

## Unit 6

### User Interfaces

#### *Discussion Topics*

- General issues in Multimedia UI Design Issues
- Video and Audio at the User Interface
- User- friendliness as the Primary Goal

## *What is multimedia user interface?*

- Multimedia user interfaces (MUI) are computer interfaces that communicate with users using multiple media, sometimes multiple modes such as writing text together with spoken language.
- Multimedia would be of without any value if application did not use the various media at the UI for the input and output.
- Media determine not only “how human-computer interaction occurs” but also “how well”
- In the early days of computers, text was the only medium for interaction with computers but now UI with mouse have greatly simplified human-computer interaction.

## **Problems(limitations) in user interfaces**

- Despite the great advances in Uis, there are still some problems with current technology:

### *i. Computer interaction*

- Speaking is more suitable and faster than writing but this form of interaction is still in underdeveloped form.

### *ii.Specification of object movement:*

- A specification of movements using graphics or text is difficult and complicated than using motion video. For example consider an electronic text book about tennis game. In this case, any information can be presented more easily using motion video than images or text.

## *General design issues*

- The main emphasis in the design of MUI is multimedia presentation. For this, there are several issues which must be considered:

### **1. Architectural issues:**

- An effective presentation design process should involve sequential flow of actions as well as parallel and interactive actions.

### **2. Information characteristics for presentation**

- How to represent the essential characteristics of the information?
- 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 the types, relational structure, multi-domain relations etc.

### **3. Specification of presentation function**

- Presentation function is a program which displays an object(e.g. printf in C to display a character).
- The presentation function should be specified independent from presentation form, style or information it conveys.

### **4. Presentation design**

- To design a presentation, following issues must be considered:
  - Content selection: to determine the appropriate information content to be communicated.
  - Media selection: To choose the proper media for information presentation
  - Coordination: To coordinate different media and assembling techniques within a presentation

### **5. Effective Human-computer interaction:**

- This one of the most important issue regarding multimedia interface.
- Also called user-friendliness.

## *Video at the User Interface*

- A continuous sequence of images gives a perception of continuous motion. At the user interface, video is implemented through a continuous sequence of individual images. Hence video can be manipulated at this interface similar to manipulation of still images.
- There are softwares with UI for manipulating images.
- Since images can be presented and modified, this should also be possible for video.
- But the functionalities for video are not simple to deliver because of high data transfer rate necessary.

## *Audio at the user interface*

- Audio can be implemented at the UI for application control.
- For this speech analysis is necessary.
- To recognize words in the speech the system can be trained(machine learning).
- If training is not possible then the system can be fed with limited set of words. This will recognize only few words
- During audio output, we can make a good sound effect by using different techniques such as stereo, woofer etc. In both of these systems, an additional space dimension is introduced using two or more separate channels to give a natural distribution of sound.
- In a window system, a user can position a separate window for audio on the screen for independent control of audio.

## *User-friendliness as the primary goal*

- User-friendliness is the main property of a good user interface.
- A user-friendly UI facilitates better human-computer interaction.
- The design of a user-friendly graphical interface requires the consideration of many conditions (criteria).
- Different applications have different user-friendliness requirements.
- Following are some requirements for UI user-friendliness.

### **1. easy to Learn**

- Application instructions must be easy to learn.
- E.g. the old phones required almost no time to learn but new smartphones require some time to learn how to make a call.
- The easily learnable interface is achieved through homogeneous design of different applications provided by a window system.

### **2. Context-sensitive help functions**

- A context-sensitive help function is very useful.
- CS help means- displaying different help texts are displayed according to the state of the application.
- E.g. after selecting call-forward in smartphone, the help function should provide a brief explanation of call forward.

### **3. Easy to remember application instruction rules**

- A user-friendly interface must also have the property that the user easily remembers the application instruction rules.
- This can be achieved by considering what user already knows and what user's background is.
- E.g. the interface of a spreadsheet application should be based on what users did in the paper-based system. This makes users easy to remember the application functions.

#### **4. Effective use of application**

- The UI should enable effective use of application.
- This means:
  - Logically connected functions should be presented together and similarly.
  - Use of graphical symbols rather than just buttons with text only. This triggers fast recognition.
  - Actions should be activated quickly
  - Configuration of UI should be usable by different kinds of users (laypersons and professionals)

#### **5. Aesthetics**

- Aesthetics means beauty (the good look) of UI
- This is the first and lasting impression for the user.
- The various factors related to aesthetics are: color combination, character sets, resolution and form of window.

#### **6. Meaningful location of function**

- Individual functions must be placed together in a meaningful fashion.
- This is done by alphabetic ordering or logical grouping.

#### **7. Dialogue boxes**

- Different dialogue boxes should have a similar construction
- This also applies to the buttons also
- Semantically similar entry functions should be located in one dialogue box instead of several dialogue boxes.

## UI Design

- We saw that user-friendliness is the most important goal in UI design. i.e. UI is highly user-oriented.
- User interfaces should be designed to match the skills, experience and expectations of its anticipated users.
- System users often judge a system by its interface rather than its functionality.
- A poorly designed interface can cause a user to make catastrophic errors.
- Poor user interface design is the reason why so many software systems are never used.

## Human factors in interface design

- *Limited short-term memory*
  - People can instantaneously remember about 7 items of information. If you present more than this, they are more liable to make mistakes.
- *People make mistakes*
  - When people make mistakes and systems go wrong, inappropriate alarms and messages can increase stress and hence the likelihood of more mistakes.
- *Each person is different*
  - People have a wide range of physical capabilities. Designers should not just design for their own capabilities.
- *People have different interaction preferences*
  - Some like pictures, some like text

## *UI design principles*

- UI design must take account of the needs, experience and capabilities of the system users.
- Designers should be aware of people's physical and mental limitations (e.g. limited short-term memory) and should recognize that people make mistakes.
- UI design principles underlie interface designs although not all principles are applicable to all designs.

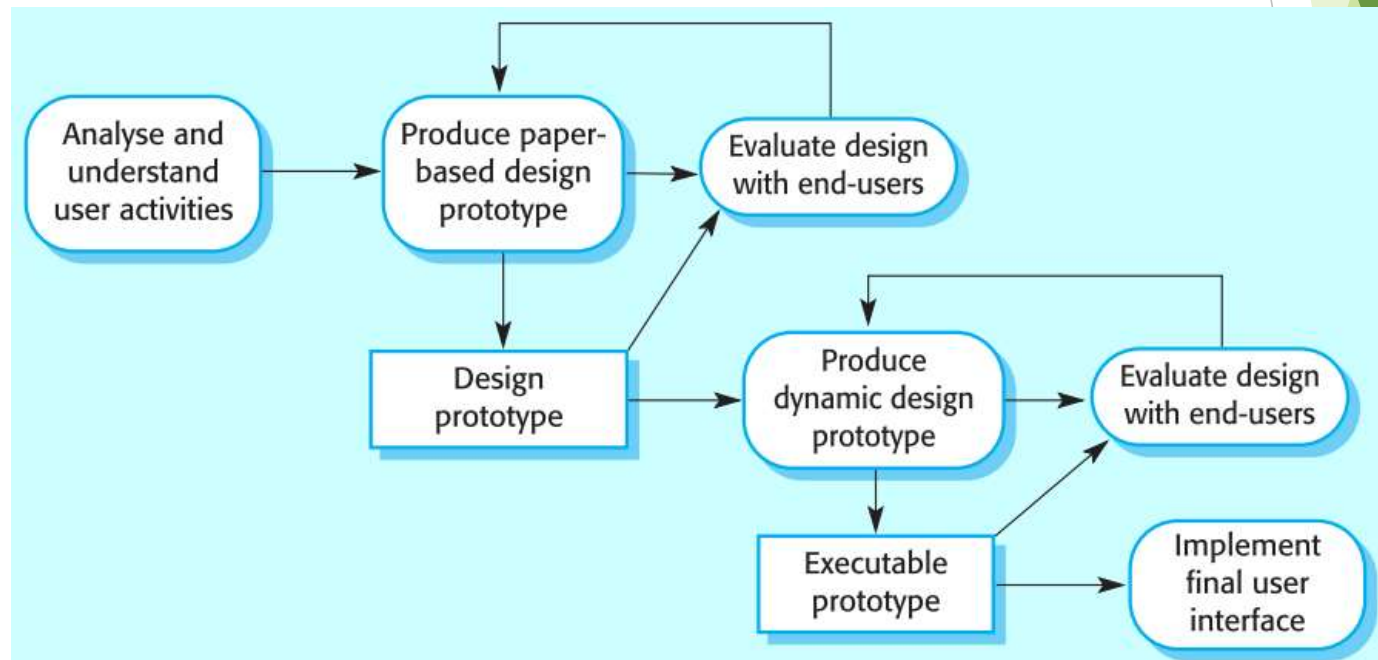


# User interface design principles

Principle	Description
User familiarity	The interface should use terms and concepts which are drawn from the experience of the people who will make most use of the system.
Consistency	The interface should be consistent in that, wherever possible, comparable operations should be activated in the same way.
Minimal surprise	Users should never be surprised by the behaviour of a system.
Recoverability	The interface should include mechanisms to allow users to recover from errors.
User guidance	The interface should provide meaningful feedback when errors occur and provide context-sensitive user help facilities.
User diversity	The interface should provide appropriate interaction facilities for different types of system user.

## The UI design/development process

- UI design is an iterative process involving close liaisons between users and designers.
- Because UI is highly user-oriented, the **prototyping method** is best suited for UI development.
- The 3 core activities in this process are:
  1. *User/requirement analysis*: Understand what the users want and will do with the system;
  2. *System prototyping*: Develop a series of working models (prototypes) for experiment;
  3. *Interface evaluation*. Experiment with the prototypes with users and improve the prototypes.



## 1. User analysis

- If we don't understand what the users want and will do with a system, we can not design a realistic and effective interface.
- Some Analysis techniques
  - ❖ Task analysis: Model the steps involved in completing a task.
  - ❖ Interviewing and questionnaires: Ask the users about the work they do and what they would like in the system.
  - ❖ Ethnography: Observe the user at work.

## 2. User interface prototyping

- Prototyping is the process of designing an early model (with limited features).
- The aim of prototyping is to allow users to gain direct experience with the interface.
- Without such direct experience, it is impossible to judge the usability of an interface.

- Prototyping can be a two-stage process:
  - Early in the process, paper prototypes may be used;
  - The design is then refined and increasingly sophisticated automated prototypes are then developed

## 3. Evaluation and refinement

- Evaluation of a user interface design should be carried out to assess its suitability.
- It is essentially a testing process where the UI is tested against user requirements specification.
- Evaluation is mainly done by involving users and taking their feedback.
- Based on the evaluation, the prototype is refined and improved.

**End of unit 6**  
**Thank you!**