary inertia level inFlow has been studied by Renita et al. (XXI-XXIII) for unsteady flow. In this paper, the effect of leading arched edges on the damping derived due to the pitch rate for the various bounty of the sine wave, flow deflection angle δ, pivot position, and the inertia level.

Pavitra et al. (XXVI) studied the influence of Mach M, δ (2-D wedge), and the angle of incidence on the stability derives at low supersonic Mach numbers as well as at extraordinary supersonic and hypersonic Mach numbers.

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Study of Mechanical Behavior for Tamarind Shell Powder and Coconut Coir Fiber Epoxy Composite for Aerospace Application

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ABSTRACT

Now-a-days, the natural fibres from renewable natural resources offer the potential to act as a reinforcing material for polymer composites alternative to the use of glass, carbon and other man-made fibres. Among various fibres, coir is most widely used natural fiber due to its advantages like easy availability, low density, low production cost and satisfactory mechanical properties. For a composite material, its mechanical behavior depends on many factors such as fiber content, orientation, types, length etc.

Natural fibre composites (NFC) are gaining interest in manufacturing because they address some of the environmental problems of traditional composites: use of non-renewable resources, and large impacts related to their production and disposal. Since natural fibres are not yet optimized for composite production, it is crucial to identify the most appropriate applications, and determine the optimal fibre/ matrix ratio. Results from various experiments help identify the application with the largest reduction in environmental burden and show that the fibre/matrix combination with the lowest environmental burden also has the best mechanical properties.

Attempts have been made in this research work to study the effect of fiber loading and orientation on the physical and mechanical behavior of coconut fiber and tamarind shell powder reinforced epoxy based hybrid composites which is prepared by hand-layup method with different weight proportions.

Key Words: *Tamarind shell powder, Coconut coir, Epoxy, Hybrid composites, Mechanical properties.*

1. INTRODUCTION

Composites have become an integral part of our day-to-day life and can be found everywhere, e.g. rubber tire, spacecraft, etc. Composites have been around for a long time with the classic example of bricks made from straw and mud was used by the Israelites, plywood were used by the ancient Egyptians when they realized that wood could be rearranged to achieve superior strength and resistance to thermal expansion as well as to swelling owing to the presence of moisture [1-5].

Medieval swords and armour were constructed with layers of different materials. Nature also has its own composites in the form of wood, teeth, bones, muscle tissue, etc. Natural fibres were used for reinforcing the matrix until early into the mid-20th century. However, since 1950 there was an increased demand for stronger and stiffer, yet light weight, composites in fields such as aerospace, transportation and construction [6-11]. This led to the incorporation of high performance fibres for reinforcement. This newer composites have low specific gravity, superior strength and modulus when compared to the traditionally engineering materials like metals.

Due to their strength to weight ratio and comparable or better mechanical properties composites are gaining grounds in industrial applications where metals were used [11-16].

2. Material Selection

Major headings are to be column centered in a bold font without underline. They need be numbered. "2. Headings and Footnotes" at the top of this paragraph is a major heading.

February 24, 2020

Improvement of Structural Robustness Against Progressive Collapse of the Structure using In-Fill Walls

B S Keerthi Gowda; V Lokesh; G L Easwara Prasad

Despite the increasing concern in progressive collapse resistant design and analysis of reinforced concrete building it was triggered by accidental and man-made extreme events occurred over the last couple of decades. Only a few studies, especially numerical ones have been carried out so far on the role of masonry infill walls on it. Much the same as on account of seismic tremor building application, infills are typically considered as non-structural or architectural components. Thus, its resistance is omitted; likewise, present design norms do not give explicit signs concerning this point. Although such considerations lead to an ease in work of design and analysis of structural elements, it may also give rise to misleading and overly conservative results, considering masonry-infills also may result in additional vertical resistance. Consequently, this article gives the results of an enormous number of progressive collapse simulations planned for evaluating the impacts of infill walls on the vertical load-carrying limits of reinforced concrete frames for various areas of damage. Thus, it is important to evaluate the interaction between the structural elements and surrounding frames at different stages of the response. The present article portrays the outcomes after validation of the proposed model which was utilized to anticipate behavioral changes in the reaction of infilled reinforced concrete structures, as a result of parametric varieties in the geometry of the selected models. Counterpart bare frames were also analyzed to present a vice-versa comparison in terms of resistance and demand capacity of both the structures.

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Studies On The Structural Characteristics Of Laterite Blocks And Masonry In Puttur Area Of Karnataka, India

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A B S T R A C T

Laterite blocks are widely used for load bearing masonry. Laterite blocks are usually found in heavy rain fall areas all over the world. The characteristics of laterite blocks vary from place to place. There is a wide variation in the property and appearance of laterite blocks. They are used in natural form without any manufacturing process. Several investigators have evaluated the characteristics of laterite blocks and laterite blocks masonry .However the information available on the characteristics of locally available laterite blocks of are scanty. As such a detailed experimental investigation has been made to know the characteristics of laterite blocks masonry constructed using locally available laterite blocks and cement mortars. Three different proportions of cement mortars have been tried. The water transport phenomenon, masonry compressive strength and shear bond strength has been obtained for each case. Compressive strength has been obtained through stack bonded masonry prisms of five block height, whereas the shear bond has been determined through masonry triplets.

From water transport studies it has been found that laterite blocks requires at least 20 to 25 minutes immersion in water at the time of construction. The compressive and shear bond strength varies from 0.29 MPa to 0.83MPa

Keywords: Laterite, Masonry, Shear strength, Prism compressive strength, Water transport

I. INTRODUCTION

Masonry units are typically porous and have the tendency of absorbing the water from the mortar due to capillary suction. The rate at which it absorbs water varies with time. Initially it absorbs the water at a very high rate and after sometime the fee of suction slows down. This property of masonry units affects the behaviour of masonry adversely. The mortar in the masonry becomes poor in water as all the water in the mortar receives

transported to the masonry units. This will be very excessive particularly when the masonry units are dry. The water deficiency in the mortar will lead to incomplete hydration. Any incomplete hydration will lead to reduction of strength of masonry. These water transport research have elaborately made by way of G.Sarangapani (1998) for bricks. He has viewed cement mortars, soil cement mortars and cement lime mortars for his study. He has made it very clear that the water in the

Research on the Strength Parameters of Poly propylene Fiber Reinforced Concrete and Steel Fiber Reinforced Concrete

Ganesha Mogaveera, Umesh S S, Anand V R

Dynamic: Fiber bolstered cement features a higher flexural high-quality than that of unreinforced concrete and cement fortified with welded wire texture. The winning paintings centers within the route of the have a bearing on of polypropene filaments and steel strands on awing parameters of cement, for example, compressive, tractable and flexural unbelievable and what is more on the reasonableness of the usage of the higher filaments within the development. Metal strands of folded kind and polypropene fiber of recron kind having bother of read % of thirty are administered during this analysis. The vital side of this design is to think the high-quality homes of metallike and polypropene fiber fortified cement of M25 assessment having combination extent 1: two.25: 4.26 with W/C % of zero.50 containing strands of bond, zero.25%, zero.50% and 0.75% by means of victimization the usage of quantity of cement. associate terribly final consequences statistics got has been stony-broke down and contrasted and a manipulate instance (zero% fiber). the highest notch parameters certainly due to the very fact the fee examination are likewise created on this art work associated metal fiber grew to form larger to be out because of the truth the higher fiber for an amount of zero.50%. Steel fiber fortified cement is castable or sprayable material of water pushed concretes, very smart or wonderful and route totals with distinct steel strands of rectangular skip-phase haphazardly scattered at some certificate at intervals the community. metallike fiber assist cement with the helpful useful resource of opposing pliable cacophonous .. metallike filaments create superior isotopically, notably enhancing the strong's protection from breaking, separation, spalling and inclined spot. Charge of the steel fiber is larger appreciation regarding the polypropenefiber, instead the primary rate is excessive contrasted with polypropene fiber.

Report terms: polypropene fiber, metal fiber, Compressive superb, Tensile exceptional Flexural outstanding.

I. ADVENT

The belief of the employment of filaments to beautify the abilities of improvement additives is antique. Truely, horsehair growth to be finished in mortar and straw in dirt blocks. at intervals the 1990's, amphibole strands are performed in concrete. within the 1950's, the taking into consideration composite assets regarded and fiber-fortified

cement grow to be one in all the themes of intrigue. Through victimization the 1960's, metal, glass and designed filaments,

as an example, polypropene strands had been administered in concrete. The

Elegant purpose at intervals the lower came back of consolidating strands right right into a bond grid is to enlarge the durability and physical property, and to oppose the affiliation of breaks. all at once for fiber bolstered cement (FRC) to be a probable improvement artefact, it wish to own the preference to contend financially with gift invigorating frameworks.

Steel fiber fortified cement is castable or sprayable composite material of water high-powered concretes, high-quality or unbelievable and direction totals with distinct metal filaments of sq. skip-phase haphazardly scattered within the finish of the grid. metallike fiber crimson meat up cement with the resource of opposing tractable breaking.

Fiber fortified cement features a higher flexural tremendous than that of unreinforced concrete and cement bolstered with welded twine texture. Steel filaments deliver a elevate to isotopically, particularly rising the sturdy's safety from cacophonous , fracture, spalling and exhaustion. The homes of FRC bear in mind upon the inexperienced exchange of worry among grid and also the strands. homes of the materials administered internal the sturdy and fiber result houses of FRC. in point of fact thought of one in every of a kind components that have a bearing on the homes of FRC are downside %, fiber quantity and separating, Orientation of strands, mixing and compaction problem, length of totals, Water/concrete % and Grade of mixture.

Polypropylene (PP) may be a thermoplastic "growth polymer" created victimization the combination of gas monomers. It's way completed in associate assortment of utilizations to embody bundling for patron gadgets, plastic components for explicit ventures aboard bother the car organization, nice gadgets like residing pivots, and materials. As traditional with some opinions, the modern-day-day international hobby for the fabric creates a all year market of spherical 45 million metric hundreds and it's evaluated that the hobby can ascend to form of sixty million metric loads with the help of manner of the employment of 2020

An endeavor has been created to think about the homes of every polypropene fiber and steel fiber for severa downside of read share and because of this the relative studies can yield

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Assessment of Road Safety Audit of NH-69, Karnataka State, India

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Abstract—Road Safety Audit (RSA) is a formal procedure for assessing accident potential and safety performance of new and existing roads. RSA is an efficient, cost effective and proactive approach to improve safety of the road users with leading to any trend of accidents and their impacts. RSA appears to be an ideal tool for improving road safety in India, as basic and accurate data on accidents have yet to be collected in a scientific way as well as in a systematic method. It is evident from the traffic composition for the countries like India, where heterogeneous traffic with varying vehicle types differing in their vehicle static and dynamic characteristics.

The project stretch considered is NH-69 (Bhadhravathi to Shivamogga – Karnataka State) ranging 22.1 Kms. The present study deals with road inventory, signage inventory, traffic volume count survey, spot speed study, Speed and delay study and other surveys such as topographic survey and Accident data has been collected for the stretch for a period of 2012-16 is collected and analysis is carried out. The study aims to evaluate Road Safety Audit of a section of four-lane National Highway (NH)-69 and will focus on evaluating the benefits of the proposed actions that have emanated from deficiencies identified through the audit process. Missing road and median markings to be done and speed signs should match with speed. Access and service lanes are also deficient which requires immediate improvement.

Keywords (Index Terms):— Road Safety Audit (RSA), NH-69, road safety in India and speed signs.

I. INTRODUCTION

In 1980's the Road Safety Audit (RSA) process was started in the United Kingdom. On 11 May 2011, the plan of action for Road Safety 2011-2020 was launched around 100 countries including India. The main goal of the plan is to prevent five million road traffic deaths globally by 2020 (Arun S Bagi et al.). Road safety audit has the greatest ability when it is considered for traffic design before and after the construction stage. Main purpose of RSA is to focus on the accident influential and safety condition of the highways. RSA is a formal procedure having definite aim with standard procedure. For the effective outcome, its need to be conducted by appropriate experienced and trained persons and they should be of independent of design team. An audit procedure initiates from beginning of design and at construction stage.RSA can also conducted on the existing road, so it can help to identify the deficiencies and formopportunity becomes to identify the highway engineering measures to improve safety.

The start of this century, the rate generation of mechanized vehicle has been expanding constantly. The awesome incrementinnumberofenginevehiclesoutandabouthasnot similarly coordinating with relating increment in complete length of highway arrange (*S. S. Jain et al.,*). The highway length has not possessed the capacity to take care of the demand made by the gigantic development of vehicle populace. The blended movement condition winning on our street organize has additionally exasperated the activity circumstance. Along these lines the vehicles populace increments in step by step (*Atul Kumar*). Because of this advancement with changing condition situation, the rates of mishaps are expanding radically. RSA is the principle worry tolessenmischance.MischancefatalitiesrateinIndiaishigh inthecorrelationwiththatinthecreatednations.

Fundamental methodologies of road safety are counteractive action and diminishment of accidents. In accident decrease, consciousness of accidents that happened on existing highway to enhance the outline of highway or to impact the conduct of road user is utilized (*S. S. Jain et al.,*).

In accident prevention, learning of aptitude in safe street outline – street geometry, and in addition the materials utilized. Accident reducing action ought to be the fundamentaltargetofthehighwayspecialisttoguaranteethat theroadsaresafe*(PavanDeshpande).*Atthepointwhenthe accident rate is least on roadway extend then the highway is to be considered as more secure for road user. In the event that accident rate is more than the street is not protected, paying little respect whether all principles were seen amid arranging andplan

A. Road Accident Scenario inIndia

The Road safety is more important in India because close to 5, 00,000 road accidents and nearly 1, 46,000 deaths caused in 2015.Non highway roads witnessed 47.6% of total accidents. This is followed by NH with a rate of 28.4% and SH with 24%. The 2% length on National Highway carry 40%ofgoodtraffic,while7%ofStateHighwaycarry30%of good traffic. The road safety on Indian roads has slowly worsened over the past years. As seen from the below table andgraph,numberofdeathsisincreasedyearbyyear*(PavanDeshpande).*

B. Projectlocation

NH-69 is a major National Highway in India that runs alongthestatesof Andhra Pradesh and Karnataka. The western terminal is at the junctionofNH-66nearHonnavaraandterminatesattheeast end at Chittoor. It passes through Honnavar, Sagara, Shivamogga, Banavara, Sira, Madhugiri, Chinthamani, and Mulabagilu in Karnataka and in Andhra Pradesh it passes throughPalamaner,Chittoor.NH-69is625kminlength.

Experimental Investigation on Strength Characteristics of Lead slag in concrete

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Abstract — **This paper has made an effort to partially replace cement by lead slag for M25 grade concrete. Initially chemical constituents of Lead slag and physical properties of cement, GGBS, River sand, Quarry dust and coarse aggregates were analyzed. Concrete was casted with 0.45 w/c ratio for M25 grade concrete. By varying the percentages of lead slag, cement and GGBS concrete was casted. Compressive Strength characteristics of lead slag in concrete with varying proportions were analysed using graphs. Percentage of cement consumption savings is found out for one cubic meter of concrete without affecting the target compressive strength of concrete.**

Keywords—Lead Slag, Compressive strength,concrete

I. INTRODUCTION

Construction industry activities has been rapidly developing day by day throughout the world.Concrete is one such material which has been abundantly used from tiny projects to mega projects. For the production of concrete it mainly requires cement, sand and aggregates with water. It has been found that about 467g of CO_2 is emitted during 1kg production of cement [1]. In order to reduce the usage of cement and reduce the effect towards environmental pollution this paper has made an attempt of partially replacing cement by lead Slag. Lead slag is the waste by-product generated during the recovery of metallic lead by pyro metallurgic process from exhausted batteries.

II. OBJECTIVES

1) To determine the chemical composition of Lead slag and physical properties of Cement, Ground granulated blast furnace slag, River sand, Quarry dust and Coarse aggregates.

2) To determine the strength characteristics of Lead slag as a partial replacement for cement and GGBS in concrete.

3) To analyse the cost savings in cubic meter

III. MATERIALS USED

A. Cement
Ordinary Portland cement of 53 grade confirming to Indian standard IS 269:2013 was used. The various properties of cement are given in the Table I

TABLE I
PROPERTIES OF CEMENT

Sl.No	Properties	Test results		Requirements as per IS 1S269:2013
1	Specific Gravity	3.19		-
2	Normal Consistency	28.5%		-
3	Initial Setting Time (minutes)	55		>30
4	Final Setting Time (minutes)	230		<600
5	Compressive Strength (N/mm²)	3 days	35	>27
		7 days	44.5	>37

B. River Sand
River sand was collected from Trident RMC plant Baikampady Mangaluru. Properties of River sand are given in Table II

TABLE II
PROPERTIES OF RIVER SAND

Properties	Test Results
Specific gravity	2.55
Water absorption	1.85%
Fineness modulus	3.30

C. Lead Slag
Lead slag sample was collected from Eshwari Metals Baikampady Mangaluru. Properties of Lead slag are given in Table II

TABLE III
PROPERTIES OF RIVER SAND

Properties	Test Results
Specific gravity	2.2
Water absorption	11.01%
Fineness modulus	4.14

D. Quarry dust
Quarry dust was collected from Trident RMC plant Baikampady Mangaluru. Properties of Quarry dust are given in Table IV

TABLE IV
PROPERTIES OF QUARRY DUST

Properties	Test Results
Specific gravity	2.52
Water absorption	3.80%
Fineness modulus	3.95

Physico-chemical Study on Extent of Water Quality Deterioration in the Lakes of Mangaluru City

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Abstract— **This study involves the analysis on extent of deterioration of lake water quality in the selected lakes of Mangaluru city. The water quality analysis shows that there is no such variation in the pH, acidity and alkalinity. But the other parameters like DO and BOD having significant importance because dissolved oxygen is very less than that of permissible limits of BIS standards and also there is high BOD or organic load in all most all the lakes and hence the water quality in the lakes is not suitable for the survival of aquatic organisms and also for drinking purposes. So that the results are helpful in the policy making decision of the rejuvenation of lakes.**

Keywords—lake, deterioration, water quality, pollution load

I. INTRODUCTION

Many civilizations that flourished after developing reliable water supply collapsed when the supply was exhausted or its quality deteriorated. Early human civilizations were centered on spring and streams. Water is vital to the human's existence. The fast growth of urban areas has affected the water quality of the surface water due to over- exploitation of resources and improper waste disposal practices. The catchment area is important for water resource conservation, both in terms of quality and quantity [1].

Generally, the status of water quality can provide information on land activities within and surrounding catchment area. Water quality index is one of the most effective tools to communicate information on the water quality to the concerned citizens and policy makers. It becomes a very important parameter for the assessment and management of surface water [1].

Lakes and ponds are significant freshwater habitats throughout many regions of the world, although the quantity of water in them constitutes only a minute fraction of the total freshwater resource on the earth. A large proportion of the fresh water is stored as ice and snow at very high altitudes and around the poles or in the form of groundwater as and less than 0.5% is available for use by organisms, including humans. Water availability is a cornerstone for modern human civilization but increasing human populations have resulted in raising demands on water supplies for drinking, hygiene, processes of industries and agriculture (like irrigation) [2].

The varying biodiversity of lake and pond ecosystems is currently threatened by a number of human disturbances, of which the most important include increased nutrient load, contamination, acid rain and exotic species invasion. Analysis of trends suggests that older, well known threats to biodiversity such as acidification, eutrophication and contamination by heavy metals and of organochlorines may become less of a problem in developed countries in the future [2].

This study involves the analysis of extent of water quality deterioration in the major lakes of Mangaluru city due to the entry of pollution load like sewage, industrial effluents, construction debris, etc. Mangaluru is one of the major city in Karnataka and due to its rapid urbanization and haphazard growth of the city, leading to deterioration of water quality in the lakes within the city of Mangaluru thereby making water in the lakes unfit for drinking and for the purposes and also it may be difficult to survive for the aquatic organisms in such a lakes.

II. METHODLOGY

A. Study Area

The present study was conducted by selecting the lakes within the Mangaluru city. Considering about ten lakes for the analysis of quality of water in the city of Mangaluru. Following are the lakes considered;

- ➢ Byradi Kere
- ➢ Shanthinagar Lake
- ➢ Niddel Lake
- ➢ Jeppinamogaru Daivasthana Lake
- ➢ Jeppinmogaru Daivasthana Fisheries Lake
- ➢ Kadri Math Lake
- ➢ Gujjarakere Lake
- ➢ Kadri Doctor's Colony Lake
- ➢ Pilikula Lake (Big)
- ➢ Pilikula Lake (Small)

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Identifying the Faces from Poor Quality Image / Video

T.Shreekumar, K.Karunakara

Abstract—Face biometric is becoming more popular because of its wide range of applications in authorizing the person either from an image or from the video sequence. The bottleneck in face recognition is Pose angle variation, varying light condition, Partial Occlusion, Blur in the image or Noise. The proposed method first removes the noise from the image using Adaptive Median Filter (AMF) then Discrete Cosine Transform(DCT) is applied to normalize the illumination problem. The algorithm is further used to remove the motion blur using Lucy Richardson's method by calculating the Point Spread Function (PSF). The Pose variation problem is then addressed with Global Linear Regression(GLR). Then the Principal Component Analysis(PCA) and Linear Discriminant Analysis(LDA) are applied to the normalized image to get the feature vector. This combined feature score is used to recognize the image using K-Nearest Neighbor (K-NN). The result shows a maximum accuracy of 92% and 87.5% with Pose angle variation between (0•, 22•) and (22•, 40•) respectively. The pose variation greater than this shows an average accuracy of 77.5%. The result also shows a maximum computation speed of 0.018 Seconds.

Keywords: Face Recognition, Linear Regression, Principal Component Analysis.

I. INTRODUCTION

The present trend expects enhancement in the protection process for each and everything which are used in real-time. The improvement in the secured accessing product is much more valued in limited surroundings like, mobile phone access, laptops access, shops, entering group which calls for an extremely high-level authentication, nearly every location in which the security is playing the main role. By providing that the security measures for the daily issues the subscribers can lead a calm as well as a protected lifestyle without being concerned about the confidential information they have to stay protected.

For authorized access to confidential information, determining the people's identity is vitally important. The identification of an individual is utilized for a valuable objective. In the recognition of the person, the biometrics plays a significant role in meeting the security must-have. The different biometrics include the private ID number, iris identification, fingerprint recognition, palm print identification, etc. These are the physiological attributes that are worn in identifying patterns for offering security to these biometric engineering. Face recognition is regarded as the prominent technology utilized at determining an individual.

Face Bio metric is starting to be common in Bio metric identification process since it's robust and non-intrusive. Face recognition gets tough due to Light variation, occlusion, pose variation, sound, and so on, when captured in a cluttered history (subway, airport). Uncontrolled Face recognition product must be in a position to identify the faces from shot picture, extract the functions of its and then identify it still from a most difficult environment.

The quality of the image is extremely important in Face Recognition. The recognition process is actually going to be difficult when the image under consideration is actually under the influence of degradation. The degradation is primarily because blur and noise. The typical type of blur is actually motion blur. The motion blur is actually because of camera or maybe object action while capturing the image. For restoring the picture ,it is crucial to discover the degree of the blur and blur perspective length. The blur perspective as well as the blur length ,then utilized for calculating the Point Spread Function (PSF). Proper kernel functionality could be used on PSF for getting rid of the blur.

Out of various challenges that influence the face recognition rate , the pose variation plays an important role. Common method to overcome the problem of Pose variation, first the pose and the illumination variations are normalized and then the image is used in recognition. Various algorithms have been developed for normalizing the Pose and illumination variations. But still some drawbacks exist in the recognition process, and to overcome these drawbacks we propose a new face recognition system for video images under a variety of viewpoint and Illumination conditions.

II. LITERATURE SURVEY

Recognizing faces appropriately under different illumination conditions is an extremely challenging problem in the field of face recognition. This is because same person's face appearance changes under different illumination conditions. Over the years, different algorithms have been developed to solve this illumination variation problem.

Aishat Mahmoud Dan-ali and Mohamed Mustafa [1] have proposed various illumination normalization techniques for face recognition. Here, five pre-processing techniques were compared and analysed with the help of Euclidean distance and Cosine distance. Experiments were performed on three challenging face databases. The normalization techniques employed here were GIC, DCT, Histogram Remapping techniques like HRN, HRL and AS method. These

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Face Pose and illumination Normalization for Unconstraint Face Recognition from Direct Interview Videos

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Abstract— The Posture variation and the Lighting sets in the vicinity problem are the two major challenges in Facial parameters identification. We use Local Linier Regression (L.L.R) and Discrete Cosine Transform for Posture and Lighting set correction. In this publication Principal Composition Exploration (P.C.A), Fisher's Linier Discrimination examination (F.L.D.A) and the combined score of P.C.A and L.D.A are castoff to articulate the single layered sped forward Neural Network. During the testing portion Posture and the Lighting sets in the vicinity normalization are carried out using L.L.R and D.C.T respectively. Then the combined score of P.C.A and L.D.A of test image is used to recognize the image using the trained Neural Network. We further use the Support Vector Machine (S.V.M) to train and recognize the Face images replacing Neural Network. We are able to obtain more improvement in the results such as computational complexities and computation speed.

Index Terms— Artificial Neural Network, Support Vector Machine,Discrete Cosine Transform, Fisher Linear Discriminant Examination, Linear Facial parameters identification, Principal Compound Investigation, Local Linear Regression.

1. INTRODUCTION

Facial parameters identification technique is one of the best technique when implementing a stored data structures technology where faces discriminates and disintegrates individuals in specified form of still or video image. It has numerous reliable applications involving both human cum computer device interaction system, substantially authentication techniques, global security management, and domestic cum commercial surveillance sectors. The predominant types of facial parameters identification strategies include (i) feature-based (ii) appearance-based. In the former method geometrical parameters pertaining to the facial part measurements are used, whereas in the latter, intensity derivative parameters are used.

The already performed researches have focused on functional parameters like pose, lighting sets in the vicinity, hair style, make-up, facial expression, identity, aging and so on. Out of these of these facial parameters identification, lighting sets in the vicinity and Posture are the two major bottlenecks which completely influence the technique. The storage of a huge number of photographic views for each

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facial image is a challenging factor in Pose-invariance recognition. Hence it becomes inapplicable in circumstances where different images to be included. Varying lighting sets in the vicinity faces computational cost as the major drawback apart from its technical incapability. Various algorithms are being developed continuously by research scholars for facial parameters identification to solve these critical problems, still in vain due to its computational complexity in investigation, huge cost incurred and huge memory space requirements. To overcome all these hitches and to make the best use of the approach we recommend a new facial recognition system involving video images clipped with variable Posture and varying lighting sets in the vicinity conditions.

Here the facial parameters identification comprises of two predominant stages (i) training section (ii) testing section. Section (i) focuses on training the database by implementing P.C.A, F.L.D.A and Neural network where, dimensionality of the image is reduced through P.C.A while feature vector is acquired with F.L.D.A. The combined score of P.C.A and L.D.A together is implicated in training the neural Network. On the contrary, section (ii) uses the video clipping of the sample personnel to be recognized to be the input which may or may not have the Posture variation and lighting sets in the vicinity fluctuation as only a standardized image of the personnel is acquired using L.L.R and D.C.T techniques .Consequently these reduced dimensions and features attained using P.C.A and F.L.D.A are converted and recognized by Neural Network.

The experiment is further carried out by selecting S.V.M in place of Neural Network. The combined score of P.C.A and L.D.A are used to train the S.V.M. The test image is standardized using the L.L.R and D.C.T. The dimensionality redued using P.C.A and the same is represented using L.D.A.Then the score is used to recognize the image. The statistical parameters such as Sensitivity, Specificity, Accuracy etc and the computation speed are recorded. In the next experiment the S.V.M with RBF kernel is used to test and recognize the image.

A brief research related views of Facial parameters identification is illustrated in Section II. The suggested video facial parameters identification system is elaborated section III with its experimental results in Section IV and the work is concluded with the possible Future Enhancement in Section V.

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Multicast Communication Using Different Group Key Managements

Ranjan Kumar H S, Ganesh Aithal, Surendra Shetty

Abstract: The most appropriate communication mechanism for transfer of packets from one source to another is multicast IPv6 communication. Nowadays, multicast communication plays a major role in a large number of communication applications. In this multicast communication, the message privacy attains a highest position. The members of multicast are dynamic so they permit the host members to enter and depart the cluster without the permission of remaining group members and, it can't provide any transfer without the interference of host, this may reduce the performance. For security enhancement in multicast communication Group Key Management (GKM) was introduced. There are three different approaches in GKM and they were mainly involved to overcome the issues of host mobility in multicast communication. The challenges that are encountered by these GKM approaches their requirements and challenges was also discussed in this paper. Finally, some questions and their explanations were provided along with it. These GKM approaches will improve the privacy of multicast communication. So, the packets can deliver to the group members without any interference.

Index Terms: Multicast IPv6 communication, Security, GKM, Centralized, Decentralized, Distributed.

I. INTRODUCTION

The most important building block for secure group communication (SGC) system is GKM [1]. The rapid fluctuations that occurred in cluster membership was largely tolerated by this SGC method. In this communication field, the members are allowed to leave or join on their own will, also they can access the basic transmission structure (i.e., the multicast communication can be provided and revoked with less system overhead) [35, 37]. The confidentiality over the communication was ensured by GKM. It was achieved by creating a secret share key between the cluster members. Such secret key was referred as "traffic encryption key" (TEK) which was used for message encryption or decryption process [33]. The most important challenge is key generation and re-keying process without enhancing the communication overhead and storage [1, 34]. Recently, number of updated methods were developed for key generation and secure information sharing among various and within similar groups [1, 38]. A large quantity of network applications depends on client–server paradigm, but they include unicast for packet delivery. But, enormous upcoming applications depend on the group communication method. Normally, communication

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sector needs to transfer packet from a number of authorized transmitters to a large amount of permitted receivers [2]. The GKM performance was largely affected by resource constraints, largely spread mobile devices, and bandwidth limitation [23].

Due to, the rapid improvement in the field of technology and internet may affect the growth of both internet and mobile users. In order to compete with this growth an advanced IPv6 (Internet Protocol version 6) was introduced. The multicast communication was successfully developed in internet for best and efficient service delivery for large groups [9]. The performance of multicast communication in both the media or content suppliers/distributors and Internet Service Providers (ISPs) have gained a large popularity. The multicast communication in IPv6 perform efficiently for delivering services for group-oriented applications like video conferencing, video-on-demand (VoD), communicative group games, etc. from internet to various members [3, 10, 29]. The methods of key management concentrates in cryptographic key generation, maintenance and distribution [39].

The major role of multicast communication is to deliver a message from a single transmitter to a cluster of members. The task performed by both the group communication and group creation was found to be similar in the internet field. It performs more effectively than a unicast method. For each group, a leader was necessary for managing the group activities. But in various multicast communication systems, a key server (KS) or group centre (GC) plays a major role in group member interaction and management [4].

The important challenge for the designing process of Smart Grid (SG) was high level security. For secure communication, the message encryption and decryption was generally performed by the cryptographic keys. The key establishment among two parties includes various solutions, and these solutions were include as a section in the authentication process. The most popular solution for session key formation is Diffie-Hellman (D-H) algorithm [5]. The scheme of key management also provide its service in health care system by providing facilities for sensor removal and addition from the Body area network (BANs), it also renew the group key if necessary [6]. The existing protocols of group key agreement (GKA) widely depends on the map-to-point hash computations and expensive bilinear pairing. But these schemes were not involved in the e-health application. The group session was safeguard by developing a secure scheme for GKM [12].

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SPECIAL ISSUE PAPER

Generation of pseudo random number sequence from discrete oscillating samples of equally spread objects and application for stream cipher system

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Summary

The demand on security privileged information has widely increased due to the sensitivity of the exchanged information over public communication channels. Nowadays, almost all organizations, mainly, business, financial, and government related areas, and also other regions are computerized, and sometimes, the data will be highly confidential. Since some areas dealing with confidential data, it is very much essential to provide the security for the data to avoid unauthorized access. Multimedia data security and security related issues have attracted many researchers towards it. Cryptography is necessary to protect the confidential information transmitting over the network. The strength of the cryptographic system, especially, stream cipher, is not only depending upon its encryption/decryption algorithm but also depends upon the randomness properties of the key sequence such as length, uniformity, independence, etc. In this work, a novel method of generating the pseudo random number that is based on the discrete equally spread oscillating points viewed orthogonally as an envelope has been considered for the generation. Depending on the number of samples, it is possible to get the higher length of the sequence. The random patterns generated by the discrete points of a moving wave are used to generate non binary random numbers. These numbers are used as key in stream cipher system. These are having greater advantages like one time padding to achieve perfect security in cryptographic application. The same non binary key sequence generated is applied for the cryptographic application, and the security parameters of the result obtained from cryptographic applications are also evaluated to observe the strength of security level.

KEYWORDS

discrete oscillating samples, Pseudo Random Number Generator, stream cipher system

1 | INTRODUCTION

Data can be hacked during transmission through network channel. Hence, it is very essential to be transmitted in a secured manner. Cryptography is one of the major techniques to ensure security of data. Cryptography is a technique of transforming an original data into a particular form so that only those who know the key can read and process it. In cryptosystem, original message or data referred to as plain text. This could be transformed into non readable or scrambled form referred to as cipher text. This is done based on encryption algorithm. The encryption algorithm uses a key for changing the plain text into a cipher text. The cipher text can be recovered into its original form by an algorithm using a key known as decryption. The main goal of cryptography is data privacy (confidentiality), data authenticity, and data integrity (it cannot be modified in any way) in the digital world. Based on the type of key used for encryption/decryption, cryptography systems are categorized as symmetric key system and asymmetric key system.[1] The symmetric system can be categorized as stream and block cipher.

Secure RSA Variant System to Avoid Factorization Attack using Phony Modules and Phony Public Key Exponent

Raghunandan K R, Ganesh Aithal, Surendra Shetty

Abstract: In cryptography Public key cryptography plays a significant job in the field of data communication. Public key uses two distinctive keys where keys are related so those, the public key can use to encode the information and private key is utilized to decode. RSA is considered as one of the effective algorithm in public key cryptography. Effectiveness of RSA Algorithm for the most part relies upon how adequately public key segments is shared i.e. common modulus n and public key exponent e. If these components compromised by the hacker using mathematical attacks, acquiring private key becomes easier task for the intruder. This paper present an upgraded RSA algorithm which is used to avoid the limitations of Integer factorization attack by improving the complexity of factorization process by utilizing fake/phony public key exponent type f rather than e and phony modulus X rather than n. Paper also gives comparative analysis of the proposed work using standard metrics.

Index Terms: Euler's function, Fermat factorization, Public key cryptography, Wieners attack

I. INTRODUCTION

In Communication period protection of information assumes a significant job in our day today life. In this way, verifying data from eavesdroppers is real assignment. A cipher is a strategy for concealing data by supplanting unique letters with different letters, numbers and images through some sort of mathematical traps. Cryptography uses pair of procedures called scrambling/encryption and unscrambling / decryption. A Function which is utilized to change over the plain content to cipher content utilizing a key is called Encryption. Getting Plaintext again from cipher message by applying another mathematical function is called Decryption [1].

There are different approaches are used in cryptography depends on the keys what they are adopting in encryption and decryption.

A. Symmetric Key Cryptography

In data transmission, encryption side (Sender) and decryption side(Receiver) utilizes a similar keys for encoding the information and decoding of the information, it is called as Symmetric Key Cryptography.

Limitations: Security of this algorithm predominantly relies

upon key age algorithm and the space used to represent the key utilized. If user uses weak key (size of the key is small) then it leads to less amount of time to obtain the key.

Proposed work center around public key cryptography by introducing improvement of the limitations of attacks on private keys of RSA

B. Asymmetric Key Cryptography

Asymmetric key also called as public key encryption. In this algorithm pair of related keys are utilized which can be gotten from an ensured specialist. key utilized for encryption capacity called Public key and another key utilized for decoding called private key. Any client needs to send any data at first he should utilize beneficiary's public key data from public catalog to encode the message. It is difficult to decode the encoded message by any individual who knows the public key. just the authentic client having the private key can unscramble original data.

An asymmetric-key cryptography procedure gives cryptography services like confidentiality, integrity, and authentication of message. Figure 1 explains asymmetric key cryptography.
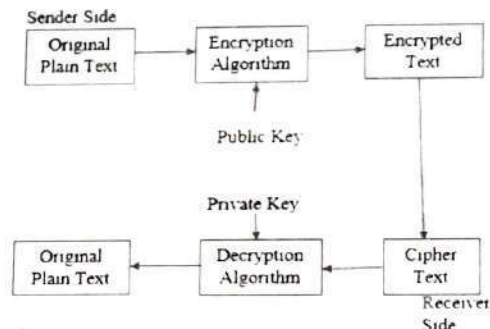

Fig. 1. Asymmetric Key Cryptography Process [16]

Public key algorithms are created dependent on some number theoretic idea which includes number-crunching tasks. Longer the keys and operands increasingly secure the algorithms is. RSA is considered as more secured, efficient and well-known Public Key Cryptosystem (PKC) which ruled public key cryptosystem from most recent 4 decades. RSA algorithm remains on the numerical capacities, for example, factorization, Euler totient work and modular exponent. During development of PKC discrete logarithms and integer factorization's are the regular issues [2].

Skin Disease Recognition using Texture Analysis

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Abstract — **There are many skin diseases that have the similar symptoms which can be recognized using neural network which is based on the texture analysis. The many diseases like Measles, German measles and Chickenpox etc. shares the similar pattern of infection and symptoms such as redness and rashes. Diagnosis and recognition of the skin disease is the very difficult job since it requires the details of patient's history, physical examination and the laboratory results. Since many skin diseases share the similar symptoms it is very difficult to diagnosis and recognize the skin disease. Hence, a computer aided diagnosis and recognition of skin disease system is introduced. Image processing, image feature extraction and classification are the few steps involved in computer aided algorithm. Classification of the data has been done with the help of the classifier such as artificial neural network (ANN). The ANN can learn patterns of symptoms of particular diseases and provides faster diagnosis and recognition than a human physician. Hence based on the symptoms detected the patients can be treated immediately using skin disease recognition by texture analysis.**

Keywords — Skin disease; classification by NN; segmentation; GLCM features;

I. INTRODUCTION

Composed of epidermis, dermis and subcutaneous tissues, skin is the largest organ of the human body, containing blood vessels, lymphatic vessels, nerves and muscles, which can perspire and perceive the external temperature and protect the body. Covering the entire body, the skin can protect multiple tissues and organs in the body from external invasions including artificial skin damage, chemical damage, adventitious viruses and individual's immune system. Besides, skin can also avoid the loss of lipids together with water within epidermis and dermis so that skin barrier function can be sterilized. In spite of defense and barrier system, skin is not indestructible in that skin tends to be constantly influenced by a variety of external and genetic factors. The skin itself can be separated into three different layers which are epidermis, dermis and subcutaneous. The two layers that make up the human skin is known as epidermis. Meanwhile, dermis is the thick layer of living tissues below the epidermis that forms the true skin and contains a lot of important structures such as blood capillaries, nerve endings, sweat glands, hair follicles and other structures.

Recognition of human skin is an important task for both computer vision and graphics. For computer vision, accurate recognition of skin texture can greatly assist algorithms for human face recognition or facial feature tracking. In computer graphics, facial animation is an important problem which necessitates reliable skin texture recognition. In addition to computer vision and graphics, skin recognition is useful in dermatology and several industrial fields. In dermatology, the skin recognition can be used to develop methods for computer-assisted diagnosis of skin disorders, while in the pharmaceutical industry; quantification is useful when applied to measuring healing progress.

A lot of research also has been made and there are plenty methodologies have been propose in order to analyze and recognize textures of the skin disease. A scheme for automated detection of three classes of skin diseases by analyzing textures and obtained from a collection of medical images based on Gray Level Co-occurrence Matrix (GLCM). In order to give more efficient recognition accuracy of the skin disease an approach relied on both skin color and texture features (features derived from the GLCM). Texture analysis is one of the most important aspects of human vision which can classify between surfaces and objects. In the computer vision techniques provided surface texture to distinguish and recognize objects based on visual patterns of objects. A GLCM is a popular statistical method for texture analysis and it indicates the probability of object's patterns.

II. PROBLEM STATEMENT

The doctors typically have assumed diagnosis opinion, which most likely begin by searching for further

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Analysis of PID Control Algorithms for Transfer Function Model of Electric Vehicle

Vinayambika S. Bhat, Akshitha G. Shettigar, Nikhitha, Nidhi Dayanand, K. P. Vishal Kumar

ABSTRACT--- In Electric Vehicles (EV) energy is stored in rechargeable batteries which is used to drive one or more electric motors. As electric vehicles are making big waves in automobiles world, modelling and simulation of Electric Vehicle have got high attention among researchers. Controlling an Electric Vehicle is not an easy task, as the design and operational parameters vary along with the road conditions. The article presents the design and simulation of conventional control algorithms for Electric Vehicle. The transfer function model of the Electric Vehicle is considered for the design and analysis in MATLAB/Simulink platform. It is found that Proportional Integral Derivative (PID) controller is simple and feasible, along with better-closed loop performance with and without disturbance. The work includes the control of the electric vehicle by designing three different control algorithms: i) Cohen-Coon (CC), ii) Wang-Juang-Chan (WJC) and iii) Chine-Hrones-Reswick (CHR) algorithm for the second-order transfer function model. The resulted controller is also simulated using equivalent First-Order Plus Dead Time (FOPDT) model of an electric vehicle. A comparative study has been carried out using its time domain specifications. Also, Performance Indices namely 1) Integral Square Error (ISE), 2) Integral Absolute Error (IAE), 3) Integral Time Absolute Error (ITAE), and 4) Integral Time Square Error (ITSE) are evaluated in order to identify the superiority of control techniques.

Index Terms— Electric Vehicle, PID Controller, Performance Indices, Transfer Function

I. INTRODUCTION

Challenges in energy saving are astronomical, and there is a spiraling increase in the cost across the world. A major source of the greenhouse effect is due to the increasing number of vehicles which results in environmental pollution [1]. Electric Vehicles (EV) have lesser harmful emissions and are capable of dealing with pollution problems in an efficient way. EVs use one or more electric motors for propulsion. Technological progress in engineering arena with specific reference to EVs has immensely contributed in making the sustainable society and better quality of human life.Internal Combustion Engine (ICE) is a greatest contributor to urban air pollution and also second highest contributor to global warming with approximately 21% emission of greenhouse gasses and the depletion of fossil fuels and their increasing prices, have significantly amplified interest in EV controller [2].

Many researchers have been working on the modelling and controlling of an EV. Due to their sustainability and cheaper running cost, EV are likely to be the way of the future. Developments throughout the 20th century have resulted in simpler and more efficient electric vehicle [3]. EVs have cutting edge compared to other technology that they only consume energy, but at the same time store and transport electricity and can reduce the emissions that contribute to climate change. The fuel to Electric Vehicles is extremely cheap as compared to traditional ICE engine vehicles. It also produces less heat and air pollution. In addition, EVs are economical and eco-friendly. This very feature of EVs makes them an incredible alternative for fuel vehicles.

The article is delimited with following structure: The section II gives the description of an Electric Vehicle; Section III describes the design of PID controller using Cohen-Coon, Wang-Juang-Chan and Chine-Hrones-Reswick tuning techniques. The section IV, presents the simulation results of control algorithm with and without disturbance, followed by a culmination section.

II. DESCRIPTION OF AN EV

The EV was invented around the middle of the 19th century [4]. It is powered by rechargeable batteries and is propelled by a motor. The rechargeable batteries which are used as energy storage devices play a significance role in Electric Vehicle application [5]. EV is nearly silent and hence prevents noise pollution. Three main components of the EV are an electric motor, a controller and a rechargeable battery.
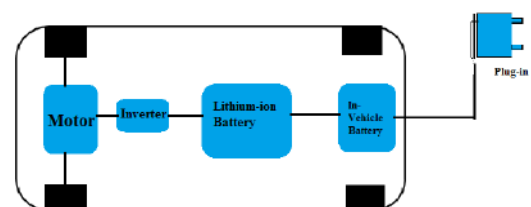

Fig. 1: Block Diagram of Electric Vehicle Model [4]

The electric motor is controlled by a controller. The rechargable battery provides the power to elctric motor as shown in the Fig. 1. Electric motor gets power from the battery pack. The EV system takes the input voltage from the electric motor and outputs the rotational speed of the electric motor [6]. Electric motors operate efficiently over a greater range of speeds and also generate high torque at low

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Table. V: Comparison of Performance Indices of FOPDT model for the regulatory response

Method	IAE	ISE	ITAE	ITSE
CC	13.26	6.682	173	43.95
WJC	2.218	1.378	4.731	1.304
CHR	3.241	1.564	12.6	2.39

Table. VI: Time domain specifications: Settling time (t_s) and Peak overshoot (M_p)

Control Algorithms	SOTF		Equivalent FOPDT	
	t_s	M_p	t_s	M_p
CC	53.54	0	52.15	0
WJC	28.5	0.36	8.37	0.26
CHR	16.28	0	15.04	0

V. CONCLUSION

Wang-Juang-Chan tuning method is faster compared to other tuning methodologies. Having said that it tends to have large overshoot and maximum settling time. Whereas, Cohen-Coon tuning method comparatively has minimum overshoot but, it is slow in response. The Chine-Hrones-Reswick method of tuning has an average settling time compared to the other two tuning methods. When Cohen-Coon and Chine-Hrones-Reswick tuning methods are applied, zero overshoot is observed. But, Cohen-Coon method is taking maximum time to settle among the other methods. The Performance Indices of Chine-Hrones-Reswickmethod of PID controller are better among the rest. The work can be extended further to analyze the robustness both in simulation and real-time environment.

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MODELLING OF AUDIO EFFECTS FOR VOCAL AND MUSIC SYNTHESIS IN REAL TIME

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Abstract- **Sound effects play an important role in today's music industry. The various effects, modulations to the voice is done. here we present a musical sound effects processing system based on virtual analog modelling and Digital Signal Processing techniques. The modelling is using in matlab and the order of effects are sequenced depending on the musicians choice. The various techniques of Digital signal processing are used .The comparison of results obtained are done with the available system.**

Keywords—**Fuzz, Flanger, Chorus, Delay, State variable filter**

I. INTRODUCTION

The music industry uses various sound effects which are used in various audio tracks or movies to augment the experience of movie watching, audio listening, public address systems and live music concerts. Musical effects processing and synthesis in real time takes an important place in most of the sounds of contemporary music whenever they are encountered in the theater or surrounding environment. Almost all the music produced in last few decades by recording or electrically amplifying uses lots of effects processing which may include dynamic compression or artificial reverberation, and synthesizers or synthetic instrument sounds play and occupy an increasingly greater part in the total musical spectrum. In addition, most of the or a vast majority of these effects are currently implemented using digital signal processing(DSP)[1][12] techniques, majorly because of the flexibility and lower cost of modern digital devices. However during live music or performance, operation of these effects[7] and synthesis algorithms to be able to work in real time is obviously of supreme importance. Recorded music however, also typically requires real-time operation [9] of these devices and algorithms, due to the fact that performers normally wish to hear the final, processed sound of their instrument while playing live. In recent years while reviews of virtual analog modeling and synthesis of digital sound's by synthesizers are to be found and discussed [3] and [4] respectively. virtual analog oscillator algorithms, tutorials are available and which is not dealt in this paper as it not in scope and which has been Documented discussed[5]. For Real-time simulation of an interesting analog effects device, the voltage-controlled filter or state variable filter is being used. In this proposed project the importance is given for the versatile, hassle free, portable and easy to utilize musical synthesizer which is the prime requirement of the modern day musicians. The proposed system is to be developed by an DSP processor or by utilizing the computer's line–in or Mic-in ports. The High speed processing capabilities of the computer is nowadays used for these kind of applications. where in the live streaming of audio has to be converted to digital data, then given to computer where it is processed and given out through line-out port of the computer. The commercial available music processors do not have the flexibility to interchange the chain of effects within the loop in a required order. This proposed system overcomes this limitation by independently running the effects and good memory or register banks.
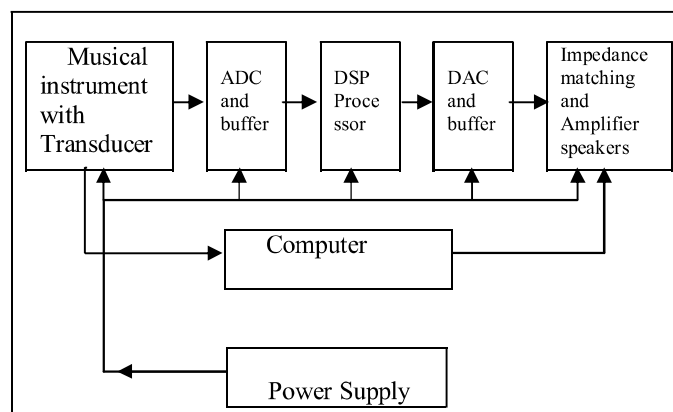
II. SYSTEM OVERVIEW

Fig 1. Block diagram of the proposed system

The system put forward consists of Musical instrument with the transducer which may be a pick up or piezo electric or the output of any musical instrument with electrical output like aux or mic output. The ADC and Buffer unit for the signal to be digitized and the buffer is used for the storage of data in order to have an easy flow of the sequence of data from ADC to the next stage[2]. The DSP processor to do the processing of the signal and then buffer and DAC and then to impedance matching and Amplifier section and to speakers .The proposed system can also utilize the Computer with very high speed processing to run the program in matlab[15] and do the processing in real time. The power supply unit supplies the power to the required sections. The computer approach consists of running Matlab

Secured Video Steganography in DWT-DCT Domains Based on Multiple Object Tracking using H.264 Algorithm

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Abstract: *The technological development in past few years has led to the evolution of new techniques for secured digital data communication. Video steganography is one of the most efficient methods for secure and robust data communication. This article presents a steganographic algorithm in transfer domain using Discrete Wavelet Transform (DWT) and Discrete Cosine Transform (DCT) based on Multiple Object Tracking, encoding and decoding using H.264 algorithm. Initially input video is divided into 'N' number of frames on which motion object detection and tracking is implemented. 2-D DWT is applied on RGB channels of each motion region resulting in LL-LH and HH sub bands. DCT is also applied on the same motion region resulting in DC and AC co – efficient. The resultant stego video is rebuilt by combining non-motion objects and transformed motion objects of the frame. The performance analysis is carried out for Peak Signal to Noise Ratio (PSNR), Correlation, Mean Square Error and SSIM. The effect of attacks such as Gaussian White and Salt & Pepper are also analysed. The experimental results predict that the recommended algorithm improves the embedding capacity and also enhances the robustness of secured data communication.*

Index Terms: *DCT, DWT, Multiple Object Tracking,H.264, Stego Video.*

I. INTRODUCTION

Steganography is a Greek word which means covered writing. It plays a vital role in hiding data in digital videos [1]. Technological development and requirement of efficient and secure sharing of digital data is responsible for video steganography. [2, 3]. In past few years, video steganography has become an effective tool as a large amount of data can be hidden effectively without causing content distortion in which the data is hidden in each video frame independently.However, transparency, robustness, payload capacity and computational complexity of embedding and extracting the hidden data are the important parameters to be considered [4, 5]. H.264/AVC is one of the most commonly adopted video compression formats.It is the advanced standard for compressing video with high compression efficiency. Hence most of the digital video technologies depend on H,264 compression framework. [2, 6-17]. DCT and DWT are the two common methods for hiding data in transform domain.Here the digital data is converted from spatial domain to transform domain. The cover video is

transformed using any these algorithms and then embedded in to appropriate co efficient. 2-D DWT is a multi-resolution process that discretises the video frames into horizontal, vertical and diagonal sub-bands by using high and low pass disintegration, where as DCT is applicable for video and image compression and also inserting data of low frequencies of cover image pixels. [9, 15, 18].

II. RELATED WORK

This section presents existing work that have been used related to DWT-DCT domains for H-264/AVC compressed videos prior to the proposed work.

K. Munivara Prasad et al., [1] have proposed a new approach of steganography for handling attacks. The imperceptibility of BCBS algorithm is improved by DCT. The hiding capacity is improved by fractal compression and security is made effective by using DES for encryption.Ma et al., [2] have proposed a innovative readable data hiding algorithm to embed data in to DCT coefficients of I frames without distorting intraframe into H.264/AVC video. K B Shiva Kumar et al., [3] have proposed a new steganographic technique with multiple transformation.Reliability is enhanced by EDCC. Alavianmehr et al., [5] have proposed a lossless data hiding technique by applying Histogram Distribution Constrained (HDC). Exact recovery of the original video is possible with this method for H.264/AVC video compression. Ke et al., [6] have put forth a scheme with Context Adaptive Variable Length Coding (CAVLC) for H.264 baseline entropy coding. Zafar et al., [7] have analysed an approach of data hiding by embedding both in intra and inter frames from H.264/AVC video codec over a vast range of QP values. Extraction of message is made possible by QTCs. Liu et al., [10] have presented a robust readable information hiding algorithm for H.264/AVC video frames without distorting intraframe drift with high visual quality. Mstafa et al., [13] have proposed a new video steganography method in DCT domain based on BCH and Hamming codes. The data is encrypted by BCH codes and then embedded by DCT for both fast- and slow-moving videos. Mstafa et al., [15] have proposed a robust and secure video algorithm in both DWT and DCT domains based on MOT and error correcting codes. Saurabh et al., [17] have put forth a novel technique to hide data in H.264/AVC compressed videos. Initially videos are compressed and F5 algorithm is used improve efficiency and prevent attacks in a better way. Wijaya et al., [18] have

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Arecanut Grade Analysis using Image Processing Techniques

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Abstract—This paper aim is at developing a computer vision based efficient grading system for boiled Arecanuts. Grading of Arecanut is a tedious process in Arecanut marketing. It requires lot of man power and time consuming process. Presently we are implementing the software part of the computer vision system. Economies of scale are derived by functions of pooling and transportation of a graded produce. Grading of Arecanut is a commodity specific function. In this proposed system to categorize Arecanuts into different grades we use MATLAB Toolbox. In this paper we have attempted to find a way to sort Arecanuts using computer vision approach. The Arecanuts differ from one grade to another based on colour, size, and texture. So, the features selected for classification are colour and texture. To extract colour information the image is converted to HSV colour space and quantized to create an 8x2x2 histogram summarizing the colour characteristic of the arecanut. The texture information is extracted using the Gabor transform and the average amplitude and mean squared energy values. This information is fed to a SVM classifier designed using a radial basis function for training. The resulting SVM model is used to run the SVM classifier for classification of the arecanut.

Keywords—Histogram;HSV;SVM;MATLAB;Gabor transformation;

I. INTRODUCTION

In this paper the Grading of Arecanut is a pivotal function in marketing. It enables the produce to be classified into different homogeneous categories by various dimensions. By this, it facilitates the producer to discover prices commensurate with the quality of the produce. Grading as a language is an effective communication medium to transfer consumer needs into action either by producer or traders or both. Areca, (Areca catechu L.) is a common masticator nut, consumed by all sections of the population, cutting across caste, class, region, religion, age and gender in India. Arecanut forms an essential requisite for several religious and social ceremonies and its use dates back to Vedic period with high antiquities. India is the largest Arecanut producing country and Karnataka is the major producing state in India. Being a high valued commercial crop, its contribution in terms of livelihood, employment and income to the National Economy is significantArecanut Grading system can be used by farmers to pre-sort the arecanuts before selling it to the wholesale dealers, thereby ensuring better return on their investments.
The grading machine can also be used by the arecanut distributors who manage large amount of arecanut stock.

With minor modifications we can use the same techniques to sort blueberries, and fruits. So, in a place where sorting is required then same machine can be used to sort multiple items and reduce operating costs. In this proposed system to categorize Arecanuts into different grades we use MATLAB Toolbox. Here utilize supervised machine learning technique to separate into different grades. This technique consists of two phase, one is training and other is testing phase. The training phase needs database creation using sample images. The training data consist of a set of training examples. The testing phase includes extracting feature of a single image called "Query" image and matching it with the database. In supervised learning, each example is a pair consisting of an input object and a desired output value (also called the supervisory signal). A supervised learning algorithm analyses the training data and produces an inferred function, which can be used for mapping new examples.

For creating database need to extract different features, extract colour feature and texture. To extract colour feature use HSV Histogram colour transform. It can effective extract colour features of each image which is one of the parameter for Arecanut classification. For the texture recognition use Gabor filter and Gabor wavelet transforms. Gabor filter (or Gabor wavelet) has been widely adopted to analyse texture features for image retrieval and its efficiency has already been proven. Basically, Gabor filters are a group of two-dimensional wavelets and each wavelet captures energy at a specific frequency and a specific direction. Expanding a signal using this basis gives a localized frequency description, hence it can capture local features or energy of the signal. After applying these wavelets, texture features can then be extracted according to the resulting energy distributions. The scale (or frequency) and orientation tuneable property of Gabor filter makes it especially useful for texture analysis. Using these features need to classify the Arecanuts into different grades. This paper used Support Vector Machine as classifier. In machine learning, support vector machines are supervised learning models with associated learning algorithms that analyse data and recognize patterns, used for classification and regression analysis.
The basic SVM takes a set of input data and predicts, for each given input, which of two possible classes forms the output, making it a non-probabilistic binary linear classifier. Given a set of training examples, each marked as belonging to one of

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Brain Tumor Detection using Hidden Markov Chain Algorithm in Image Processing

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Abstract— The main objective of this paper this is to provide an efficient tool for delineating brain tumors and classification of different types in magnetic resonance images. To achieve this goal, we take into account neighborhood information on using a Hidden Markov Chain [HMC] model. Due to the limited resolution of imaging devices, voxels may be composed of a mixture of different tissue types; this partial volume effect is included to achieve an accurate segmentation of brain tissues. Instead of assigning each voxel to a single tissue class (i.e. hard classification), we compute relative amount of each pure tissue class in each voxel (mixture estimation). Further, a bias field estimation step is added to the proposed algorithm to correct intensity in homogeneities. Furthermore, atlas priors were incorporated using probabilistic brain atlas containing prior expectation about spatial localization of different tissue classes. This atlas is considered as a complementary sensor and the proposed method is extended to multimodal brain MRI without any user-tunable parameter (unsupervised algorithm). To validate this new unifying framework, we present experimental results on both synthetic and real brain images for which ground truth is available. Comparison with other often used techniques demonstrates that accuracy and robustness of this new Markovian Segmentation scheme.

Keywords—MRI; segmentation; HMC;

I. INTRODUCTION

The brain is the centre of the nervous system in all vertebrate and invertebrate animals. The finite element model shown in Figure 1.1 includes, for example, white matter, gray matter, cerebrospinal fluid (CSF), bone, major blood vessels, and meninges. However, the model does not have a very detailed geometry.

A brain tumor is an abnormal growth of cells within the brain or inside the skull, which can be cancerous (malignant) or non-cancerous (benign). It is defined as any intracranial tumor created by abnormal and uncontrolled cell division, normally either in the brain itself or in the cranial nerves or in the brain envelopes (meninges) or skull, pituitary and pineal glands, or spread from cancers primarily located in other organs (metastatic tumors).

In the evolution of healthcare services, there is an increasing need for greater effective use of imaging data in medical diagnosis and individual risk assessment, treatment selection, and disease prevention. The ultimate challenge is to develop software with intelligence to combine imaging technology with a workable diagnostic system that is capable of detecting tumor in its early stages. It is believed that diagnostic research-based patient-oriented system, with the capability to distinguish the presence of tumors on medical images of healthy people and tumor patients, will be one of the most pressing issues in the near future. The analysis and study of the brain is of great interest due to its potential for studying early growth patterns and morphologic changes in the tumor process.
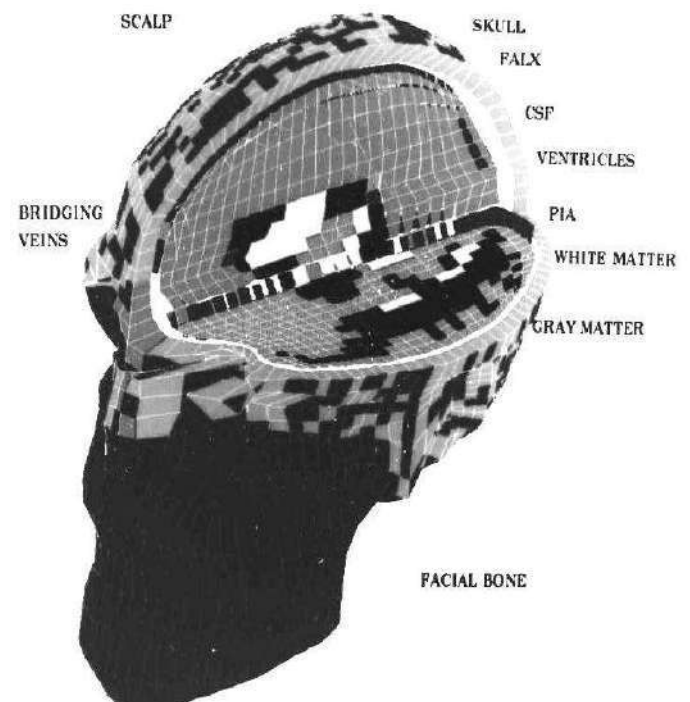

Figure 1.1 Finite element model

Recent studies have demonstrated the potential of a decision support system for detecting tumors in medical images, providing radiologists with a second pair of highly trained eyes. It gives doctors access to additional information present in images that have characteristics generally accepted to be associated with cancer, clusters of bright spots that are suggestive of lesions, patterns suggestive of tissue masses or distortions, and mark regions that have the characteristics of lesions or tumors.

II. OBJECTIVES

The objective of this paper is to detect brain tumor in images collected from the Diagnostic Centre. The images obtained are based on Magnetic Resonance Imaging technique. In our project work we aim to achieve the following:

- To provide a fully automated model-based method for tissue classification of MR images of the brain.
- To propose a segmentation method which is more robust than the existing ones.

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Application of Raspberry-Pi model for Plant Disease Detection

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Abstract—**Agriculture with its associated sectors is undoubtedly the largest livelihood provider in India. Today, in agriculture plant disease is the significant concern as it reduces the production and quality of food. Hence there is a need to detect the plant diseases at the early stage. Banana leaf is highly exposed to diseases like Black Sigatoka, Yellow Sigatoka, Bunchy top, Panama Wilt, Streak virus. The detection of plant leaf diseases requires close observation. Finally solution for automatic plant disease detection and finally the percentage infection raspberry pi with using image processing technique. Image processing techniques are employed to enhance the quality of images. Besides, the proposed work uses Artificial Neural Network to classify the Banana plant diseases and Artificial neural network based training and classification. Finally a system is developed that extracts the features from images and classifies the diseases.**

Keywords—**ANN; SVM; RASPBERRY PI 3; RASPERRY-PI, DC MOTOR; MATLAB.**

I. INTRODUCTION

Agriculture is the main occupation of India. 70% of the population depends on agriculture either directly or indirectly. The nation's economy depends on agriculture. It additionally contributes a noteworthy figure to the Gross Domestic Product (GDP). Plant diseases, which are generally caused by viruses, bacteria, fungi, nematode and nutrient deficiency, cause lots of damage to crops and its affects are – reduces the yield and quality of crops. It also results in death of the plant, affects the income of the farmer and also increases the cost of production over the span of controlling them. Banana is the most vital fruit consumed in the Asia and pacific regions. Banana plant is affected by various diseases, whose symptoms appear on leaves. The diseases are Black Sigatoka, Yellow Sigatoka, Banana Bunchy Top Virus, Streak virus, Panama wilt.

1.1 Banana Bunchy Top Virus
Banana Bunchy Top is the most severe viral disease of Banana caused by single- stranded DNA virus. Symptoms of this disease are- the newer leaves are narrower, yellow and cause a bunchy like appearance. Another symptom visible on the leaf is "Morse code streaking" which gives dark color dash like appearance on the leaf surface and also the edge of some leaves are rolled upwards. This disease can be controlled by spraying Meta-systox (0.1- 0.5%). It can also be controlled by uprooting the infected plants.

Fig 1.1: Banana Bunchy Top Affected leaf

1.2 Black Sigatoka

Fig 1.2: Black sigatoka affected leaf

Black Sigatoka is basically a leaf spot disease of the Banana plant caused by Mycosphaerella fijiensis. The disease symptoms are red/brown spots with yellow border on edges of leaves. It is spread by wind. It is the most dominant disease of Banana all over the world. This disease can be controlled by regular fungicide applications and by increasing the spacing between plants to augment air circulation and reduce moistness

1.3 Yellow Sigatoka
Yellow Sigatoka is another leaf spot disease of Banana plants caused by Mycosphaerella musicola. The disease symptoms are small yellow spots with gray centre and yellow border on upper side of leaves. It is spread by wind and rain. The disease can be controlled by the application of Thiophante methyl

Anti-Theft Control System

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Abstract— Theft security of vehicle in common parking places has become a matter of concern. An efficient automotive security system is implemented for anti-theft using a microcontroller with Global System for Mobile Communication (GSM). This proposed work is an attempt to design and develop a smart anti-theft system. The system contains GSM module, vibration sensor, DC motor, keypad, LCD display and relay. It uses GSM module to send the SMS to the authorized user. The vibration sensor senses the insertion of key and triggers the microcontroller. an SMS is sent to the user. The user enters the password using keypad which is displayed in LCD. If the password is wrong the relay is used to turn off the engine.

Keywords— Microcontroller 8051, GSM, Buzzer, Vibration Sensor

I. INTRODUCTION

As far as vehicle security is concerned many options are available depending upon the technology being adopted. With the development and applications of lots of embedded techniques, car security system design and analyses are continually improving. Many new techniques, such as biometric recognition technique, image processing technique, communication technique and so on, have been included into car security systems. At the same time, the amount of accident of cars still remains high, specially, lost. Statistics show that the number of cars is growing rapidly and so is the number of car theft attempts, locally and internationally. Although there are a batch of car security systems that had been produced lately, but the result is still unsatisfactory as the number of car

theft cases still increases. The thieves are inventing cleverer and stronger stealing techniques that need extra powerful security systems.

This proposed project presents an anti-theft-control system for automobiles that tries to stop a vehicle from being stolen. In present days, vehicle theft is increasing rapidly and people have started using anti-theft-control systems in different automobiles"

systems. These anti-theft- control systems are very expensive, but this project is designed cost-effectively by using a microcontroller along with the GSM [1]. GSM system is also installed in the vehicle for sending the information to the owner of the vehicle. The main purpose is to prevent vehicle theft. This is achieved by sending an SMS which is generated automatically.

This SMS is then sent to the owner of the vehicle. Thus in this way crimes can be reduced to a great extent as vehicles today are being stolen in large number. Hence, vehicles today require high security which can be achieved with the help of this application.

When a person tries to steal the vehicle, the microcontroller is interrupted and the command is sent to the GSM modem to send SMS. This GSM modem is interfaced to the microcontroller. This microcontroller on the receipt of the message uses a mechanism that helps to stop the engine. Motor is being used in this project in order to indicate vehicle ON/OFF state. Further enhancement can be done to this project by using a GPS system that helps to find out the exact position of the vehicle with the help of its latitude and longitude which then can be sent to the owner of the vehicle via SMS [2].

An idea of using microcontroller, as the core and GSM

interface through the serial port in the microcontroller is the major functional unit of the system. Loud sound and message sending, which brings the notice of the owner. A keypad and a display is provided inside the vehicle. The commercially available anti-theft vehicular systems are very expensive. Here a modest attempt is made to design and develop a simple, low cost vehicle theft control scheme using an inbuilt microcontroller. This scheme involves a microcontroller and a mobile for the communication purposes.

An Embedded chip that uses vibration sensor which senses the key during insertion. This is followed by the system present in the car asking the user to enter a

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Power Theft Detection using GSM

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Abstract— **Electrical energy is very important for everyday life and spine for the industry. Electricity power is indiscipline to our daily life with increasing need of electricity, the energy robbery is also growing, electricity theft is a hassle that keeps to plague electricity region across the country, the goal of this paper is to design one of these gadget with a purpose to try and reduce the illegal use of power and also lessen the probabilities of theft. In this research we have focused on the most common practice of stealing power which is tapping or tampering the meter. The system has been designed to detect the theft and also inform to the nearest substation and to the consumer. This model try to achieve theft control.**

Keywords-: *Energy Meter, ESP32 Controller, GSM Model, Opto coupler.*

I. INTRODUCTION

Electricity is the modern man's most convenient and useful form of energy without which the present social infrastructure would not be feasible. When significance of electricity is at the growing aspect, then the stealing of this energy or illegal intake of electricity from the transmission traces could be prevented. Electricity theft has come to be a incredible task to the energy board. Electricity theft is the most important hassle in recent days which causes lot of loss to electricity boards. In international locations like India, the conditions are greater often, if we can save those thefts we can store lot of power. Electricity theft detection system is used to discover an unauthorized tapping on distribution lines. Theft also may occur by rewiring circuits to avoid an electric meter, or by tapping into another customer's electrical lines. The proposed electricity theft detection system helps to detect the theft which includes tapping on the distribution lines using a piece of wire, which is counting the current units by placing a wire before and after the meter reading unit. Electricity theft has been focused all over the world, but power theft in India has a significant effect on the Indian economy. There are variety of power theft has been taking place with the support of people from different walks of life, utility staff, consumers, labour union leader, political leaders and high level utility officials. The proposed system could be hidden in energy meter and as quickly as an try is made for the theft, it'll send an message to control unit of electricity board and consumer. this will shield distribution community from power theft accomplished with the aid of meter tampering, tapping and many others.

In domestic electricity connection as well as industrial electricity supply there is a continuous growing of electricity thefts across the India, which ends up in lack of electricity energy and due to which we are facing the frequent issues of load shading in urban in addition to rural areas also. So as to overcome the need of electricity for whole state is in high demand

Energy management and monitoring has a significant role for the proper utilization and better energy management. In existing system the meter readers has to visit every home to take the consumed units and cost.

II. LITERATURE SURVEY

Detection of power theft in every houses and in industry for different methods of theft. A system is designed which will try to reduce the unlawful use of electricity and also lessen the probabilities of theft. Detect the theft and try to acquire theft manipulate[1].

Because of electric powered electricity theft, about 30-35 percent of the earnings earned through the electric board is going waste. Previous attempt to monitor the power theft has not resulted in well ordered manner because of the unlawful practices of some of the employs and consumers. This studies goals at reducing all these difficulties by fabricating a simple system to send a message whenever there is a power theft activity at a certain location[2].

The electricity theft detection using microcontroller has been proposed. This system reduces the cost of man power for providing information regarding theft by consumers[3].

This paper consider a model to reduce the power theft. Use of GSM in this system provides a various advantages of wireless system. The government saves

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Generator Monitoring using Android Phone

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Abstract—Remote Monitoring System is widely used application which needs to be precise and compact. Project proposes an innovative design and development of remote monitoring system for a three-phase generator based on arduino and Zigbee Wireless device. The arduino controls the three phase generator by monitoring the current, voltage, temperature and power. Parameters can also be monitored by android phone interfaced to WiFi module. The Zigbee-based wireless device is used as a long range communication channel between the transmitter and receiver Modules. WiFi area is created using ESP8266 WiFi module. Monitoring can also be done through the android devices which are connected to the wireless local area network (WLAN). An alert system is enabled through arduino if the load current is more than the full load capacity of the generator.

Keywords— Three Phase generator Parameters, Arduino, ESP 8266, Zigbee module, Potential Transformer, current sensor, Step down transformer, LCD Display, Android Phone, Alert System .

I. INTRODUCTION

Generators are used as backup power supplies in the case of power outage. It is important to ensure that the generators operate safely with high reliability. Generator in its perfect running condition maintains its specified rate of performance for several years, but it also does withstand some excessive load repeatedly. If the generators are operated without exceeding rated conditions they will have long service life. To ensure the safe operation of the generator some preventive measures must be taken against overloading and abnormal conditions. Generator faults can be minimized by monitoring the generator regularly. Remote monitoring system eases this task and also saves time and manpower requirement. On-line Monitoring of the generator allows the operator to remotely control the load and ensure the safe operation.

II. PROBLEM STATEMENT

Generators are currently monitored manually where a person periodically visits generator room for maintenance and records parameters of importance. Such monitoring cannot provide information regarding occasional overloading and overheating of generator. This type of monitoring becomes difficult when bad weather conditions persist and during night conditions. All these factors can significantly reduce the

generator life. Hence need for automated monitoring system arises.

Hazards in the generators are mainly due to overloading and improper maintenance. Hence it becomes important aspect to monitor the generator continuously. Monitoring systems currently used poses some deficiencies. Ordinary measurement system detects single phase parameters such as voltage, current, power. Some detects are able to measure multiple parameters but the acquisition time is too long also the data transfer rate is not quite fast enough. Drawbacks offer additional measurement systems include low data measurement accuracy, system instability and poor reliability.

PLC based transformer monitoring and control systems were developed for permanent installation. These are intended to monitor single unit. Local Area Network (LAN) provides input to the central processing unit. It also gives access to WEB page where the transformer parameters can be monitored. The process of data acquisition of this system is slow.

Embedded system based monitoring for 10kVA switchable transformer uses three microcontrollers to measure parameters of all three phases. Separate microcontroller is used to measure temperature and graphic LCD interface. Embedded Ethernet is used to transfer data to remote location. Client server applications were developed by using embedded Ethernet to enable the monitoring through LAN. Using multiple numbers of microcontrollers makes the overall system bulky. Wired LAN connection makes the system complex and unreliable.

I. METHADOLOGY

A. Transmitter

The transmitter station monitoring system block diagram consists of arduino as a processing unit. Temperature sensor is connected to digital pin of the microcontroller. Temperature sensor library is used to read the variation in temperature and display it on LCD. LCD is enabled and written through different pins of arduino. Potential Transformer will step down the voltage from the generator and then this voltage is converted to DC and given to the Analog pin of the arduino. Three phase voltages from the

Kannada Speech Recognition Enquiry System For Farmers

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Abstract— Under developing and developing countries agriculture provides large scale of employment in rural area. It is the backbone of economic system. For formers it is important to decide which crop to grow and to gain knowledge regarding the crops. In This paper describe the process of acquiring speech data for training an ASR system for Kannada language that will form the core of a voice interface to the webpage providing information about crops as a voice. Provision will be provided to display the information on a screen using a website.

Keywords—google speech recognizer software ; web crawl;

I. INTRODUCTION

India is an agricultural country. Despite the advent of technology in recent years, agriculture has still remained the major source of income for majority of the population. In order to provide a stimulus to the agricultural growth, the Ministry of Agriculture, Government of India set up many websites which displays information regarding problems and solutions. But most of the farmers are far behind in technology to use website. So, we are conceptualizing a voice recognizing portal for kannada speaking farmers which can show the information about crops. The benefits of such system can be reaped if farmers are able to access this information easily. Presently, illiteracy, ignorance, lack of knowledge of English, computers and internet are acting as hurdles in accessing the information from the website. On the other hand, if this information can be made available just by speaking over a mic it would foster a large number of farmers. This would need implementation of a voice interface to the website using Automatic Speech Recognition (ASR). Speech data acquisition is the first step towards building a speech recognition system. The accuracy of recognition depends on the speech data used to train the system. The measures taken for collecting apt speech data from Kannada Speaking farmers, to develop a robust speech recognition system as a part of voice interface for agricultural information retrieval. The process of acquiring speech data for training an ASR system for Kannada language that will form the core of a voice interface to the webpage providing information about crops as a voice. Provision will be provided to display the information on a screen using a website.

The Technology Development for Indian Languages (TDIL) [1] programme of the Department of Information Technology (DIT) has initiated a nationwide project that effects such a voice interface in six Indian languages, which are Marathi, Hindi, Tamil, Telugu, Bangla and Assamese. This project is being implemented by a consortium of seven institutions, which are Indian Institute of Technology (IIT) Madras, IIT Bombay, IIT Kanpur, IIT Guwahati, International Institute of Information Technology (IIIT)Hyderabad, Tata Institute of Fundamental Research (TIFR) Mumbai and Centre for Development and Advanced Computing (C-DAC) Kolkata [3]. IIT Bombay and TIFR Mumbai are jointly involved in developing the Marathi ASR system.

II. LITERATURE REVIEW

In [1] has proposed that in daily life Speech and spoken words have always played a big role in the individual and collective lives of the people. The Speech that represents the spoken form of a language. Speech synthesis is the process of converting message written in text to equivalent message in spoken form .A Text-To-Speech (TTS) synthesizer as a computer-based system that should be able to read text. In this paper, I am explaining single text-to-speech (TTS) system for Indian languages Viz., Hindi to generate speech .This generally involves two steps, text processing and speech generation. A graphical user interface has been designed for converting Hindi text to speech in Python Swings. In India there are different languages are spoken, but each language is the mother tongue of tens of millions of people. The languages and scripts are very different from each other. The grammar and the alphabet words are similar to a large extent. It present text-to-speech (TTS) system based on the Concatenate synthesis approach. The text to speech conversion may seem effective and efficient to its users if it produces natural speech and by making several modifications to it. This system is useful for deaf and dumb people to Interact with the other peoples from society. Text to speech synthesis is a critical research and application area in the field of multimedia interfaces. The system read the input data in a natural form. The user types the input string and the system reads it from the database or data store where the words,

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Helious Helmet

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Abstract : In our daily life safety may be general term, but the study of these in the transportation has been very limited. Worldwide, there are estimated to be approximately one million road accident and fatalities and ten million people injured annually. In India around 20 million two wheelers come up road. Most of the people die in bike accidents due to head injury. This is happens because they don't wear helmet. Riders feel uncomfortable to wear helmet while riding a bike. In this work we will propose a solar based cooling helmet which will definitely attract the bike riders. Here we use solar power to drive all the components. Temperature sensor with cooling system is used to provide cooling effect to the motorcycle rider's head when temperature goes beyond the threshold value. Switch with the air purifier is used to provide purified air. Along with this a USB mobile charging module will help a bike rider to charge his mobile when he is in rest condition.

I. INTRODUCTION

The concern over the safety of motorcyclists has pushed for new invention, not only for the safety, but also comfort of the user. The primary safety feature used by the latters is uncomfortable and dangerous environment to the head, especially for long distance travel in hot conditions and also we have very high number of road accidents and fatalities relating to it, every Indian on the road considers himself special and an expert level driver and believes that he/she does not need a helmet. Another misconception is that, helmet is not required in low speeds. This is not just the case with helmets. When it comes to safety, we never think anything wrong can happen to us. The reason for all this is overconfidence that nothing can happen to them. Another stupid argument is that the traffic speeds in India are low and we do not need all the safety features and accessories. Well, if that was the case we would not be toppers in terms of fatalities in road accidents. We live in a country where the roads are unsafe. Even otherwise, an accident can happen for many reasons, whether it's your fault or not. Wearing a helmet is the sensible thing to do, it decreases the risk and severity of injuries by about 72%, decreases the likelihood of death by up to 39%, with the probability depending on the speed of the motorcycle involved and it also decreases the costs of health care associated with crashes.

This work aims to design and build the helmet with inbuilt cooling fan, cell phone charging, air filtration system, using solar power. We find our self regularly stuck in frustrating traffic jams with summer heat getting to our head, difficult for breathing due to which the user opens the visor there by exposing himself to the air pollution which is at its peak at traffic signal as vehicles tend to release more pollutants during the start of vehicle when the signal is free to move, this helmet is useful at that time. The inbuilt cooling fan can reduce the internal temperature and we can get the cool air to face, so with this rider get comfort riding[6]. This helmet protects against inhalation of hazardous air pollutants on the road, with the help of an air filtration mechanism used in the helmet. It creates pollution free and breathable environment inside the helmet by cleaning the polluted air. Cell phone charging with the solar power, in this feature we can charge the cell phone battery, by using solar power as energy source. Solar device is considered more advantageous than the other alternative because although the motorcyclist stops riding, charging can still proceed by directing the helmet towards the sunlight. Through our environment-friendly solar powered helmet, we aim to make life more comfortable for the bike riders[7]. While designing the product, the focus is to optimize the use of solar energy without compromising on our goal to provide clean breathing air to the bike rider and reducing the temperature inside the helmet.

II. RESEARCH REVIEW

Thermoelectric cooling to provide cool air for the users through solar energy trapped by solar cells placed on the top of the helmet. A fan sucks the hot and polluted air from the outside, and pumps clean and cool air on to the face of the rider. The air first passes through the filters and then through the thermoelectric Peltier cooling unit [5].

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Covert Communication Based on Symlet and Daubechies Wavelets

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Abstract   Rapid technological growth in digital communication is responsible for the development of newer techniques to communicate secret data. Covert communication is the advanced method of concealing the secret data into a cover media.   This article presents image steganography in which the secret image is concealed in the cover image by two different techniques: Symlet and Daubechies wavelets. The performance analysis for Peak Signal to Noise Ratio (PSNR), Mean Square Error (MSE) and processing time is evaluated. It is evident from the experimental results that the proposed techniques are suitable for secured communication in which embedded data is out of reach for human visual system

I. INTRODUCTION

Information hiding is a new and multidisciplinary field that encompasses cryptography, coding theory, information theory and theory of human perception. Data hiding using steganography is applicable in various fields which includes business and corporate companies. Covert communication is the process of hiding a data within another data. This data can be a file, message, image or video. Steganography is a combination of the two Greek words steganos and grapheia, where steganos means covered, concealed or protected [1-4]. Image steganography is based on stegno-key, where images are altered in unique ways thus enabling the detection of embedded data using proper steganalysis method. [5, 6, 7]

Another classification for image steganalysis is Specific and Generic. The specific approach depends on the underlying steganographic algorithm used whereas the generic approach does not depend on underlying steganographic algorithm. The high success rate for detecting the presence of the secret message is hidden with the algorithm is possible by specific approach. The accuracy of the prediction heavily depends on the choice of the right features, which should not vary across images of different varieties in generic approach [4,9] The wavelets are classified into Orthogonal and Biorthogonal of which Daubechies, Coiflet and Symlet come under Orthogonal family. The Daubechies wavelets, based on the work of Ingrid. Daubechies are a family of orthogonal wavelets defining a discrete wavelet transform and characterized by a maximal number of vanishing moments for some given support whereas Symlet Wavelet is a family of wavelets.

They are a modified version of Daubechies wavelet with increased symmetry [10-13].

II. LITERATURE SURVEY

Youseef et al., [1] have proposed a steganographic method to embed data in gray scale and RGB images. Wavelet domain communication has been adopted. Mayra Bachrach et al., [2] have adopted a image steganography to embed secret messages in files, texts and images. DCT and DWT have been implemented for experimental analysis. Chang Wang et al., [3] have presented JPEG covert communication based on Discrete Wavelet Transform coefficients and syndrome trellis coding. The flipping and rounding errors have caused block complexity and distortion effects. S. Kumari et al., [4] have experimented the effect of Symlet filter order on denoising of still images. Compression Ratio and Peak signal to noise ratio have been analyzed. Vojtech Holub et al., [5] have proposed a universal wavelet relative distortion to embed secret data in arbitrary domain. Distortion during embedding is calculated to measure the degree of security. Ashwani Kumar Yadav et al., [8] have proposed a Discrete wavelet transform with Symlet wavelet with wiener and median filters to denoise ultra sound image. J K Mandal et al., [12] have proposed a new scheme of hiding information in images using four-point Daubechies wavelet in which horizontal, vertical and diagonal coefficients of the transformed array is used for embedding. DFT and DCT algorithm are adopted. Vijay Kumar Sharma et al., [13] have proposed a method of hiding the secret image Daubechies discrete wavelet transform operation followed by mixing operation further decryption using inverse

Review Of Different Fuzzy Logic Approaches For Prioritizing Software Requirements

Raghavendra Devadas, G.N Srinivasan

Abstract: Software requirements prioritization is an important process where in the decision is taken as to which requirements will first be implemented and delivered in the first release. In past many projects have failed because of the results of improper prioritization technique. We have many prioritization techniques in the literature each one with its own positive and negative side. This paper enumerates different Fuzzy logic-based requirements prioritization approaches. We also present latest work in this field.

Index Terms: Requirements Engineering, Requirements Prioritization, Prioritization Techniques, Fuzzy Logic.

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1. INTRODUCTION

Software development life cycle has different phases viz., Requirement gathering and analysis, Design, Implementation or coding, Testing, Deployment, Maintenance. Requirements engineering is the starting phase where in the analyst tries to understand different needs of the stake holder, needs of stakeholders is expressed as requirements. Requirements prioritization plays the role of assigning priority to multiple requirements expressed by multiple stakeholders, it emphasizes as to which requirements will be implemented and delivered in the first release cycle and which requirements will be follow up in the subsequent releases. Requirements prioritization fosters various techniques for resolving indistinctness, fuzziness and ambiguity among the conflicting requirements between various stakeholders [1,2]. Prioritizing requirements plays an integral role in software development process as it enhances software release planning, budget control and scheduling [3].In literature there are numerous techniques available towards Prioritizing requirements, viz. Analytical Hierarchical Process, Cumulative Voting, Numerical Assignment Technique, Ranking, Wieger's Method, Top-ten requirements, Theory W, Planning game with each approach having positive and negative side. This paper focuses enumerates different Fuzzy logic approaches towards Prioritizing requirements that have been used in past and also latest approach. Reason for focusing on Fuzzy approach is its power to deal with uncertainty and vague nature of requirements which are not been considered in the traditional approaches as aforesaid. The flow of this paper is as follows Section II illustrates comprehensive literature review on Fuzzy logic based prioritizing requirements. Section III describes the observations of past work. Section IV concludes the paper

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2 RELATED WORK

Neha Mishra, M.Akheela Khanum, Kavita Agrawal [4] ,have proposed an algorithm which works in three stages, first and second stages achieve prioritization from the perspective of stakeholders and experts and in the third stage they have used Fuzzy logic approach to requirement prioritization is modeled in the form of fuzzy rules, which is based on Mamdani method. They have developed fuzzy system in terms of input/output variables. The parameters selected for input are Cost, Design time, Performance, Response time, Number of Stakeholders.The output parameters are Completeness and Understandability. The main theme of this work is on requirement completeness and understandability prediction in the activity of requirement engineering phase in software development.Bhagyashri B. Jawale, Girish Kumar Patnaik, Ashish T. Bhole [5], have developed Adaptive Fuzzy Hierarchical Cumulative Voting (AFHCV) which is an extension of Fuzzy Hierarchical Cumulative Voting (FHCV) technique, in order to increase the coverage of events that can occur at runtime. Input to the proposed system is a hierarchically arranged requirement set. Output of the proposed system is prioritized requirement set in hierarchical format. In FHCV for calculating priorities, triangular fuzzy numbers are used. FHCV do not provide the way to add or change requirements value at run time. AFHCV uses re-prioritization process to recalculate the priorities of all requirements collectively. AFHCV technique provides way to change requirements priority value or add some requirements to existing data set at runtime.Vibha Gaur, Anuja Soni [6], have proposed an integrated approach to requirement prioritization, which is split up the various sections First they work with individual concerns for this here they have used Yager's method for decision making. Second stage they deal with consolidated concerns. Finally, they prioritize the requirements, and to illustrate their proposed methodology they took a case study of Material Management Agent Oriented System.V. C. Gerogiannis, and G. Tzikas [7], prioritize software requirements based on ratings expressed from different stakeholders with the following steps, Step 1: Specify Importance Values for Stakeholders and Determine Weights for the Prioritization Criteria, Step 2: Stakeholders Evaluate Requirements with respect to the Prioritization Criteria, Step 3: Calculate Weighted Aggregated Ratings for the Values of Requirements, Step 4: Calculate the Final Requirements Priorities They prioritize requirements based on vague ratings from various stakeholders. Similarities in stakeholder's ratings are used to derive a final requirements status which imitates aggregated valuations of all stakeholders more logically, reasonably and without bias. The proposed

Impact of Mobile Learning in the Cloud on Learning Competencies of Engineering Students

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Abstract—It has been acknowledged that the mobile learning concept has extended numerous opportunities for teachers as well as students, as it makes way for an active learning atmosphere anywhere and anytime. Mobile learning technology can be resourcefully improvised by extending the cloud technology into it. This study is an attempt to analyze the impact of mobile cloud computing on learning competencies of engineering students. The main intention is to experiment whether mobile learning using cloud technology has an impact on student's performance by investigating the influence of this innovative teaching technique on course outcomes. The results illustrated that use of cloud based mobile learning in studying an engineering subject is rewarding and does has an encouraging impact on learning competencies of students. The results distinctively indicate that cloud based mobile learning can be effectively used for learning engineering subjects that results in superior attainment of course outcomes.

Keywords—Mobile cloud computing, mobile learning, course outcomes, engineering, education

1 Introduction

In the recent times, there is a great tendency for the engineering educational institutions to adapt new methods of learning along with the traditional methods. Engineering education sector has been entering into a new technical era of modern days due to the rapid revolution in information and communications technologies. The existing traditional in-class learning is being complemented with electronic learning and mobile learning making the learning process more effective [1].

It is evident that existing traditional learning methods are not satisfying the demands and requirements of industries. These methods also tend to make the educational growth stagnant. Hence it becomes the need of time to enhance the learning techniques according to the growing requirements of the industry and student com-

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Effect of Annealing and Aging Treatment on Pitting Corrosion Resistance of Fine-Grained Mg-8%Al-0.5%Zn Alloy

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In order to study the influence of plastic deformation, annealing and aging treatment on pitting corrosion, the AZ80Mg alloy was subjected to equal-channel angular pressing (ECAP) by route R at 325°C for up to 4 ECAP passes (P) and annealing conditions of 523 K, 623 K and 723 K followed by aging treatment at 6 h and 12 h. A microhardness and corrosion study was accomplished and microstructural evolution was recorded using optical microscopy (OM), scanning electron microscopy and electron backscatter diffraction (EBSD). OM and EBSD analysis showed that a fine-grain microstructure with average grain sizes of 32.87 μm and 6.35 μm was achieved after 2P and 4P of ECAP, respectively. During annealing and aging treatment, the fine-grain Mg alloy revealed that the maximum microhardness and improved corrosion resistance were observed mainly due to redistribution of β-secondary phases. Specifically, 12 h aged specimens at 523 K represented maximum microhardnesses of about 85 Hv and 87 Hv for ECAP-2P and -4P, respectively. Also, 12 h aging at 723 K appeared preferable for accomplishing enhanced corrosion properties.

INTRODUCTION

Equal-channel angular pressing (ECAP) is a reliable and attractive method for producing grain refinement in magnesium and other engineering materials. Processing by ECAP is exclusively attractive because the process can easily enhance the mechanical properties of Mg alloys for structural and other industrial applications.[1–3] During ECAP, simple shear is induced in the bulk material by extruding the Mg alloy repeatedly through a die with two channels of equal cross-section which intersect at a channel angle (ϕ) and a corner angle (ψ). Due to a dynamic recrystallization process, significant grain refinement occurs in Mg bulk material, resulting in a significant improvement in the mechanical properties of Mg alloys.[4–6] The property enhancement for a given material depends on die channel angle (ϕ) and corner angle (ψ) processing routes, the processing temperature and the number of passes (P). The poor mechanical and corrosion behaviour of Mg alloys have been improved through ECAP as reported in the literature. Yamashita et al.[7] examined the ECAP process performance towards grain refinement and improvement in the mechanical properties of Mg alloys. They concluded that ECAP is a simple and effective method to attain fine grains in bulk material and to improve the mechanical properties of Mg alloys. Avvari et al.[8] investigated the effect of processing temperature on the microstructure and mechanical properties of the AZ61Mg alloy, and reported that the Mg alloy processed with a lower temperature produced a fine-grain structure and desirable mechanical properties. Minárik et al.[9] studied the corrosion behavior of the AE21 and AE42Mg alloys after processing through ECAP. Their study revealed that the ECAP-processed AE42Mg alloy exhibited improved corrosion resistance when compared to the as-received Mg alloy

An Experimental Investigation of Microwave Developed Nickel-Based Clads for Slurry Erosion Wear Performance Using Taguchi Approach

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Abstract

In the present work, investigation of slurry erosion wear performance of nickel-based clads on austenitic steel SS-304 substrate has been reported. Clads were developed through microwave hybrid heating technique using a low-cost microwave oven. The microwave-induced clads were characterized through scanning electron microscope equipped with energy-dispersive X-ray spectroscopy. The tribological properties of clads were determined using a slurry erosion wear testing setup. Experimental trials were conducted as per Taguchi L_{27} orthogonal array considering three factors: spindle speed, specimen angle and time of exposure of clad surface to spinning slurry. The developed clads exhibited considerable resistance to slurry erosion; however, higher wear resistance characteristics were observed at lower spindle speed and higher specimen angle. ANOVA results indicated the specimen angle as the most significant factor followed by speed and time. A multiple linear regression equation was obtained to determine the correlation between the parameters. The clad specimens tested at a lower specimen angle were completely damaged due to microcutting, grooves and crater formation.

Keywords Nickel-based clad · Microwave hybrid heating · SS-304 · Taguchi method · Slurry erosion

Introduction

Austenitic stainless steels are known for their exceptional corrosion resistance and are extensively used in many applications across engineering and processing activities; however, these steels exhibit essentially higher wear in several applications. The properties of material to a great extent influence the erosion rate and surface degradation in tribological system. It is also evident that wear is the major cause of failure as compared to corrosion-assisted surface

degradation of austenitic stainless steel parts [1, 2]. Austenitic stainless steel components when in relative motion with other counterparts often experience a wear phenomenon attributed to the development of strong bonding between the contacting surfaces and severe plastic deformation in surface/subsurface regions. These steels also form a major class of materials in hydroturbine blades that are exposed to the impact of sand particles contained in the flowing water resulting in severe surface degradation commonly termed as slurry erosion [3]. Slurry erosion involves a complex mechanism influenced by the combined effect of several factors resulting in material loss from exposed surface. However, the factors, specimen angle and microstructure of candidate material play a key role in the process of material erosion from the functional surface [4–7]. Further, it has been reported that mass loss due to slurry erosion also depends upon density and shape of the erodent particles [8]. This mass loss due to the plastic deformation of surface restricts the use of stainless steel in an aggressive interacting environment, and the use of high strength steel is therefore not recommended in several potential applications involving wear [9]. However, this difficulty could be met by means of surface engineering wherein the enhancement in surface characteristics of the target material is achieved

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Dry sliding wear behaviour of multi walled carbon nanotubes reinforced aluminium composites produced by powder metallurgy technique

Dry Sliding Wear behaviour of Multi Walled Carbon Nanotubes Reinforced Aluminium Composites Produced by Powder Metallurgy Technique

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Abstract

The nanocomposites of Multi-Walled Carbon Nano Tubes (MWCNTs) having weight fractions of 0, 0.25, 0.5, 0.75 and 1.0 wt%, reinforced in 200 mesh size Aluminium (Al) particles, produced through Powder Metallurgy process. Uniform distribution of MWCNTs was achieved using ultrasonic blending and mechanical planetary ball milling. Dry sliding wear behavior of fabricated composites were studied in accordance with the ASTM G99-95a standard. Wear behavior were studied for various sliding distance, load, and disc rotation speeds. The results showed that, wear rate increased with increasing sliding distance and load because of an increased of temperature during an investigation. However, the wear rate decreased with an increased speed due to the formation of a stable tribolayer. Further Al 0.5 wt% of MWCNT nanocomposites were found to have better wear resistance characteristics compared to others. The resistance to wear enhanced because of bonding among matrix and MWCNTs and the formation of tribo layer was characterized using Scanning Electron Microscopy.

Keywords: Nanocomposite, Aluminium (Al), Wear, Powder Metallurgy (PM), Multi Walled Carbon Nano Tubes (MWCNTs)

1.0 Introduction

The increased mechanical properties like strength, hardness, stable dimensions and wear resistance at high temperatures. Metal Matrix Composite (MMC) must exhibit stable performance in comparison to base metal. Al is known for its abundant availability, lower density, high recyclability, corrosion resistance and excellent formability. Al based metal matrix is preferred in most of the applications due to the advantage of light in weight and wear resistance [1]. The Al-MMCs was reported to have higher strength with reducing micro to nano size of reinforcement. The homogeneous dispersion of hard nano constituent into matrix material, positively influence the nanocomposites properties [2]. The percentage of porosity and tensile behaviour of nanocomposites improved with increase of weight percentage of nano particles reinforcement. However, ductile nature of Al turns into brittle [3]. It is observed that the engineering sectors like automotive, aerospace, mechatronics and similar industries are expecting new potential properties of materials for the replacement of traditional light weight materials, alloys and composites [4].

Carbon Nano Tubes (CNTs) have emerged as outstanding reinforced material for low weight and higher strength composites because of its aspect ratio, higher strength and Young's modulus. Also, new CNTs reinforced MMCs finds demanded potential structural application. If several Single Walled Carbon Nanotubes (SWCNTs) existed in a concentric mode is termed as MWCNTs [5]. Present material science research fascinated on MWCNTs, due to its

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Application Potential of Fuzzy and Regression in Optimization of MRR and Surface Roughness during Machining of C45 Steel

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Abstract

In the machining industry, coolant has an important role due to their lubrication, cooling and chip removal functions. Using coolant can improve machining process efficiency, tool life, surface quality and it can reduce cutting forces and vibrations. However, health and environmental problems are encountered with the use of coolants. Hence, there has been a high demand for deep cryogenic treatment to reduce these harmful effects. For this purpose, −196 °C LN_2 gas is used to improve machining performance. This study focuses on the prediction of surface roughness and material removal rate with cryogenically treated M2 HSS tool using fuzzy logic and regression model. The turning experiments are conducted according to Taguchi's L9 orthogonal array. Surface roughness and material removal rate during machining of C45 steel with HSS tool are measured. Cutting speed, feed rate, and depth of cut are considered as machining parameters. A model depended on a regression model is established and the results obtained from the regression model are compared with the results based on fuzzy logic and experiment. The effectiveness of regression models and fuzzy logic has been determined by analyzing the correlation coefficient and by comparing experimental results. Regression model gives closer values to experimentally measured values than fuzzy logic. It has been concluded that regression-based modeling can be used to predict the surface roughness successfully.

Keywords

surface roughness, material removal rate, regression, fuzzy logic

1 Introduction

In the manufacturing industry, machining process plays an important role. Generally, machining is defined as the removal of excess material from the workpiece in the form of chips. Using different methods, unwanted part can be removed without much difference in their results. The surface roughness (*Ra*) is an essential evaluation of the quality product since it considerably affects the staging of mechanical parts as well as the cost of production. Quality of surface (roughness) has a link with the mechanical properties such as corrosion resistance, fatigue behavior.

In small-scale industries, high-speed steel is in great use. HSS tool finds its application as a milling cutter, bits, drills, and broaches. When a too low cutting speed of bits is required, a manufacturer will think of carbide tools [1]. A standard procedure used in the ancient times to enhance the life of HSS cutting tools is by subjecting them to heat treatment, which gives higher control beyond the scope of attributes viz. excellent wear resistance, hardness, and excellent toughness.

Cryogenic treatment is an additional subzero treatment (Vacuum) to the traditional heat treatment process, have been around for several years but certainly in its infancy when linked to heat-treating. Cryogenic treatment is the process of offering material to subzero temperatures (below 0 °C) to increase the life of the tool, into morphological alterations that occur during treatment.

Various factors affect the quality surface roughness and material removal rate. The most prominent are cutting tool configurations and cutting parameters [2]. The influences of these parameters on the surface and material removal rate (*MRR*) to be optimized by applying the Taguchi method. Hence, suitable prediction of surface

Portable Groundnut Stripper

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Abstract - *This project aims at design and fabrication of Portable Groundnut Stripper. The proposed project is intended to separate the groundnuts from the groundnut plant. The machine has one slider, stepper metal blade, AC motor, one metal plate with holes and one metal plate without holes, supporting stand for motor, wheels for easy movement of the machine. In this machine the groundnut plant will feed to the blades with the help of slider by manually. Then the rotating blades will separates the groundnuts from the plant by cutting their smooth roots. Later the groundnuts will drop on the inclined metal plate which has several holes, then all the wastage will go out through the holes and only good quality groundnuts will come out. So, this machine will vanish the labourers problem. Therefore, it is a time saveable machine. And it is very small in size and it has very less weight so, it is very easy to carry the machine from one place to other place. Hence, this machine is most helpful to our farmers to get more profit.*

Key Words: Groundnut, Pods, Portable, Stripper, labour problem, etc

1. INTRODUCTION

Groundnut is one of the major cash crops for India. It is gown in upland areas during rainy season (rainfed) and in lowland areas after paddy during dry season (irrigated). The most common practice for groundnut stripping in irrigated area is to strip within 1 or 2 days after harvesting. Stripping is done by picking pod by pod with an average capacity of 25 kg of pod per man-day. The major reasons for the demand for groundnut machinery are to reduce drudgery, to reduce time consumption, and to increase productivity and income

1.1 Manual Lifting Process

The groundnut plants are annually harvested by being pulled or dug up. This is usually called 'lifting'. There are various designs of equipment available to assist in lifting groundnuts. Manual lifting and machine lifting. In manual lifting, the groundnut plant is lifted by the effort of people.
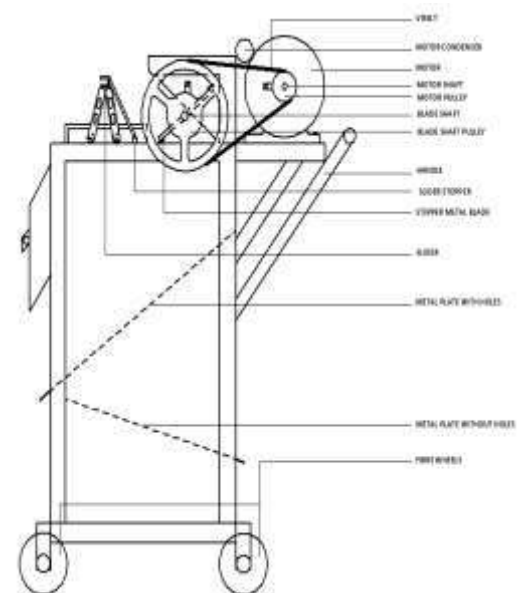
2. CONSTRUCTION AND WORKING

Fig -1: Portable Groundnut Stripper

The machine has one slider, stepper metal blade, AC motor, one metal plate with holes and one metal plate without holes, supporting stand for motor, wheels for easy movement of the machine.

The motor is placed on the motor stand and the power is transmitted to the blade shaft with the help of pulleys and v-belt. The shaft is rigidly fixed with the help of bearings. The rectangular stepper blades are welded to the shaft. The slider is placed on the top in front of the rotating blades. The metal plate with and without holes are inclined to certain angle and welded. The wheels are attached to the body of the machine at the bottom. The electrical wiring is made for proper flow of electricity to the motor.

In this machine the groundnut plant will feed to the blades with the help of slider by manually. Then the rotating blades will separates the groundnuts from the plant by cutting their smooth roots. Later the groundnuts will drop on the inclined metal plate which has several holes, then all the wastage will go out through the holes and only good quality groundnuts will come out

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Computational Analysis of Thermal Behavior within a Scraped Surface Heat Exchanger (SSHE)

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ABSTRACT

In this present work, the Computational analysis of fluid flow and heat transfer within a Scraped Surface Heat Exchanger (SSHE), which is an industrial device, is reported. The 3D model of SSHE geometry is achieved with Solid Edge V18. 3D mesh model of SSHE with finite volume discretization obtained in ANSYS ICM CFD code and ANSYS CFX V15 used to solve continuity, momentum and energy equations using multiple rotating reference frame formulation. The steady, laminar, non-isothermal flow of pure glycerin Newtonian fluid was investigated. The cooling process without phase change within the SSHE was studied. The different scraper blades of 3 and 2.The inlet velocity of the fluid is varied to evaluate the thermal behavior of SSHE. The different process parameters in the parametric study are rotational velocity, axial velocity and the different scraper blades (3 and 2). When reducing the number of rotating parts, better cooling is achieved. The variations of the local heat transfer coefficient based on inner wall temperature and bulk fluid temperature as a function of the main process parameters, namely rotational velocity, axial velocity and the different scraper blades obtained. The results have shown that viscous dissipation has a significant effect on the cooling of the glycerine. The local heat transfer coefficient increases gradually when reducing the rotating parts of scraper blades improves the heat transfer rate. Larger increases of the same occurred with higher rotational velocity and axial velocity. If higher the value of rotating velocity=9rps is considered there is a viscous heating occurs and also more number of rotating parts friction is produced on the boundary layer surface and the temperature increases, so 2 scraper blades results shows the better heat transfer performance in bulk fluid temperature and local heat transfer co-efficient. This is expected to be useful in the design of SSHEs handling highly viscous fluids.

KEYWORDS: Scraped Surface Heat Exchangers, Newtonian Fluid, Heat transfer co-efficient, bulk fluid temperature

1. INTRODUCTION

Scraped surface heat exchangers (SSHE) are used to prevent the deposition of substantial solids on the heat transfer surface. The construction consists of a double pipe with the process fluid in the inner pipe and acting and cooling or heating medium in the annulus. The inner wall of the tube is scraped with a rotating element which is equipped with a spring. There is an annular gap with cylindrical rotor and stator. Blades are provided which are in turn driven by the rotor.
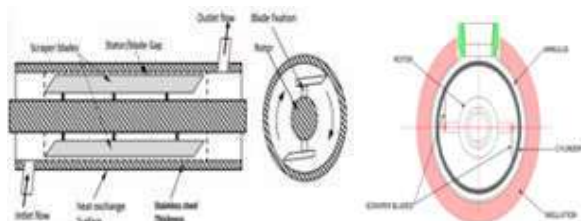

Fig. 1.1 Schematic Representation of a SSHE, Longitudinal and Transversal Cross Section

Scraping enhances the heat transfer by breaking the thermal and hydrodynamic boundary layers. Scraped Surface Heat Exchanger has capacity to thermally treat high viscous fluids. It has many applications in pharmaceutical, food, and chemical industries etc. It can be used for freezing, sterilization, gelatinization and cooling of the products. Fluids with high viscosity such as peanut butter, cream cheese, and mayonnaise etc. can be sterilized using SSHE. MounirBaccar et.al [1] performed a 3-D numerical simulation of the scraped surface heat exchanger with helical screw., the increase of the number of turns in the screws allows to increase the thermal efficiency of the SSHE. S. Ali, M.Baccar et. Al [3] performed a numerical 3D CFD analysis of heat transfer in a scraped surface heat exchanger for Bingham Fluids. The numerical results indicate that by increasing the Reynolds rotation, the Reynolds axial and Oldroyd numbers can improve the heat transfer. TiborVarga et.al[4] conducted a study on the flow characteristics and pressure drop within the horizontal scraped surface heat exchanger the use of different types of mixers does not have a significant effect on the speed profile, when the product is

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INVESTIGATION OF MACHINABILITY CHARACTERISTICS ON C45 STEEL ALLOY WHILE TURNING WITH UNTREATED AND CRYOTREATED M2 HSS CUTTING TOOLS

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ABSTRACT

The present paper compares some of the vital cut qualities of C45 alloy steel while turning operation. The effect of cryogenic treatment and machining parameters on cutting force and temperature were investigated in the dry turning of C45 steel with treated and untreated M2 HSS tool with the radial nose of 0.4mm, are optimized by using the statistical method. The selected work material was machined with untreated and deep cryogenically treated M2 HSS tools and the results were compared in order to exhibit the feasibility of DCT tools. Series of experiments were performed by adopting Taguchi's L_{27} orthogonal array. Cutting speed, feed rate, and depth of cut were taken as three process variables whereas cutting force (F_c), machining temperature (T_m) were selected as the machining characteristics to be compared. The cutting tool materials were initially characterized to examine the effects of deep cryogenic treatment. The characterization was done with the help of a hardness test and scanning electron microscopy (SEM) test coupled with energy dispersive spectroscopy (EDS). The result shows that the depth of cut is the most significant factor for both treated and untreated tool on cutting force, temperature followed by cutting speed and feed rate has less significance, from statistical method to obtain considerably reduced the cutting force of HSS tool by 9.11%and temperature by 11.5%, while depth of cut was the dominating factor for both.

Keywords: M2 HSS tool, cutting force, temperature, machining, deep cryogenic treatment

1. INTRODUCTION

In the concept of dry machining, there is no scope for contamination, disposal, and filtration due to cutting fluids (2004); but operate at lower cutting speeds resulting in slow production rate. The possibility of overheating the tool and lack of chip removal mechanisms pose a significant challenge on the scope of dry machining (1993). In the metal cutting process, cutting tool overcomes the shear strength of work piece and cuts the metal. Advanced manufacturing has produced materials with good strength whose machining demands a paradigm shift in the cutting tools. These cutting tools need to apply more force to cut while compromising their tool life. High temperature generated during cutting impacts in multiple ways on tool life by causing thermal distortion and dimensional changes thereby affecting accuracy (1992).The force components that come into play, impacting on the cutting tool during machining process are termed as cutting forces (2000). They indicate the work done by the tool in removing metal; there by giving an account of tool life, the machined work piece's dimensional accuracy and quality of finished product. High- speed steels first produced in the 1900s are the best choice for cutting tools owing to its high toughness and excellent wear resistance characteristics (1998). Its peculiar behaviour of maintaining hardness at elevated temperatures makes it suitable for drilling, cutting, and various machining processes. Molybdenum type HSS are most favoured due to their cost- effectiveness and high abrasion resistance as compared to Tungsten type (2005).

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Investigation of machinability characteristics on C45 steel with cryogenically treated M2 HSS tool using statistical technique

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Abstract. The machining industries always eye on increasing hardness and reducing the friction at the cutting tool–workpiece interface to reduce flank wear, thereby enhancing the tool life. The present study investigates the effect of deep cryogenic treatment (DCT) on the behavior of M2 HSS tool in turning of C45 medium carbon steel. The tool is double tempered and is tested for hardness and flank wear. The power consumption is also analyzed in the process with a focus on green machining. While Taguchi's L_{27} orthogonal array (OA) is used to study the main interaction effect of all machining parameters, analysis of variance (ANOVA) and signal to noise (S/N) ratio are used for analysis of experimental outcomes. The study reveals that DCT has enhanced the hardness of HSS tool by 14.9%, while speed and feed were the dominating factors on the flank wear. Microstructure morphology using SEM is also discussed.

Keywords: M2 HSS tool / Deep cryogenic treatment / Hardness / Flank wear / Machining

1 Introduction

In manufacturing process, the production costs increase due to constant tool wears. The tool being cut is also hard and poses huge friction to the cutting tool. Many attempts to reduce friction have provided poor results. The precision and efficiency are inversely proportional to the duration of tool usage as wear increases with time. An ideal cutting tool is expected to exhibit hardness by withstanding the frictional force, high temperature, and residual stress generated at interface during the machining. A harder and wear resistant tool is preferred in high-speed cutting due to its high ergonomics.

To enhance the tool life, cryogenic treatment (CT) has emerged as a promising candidate, where the cutting tool is exposed/treated under extreme temperature conditions. Deep cryogenic treatment (DCT) is a new and efficient method of CT, where the tool is treated from ambient temperature to $-193\,°C$ and back [1]. To further enhance the tool condition tempering can be done, where the tool is heated to $150\,°C$ and cooled suddenly to room temperature. Tempering is done after DCT and can be of multiple cycles. Molybdenum has successfully replaced tungsten during World War [2] and is still preferred in small scale industry due to its affordability and few superior qualities as compared to its counterpart [3]. The molybdenum-based HSS tool finds its application as taps, drills, milling cutters, broaches, and bits [4]. Heat treat of HSS tool will greatly increase the range of properties such as wear resistance and hardness. Strong cutting tool suppresses friction, thereby controlling temperature and demanding less power to overcome the stress. Many efforts have been put in understanding the impact of CT during machining. But very few works focus on impact of DCT on tool life of M2 HSS tool used for dry machining of C45 [5]. The investigations on relevance of cutting parameters on hardness and flank wear lack clarity. The study on power consumption during turning is missing in literature.

This work attempts to show the effect of DCT on hardness, flank wear, and power consumption. Here, the current literature is reviewed; research gaps are identified and addressed. The performance evaluation of DCT tool is compared with untreated tool for hardness and flank wear. The cutting parameters are optimized using Taguchi's technique and experimental results are analyzed using analysis of variance (ANOVA) [and signal to noise ratio (SNR)] methods. The remainder of the paper is organized as below: Section 2 provides a comprehensive background of CT, while Section 3 reviews the current efforts made in this regard. Section 3.1 explains the design of experiment (DOE); Section 4 presents the results. Finally, paper concludes with future work and outlook in Section 5.

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Materials Research Express

TOPICAL REVIEW

Investigation of mechanical properties and applications of polylactic acids—a review

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Abstract

Polylactic acid (PLA) is one of the most promising biopolymers used nowadays and has a wide range of applications in food, packaging, pharmaceutical, and medical industries. PLA films and foams are emerging as the most promising new materials option for sustainable packaging because of their high clarity and environment-friendly character. In recent times, there has been a renewed interest in various technologies that have a much lesser impact on our environment. Numerous studies have come to the conclusion that engineering reforms are very important for environmental sustainability. Surgical processes and drug delivery systems have advanced a lot over the years, but the emergence of PLA has opened up new avenues in these fields. In 2016, PLA was the second most utilized bioplastic in the world. The main use of PLA is observed in packaging industries, followed by medical implants. A literature review has been carried out with the objective of familiarising the properties, and applications of PLA in the different areas of engineering and technology, additives used and their effects, and manufacturing techniques so that it enables the researchers to strengthen their study on PLA for further enhancing its applications and mechanical properties.

1. Introduction

1.1. General information about polylactic acid

Generally, Polylactic acid (PLA) can be manufactured by chemical synthesis of acetaldehyde and through the carbohydrate fermentation process. The lactic acid was first synthesized by a Swedish chemist Scheele in 1780. However, it was produced on a large-scale by Charles E. Avery of Massachusetts, the United States of America in 1881(Narajayan *et al* 2004). Polylactic acid is synthesized by the self-condensing of individual lactic acid strands, or by the rings opening polymerization in lactides. The physical, mechanical, biological and rate of degradation properties were affected by the molecular weight distribution of the polymer (Amass *et al* 1999).

The condensation polymerization in lactic acid strands doesn't raise the weight of the molecules in a sufficient manner. Furthermore, the normal poly-condensation of lactic acid gives a glassy kind of polymer that is brittle in nature (Tuominen 2003), and also has limited applications. The remarkable improvement of molecular weight was achieved by azeotropic distillation and by a longer polymerization time (Lunt 1998, Tuominen 2003). To prevent the problem of brittleness, polylactic acid was prepared as a high molecular weight product with chain extenders (Woo *et al* 1995).

Chain extenders can react with PLA end group which results in chain extended high molecular weight polylactic acid. The chain extender helps in determining the range of molecular weight in the final extended product. Several researchers (Kylma *et al* 1997) reported the use of various chain extenders such as hexa-methylenedi-isocyanate (HMDI), iso-propane di-isocyanate (IPDI), butanediol, succinic anhydride, hydro benzoic acid, maleic acid, and citric acid to increase the molecular weight of polylactic acid. The biodegradable plastics are generally produced from common aliphatic acids such as poly(hydroxyl butyrate), poly

A REVIEW ON METALLIC DENTAL MATERIALS AND ITS FABRICATION TECHNIQUES

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ABSTRACT

Evolutions of metallic dental restorative materials are facilitated due to need in improvement in its quality such as mach in ability and aesthetics. Availability of numerous substitutes and advancement in the manufacturing technology is one of many reasons of evolution, from gold and its alloys to titanium and its alloys. Numerous innovative fabrication techniques were spotted through time from casting to additive manufacturing (AM), AM being the latest. Fatigue analysis is reviewed including finite element analysis to draw a conclusion towards the selection of suitable material and its subsequent fabrication technique.

KEYWORDS: Dental Materials, Nobel Metal Alloys, Titanium and its Alloys & Dental Prosthesis

Original Article

1. INTRODUCTION

Evidences of dental repairs have been found for more than 4000 years, but these early dental applications were purely based on ascetics rather than masticatory abilities. The early Phoenicians were known to use gold wires to bind teeth and then Etruscans and the romans, introduced the art of making fixed dental bridges with a strip of gold [1]. But during the middle ages these techniques became obsolete and were subsequently lost. Therefore, it cannot be said that dental restoration is a new concept; our ancestors have been practicing it since ages. With the revival of lost wax technique in the early 20th century by W. H Taggart (1907) to produce precise cast metal forms [2]. There has been a need and quest to develop new and better extra oral restorative material that can maintain the desired ascetics, restore tooth strength, longevity with being biocompatible and cost effective. The material choice for dental restoration is case specific and varies through patients. However, with the increasing wide range of available alternatives for dental repairs, it is appropriate to review the current all metal based dental materials and their fabrication techniques. The following review highlights the different metal based dental prosthesis materials like high noble metal alloys(40%>Au), noble metal alloys (20%>Au), base metal alloys (20%<Au) and titanium alloys with their subsequent fabrication techniques such as casting, electroforming, copy milling, powder metallurgy, CAD/CAM and additive manufacturing. The review includes fatigue analysis and computer aided analysis in few of the dental materials.

2. DENTAL MATERIALS

The tooth is known the strongest material in human body being stronger than any other bone in the system. It serves an integral function in our digestive system, but these teeth are subjected to failure due to health problems,

A LITERATURE REVIEW ON PROCESSING AND TESTING OF MECHANICAL PROPERTIES OF HYBRID COMPOSITES USING GRAPHENE/EPOXY WITH ALUMINA

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ABSTRACT

Epoxy has been often used with reinforcements due to its brittle nature. Various reinforcing agents have provided a multitude of composites with their own unique characteristics. Graphene is perhaps one of the most inspiring discoveries in the field of science and technology since its potential applications are limitless due to its admirable properties. It is basically an allotrope of carbon, a single layer of atoms bonded in a honeycomb lattice. Among the various other nano fillers, graphene has been used as reinforce epoxy which is then further strengthened with alumina. Composites have been designed and redesigned throughout the years, developing more and more advanced materials for engineering applications. But there's always a need for a material with higher performance at lower cost in every aspect of technology. The aim of this review is to put forth information regarding the materials used for developing a hybrid composite using alumina, graphene and epoxy. This is done in order to boost the performance of the existing epoxy resin, which will be then tested for its mechanical characteristics. The result of the experiment will be compared with a standard specimen consisting of graphene and epoxy. The materials and their properties, along with tests conducted on them are covered in this paper.

Key words: Alumina, Epoxy, Graphene, Mechanical properties, Nanocomposite, Synthesis.

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Accident at Vidyalaya School – an ethical dilemma

<u>Jayadeva Prasad Moleyar</u>   ▼

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CASE	TEACHING NOTES

Abstract

Learning outcomes

This paper aims to sensitize learners to some of the ethical and public relation issues involved in decision-making with specific reference to the educational field.

Case overview/synopsis

This case brings out a dilemma faced by the school management of Vidyalaya School, Karnataka, India in responding to a notice issued by the State Government to pay a huge compensation and to re-absorb a teacher who was rendered physically challenged owing to an accident within the school premises. The case is set in the milieu of a self-financed, private education industry during the period 2013-2018. This is a case in "Strategy formulation" and "Ethical dilemma" involved in the field of education in India. A teacher was permanently injured and confined to a wheelchair in an attempt to rescue a child attempting to jump off the school building and end her life for having obtained low marks in a test paper. While the school management was initially sympathetic and paid her medical bills and full salary purely on humanitarian grounds, they discontinued this support-line after about two years. The teacher filed a complaint with the Disability Commission, a grievance redressal body of the Government of Karnataka, India. She demanded re-absorption into the job, payment of salary arrears and reimbursement of all the subsequent medical bills incurred abroad totaling Rs 15.5 million, which is unaffordable for a school of that size. The management is faced with a situation where they cannot accept such a huge financial liability as well as accept a wheelchair-bound teacher who would not be able to discharge her duties. The school was briefed by legal experts that there exists no law that specifies either compensation or re-absorption into the job in a situation like this. At the same time, to fight the case purely on legal grounds and deny her a decent livelihood would impact the image of the school as being inhuman to a lady who had actually

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DETERMINANTS AND DIMENSIONS OF CORPORATE COMMITMENT TO SOCIAL RESPONSIBILITY: A STUDY WITH REFERENCE TO LARGE SCALE UNITS IN KARNATAKA

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ABSTRACT

This paper identifies the key determinants and dimensions of corporate commitment to social responsibility among selected large scale units in Karnataka. The main objective of the study was to know the relationship between key determinants of corporate social responsibility and dimensions of corporate social responsibility with corporate commitment to social responsibility. An effort is also made to know the relationship between corporate commitments to social responsibility with certain corporate social responsibility observations. The large scale industrial units mainly engaged in either manufacturing or service activities and representing the private, public and multinational corporations were chosen. The key determinants, dimensions of corporate social responsibility, and corporate social responsibility observations were considered as independent variables and corporate commitment to social responsibility was treated as dependent variable. From the analysis it was found that majority of the multinational enterprises and the organizations above 30 years of existence tend to show high commitment to social responsibility than their counterparts either in private or public sector having less than 30 years of existence. The organizations show significant positive relationship between various dimensions of corporate social responsibility and corporate commitment to social responsibility. Among corporate social responsibility observations reasons for involvement in corporate social responsibility activities and perception about corporate social responsibility have significant effect on corporate commitment to social responsibility.

KEY WORDS: *CSR, Determinants of CSR, Dimensions of CSR, Commitment to CSR, CSR observations, Social responsibility,*

INTRODUCTION

Modern businesses are increasingly becoming involved in society and show increasing interest in Corporate Social Responsibility (CSR). Social responsibility represents the obligation of management to undertake certain activities that contribute to improving the welfare of the company and whole society. The contribution of the organisations towards CSR varies from organisation to organisation based on their organisational characteristics and commitment to CSR. Furthermore, social, environmental, economic, and political factors influence CSR. At the same time society's expectations from corporate has been changing. The government is considered as the mediator to connect the expectations of the society and corporate. In such a situation the government

was compelled to insist the corporate to have mandatory CSR with certain conditions. India is the first country in the world to have mandatory CSR.

In accordance with section 135(5) of the Indian companies Act 2013, the companies having net worth of INR 500 crore or more or turnover of INR 1000 crore or more or net profit of INR 5 crore or more during any financial year need to spend, in every financial year, at least 2% of their average net profits made during the three immediately preceding financial years, in pursuance of its CSR policy and shall be required to constitute a CSR Committee. CSR in India tends to focus on what is done with profits after they are made. Corporate sustainability essentially refers to the role that companies can play in meeting the agenda of

TRENDS AND STATUS OF CORPORATE SOCIAL RESPONSIBILITY IN KARNATAKA: AN EMPIRICAL STUDY

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ABSTRACT

Corporate social responsibility (CSR) is not new to India. It is a part of the ancient tradition which is currently being practiced by companies. The Companies Act 2013 has made it obligatory for the companies to practice CSR with certain conditions. Effective CSR towards communities require close interaction with current development thinking. This article examines the trends and status of corporate social responsibility in Karnataka. The article brings out the key issues highlighting the trends and status of CSR such as involvement in CSR initiatives, CSR policy development and implementation, the target groups covered while implementing CSR initiatives, the regularity of CSR initiatives, the rationale behind targeting the particular area for undertaking CSR initiatives, and the chances of change in CSR initiatives in future. The major issues considered by companies under CSR continue to be education, health care and environment. Few other initiatives such as rural development, livelihood promotion, safe drinking water and sanitation are also gaining the attention of the companies. With CSR roadmaps being integrated into the strategic blueprints of the companies, there is a hope that one can see some serious, innovative and impactful CSR initiatives in future.
KEY WORDS: *Corporate social Responsibility, CSR initiatives, Trends and status of CSR, Involvement in CSR.*

INTRODUCTION

The 1990's has been the decade of profound change in India's economic paradigm and has significantly affected corporate India. Liberalization has meant an increasing role for the corporate sector and freedom from controls. While corporate India represents one face of this country, there exists another visible face, marked by poverty, illiteracy, never ending health problems, inhuman living conditions and overpopulation. Whether liberalization has made India better is a matter for introspection. CSR is not new to India. It is a part of the ancient tradition which is currently being practiced by companies. The Companies Act 2013 has made it mandatory for the companies to practice CSR with certain conditions.

Effective CSR towards communities require close interaction with current development thinking. Initially there was welfare and now there is empowerment. Soon basic needs will become basic rights. These ideas gain currency in the view that economic development alone cannot ensure human development, which is the ultimate goal. Corporate India can bring this difference through a sustainable approach. In this process companies need to give greater emphasis to people and communities, while protecting the interest of employees, shareholders and customers. The government and NGO's play their role in human development, while the corporate need to join hands with them. There is recognition that human development is the ultimate goal and economic growth is a means to this end.

There is a view that corporate have a moral and social obligation towards society. This is because they depend on society for a number of facilities such as developed infrastructure, natural resources, trained workforce, and serenity at the work place. They also depend on society for the maintenance of law and order, without which they cannot carry on their productive activities and also for reaching to

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