

User Interface Design

Lecture #4

Part-A

Agenda

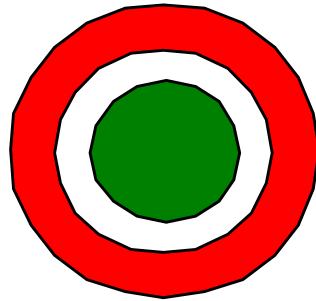
- Principles on User Interface Design
 - **Principle 1: Recognize the Diversity**
 - Usage Profiles
 - Task Profiles
 - Interaction styles
 - Principle 2: Eight Golden Rules
 - Principle 3: Prevent Errors

Principle 1: Recognize the Diversity

- Designer to deal with several community of users for a system
- No single design, in fact, can satisfy all users and situations
- Designer faces real challenges to cater the need of each community

Principle 1: Recognize the Diversity

- User interface designers must make the characterization of the users and the situations as precise and complete as far as possible
- Following are the three important characterizations
 - User profiles
 - Task profiles
 - Interaction styles



Recognize the Diversity: **User Profiles**

- Objective: “Know thy users”
- User profiles varies as
 - Age, Gender, Physical abilities, Education, Cultural or ethnic background, Training, Motivation, Goals and Personality
- Getting to know the users is never ending process because there is so much to know and because the users keep changing

Recognize the Diversity: User Profiles

A generic separation of users (three profiles)

1. Novice or first time users
 - Know nothing of the task or interface concepts
 - Often anxious about the computer and its functionality
2. Knowledgeable or intermittent users
 - They have stable task concepts and broad intercept concepts
3. Expert frequent users
 - Thoroughly familiar with the task and interface concepts and seek to get their work done quickly

User Profiles: **Novice Users**

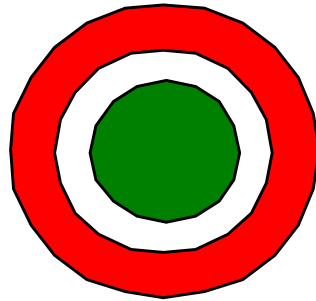
- Restricting vocabulary to a small number of familiar, consistently used concept terms
- The number of actions should also be small
- Informative feedback about the accomplishment of each task is helpful
- Constructive, specific error messages should be provided when users make mistakes
- Carefully designed paper manuals and step-by-step online tutorials may be effective

User Profiles: **Knowledgeable Intermittent Users**

- Have difficulty to retaining the structures of menus, syntaxes etc. To reduce the memory load
 - Orderly structure the menus, consistent terminologies, high interface apparency, which emphasizes **recognition rather than recall**
 - Consistent sequence of actions, meaningful messages, guides to frequent patterns of usage
 - Online help screens to fill in missing pieces of task or interface knowledge
 - Well-organized reference manuals also will be useful

User Profiles: **Expert Frequent Users**

- Expert “Power” users demand
 - Get their work done quickly
 - Rapid response time
 - Brief and non-distracting feedback
 - The capability to carry out actions with just a few keystrokes or selections
 - Strings of commands, shortcut through menus, abbreviations and other accelerators

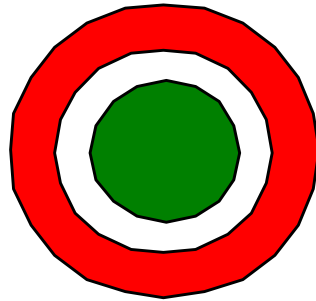


Recognizing the Diversity: Task Profiles

- Task analysis is an important issue in UID
- A proper task hierarchy is essential for good design
 - Decomposing a high-level task action into atomic actions (that the user executes with a single command, menu selection etc.)
 - Choosing the most appropriate set of atomic actions is a challenging problem to the designer
 - Too small atomic actions → the user will become frustrated by the large number of actions necessary to accomplish a higher level task
 - Too large atomic actions → the user will need many such actions with special options or they will not be able to get exactly what they want from the system

Recognizing the Diversity: Task Profiles

- Desirable: Task may be analyzed on certain important parameters
 - Frequently performed task should be simple and quick to carry out
 - Might be performed by special keys
 - Intermittent frequent actions
 - Might be performed by a single letter plus CTRL, or by a selection from a pull-down menu
 - Infrequent actions
 - Might be required going through a sequence of [menu selection](#) or [form fill-in](#) etc.



Recognizing the Diversity: **Interaction Styles**

- Five classic interaction styles are known to cater the need of varieties of user
 - Direct Manipulation
 - Menu selection
 - Form fill-in
 - Command language
 - Natural language

Interaction Styles: **Direct Manipulation**

- Direct manipulation involves **three** interrelated techniques
 1. Provide a physically direct way to moving a cursor or manipulating the object of interest
 2. Present a concrete visual representations of objects of interest and immediately change the view to reflect operations
 3. Avoid using a command language and depends on applied to the cognitive model which is shown on the display

Interaction Styles: **Direct Manipulation**

- Direct manipulation (DM) permits novice users access to powerful facilities without the burden of learning to use a complex syntax and lengthy list of commands
- DM is easy to remember for intermittent users
- DM can be rapid for frequent users
- DM is the one of the most elegant interaction styles that suit with most if the user types

Applications of
Direct Manipulation
is an important topics and will be
discussed in details later on

Interaction Styles: Menu Selection

- In menu selection based interface design, users read a list of items, select the most appropriate to their task and get their work done
- The terminology and meaning of the items should be simple and consistent so that user can accomplish their task with
 - Little learning
 - Little memorization
 - Just a few stroke of actions

Interaction Styles: Menu Selection

- Advantages:
 - There is a clear structures to decision making, since all possible choices are presented at one time
 - This interaction styles is appropriate for
 - Novice and first-time users
 - Knowledgeable and intermittent users
 - Can be appealing to expert frequent users if the display and selection mechanism's are rapid

Interaction Styles: **Form Fill-in**

- For certain applications (such as data entry, web interface etc.) form fill-in is an appropriate interaction style
- With this style users see
 - Display of several fields
 - Move cursor among the fields
 - Type data onto the field or select from the set by scrolling
- Very suitable for dealing with errors (such as entry of invalid data)
- No prior experience is required hence suitable for novice users
- Also most appropriate knowledgeable intermittent as well as frequent users

Interaction Styles: **Form Fill-in**

- No users will mind if this interaction style is in the interface but will feel inadequacy if it is not there

Interaction Styles: **Command Language**

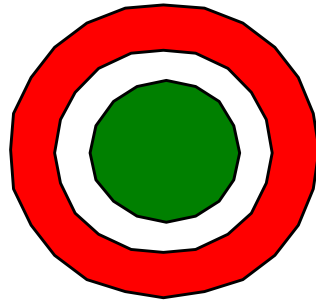
- A set of instructions at higher level (such as query language)
- For frequent users this interaction style provides a strong intuition
- However, error rates are typically high and retention may be poor
- Error messages and online help are hard to provide because of the diversity of possibility of mapping from task to interface concepts

Interaction Styles: **Natural Language**

- Most sophisticated interaction style with which machines accept natural language
- Computers responds to commands that users issue by speaking (sonification) or typing (in common language)
- Users don't have to learn command, syntax, menus etc.

Interaction Styles: **Natural Language**

- Novice and intermittent users feel happy with this style
- Frequent users can enjoy maximum throughput by posing the input clever ways
- Most suitable in
 - Natural language queries
 - Text-database searching
 - Natural language text generation (e.g. preparation of report etc.)



Recommended Materials

- My Home page

<http://www.facweb.iitkgp.ernet.in/~dsamanta>

(For the presentation slides of the current lecture)

- Book

*Designing the User Interface: Strategies for
Effective Human-Computer Interaction (3rd Ed.)*

Ben Shneiderman, Pearson Education, New Delhi,
2004

