

Introduction to Software Engineering

- User Interface Design
- ESE 8.3

The UI design process

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- UI design is an iterative process involving close liaisons between users and designers.

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- The 3 core activities in this process are: — User analysis. Understand what the users will do with the system; — System prototyping. Develop a series of prototypes for experiment; — Interface evaluation. Experiment with these prototypes with users.
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The design process

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Interface Design Models

Four different models occur in HCI design:

1.
 - The design model expresses the software design.
2.
 - The user model describes the profile of the end users. (i.e., novices vs. experts, cultural background, etc.)
3.
 - The user's model is the end users' perception of the system.
4.
 - The system image is the external manifestation of the system (look and feel + documentation etc.)
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User Interface Design Principles

- Principle
- Description
- User familiarity
- Use terms and concepts familiar to the user.
- Consistency
- Comparable operations should be activated in the same way. Commands and menus should have the same format, etc.
- Minimal surprise
- If a command operates in a known way, the user should be able to predict the operation of comparable commands.
- Feedback
- Provide the user with visual and auditory feedback, maintaining two-way communication.
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GUI Characteristics

- Characteristic
- Description
- Windows
- Multiple windows allow different information to be displayed simultaneously on the user's screen.

- Icons
- Usually icons represent files (including folders and applications), but they may also stand for processes (e.g., printer drivers).
- Menus
- Menus bundle and organize commands (eliminating the need for a command language).
- Pointing
- A pointing device such as a mouse is used for command choices from a menu or indicating items of interest in a window.
- Graphics
- Graphical elements can be commands on the same display.
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GUIs

Advantages

- They are easy to learn and use. — Users without experience can learn to use the system quickly.
- The user may switch attention between tasks and applications.
- Fast, full-screen interaction is possible with immediate access to the entire screen

Problems

- A GUI is not automatically a good interface — Many software systems are never used due to poor UI design — A poorly designed UI can cause a user to make catastrophic errors
- ESE 8.11

Direct Manipulation

Advantages

- Users feel in control and are less likely to be intimidated by the system
- User learning time is relatively short
- Users get immediate feedback on their actions
- mistakes can be quickly detected and corrected

Problems

- Finding the right user metaphor may be difficult
- It can be hard to navigate efficiently in a large information space.
- It can be complex to program and demanding to execute
- ESE 8.12

Menu Systems

- Advantages > Users don't need to remember command names > Typing effort is minimal > User errors are trapped by the interface > Context-dependent help can be provided (based on the current menu selection) Problems > Actions involving logical conjunction (and) or disjunction (or) are awkward to represent > If there are many choices, some menu structuring facility must be used > Experienced users find menus slower than command language
- ESE 8.13

Menu Structuring

Scrolling menus

- The menu can be scrolled to reveal additional choices
- Not practical if there is a very large number of choices

Hierarchical menus

- Selecting a menu item causes the menu to be replaced by a sub-menu

Walking menus

- A menu selection causes another menu to be revealed

Associated control panels

- When a menu item is selected, a control panel pops-up with further options