

Subject: Interface Design
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Module-1

- Introduction
- Importance of Human-Computer interface
- characteristics of graphics interface
- web user interface: Characteristics
- Differences between GUI & Web UI

Learning Outcomes

What You Will Learn

1. What is user interface design.
2. How the Human-Computer interface works.
3. Brief characteristics of Graphical interface.
4. Conclude this Module with web interface.

Text books and References

Text Books:

1. Wilbent. O. Galitz , "The Essential Guide to User Interface Design", John Wiley & Sons, 2001.

Reference Books:

1. Ben Sheiderman, "Design the User Interface", Pearson Education, 1998.

2. Alan Cooper, "The Essential of User Interface Design", Wiley - Dream Tech Ltd., 2002.

Graphical user interface

Good interface design , a variety of new display and interaction techniques wrapped into a package called the *graphical user interface* or, as it is commonly called, GUI

Goal of GUI

- Make working with computer *easy* > *enjoyable* > *productive*.
- User interface design is a subset of a field of study called *human-computer interaction*.
- Human-computer interaction is the study, planning, and design of how people and computers work together so that a person's needs are satisfied in the most effective way.

Factors of GUI

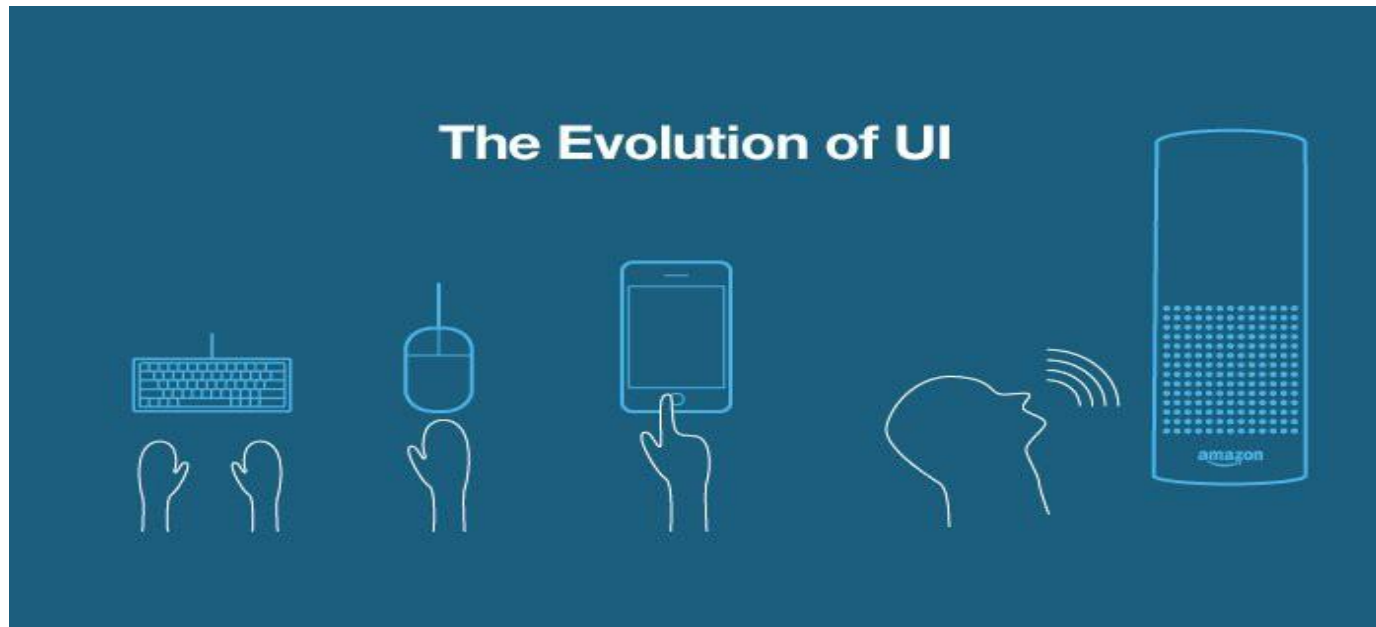
GUI designers must consider a variety of factors:

- What people want and expect
- What physical limitations and abilities people possess
- What people find enjoyable and attractive
- Technical characteristics and limitations of the computer hardware and software

User Interface

- The *user interface* is the part of a computer and its software that people can see, hear.
- The user interface has essentially two components: input and output.
- *Input* is how a person communicates his or her needs or desires to the computer.
- *Output* is how the computer conveys the results of its computations to the user.

The evolution of UI



Importance of Good Design

Motivation to create really effective and usable interfaces and screens.

Systems that are inefficient and confusing or, at worst, just plain unusable? Is it because:

1. We don't care?
2. We don't possess common sense?
3. We don't have the time?
4. We still don't know what really makes good design?

Well-designed interface ,screen, screen's layout - appearance and a system's navigation affect a person in a variety of ways.

Benefits of Good Design

- **Productivity** benefits gain
- **Training costs** are lowered
- **Support line costs** is reduced
- **Employee satisfaction** is increased
- **Organization's customers benefit** from the improved service they receive. It also has significant **economic benefits**.

Introduction of the Graphical User Interface

- The Xerox systems Altus and STAR introduced the mouse and pointing and selecting as the primary human-computer communication method. The user simply pointed at the screen, using the mouse as an intermediary. These systems also introduced the graphical user interface as we know it today.

- In 1985 Microsoft released Windows 1.0 and Commodore introduced the Amiga 100.
- In 1987 Apple introduced Macintosh II, the first color Macintosh, and the X Window system became widely available.
- In 1989, several UNIX-based GUIs were released, including Open Look by AT&T and Sun Microsystems.
- Finally, through the 1990s and 2000s, a succession of products and upgrades from Microsoft and Apple have appeared.

A Brief History of Screen Design

```
TDX95210          THE CAR RENTAL COMPANY          10/11/76  10:25

NAME              TEL              RO
_____

PUD              RD              C              RT              MPD
_____

ENTRY ERROR XX465628996Q.997
Command==>
```

Figure 1.1 A 1970s screen.

```
THE CAR RENTAL COMPANY

RENTER >>      Name: _____
                Telephone:  ___  ___  ___

LOCATION >>      Office: _____
                Pick-up Date:  ___  ___  ___
                Return Date:  ___  ___  ___

AUTOMOBILE >>  Class: _____ (PR, ST, FU, MD, CO, SC)
                Rate: _____
                Miles Per Day:  _____

The maximum allowed miles per day is 150.
                Enter  F1=Help  F3=Exit  F12=Cancel
```

Figure 1.2 A 1980s screen.

THE CAR RENTAL COMPANY

RENTER

Name:

Telephone:

LOCATION

Office:

Pick-up Date:

Return Date:

AUTOMOBILE

Class:

Rate:

Miles Per Day:

Figure 1.3 A 1990s and beyond screen.

Interaction Styles

An interaction style is simply the method, or methods, by which the user and computer system communicate with one another.

- ■ Command line
- ■ Menu selection
- ■ Form fill-in
- ■ Direct manipulation
- ■ Anthropomorphic

Command Line

Powerful

Commands must be memorized

- Flexible
Requires learning
- Appeals to expert users
Intolerant of typing errors
- Conserves screen space
Difficult for casual users

STYLE	ADVANTAGES	DISADVANTAGES
Menu Selection	Utilizes recognition memory Reduces interaction complexity Aids decision-making process Minimizes typing Aids casual users	May slow knowledgeable users Consumes screen space May create complex menu hierarchies
Form Fill-in	Familiar format Simplifies information entry Requires minimal training	Consumes screen space Requires careful and efficient design Does not prevent typing errors
Direct Manipulation	Faster learning Easier remembering Exploits visual/spatial cues Easy error recovery Provides context Immediate feedback	Greater design complexity Window manipulation requirements Requires icon recognition Inefficient for touch typists Increased chance for screen clutter
Anthropomorphic	Natural	Difficult to implement

The Popularity of Graphics

- The older text-based screen possessed a one-dimensional, text-oriented, form-like quality, graphic screens assumed a three-dimensional look.
- Controls appeared to rise above the screen and move when activated.
- Information could appear and disappear as needed, and in some cases text could be replaced by graphical images called icons. These icons could represent objects or actions.
- Screen navigation and commands are executed through menu bars and pull-down menus. Menus “pop up” on the screen
- The screen body, selection fields such as radio buttons, check boxes, list boxes, and palettes coexisted with the reliable old text entry field. More sophisticated text entry fields with attached or drop-down menus of alternative options also became available.

The Concept of Direct Manipulation

- **The system is portrayed as an extension of the real world**
- **Objects and actions are continuously visible**
- **Actions are rapid and incremental with visible display of results**
- **Incremental actions are easily reversible**

EX for **Direct and Indirect Manipulation**

- A menu may be accessed by pointing at a menu icon and then selecting it (direct manipulation). The menu itself, however, is a textual list of operations (indirect manipulation). When a operation is selected from the list, by pointing or typing, the system executes it as a command.

Graphical Systems: Advantages

Symbols recognized faster than text

Faster learning

Faster use and problem solving

Easier remembering

More natural

Increased feeling of control

Immediate feedback

Predictable system responses

More attractive

Replaces national languages

Low typing requirements

Disadvantages

- **Greater design complexity**
- **Learning still necessary**
- **Inconsistencies in technique and terminology**
- **Lack of experimentally-derived design guidelines**
- **Not always familiar**
- **Human comprehension limitations.**
- **Window manipulation requirements**
- **Inefficient for expert users**
- **May consume more screen space.**
- **Hardware limitations**

Characteristics of the GUI

- *Sophisticated Visual Presentation*
- *Pick-and-Click Interaction*
- *Restricted Set of Interface Options*
- *Visualization*
- *Object Orientation*
- *Use of Recognition Memory*
- *Concurrent Performance of Functions*

Web User Interface

Web interface design was essentially the design of navigation and the presentation of information. It was about content, not data.

- Content- or information-focused interface design is typically called *Web page* design
- An application-focused interface is usually referred to as *Web application* design.

Both styles share many similar features, both being heavily graphical and information rich.

- Web page interface design is largely a matter of properly balancing the structure and relationships of menus, content, and other linked documents or graphics.
- The design goal is to build a hierarchy of menus and pages that feels natural, is well structured, is easy to use, and is truthful.
- A Web application is usually designed to collect and process data

Popularity of the Web interface

- It enables millions of people scattered across the globe to communicate, access information, publish, and be heard.
- It enables people to control much of the display and the rendering of Web pages.
- People can also change aspects such as decide whether or not to transmit certain data, accept or refuse cookies.

Characteristics of a Web Interface

- *GUI versus Web Page Design*

GUI and Web interface design are similar. Both are software designs, they are used by people, they are interactive, they are heavily visual experiences presented through screens, and they are composed of many similar components

most significant differences.

- **1. Devices.**
- **2. User focus.**
- **3. Data/information**
- **4. User tasks.**

- **5. User's conceptual space**
- **6. Presentation elements**
- **7. Navigation**
- **8. Interaction**

Principles of User Interface Design

- An interface must reflect a person's capabilities and respond to his or her specific needs.
- It should be useful, accomplishing some business objectives faster and more efficiently than the previously used method or tool.
- It must also be easy to learn. Finally, the system must be easy and fun to use, and evoke a sense of pleasure and accomplishment, not tedium and frustration.

Principles for the Xerox STAR

- **The illusion of manipulable objects**
- **Visual order and viewer focus**
- **Revealed structure**
- **Consistency**
- **Appropriate effect or emotional impact**
- **A match with the medium**

General Principles

Aesthetically Pleasing

Provide visual appeal by following these presentation and graphic design principles:

- — Provide meaningful contrast
- — Create groupings.
- — Align screen elements and groups.
- — Use color and graphics effectively and simply.

Clarity

The interface should be visually and conceptually clear including:

- — Visual elements
- — Functions
- — Metaphors
- — Words and text

Compatibility

Provide compatibility with the following:

- — The user
- — The task and job
- — The product
- Adopt the user's perspective.

Directness

Provide direct ways to accomplish tasks.

- Available alternatives should be visible.
- The effect of actions on objects should be visible.

Efficiency Familiarity Flexibility

Recovery Responsiveness

Simplicity

Important Questions

- Explain the Importance and Benefits of good user Interface Design.
- Write any four differences between GUI and Webpage Design.
- Explain in detail, the characteristics of GUI.
- Explain the concept of Direct Manipulation for Graphical Systems.
- Discuss the characteristics of Intranet and Internet and bring out the differences between them.
- Discuss the general principles of User Interface Design.