CSCI 1320
Creating Modern Web Applications
Lecture 22: HCI Design
Steve’s Golden Rules

- Common Sense
- Simplicity
- Consistency
- Feedback
- Handle Errors
- Accommodate all levels of users
- Make it look good (aesthetics)
Common Sense

• Principle of LEAST ASTONISHMENT
  • Surprise the user as little as possible
  • The system should do what the user expects
• Users have different models of how the system works
  • What they expect can be different (scrolling)
  • Often very different from the programmer’s model
  • The UI should guide the user to the right system model
Common Sense

• Commands should do the logical thing
  • Command names should fit the user model
  • Command names should be meaningful to the USER
  • Direct manipulation should be available and meaningful

• Spoken conversation is a good model
  • The user is telling the computer what to do
  • But the computer is pretty stupid

• Appeal to your intuition
  • Easier when looking at someone else’s design
  • Use the user’s knowledge of the world and the application
Common Sense

• Make the system do what the user means
• Examples: DWIM, Clippie, automatic spelling correction
  • Good in principle, difficult to achieve in practice
Simplicity

OpenOffice.org Writer

Google

This space intentionally left blank.

Human Centric Computing
Simplicity

- Simpler interfaces are generally better
  - Google search, Mac versus PC
- Minimize the amount of interaction required
  - Search: providing the user with likely search strings
  - No more than 3 clicks for any action
- Simpler makes it easier for users to find what they need
  - Users aren’t going to read a manual, help file, or FAQ
- **DON’T MAKE ME THINK**
- **DON’T MAKE ME WORK**
Consistency
Consistency

• **Consistency make the interface easier to use**
  • User can build on what they already know
  • Only have to learn things once
• **Application should be consistent throughout the interface**
  • Consistent use of colors
  • Consistent look and feel
  • Consistent navigation and menus
  • Consistent screen layout
  • Clicking on most things should be meaningful & consistent
Consistency

- Consistent with other applications
  - What do users expect in this type of application
    - For example: web apps, phone apps, ...
  - What do similar applications do
    - For example: shopping carts

- Use Common Sense
  - Don’t go overboard – you can be too consistent
  - What does moving an icon from one folder to another do?
Feedback

• Keep the user informed
  • The user needs to know if actions are accepted
    • Especially for actions that may take a long time
  • The user wants to know what is happening
  • Conversational model

• Showing feedback
  • Generally this should be non-obtrusive
    • Sometimes, it needs to be more blatant
  • Should be easy to view
Handle Errors

User error
This error can be caused by the user doing something stupid.
Please replace user!

User Interface Failure
The Logon User Interface DLL C:\WINDOWS\System32\CTGINA.dll failed to load.
Contact your system administrator to replace the DLL or restore the original DLL.

Restart

Pavement Mesh Dialog

Invalid Data: Zone 1 Width Ratio
Value should positive

Errors

Exception Processing Message: 0x0000013 Parameters:
0x000007FEDF97240 0x0000000000000004 0x000007FEDF97240
0x000007FEDF97240

Cancel  Try Again  Continue
Handle Errors

- **Users will make mistakes**
  - Minimize error possibilities
  - Many UI problems involve errors
- **Don’t let users clobber themselves**
  - Don’t display meaningless buttons
  - Make dangerous actions difficult
- **Avoid unexpected side effects**
  - Adding to shopping cart
  - Printing a document
Handling Errors

• Design to minimize errors
  • Make it difficult to click in the wrong place
  • Make sure buttons have meaningful names
  • Require acknowledgement where appropriate
  • Simpler is better
• Provide for error recovery
  • UNDO
  • Make options obvious (e.g. remove from cart)
• Remember old values for forms
  • Don’t force the user to do extra work on errors
  • Highlight bad values as early as possible
• Allow multi-step commands to be aborted
Handle All Levels of Users

• **Novice users**
  • Prompting, help facilities, meaningful error messages

• **Intermediate users**
  • Simplified input screens, short cuts
  • Auto-completion of input fields
  • Perpetual intermediate users

• **Experienced users**
  • Efficiency of use is important
  • Customization of the interface

• **Need to work at all levels simultaneously**
  • Novice users aren’t novices forever
  • Experienced users are novices too
Aesthetics
Aesthetics

• Good user interfaces LOOK GOOD
  • Must be comfortable to look at as well as to use
  • This is not purely subjective

• Several aspects to this
  • Visual clarity/coding; attention getting; layout; color; ...
Visual Clarity and Coding
Visual Clarity and Coding

• Meaning should be apparent
  • For icons, images, buttons, the overall screen
  • User shouldn’t need to wonder “what is this”
• Many different coding techniques (Tufte)
  • Color, shape, size, font, line styles, fill styles, ...
  • Can be assigned different meanings
  • Should be done consistently and logically
• Don’t overdo it
Attention Getting

```csharp
#include "shape.inc"

tobject notDeclaredDeclaration = null;

#define generateTestObject(locationX, locationY)

    // do something here

#endif
```

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Search by Claimant Last Name and Claim Number or SSN or Date of Birth

<table>
<thead>
<tr>
<th>Column Name</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claim Number</td>
<td></td>
</tr>
<tr>
<td>Claimant Social Security No.</td>
<td></td>
</tr>
<tr>
<td>Claimant Date of Birth</td>
<td></td>
</tr>
</tbody>
</table>

- Choice of one (1)

Legend:

1. C-17 - Response to Request from Employer for Insurance Information
2. C-46 - Response to Request from Employer for Providing Claim
3. C-65 - Request to Date Appearance of Counsel
4. C-95 - Request to Skills Appearance of Counsel
5. C-52 - Request to Date Appearance of Counsel for Employee Answer
6. C-55 - Request for Document Correction
7. C-56 - Request for Hearing in Premature Withdrawal Issues
8. C-62 - Communication of Medical Claim
9. C-70 - Request for Hearing in Premature Withdrawal Issues
10. C-71 - Request for Hearing in Premature Withdrawal Issues
11. M-50 - Request for Action on File Issues
12. M-51 - Request for Emergency Hearing
13. M-52 - Request for Interview
15. M-54 - Request for Determination of Emergency Hearing

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![Pie Chart for Over 75 vs Under 75]

- Chest Pain
- Uncomplicated
- Complicated
- Over 75
- Under 75
- Pulmonary Edema
- Uncomplicated
- Complicated

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CS132 Lecture 22: Human Centric Computing
Attention Getting

• One of the principle uses of encoding

Alternatives
  • Intensity: 2 levels
  • Sizes: up to 4 sizes
  • Fonts: up to 3 fonts
  • Inverse video
  • Blinking (2-4 hz)
  • Color: up to 4 colors
  • Animation
  • Audio (but some users will have it turned off)

• Do not overuse
Layout

• Balance
  • Left-right and top-bottom

• Gridding
  • Put things on a well-defined grid

• Proportion
  • Know the pleasing proportions
Use of Color

- Color is easy to misuse
- Color can do a lot of things for you
  - Be soothing or striking to the eye (warm versus cold)
  - Add accents to an uninteresting display
  - Provide subtle discriminations in complex displays
  - Draw attention to errors/problems
  - Evoke emotional reactions
- Don’t rely solely on color
  - 6-8% of males are color blind
- Color should be used conservatively
Next Week

• Poster Session (Monday and Wednesday)
• Design Lab (Friday)