Ul design principles Lecture 19

CS 2112 Fall 2017

Goals and non-goals

• Goals:

• efficient, easy, enjoyable completion of task

• Non-goals:

- Exposing functionality with minimal code
- Providing any many features as possible
- Giving users what they think they want "If I had asked my customers what they wanted, they would have said a faster horse."

Principle 1: Know your user



Design to your user

- Frequent or occasional?
- Novice or knowledgeable?
- Training?
- Don't design for yourself—you are not the user



Novice users

- Gentle learning curve: **discoverability**
 - Way for user to find all functionality
- Protection from dangerous actions
- Clarity: simple displays, consistency with other applications and real world
 - E.g., using icons as metaphors



Discoverability





Know your user.

No loaded guns





Know your user.

Frequent/power users

- Optimize for efficient interaction
- Powerful actions, short interaction sequences (e.g., hotkeys)
- Rapid response times
- Rich controls, shortcuts for common actions
- Exploit muscle memory
- Information-rich displays
- Customization and macros



Expert UI





Know your user.

Principle 2: UI is a dialogue



Ul: good conversation partner?

• Ratify actions quickly

• Be responsive (e.g., highlighting affordances)

• Show progress on longer actions

Conversations

- Identify use cases to figure out what users will have to do.
- Eliminate unnecessary user actions (e.g., needless confirmation dialogs)
- Aim for short interactions with clear progress: intermediate goal satisfaction
- User testing to find your blind spots (as developer).
- May need testing scripts for human testers to achieve coverage.

Interaction paradigms

- Direct manipulation: the UI *is* the underlying data/behavior model
 - User view: Model = View = Controller
 - Implementation: Model \neq View \neq Controller
- I/O: UI generates output when input provided (UI ≠ model)
 - e.g., menus, submitted forms, command shells

Direct manipulation vs. I/O





Know your user. UI is a dialogue.

Interaction time scales

- I/60s: biologically imperceptible: faster than neurons
- I/30s: fast enough for continuous-feedback tasks (e.g., mouse tracking)
- I/I0s: imperceptible delay for discrete actions, e.g. button clicks.
- I/2s: fast but noticeable (ok for command-response interaction)
- I/2s–5s: increasingly annoying but user stays focused
- 5s–10s: User starts to lose attention.
- I0s–I min: User becomes distracted and productivity declines.
 App needs to support parallel activities.
- >1 min: Significant loss of productivity. User leaves for coffee.

Modes

- Modes: states of UI that restrict interactions.
 - Good: restricted context-sensitive vocabulary simplifies user interaction
 - Bad: can be confusing and can trap users
- Moral: use judiciously

When modes go bad: cascading dialogs

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Know your user. UI is a dialogue.

xfig: the context-sensitive mouse



Principle 3: Aid Memory



"The advantage of a bad memory is that one enjoys several times the same good things for the first time." — Friedrich Nietzsche



- Humans can hold at most 7 things in their head at once
 - ⇒ Avoid long menus, arrays of buttons



Spatial memory

- Human spatial memory is amazingly good (e.g., memory palaces).
 ⇒ Good UIs exploit it
- Each window or dialogue or mode is a "place" for interaction
 - make it a nice place to be
 - avoid unnecessary places/modes
 - make navigation easy, obvious
- Big-picture views strengthen spatial sense



Muscle memory

- Frequent users don't need to look UI is programmed into their muscles
- ⇒ action needs to activate functionality should be consistent
 - e.g., gray out menu items instead of removing them

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Context-sensitive help

- Help should be about what user is doing now.
- ⇒ task-focused rather than feature-focused (unlike most modern apps!)
- \implies modes provide context



Principle 4: Visual design matters



Avoid visual clutter





Avoid visual clutter

- Use space shading, color instead of lines to organize
- Use low-contrast separators
- Maximize information/ink ratio



Good use of color and contrast?





Use high contrast, avoid chromatic aberration

This text is probably not very pleasant to read.

And it gets harder if the font size is small.

Visual consistency

- For novice users, be consistent with existing apps and real world
- For expert users, be internally consistent
 - e.g., buttons that navigate vs. buttons that change state vs. buttons that expose new information

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Visual features

- • Shape: up to 15
- Color: up to 24
- Size, length, thickness: up to 6
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- Orientation: up to 24
- Texture
- Differing color perception!
 - \Rightarrow can only *complement* other sources of information





UI design principles



- Know your user
- \bigcirc
- UI is a dialogue



• Aid memory



• Visual design matters