Vorlesung
Mensch-Maschine-Interaktion

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Chapter 6
Implementing Interactive Systems
(selected topics)

- 6.1 Constraints
- 6.2 Mapping
- 6.3 Guidelines
Constraints

- Physical constraints
  - basic physical limitations

- Semantic constraints
  - Assumption that create something meaningful

- Cultural constraints
  - Borders provided by cultural conventions

- Logical constraints
  - Restrictions due to reasoning

- Applying constraints is a design decision!
Constraints & Redundancy

- Redundancy is safe!
- Constraints can only work at their own level
- But: things can go wrong elsewhere
Cultural Constraints

- Universal or culturally specific
- Arbitrary conventions that have been learned
- Users’ expectations build on cultural constraints

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Foreign Cultures: Example
Physical Constraints & Affordances

Examples

- **USB Memory Stick vs. DVD vs. money**
  - If there is more than one option (physically) cater these cases

- **Dials vs. Buttons vs. Sliders**
  - Dials are turned
  - Buttons are pressed
  - Sliders are pushed
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Mapping

- Relationship between controls and action
- Mappings should be
  - Understandable (e.g. moving the mouse up move the slider up)
  - Consistent
  - Recognizable or at least quickly learnable and easy to recall
  - Natural, meaning to be consistent with knowledge the user already has
- Example: cooker
  (for these issues see also Gestalt theory)
Mapping & Human Error

- Labels are correct
- However full context is needed
- Built-in source for potential frustration
- Missing context
Mapping & Human Error

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Mapping – Examples (1)

- Relationship between controls and action

![Diagram of a message input form with options for message text and print position.](attachment:image.png)
Mapping – Examples (2)

- Relationship between controls and action

![Diagram with text: Please attach a Message to Your Order. Message Text: Position to Print Message: Possible Label Positions]
Mapping – Examples (3)

- Relationship between controls and action

![Image of a form with fields for message text and position options for printing the message. The form asks to please attach a message to your order. The fields include options for message text and position choices such as top-left, top, top-right, left, centre, right, bottom-left, bottom, bottom-right. Buttons for submit and reset are also included.]
Mapping – Examples (4)

- Relationship between controls and action
Mapping – Examples (6)

- Relationship between controls and action
“natural” mappings can be found in many areas

It is not always obvious what the “natural” mapping is

Correlation with cultural constraints
Chapter 6
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- 6.1 Constraints
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Hix and Hartson’s guidelines

1. User centered design
2. Know the user
3. Involve the user
4. Prevent user errors
5. Optimize user operation
6. Keep control with the user
7. Help the user to get started
8. Give a task-based mental model
9. Be consistent
10. Keep it simple
11. Design for memory limitations
12. Use recognition rather recall
13. Use cognitive directness
14. Draw on real world analogies
Hix and Hartson guidelines (2)

15. Use informative feedback
16. Give status indicators
17. Use user-centred wording
18. Use non-threatening wording
19. Use specific constructive advice
20. Make the system take the blame
21. Do not anthropomorphise

- Use modes cautiously
- Make user action reversible
- Get attention judiciously
- Maintain display inertia
- Organize screen to manage complexity
- Accommodate individual difference

(Hix and Hartson, Developing User Interfaces, Wiley, 1993)
GNOME Guideline

1. Usability Principles
   - Design for People
   - Don’t Limit Your User Base
   - Accessibility
   - Internationalization and Localization
   - Create a Match Between Your Application and the Real World
   - Make Your Application Consistent
   - Keep the User Informed
   - Keep It Simple and Pretty
   - Put the User in Control
   - Forgive the User
   - Provide Direct Manipulation

2. Desktop Integration
   - Placing Entries in the Applications Menu
   - Menu Item Names
   - …

3. Windows
   - Titles
   - …
   - Layout
   - Common Dialogs

4. Menus
   - The Menubar
   - Types of Menu
   - Drop-down Menus
   - …
   - Help

5. Toolbars
   - Appearance and Content
   - …

6. Controls
   - …
   - Sliders
   - Buttons
   - Check Boxes
   - …
Drag and Drop Semantics

Your application must determine whether to move or copy a dragged item after it is dropped on a destination. The appropriate behavior depends on the context of the drag-and-drop operation, as described in this section.

Move Versus Copy

If the source and destination are in the same container (for example, a window or a volume), a drag-and-drop operation is interpreted as a move (that is, cut and paste). Dragging an item from one container to another initiates a copy (copy and paste). The user can perform a copy operation within the same container by pressing the Option key while dragging. When performing a copy operation, indicate a copy operation to the user by using the copy cursor. (See “Standard Cursors” (page 67.).)

Example 1: Apple Human Interface Guidelines (page 42)

<table>
<thead>
<tr>
<th>Dragged item</th>
<th>Destination</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data in a document</td>
<td>The same document</td>
<td>Move</td>
</tr>
<tr>
<td>Data in a document</td>
<td>Another document</td>
<td>Copy</td>
</tr>
<tr>
<td>Data in a document</td>
<td>The Finder</td>
<td>Copy (creates a clipping)</td>
</tr>
<tr>
<td>Finder icon</td>
<td>An open document window</td>
<td>Copy</td>
</tr>
<tr>
<td>Finder icon</td>
<td>The same volume</td>
<td>Move</td>
</tr>
<tr>
<td>Finder icon</td>
<td>Another volume</td>
<td>Copy</td>
</tr>
</tbody>
</table>
Icon Genres and Families

**Icon genres** help communicate what you can do with an application before you open it. Applications are classified by role—user applications, software utilities, and so on—and each category, or genre, has its own icon style. This differentiation is very important for helping users easily distinguish between types of icons in the Dock.

**Figure 5-1** Application icons of different genres—user applications and utilities—shown as they might appear in the Dock.

For example, the icons for user applications are colorful and inviting, while utilities have a more serious appearance. Figure 5-2 shows user application icons in the top row and utility icons in the bottom row. These genres are further described in “User Application Icons” (page 57) and “Utility Icons” (page 58).

**Example 2:**
Apple Human Interface Guidelines (page 55)
Example 2: Apple Human Interface Guidelines (page 126 & 134)
Example 2: Apple Human Interface Guidelines (page 138, 163 & 190)

Radio Button Specifications

Figure 10-14 Radio button spacing

Full-size radio button

Small radio button

Mini radio button

Align the baselines of the label and the first button's text.
Example 2: Apple Human Interface Guidelines (page 207, 209 & 210)
Specific Guidelines for Operating Systems, Window Managers, and the WWW

Some Examples:

- Introduction to the Apple Human Interface Guidelines

- KDE User Interface Guidelines

- Palm OS® User Interface Guidelines

- MSDN - User Interface Design and Development
  [http://msdn.microsoft.com](http://msdn.microsoft.com)

- GNOME Human Interface Guidelines (1.1 - DRAFT)

- Web Guidelines???
References


- A. Cooper. About Face 2.0: Chapter 1 - Goal-Directed Design


- GNOME Human Interface Guidelines (1.0) by The GNOME Usability Project [http://developer.gnome.org/projects/gup/hig/1.0/hig-1.0.pdf](http://developer.gnome.org/projects/gup/hig/1.0/hig-1.0.pdf)