

UNIT-1

INRODUCTION

Man-machine studies or man-machine interaction were the earlier names for human computer interface (HCI). It focuses on the development, implementation, and evaluation of computer systems and associated phenomena that are intended for human use.

Definition:

Designing and assessing computer systems and technologies that people engage with are the main objectives of the multidisciplinary discipline of human-computer interaction. It focuses on comprehending and enhancing how people and computers interact in order to make technology more approachable, effective, and fun.

Goals:

- Design user interfaces and software-enabled goods that are usable.
- Improve the usefulness of current products
- Determine what issues and tasks (such as those at work) can be solved with software products.

A basic goal of:

- Improve communication between users and computers
- Making computers more usable and responsive to user needs.

A long term goal of HCI is

- To design system that minimize the barrier between the human's cognitive model of what they want.
- To accomplish and the computer's understanding of the user's desk.

Why is HCI important?

High-converting-information (HCI) is essential for creating user-friendly interfaces that are typically accessible to people with varying levels of experience and

expertise. Most notably, human-to-machine (H2M) interaction is important for communities that lack expertise and formal training on how to interact with particular computing environments.

Let's take a closer look at how HCI plays a role in our daily lives:

HCI in daily lives: Today, technology has penetrated our daily life and affected our daily activities. You don't need to own or use a Smartphone or computer to use HCI technology. When people use an ATM, vending machine or food machine, they inevitably come into contact with HCI. This is because HCI plays an important role in designing the interfaces to such systems that make them usable and efficient.

Industry: Industries that use computing technology for day-to-day activities tend to consider HCI a necessary business-driving force. Efficiently designed systems ensure that employees are comfortable using the systems for their everyday work. With HCI, systems are easy to handle, even for untrained staff.

Accessible to disabled: The main goal of HCI is to design systems that make them accessible, usable, and efficient and secure for everyone. This means that people with a wide range of skills, knowledge and expertise can easily use systems created by HCI. This includes people with disabilities. HCI generally relies on user-centered techniques and methods to make systems accessible to people with disabilities.

An integral part of software success: HCI is an integral part of software development companies that develop software for end users. Such companies use HCI techniques to develop software products to make them usable. Since the end user consumes the product, following HCI methods is crucial because the sale of the product depends on its usability.

Useful for untrained communities: Today, user manuals for common computer systems are rare. Very few advanced and advanced computer systems provide user manuals. In general, users expect systems to be user-friendly and will allow access to the system within minutes of interacting with it. Here, HCI is a powerful tool that allows designers to design user interfaces that are easy to use.

Defining the user interface:

- User interface, design is a subset of a field of study called human-computer interaction.
- Human-computer interaction is the study, **design** and **engineering** of **humans** and computers **to** work together **to meet people's** needs **as effectively as possible**.

HCI designers must consider **several** factors:

- **what** people want and expect, **people's** physical limitations and **abilities**,
 - **how data** processing systems work,
 - What people find **pleasant** and attractive.
 - Technical characteristics and limitations of computer hardware and software also **consider**.
-
- The user interface is the part of **the** computer and its software that people can see, hear, touch, **to speak** or otherwise understand or direct.
 - The user interface **basically consists of two parts**: input and output.
 - Input is how a person communicates his / her needs to the computer.
 - Some common input components are the keyboard, mouse, trackball, one's finger, and one's voice.
 - Output is how the computer conveys the results of its computations and requirements to the user.
 - The display screen is currently the most widely used computer output device, followed by speech and sound methods that make use of an individual's aural ability.
 - The application of touch output and scent in human senses to interface design is yet mainly unexplored.
 - A well-designed interface will offer a combination of input and output techniques that best suit the user's requirements, capabilities, and constraints.
 - The optimal user interface is one that goes unnoticed, allowing the user to concentrate on the content and task at hand rather than the tools utilized to display the information and complete the task.

The Importance of good design:

For our users, having an attractive screen and interface is crucial. It is both the vehicle via which difficult activities can be completed and their window into the system's capabilities.

A person is impacted by a screen's design and layout in several ways. People will find it harder to complete their tasks and make more mistakes if they are unclear and ineffective.

Inadequate system design can potentially drive certain users away from it forever. It may also result in heightened stress, irritation, and annoyance.

Benefits of good design:

For many years, experiments have also examined the advantages of a well-designed screen. For instance, one researcher tried to make screens less congested in order to increase screen clarity and readability. As a consequence, screen users who utilized the updated screens finished transactions 25% faster and with 25% fewer errors than those who used the original displays.

Poor clarity forced screen users to spend an extra second for a screen.

- It would take almost one more year to process all the screens.
- Twenty extra seconds of screen time adds up to 14 man-years of work.
- The benefits of a well-designed display have also been studied experimentally for years.
- For example, one researcher tried to improve the clarity and readability of the screen making the screens less crowded.
- Separate items that have been combined on the same display line for economy space, was placed on a separate line instead.
- Results screen users were about 20 percent more productive with less full version.
- Training costs are lowered because training time is reduced.
- Support line costs are lowered because fewer assist calls are necessary.
- Employee satisfaction is increased because aggravation and frustration are reduced.

- Ultimately, that an organization's customers benefit because of the improved service they receive.
- Identifying and resolving problems during the design and development process also has significant economic benefits.

Introduction to the graphical user interface:

A GUI is a user interface that allows users to interact with various electronic devices using icons and other visual indicators. Graphical user interfaces were created because command line interfaces were quite complex and difficult to learn all their commands. Nowadays, GUIs are used in many devices such as mobile phones, MP3 players, game consoles, smart phones, etc. A GUI is a user interface that allows users to interact with various electronic devices using icons and other visual indicators. Graphical user interfaces were created because command line interfaces were quite complex and difficult to learn all their commands.

- Xerox systems, Altus and STAR, introduced the mouse and **point** and **select** as the primary **mode of human-computer communication**.
- The user simply pointed at the **screen and used** the mouse as an intermediary.

Elements in Graphical User Interface: Window: This is the element that displays the information on the screen. It is very easy to manipulate a window. It can be opened or closed with the click of an icon. Moreover, it can be moved to any area by dragging it around. In a multitasking environment, multiple windows can be open at the same time, all of them performing different tasks.

Menu: A menu contains a list a choices and it allows users to select one from them. A menu bar is displayed horizontally across the screen such as pull down menu. When any option is clicked in this menu, then the pull down menu appears.

Icons: Files, programs, web pages etc. can be represented using a small picture in a graphical user interface. This picture is known as an icon. Using an icon is a fast way to open documents, run programs etc. because clicking on them yields instant access.

Controls: Information in an application can be directly read or influences using the graphical control elements. These are also known as widgets. Normally, widgets are used to display lists of similar items, navigate the system using links, tabs etc.

Tabs: A tab is associated with a view pane. It usually contains a text label or a graphical icon. Tabs are sometimes related to widgets and multiple tabs allow users to switch between different widgets. Tabs are used in various web browsers such as Internet Explorer, Firefox, Opera, and Safari etc.

A brief history of screen design:

Although developers have designed screens since the electron beam tube screen was first connected to a computer, there is an increasingly widespread interest in implementing good design the principles of screens only began to appear in the early 1970s when IBM introduced its 3270 CRT text-based terminal.

The screen of the 1970s often resembled the one in the picture. It usually consisted of many fields (more than described here) of very mysterious and often incomprehensible subtitles.

TDX95210		THE CAR RENTAL COMPANY			10/11/16 10:25	
NAME		TEL			RO	
PUD		RD	C	RT	MPD	
ENTRY ERROR		XX465628996Q.997				
COMMAND		→				

It was visually cluttered, and often possessed a command field that challenged the user to remember what had to be keyed into it.

Ambiguous messages often required referral to a manual to interpret.

Effectively using this kind of screen required a great deal of practice and patience.

Most early screens were monochromatic, typically presenting green text on black backgrounds.

At the turn of the decade guidelines for text-based screen design were finally made widely available and many screens began to take on a much less cluttered look through concepts such as grouping and alignment of elements, as illustrated in Figure.

User memory was supported by providing clear and meaningful field captions and by listing commands on the screen, and enabling them to be applied, through function keys. Messages also became clearer.

Not all 1980s screens looked like this, however. In the 1980s, 1970s-type screens were still being designed, and many still reside in systems today.

```

                                THE CAR RENTAL COMPANY
RENTER»
    Name: _____
    Telephone: _____
LOCATION»
    Office: _____
    Pick-up Date: _____
    Return Date: _____
AUTOMOBIL»
    Class: _____(PR. ST. FU. MD. CO. SC)
    Rate: _____
    Miles per Day: _____
The maximum allowed miles per day is 150.
Enter FI-Help F3-Exit F12=Cancel
```

Screen design reached yet another significant turning point with the introduction of graphics, as shown in the top figure.

- Although many fundamental "design principles remained unchanged," functions keys were replaced with buttons and menus for executing instructions, and borders were added to groups and alignment, for example, to visually improve them.

THE CAR RENTAL COMPANY

RENTER

Name:

Telephone:


LOCATION


Office:


Pick-up Date:

Return Date:

AUTOMOBILE

Class: 

Rate: 

Miles Per Day: 

There were also several other font styles, line thicknesses, and colour options available for the components.

- ✓ Many other types of controls were added to the entry field, such as list boxes, drop-down combination boxes, spin boxes, and so on.
- ✓ These new controls were much more successful in assisting with recall because they only required selection from a list rather than a key entry that had to be remembered.

- ✓ One of the new listing controls took the place of the completion aids on displays. Because far more powerful computers could display a new screen more quickly, screens could also be made simpler.

The Graphical User Interface:

An interface is a collection of methods and approaches used to communicate with an object.

One type of pointing device is the main means of interaction in a graphical interface.

This gadget is the human hand's electrical counterpart. An assembly of components known as objects is what the user interacts with.

They are sensed in many ways, such as hearing, touching, or seeing.

Items are utilized to carry out tasks and are always visible to the user.

One interacts with them as separate entities from all other items.

Individuals carry out activities, or operations, on things.

By pointing, choosing, and manipulating items, one may access and alter them.

Everything has a consistent outcome behaviors.

The Popularity of graphics:

The screen was graphical and had nothing in common with its predecessors that were text-based.

- A one-dimensional text-based screen from earlier times
- Graphic displays appeared to be three-dimensional.
- When pressed, controls seemed to rise above the screen and move.
- Data may show up and go as required.
- Graphical representations known as icons may be used in place of text.
- These icons might be used to represent things or activities.
- More advanced text entry fields with dropdown menus or connected radio buttons coexisted alongside selection fields like radio buttons, check boxes, list boxes, and palettes.

- Pointing methods were used to choose actions and objects.
- Enhanced computing capability.
- Reactions to user activities should be prompt, dynamic, and significant.
- Windows, menus, icons, and pointers comprise the WIMP interface.
- Compared to other presentation techniques, graphic presentation is far more successful.
- When utilized appropriately, it lessens the need for rearranging and recoding perceptual and mental data, as well as memory burdens.
- It allows for more visual comparisons of quantities, patterns, or relationships; more condensed representation of information.

Graphical System advantages and disadvantages:

- Lower the amount of RAM used.
- Make better use of the facts at hand;
- Significantly lower system learning needs.
- Experience suggests that a large number of people have engaged in all of these activities.

Advantages:

- Symbols recognized faster than text
- Faster learning
- Faster use and problem solving
- Easier remembering
- More natural
- Exploits visual/spatial cues
- Fosters more concrete thinking
- Provides context
- Fewer errors
- Increased feeling of control

Disadvantages:

- Greater design complexity.
- Learning still necessary
- Replaces national languages
- Easily augmented with text displays
- Smooth transition from command language system
- Lack of experimentally derived design guidelines
- use a pointing device may also have to be learned
- Working domain is the present
- Human comprehension limitations
- Window manipulation requirements

Concept of direct manipulation:

It is said that the system is an expansion of the actual world: It is considered that an individual already has a basic understanding of the things and activities in their surroundings of interest.

All that the system does is copy them and present them on the screen, which is a separate media.

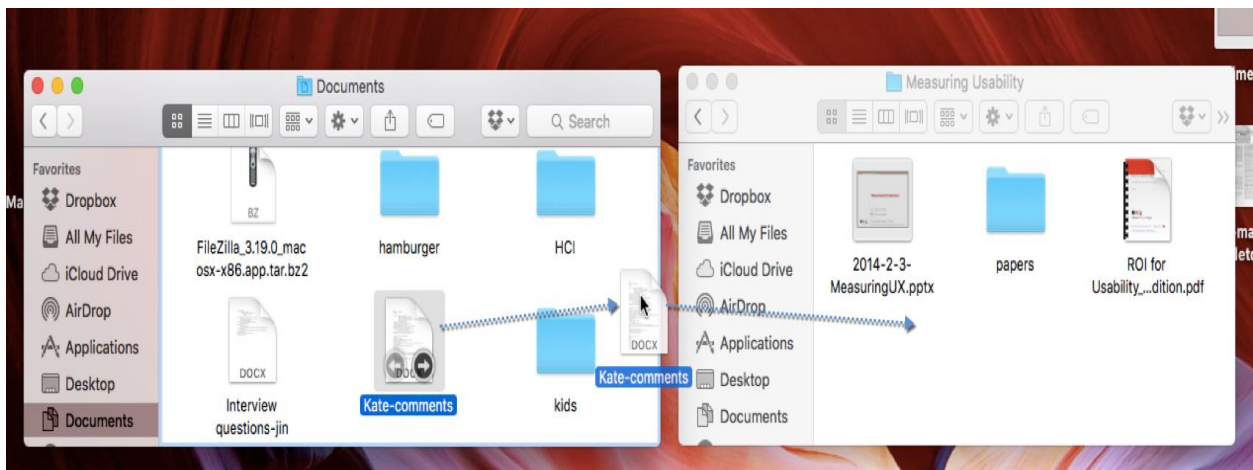
These objects among them windows are subject to access and modification by an individual.

One is permitted to operate in an accustomed setting and manner, concentrating on the data rather than the programmed or equipment.

Direct manipulation (DM) is a type of interaction where users physically move, incrementally move, and reversibly move items of interest on the screen, and the repercussions of their actions are instantly evident.

The phrase "direct manipulation" was initially used by Ben Shneiderman in the early 1980s, when the command line was the most common method of contact. When using command-line interfaces, the user has to remember the system label

for the action they want to do and enter it together with the names of the objects they want to perform.



Characteristics of direct manipulation:

Continuous representation of the object of interest- Users can see visual representations of the objects that they can interact with. As soon as they perform an action, they can see its effects on the state of the system. For example, when moving a file using drag-and-drop, users can see the initial file displayed in the source folder, select it, and, as soon as the action was completed, they can see it disappear from the source and appear in the destination an immediate confirmation that their action had the intended result.

Physical actions instead of complex syntax. Actions are invoked physically via clicks, button presses, menu selections, and touch gestures. In the move-file example, drag-and-drop has a direct analog in the real world, so this implementation for the move action has the right signifiers and can be easily learned and remembered. In contrast, the command-line interface requires users to recall not only the name of the command (“mv”), but also the names of the objects involved (files and paths to the source and destination folders).

Important of direct manipulation:

Encourage human like interactions: It may be challenging for human users to use technology if UX designers didn't incorporate human-computer interaction in their work. The goal of the discipline of human-computer interaction is to provide users with the most personalized technological experience possible. Users can

interact with an interface in familiar and personalized ways by entering instructions into a computer.

Contributes to UX design:

Since human-computer interaction paved the way for the creation of UX design, it is significant. Even though UX design came before human-computer interaction, the two are nonetheless distinct and significant. Human-computer interaction practitioners typically take a more scholarly stance. They make use of it for both practical understandings of computer users and scientific study. Within their business, UX designers often employ this method to create digital goods or services.

The Web User Interface:

The expansion of the World Wide Web since the early 1990s has been truly amazing.

Once simply a communication medium for scientists and researchers, its many and pervasive tentacles have spread deeply into businesses, organizations, and homes around the world.

Unlike earlier text-based and GUI systems that were developed and nurtured in an organization's Data Processing and Information Systems groups, the Web's roots were sown in a market-driven society thirsting for convenience and information.

Web interface design is essentially the design of navigation and the presentation of information.

It is about content, not data. 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.

Hypertext:

Hypertext is text displayed on a computer display or other electronic devices with references (hyperlinks) to other text that the reader can immediately access.

Hypertext documents are interconnected by hyperlinks, which are typically activated by a mouse click, key press set, or screen touch.

Regular text:

- Simple footnotes or margin notes, which can be rendered as pop-up overlays
- Images which act as single characters and which can be vertically aligned relative to the text line in which they are embedded
- Hypertext Links based on the URL or URN notations
- Markup signifying the start and end of change bars. You can also mark text as being removed or added, as is common in legal documents
- Conditional text which appears only on-line or only when printed
- Input fields when the paragraph is part of a form
- Explicit line breaks

Component of hyper text:

Nodes: Hyper text some time called a network of node. A node is a collection of data organized around a specific topic.

Link: HTML links are hyperlinks. You can click on a link and jump to another document. When you move the mouse over a link, the mouse arrow will turn into a little hand. Note: A link does not have to be text. A link can be an image or any other HTML element.

Button: The <button> tag defines a clickable button. Inside a <button> element you can put text (and tags like <i> , , ,
 , , etc.). That is not possible with a button created with the <input> element!

Editor: Web pages can be created and modified by using professional HTML editors.

However, for learning HTML we recommend a simple text editor like Notepad (PC) or Text Edit (Mac).

We believe that using a simple text editor is a good way to learn HTML.

Follow the steps below to create your first web page with Notepad or Text Edit.

Menu in GUI application:

Drawback: You often can't go to the exact place you want right at the start. You have to work your way through the menu screens even if you know where you want to get to.

Benefits: Step-by-step options are given so that the user doesn't have to remember anything.

Effect in screen design in GUI: screen design has a particularly important role in the areas of usability, user experience and interaction between man and machine. Screen design can significantly impact the conversions of a website or an app.

Effect in interface design in GUI: The best interfaces are almost invisible to the user. They avoid unnecessary elements and are clear in the language they use on labels and in messaging. Create consistency and use common UI elements. By using common elements in your UI, users feel more comfortable and are able to get things done more quickly.