Software Engineering

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User Interface Design and System Design

Chapter 6

Introduction

- The user interface (UI) is the system which helps users communicate with the computer system and/or the application system.

- UI Consists of all the hardware, software, screens, menus, functions, and features that affect two-way communications between the user and the computer.

- A good user interface provides a unifying structure for finding, viewing and invoking the different components of a system.

Evolution of the User Interface

- In older systems, analysts designed all the printed and screen output first, then worked on the inputs necessary to produce the results.

- In older systems, interface mainly consisted of process-control screens that allowed the users to send commands to a system.

- A process control screen (also known as a dialog screen) is part of the user interface, and enables a user to initiate or control system actions.

- A process-control screens worked with traditional systems that simply transformed input data into structured output.

Evolution of the User Interface

- In modern systems, the main focus is on users within and outside the company, how they communicate with the information system, and how the system supports the firm's business operations.

- In modern systems, most users work with varied mix of input, screen output, and data queries.

- To perform users day-to-day job, the user interface is a vital element in the systems design phase.

4

Human-Computer Interaction

- A user interface is based on the basic principles of human-computer interaction.

- Human-computer interaction (HCI) describes the relationship between computers and people who use them to perform business-related tasks.

- User interface includes all communications and instructions necessary to enter input to the system and to obtain output in the form of screen displays or printed reports.

- Your main objective is to create a user-friendly design that is easy to learn and use.

Human-Computer Interaction

- IBM expert professors, state that "**in this new computer age, the customer is not only right, the customer has rights**."

- The user rights include

  - **<u>Perspective</u>**: the user is always right.

  - **<u>Installation</u>**: the user has the right to install and uninstall software and hardware systems easily without negative consequences.

  - **<u>Compliance</u>**: the user has the right to a system that performs exactly as promised.

  - **<u>Instruction</u>**: the user has the right to easy-to-use instructions to achieve desired goals and recover efficiently from problem situations.

  - **<u>Control</u>**: the user has the right to be in control of the system.

Human-Computer Interaction

The user rights is also include

- **<u>Feedback</u>**: the user has the right to a system that provides clear, understandable, and accurate information.
- **<u>Dependencies</u>**: the user has the right to be informed clearly about all systems requirements for successfully using software or hardware.
- **<u>Scope</u>**: the user has the right to know the limits of the system's capabilities.
- **<u>Assistance</u>**: the user has the right to communicate with the technology provider and receive a thoughtful and helpful response when raising concerns.
- **<u>Usability</u>**: the user has the right to be the master of software and hardware technology, not vice versa.

User-computer interface design

User Interface design: There are various types of user interface designs, each of which has a typical character and ability.

- The design type is required to be suitable to the system's duties and users who will interact directly with computer.

  - Natural-language interfaces
  - Question-and-answer interfaces
  - A menu interface
  - Form-fill interfaces
  - Command-language interfaces
  - Graphical User Interfaces (GUIs)

Natural language

- Natural-language interfaces permit users to interact with the computer in their everyday or "natural" language.

- Inputs to and outputs from system are in a conventional speaking language like English.

- Based on research in artificial intelligence.

Question-and-answer interfaces

- The computer displays a question for the user on the screen.

- The user enters an answer via the keyboard.

- The computer acts on that input information in a preprogrammed manner.

- New users may find the question-and-answer interface most comfortable.

A Menu Interface

- A menu interface provides an onscreen list of available selections.
- A specific command is invoked by user selection of a menu option. Two common placement methods:
    - Pop-up
    - Drop-down
- A nested menu is a menu which can be reached through another menu. The advantages of nested menus are:
    - Nested menus eliminate menu options which do not interest a user.
    - Nested menus allow users to move quickly through the program.

Guidelines for Menu Design

- **Wording**: meaningful titles, clear command verbs, mixed upper / lower case.

- **Organization**: consistent organizing principle

- Length: all choices fit within screen length.

- **Selection**: consistent, clear and easy selection methods.

- **Highlighting**: only for selected options or unavailable options.

Graphical User Interface (GUI) Menus

- The main menu is always on the screen.

- The main menu uses single words.

- The main menu should have secondary menus grouped into similar features.

- The secondary drop-down menus often consist of more than one word.

- Secondary options perform actions or display additional menu options.

- Menu items in gray are unavailable for the current activity.

Form

Filling in the form is a popular type of dialogue on data and data processing.

- Form-fill interfaces are onscreen forms displaying fields containing data items or parameters that need to be communicated to the user.

- Forms are displayed on the screen similarly to the way tables are arranged. The screen also displays form name, field name and instruction information.

- Form-fill interfaces may be implemented using the Web.

Form

- Advantages of using a Web-based form
  - User enters the data.
  - Data may be entered 24 hours a day, globally.
- Disadvantages of a Web-based form
  - The user may not know what to enter if the form is not clear.
  - User might be nervous about using a credit card over the Internet.

15

Command-Language Interfaces

This is a wide but simple area consisting of both simple commands and grammatically complicated commands.

- Allow the user to control the application with a series of keystrokes, commands, phrases, or some sequence of these

- A command will result in a move of the system when it is entered by the user.

- The most significant advantage of command-language is that its flexibility and limited by the language's grammar only.

- It takes time from users to learn the commands. Users require to have a background knowledge of the system in case there are no information displayed on the screen.

- Command-language asks for great efforts while developing it.

- It is suitable for user who are professional.

Graphical User Interfaces (GUIs)

- GUIs provide a strong metaphor of the application.
- Allow direct manipulation of the graphical representation on the screen.
  - Can be accomplished with keyboard input, joystick, or mouse.
  - Requires more system sophistication than other interfaces.