UI design: Graphics and Audio

YOU HAVE CHRONIC MAHJOBBIS CRAPPU BUT THAT'S NOT WHY YOU PUKE.

HAVE YOU BEEN EXPOSED TO ANY USER INTERFACES DESIGNED BY ENGINEERS?

YOU HAVE INTERFACE POISONING. YOU’LL BE DEAD IN A WEEK.

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Cardinal Axiom of UI Design

A user interface is well-designed when the program behaves exactly how the user thought it would.

Joel Spolsky, Ref: http://www.joelonsoftware.com/uibook/chapters/fog0000000057.html
Assessment Criteria for UI Design

• **Usability**: Can users easily learn and efficiently interact to get to the desired information?
• **Functionality**: What functions and controls are available to allow optimal use?
• **Visual communication and aesthetics**: How do the visual elements optimize functionality?

Laurie Vertelney, Michael Arent, Henry Lieberman, Two Disciplines in Search of an Interface Reflections on a Design Problem
Usability via the “Tap Counter”
Discipline, Science, Art

Designing [a user interface] is part:

- **discipline**: following platform conventions and good design principles
- **science**: usability testing
- **art**: creating screen layouts that are informative

Leslie Cortes, Ref:http://www.medicalcomputing.org/archives/0agui.php
How to achieve good UI design?
Optimize the common case

- this is a standard web browser icon set, but is the most commonly used button easiest/fastest to access?
Capitalize on Fitts’ Law

- Fitts’ Law suggests making the target larger
Make sparing use of sound, color, fonts, animation

- oooh, nice Ferris wheel and pretty colours, right?
- but do they convey useful information or distract?
- is the content easily visible?
Readability
Make different states easily distinguishable

Any chance the user thinks everything worked out fine?
Search – pop-up dialogue

- this search dialogue is disruptive and inefficient
Use the power of the computer

- Firefox uses background colour to indicate when the search fails, without disrupting the user
Make items easy to recognize

• there’s probably a good reason why nobody you know uses the Konqueror web browser
Make items easy to distinguish

Figure \texttt{depthsearch} shows a search strategy called depth-first search (here two nodes), after which no further backtracks are allowed. This search method will explore possible combinations of deliveries from the search tree which have identical $(V_c)$ values. However, some of these deliveries have been found. Figure \texttt{coefficients} shows we need to be cautious.

- Highlighting dark text with a dark background is probably not the most visible
QuickTime 4.0 UI Disaster

before media file loaded  after media file loaded  while media file playing
Exercise: Media Player Controls

QuickTime 10.4

VLC 2.1

Windows Media Player 12
Speech & non-speech audio
Speech Technologies

- speech recognition (dictation, command)
- speaker recognition (who is this?)
- speaker verification (authentication)
- speech synthesis (TTS)
Why speak to your computer?

- HCI tasks
  - command-and-control, dictation
  - for users with disabilities
- computer-mediated human-human communication
  - voice-mail
  - voice annotation of documents
Exercise: Non-speech auditory cues

• what are some non-speech auditory cues you encounter on a daily basis (not just computer-generated)?
• what information do these convey to you?
(Some) Answers

- Smoke detector alarm, alarm clock:
  - Loud and attention-grabbing; typically dealt with immediately

- Telephone ring, microwave heating finished, Windows shutdown:
  - Clearly audible, interrupting; possibly heard in other rooms

- Incoming email or chat notification:
  - Faint/brief, can be ignored, indicates a change of state
Forms of non-speech audio

alarms and warning systems
• Smoke detector alarm, alarm clock

status and monitoring indicators
• Telephone ring, microwave heating finished, Windows shutdown

encoded messages and data
• Incoming email or chat notification

“Just like any other language, this is a learned vocabulary”
- Bill Buxton
Sonification

- Use of non-speech audio to convey information about object or event, or to perceptualize data
  - earcons - [Blattner, 1991]
    - auditory equivalent of graphical icons
    - abstract, structured musical tones
    - short audio recording, typically from real world
  - parameter-mapping and model-based sonification
    - continuous mapping of parameter(s) to sound
    - e.g., Geiger counter, heartbeat variability, metal detector
Live Wire
[Jeremijenko 1995]

- piece of plastic cord that hangs from a small electric motor mounted on the ceiling
“Blindminton”: Pong for visually impaired
[Hermann, Höner and Ritter ‘05]