Interface Architecture and Consistency

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CS 4570 Human-Computer Interfaces

Today -- HCI Architecture, Style, and Consistency

- HCI Architecture
  - Describe the concept
  - Architectural Presentation
    » various types of components
  - Architectural Form
    » how the components relate to each other
    » HCI styles
- Consistency and Orthogonality

HCI Architecture

- What do we mean when we talk about the architecture of a house?
  - Building components
  - style
- What would we mean if we used the term--

The Driver-Car Interface

- What controls must exist and cannot be changed?
- What controls must exist and must be easily located/used by the driver?
- What controls must exist, but the designer can have much freedom in locating and designing the controls?
- What displays must exist and what form should they take?

Back to HCI Architecture

- Architectural Presentation
  - components of the interface (menus, icons, tables, commands, mouse buttons, function keys, keyboard, buttons, etc.)
  - generally divided into objects and operations (nouns and verbs)
- Architectural Form
  - “Style”
  - how the components are inter-related
  - “how things fit together”

Architectural Form (Style)

- Key-modal
  - The user interface is operated mainly with the aid of function keys or an alphanumeric keyboard and has a number of different modes of behavior.
- Direct Manipulation
  - The user interface displays a number of objects on the screen and allows the user to interact with each one independently with the aid of a pointing device.
- Linguistic
  - The user interface consists of a “conversation” between the computer and the user involving a particular language.
Properties of menu-based interaction

- hierarchical structure helps form mental model
- simple interaction
- choices are visible
- Experts dislike them—especially deep menu structures.

Direct Manipulation (1)

- Graphical direct manipulation
  - Natural representation of objects and actions
  - Icons
- Forms fill-in
  - set of text fields that may be selected and modified

Direct Manipulation (2)

- Metaphors
- Requires good mental models
- Graphical representation
- Requires good mappings

Example of Direct Manipulation

Direct Manipulation (3)

- Direct display representation
- User applies actions directly to objects
- The display of the object responds immediately to any change

Direct Manipulation Example

- Differences between older WPs and new WPs
- hybrid (modal/direct manipulation)
- Why do we like the new ones better?
Direct Engagement

- Affective response to good direct manipulation
  - confidence
  - joy
  - challenge
- Feeling of user control (vs. being controlled)

Linguistic Style

- Two types
  - Command-line interaction
  - Text-based natural language
- Involves syntax and semantics
- Names can invoke mental models, e.g., `mv` in UNIX

Consistency

- At almost every turn over the next few weeks, you will receive the advice, “Be consistent.”
- Thought it would be good at this point to talk about “consistency” in general.
- Consistency is what architectural style is about.

Three forms of consistency

- Within an application
- Between applications
- With the “outside world” (metaphors)

Examples of inconsistency

More inconsistency
The classic example of inconsistency

- Deleting a file and removing a disk on a Mac

Consistency can lead to conflicting concerns

Where would you place +, -, x, and / in the unlabeled keys above?

When consistency fails

Which of the above arrangements of arrow keys would you choose?

Orthogonality (1)

- related to consistency
- If “delete” is available then “insert” should be available.
- If we can “delete” a document, then we should also be able to delete a paragraph, sentence, word, character, etc.

Orthogonality (2)

Orthogonality (3)

- Don’t go overboard here.
- Over-commitment to this idea can lead to nonsense.
- What does it mean to “insert a document”?

What does it mean to “insert a document”?
Next

- Menus