UNIT-6
User Interfaces

Multimedia user interfaces are computer interfaces that communicate with users using multiple media. Media determines how and how well human-interaction occurs.

⊛. General Design Issues:

From point 1 to 5 all are design issues write all upto 5 in short if asked for 10 marks.

The general issues to be considered are:

→To determine appropriate information content to be communicated.
→To represent essential characteristics of information.
→To represent the communication intent.
→To choose the proper media for information presentation.
→To coordinate different media and assembling techniques within a presentation.
→To provide interactive exploration of the information presented.

1). Architectural Issues:

An effective presentation design process should not only involve sequential flow of actions, but also parallel and interactive actions. This means that there is a requirement for extensive feedback going on between the components making decisions about medias and modalities. Additionally, the design includes a number of higher-level concerns, such as goals and focus of the dialogue, the users context and current task, and media selection to represent the information in a way that corresponds to these concerns.

2). Information Characteristics for Presentation:

A complete set of information characteristics makes knowledge definition and representation easier because it allows for appropriate mapping between information and presentation techniques. The information characteristics specify:

1) Types: Characterization schemes are based on ordering information. There are two types of ordered data: first one is coordinates versus amount, which signify points in time, space or other domains; second one is intervals versus ratio, which suggests types of comparisions meaningful among elements of coordinate and amount of data types.

2) Relational Characters: This group of characteristics refers to the way in which a relation maps among its domain sets. There are functional dependencies (sets) and non-functional dependencies (sets).

3) Multi-domain Relations: Relations can be considered across multiple domains, such as: multiple attributes of a single object set (e.g, positions, colors, shapes); multiple object sets (e.g, a cluster of text and graphical symbols on map); and multiple displays.

4) Large Data Sets: Large data sets refer to numerous attributes of collections of heterogeneous objects (e.g, presentation of semantic networks).

3) Presentation Function:

Presentation function is a program which displays an object (e.g, printf for display of a character). It is important to specify the presentation function independent from presentation form, style or the information it conveys. Several approaches consider the presentation function from different points of view. For example, one approach views the presentation function as a set of information-seeking goals, an-other approach considers it as a hierarchical representation of media-independent presentation goals.

4) Presentation Design Knowledge:

To design a presentation, issues like content selection, media selection, and presentation coordination must be considered.

→ Content selection is the key to convey the information to the user. However, we are not free in the selection of it because content can be influenced by constraints like size and complexity, the quantity of information, limitations of display hardware etc.

→ Media selection determines the information characteristics partly. Media must be choosen to be "adequate". For example, to present a course on how to play tennis, graphics and video are more suitable than text only.

→ Coordination can be viewed as a process of composition. It requires mechanisms such as: encoding techniques, presentation objects that represent facts, and multiple displays.

5) Effective Human-Computer Interaction:

One of the most important issues regarding multimedia interfaces is effective human-computer interaction of the user i.e, user-friendliness.

Here, the main issues the user interface designer should keep in mind are:

i) Context.

ii) Linkage to the world beyond the presentation display.

iii) Evaluation of interface with respect to other human-computer interfaces.

iv) Interactive capabilities.

v) Separability of the user interface from the application.

⊛. Classification of Software:

1) System Software: System software directly interacts with computer hardware. It is primarily concerned with the efficient management of computer system. It is machine dependent and is used to develop new system programs. The system software is classified into three categories:

→ The operating system, which acts as an interface between the user and the hardware and provides different services to users.

→ The system support software, which manages the hardware more efficiently.

→ The system development software, which supports programming development to the user.

2) Application Software: It is designed to solve user problems as per the user's requirements. Application software can be generic or customized. Application software is classified into two categories:

→ General purpose software, which is used for much number of tasks and provides many features.

→ Special purpose software, which is designed for a specific purpose only.

The focus of application software is on the application not on the computer system. It is primarly concerned with the solution of some problems using the computer as a tool.

⊛. Audio and Video at User Interface:

Continuous stream audio and video play is a significant role in multimedia. The main issue during the presentation of continuous media streams is the continuity in time. Hence, time is a new presentation dimension in a user interface.

1) Audio at user interface:

Audio can be implemented at the user interface for application control. Thus, speech analysis is necessary.

i) **Speech Analysis:** Speech analysis is basically of two types:

Speaker-dependent analysis → It allows the input of approximately 25,000 different words with a relatively low error rate. In this analysis training of the system is needed.

Speaker-independent analysis → It is less advanced than that of speaker-dependent system in a sense that it can only recognize only few limited words. In this analysis training of system is not needed.

ii) **Dimension of Space:**

Monophony → All audio sources have the same spatial location.
Sterophony → Allows bilateral listening to hear low intensity sounds.
Quadrophony → Concept of two or more separate channels.

iii) **Audio Windows:**

→ Audio windows as the graphical representation of audio locations.
→ One audio window per audio source.
→ Changing the position of the audio windows on the desktop changes the location of the audio source.

2) Video at user interface:

A continious sequence of at least 15 individual images per second gives a rough perception of a continuous motion picture. At the user interface, video is implemented through a continuous sequence of individual images. Hence, video can be manupulated at this interface similar to manupulation of individual still images. An example of a user interface for manupulating images is the software package xv, developed by John Bradely.

⊛. User-Friendliness as the Primary Goal:

User-friendliness is the main property of a good user interface. As an example, we can compare a multimedia-integrated telephone service with an ISDN telephone service. The design of a user-friendly graphical interface requires the consideration of many conditions, and criteria:

1) **Easy to learn instructions:** Multimedia User Interface (MUI) for being a user-friendly it should posses a property that the user can easily remember the application instruction rules. Any of MUI having easy and simple instruction helps user to interact with computers without any complications. In order to maintain the friendliness, the interface should have those instruction that are simpler and easier.

2) **Presentation:** It is another criteria that leads to user-friendliness. In general presentation can have following variants:
   - → Abbreviated text
   - → Full text.
   - → Icons i.e, graphics
   - → Micons i.e, motion videos.

   Each variants of presentation may or may not be easily understood to the user. Example: Call Waiting may be easy to understand to some user but not at all.

3) **Dialogue Boxes:** The dialogue boxes being display with options like ok and abort should always have a strict rule to place them at a specific part of dialogue box. For Example: While multiple dialogue box are displayed then the button ok of entire dialogue boxes should be at same position like the underlying dialogue box should have the same positioning of options as of surface/displayed one.

4) Additional Design Criteria: For being user friendly interface it is important that certain additional design be included which would be helpful to user while interacting.

→ The cursor acting as a rotating fish instead of being steady while a task is at progress.

→ An entry being highlighted while being selected.

→ The details of any image, video, audio being displayed as a cursor stays on it for a while.

5) Design Specific Criteria:

Along with additional design criteria, design specific criteria may increase the interaction between MUI and user. The telephone network service is its example specifying the following characteristics:

→ The end device must have the basic function of dialing a number.

→ Ongoing tasks should be signaled.

→ The telephone device must always be operational.

→ When a call request arrives, it must be immediately signaled. (e.g, ringing).