HUMAN COMPUTER INTERFACE

- Human Computer Interface (HCI) was previously known as the man-machine studies or man-machine interaction. It deals with the design, execution and assessment of computer systems and related phenomenon that are for human use.
- HCI can be used in all disciplines wherever there is a possibility of computer installation. Some of the areas where HCI can be implemented with distinctive importance are mentioned below −
- **Computer Science** − For application design and engineering.
- **Psychology** − For application of theories and analytical purpose.
- **Sociology** − For interaction between technology and organization.
- **Industrial Design** − For interactive products like mobile phones, microwave oven, etc.

Objective

- The intention of this subject is to learn the ways of designing user-friendly interfaces or interactions. Considering which, we will learn the following −
- Ways to design and assess interactive systems.
- Ways to reduce design time through cognitive system and task models.
- Procedures and *heuristics* for interactive system design.

Importance of HCI

- HCI is critical since it will be necessary for goods to be more successful, safe, helpful, and functional. It will make the user's experience more enjoyable in the long term. As a result, having someone with HCI skills involved in all phases of any product or system development is critical. HCI is also necessary to prevent goods or projects from failing completely.
- When creating clear intuitive systems that will be accessible by people with a wide variety of talents and knowledge, as well as those who have not finished any official training, HCI is critical. HCI makes software and gadgets more intelligible and useful for everyone by leveraging our everyday knowledge of the environment.

Applications of Human-Computer Interaction

- Everyday Life
- Industry and Business
- Accessibility
- Virtual reality

Importance of Good Design

- Inspite of today's rich technologies and tools we are unable to provide effective and usable screen because lack of time and care.
- A well-designed interface and screen is terribly important to our users. It is their window to view the capabilities of the system and it is also the vehicle trough which complex tasks can be performed.
- A screen's layout and appearance affect a person in a variety of ways. If they are confusing and inefficient, people will have greater difficulty in doing their jobs and will make more mistakes.
- Poor design may even chase some people away from a system permanently. It can also lead to aggravation, frustration, and increased stress.

Benefits of Good Design

- The benefits of a well-designed screen have also been under experimental scrutiny for many years. One researcher, for example, attempted to improve screen clarity and readability by making screens less crowded. The result: screen users of the modified screens completed transactions in 25 percent less time and with 25 percent fewer errors than those who used the original screens.
- Other benefits also accrue from good design (Karat, 1997). Training costs are lowered because training time is reduced, support line costs are lowered because fewer assist calls are necessary, and employee satisfaction is increased because aggravation and frustration are reduced.
- Another benefit is, ultimately, that an organization's customers benefit because of the improved service they receive.

GUI(Graphical User Interface) Definition

- A user interface, as recently described, is a collection of techniques and mechanisms to interact with something. In a graphical interface, the primary interaction mechanism is a pointing device of some kind.
- What the user interacts with is a collection of elements referred to as objects. They can be seen, heard, touched, or otherwise perceived. Objects are always visible to the user and are used to perform tasks. They are interacted with as entities independent of all other objects.
- People perform operations, called actions, on objects. The operations include accessing and modifying objects by pointing, selecting, and manipulating.

Popularity of Graphics

- Graphics revolutionized design and the user interface. Graphics assumes three dimensional look whereas text based system assumes one dimensional look.
- Information can appear or disappear through floating windows and navigation and commands can be done through menu or pull downs or screen controls.
- Increased computer power and the vast improvement in the display enable the user's actions to be reacted to quickly, dynamically, and meaningfully.
- If properly used graphics can reduce mental and perceptional load and increases information transfer between men and machine because of visual comparisons and simplification of the perception of structure.

Concept of Direct Manipulation

- The term used to describe this style of interaction for graphical systems was first used by Shneiderman (1982). He called them "direct manipulation" systems, suggesting that they possess the following characteristics:
- **The system is portrayed as an extension of the real world**: A person is allowed to work in a familiar environment and in a familiar way, focusing on the data, not the application and tools. The physical organization of the system, which most often is unfamiliar, is hidden from view and is not a distraction.
- **Continuous visibility of objects and actions**: objects are continuously visible. Reminders of actions to be performed are also obvious. Nelson (1980) described this concept as "virtual reality," a representation of reality that can be manipulated. Hatfield (1981) is credited with calling it "WYSIWYG" (what you see is what you get) and Rutkowski (1982) described it as "transparency,"
- **Actions are rapid and incremental with visible display of results** : the results of actions are immediately displayed visually on the screen in their new and current form. Auditory feedback may also be provided. The impact of a previous action is quickly seen, and the evolution of tasks is continuous and effortless.

Characteristics of the Graphical User Interface

- **Sophisticated Visual Presentation -** Visual presentation is the visual aspect of the interface. It is what people see on the screen. The sophistication of a graphical system permits displaying lines, including drawings and icons. It also permits the displaying of a variety of character fonts, including different sizes and styles. The meaningful interface elements visually presented to the user in a graphical system include windows (primary, secondary, or dialog boxes), menus (menu bar, pulldown, pop-up, cascading), icons to represent objects such as programs or files, assorted screen-based controls (text boxes, list boxes, combination boxes, settings, scroll bars, and buttons), and a mouse pointer and cursor. The objective is to reflect visually on the screen the real world of the user as realistically, meaningfully, simply, and clearly as possible.
- **Restricted Set of Interface Options** - The array of alternatives available to the user is what is presented on the screen or what may be retrieved through what is presented on the screen, nothing less, and nothing more. This concept fostered the acronym WYSIWYG.
- **Pick-and-Click Interaction** - To identify a proposed action is commonly referred to as pick, the signal to perform an action as click. The primary mechanism for performing this pick-and-click is most often the mouse and its buttons and the secondary mechanism for performing these selection actions is the keyboard.
- **Visualization** - Visualization is a cognitive process that allows people to understand information that is difficult to perceive, because it is either too voluminous or too abstract. The goal is not necessarily to reproduce a realistic graphical image, but to produce one that conveys the most relevant information. Effective visualizations can facilitate mental insights, increase productivity, and foster faster and more accurate use of data.

The Web User Interface

- Web interface design is essentially the design of navigation and the presentation of information.
- Proper 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.
- The Web is a navigation environment where people move between pages of information, not an application environment. It is also a graphically rich environment.

The popularity of Web

- The user interface, the Web has revolutionized computing. It allows millions of people scattered across the globe to communicate, access information, publish, and be heard. It allows people to control much of the display and the rendering of Web pages.
- Web usage has reflected this popularity. The number of Internet hosts has risen dramatically.
- Users have become much more discerning about good design. Slow download times, confusing navigation, confusing page organization, disturbing animation, or other undesirable site features often results in user abandonment of the site for others with a more agreeable interface.

Principles of User Interface Design

- It should be useful, accomplishing some business objectives faster and more efficiently than the previously used method or tool did. It must also be easy to learn, for people want to do, not learn to do.
- The interface itself should serve as both a connector and a separator: a connector in that it ties the user to the power of the computer, and a separator in that it minimizes the possibility of the participants damaging one another.