Prototyping the User Interface

Sketches, storyboards, mock-ups, scenarios and tools

This material has been developed by Georgia Tech HCI faculty, and continues to evolve. Contributors include Gregory Abowd, Jim Foley, Diane Gromala, Elizabeth Mynatt, Jeff Pierce, Colin Potts, Chris Shaw, John Stasko, and Bruce Walker. Comments directed to foley@cc.gatech.edu are encouraged. Permission is granted to use with acknowledgement for non-profit purposes. Last revision: March 2011 by Valerie Summet.
Prototyping Concepts

Low-fidelity
Sketches, mock-ups
Scenarios
Storyboards

Medium-fidelity
Slide shows
Simulations

High-fidelity
System prototypes
Wizard of Oz

Part 2
Part 3

Early
Late
Agenda

• Prototyping dimensions
• Prototyping terminology
• Non-computer methods
• Computer methods
Your Project Group

THE TECHNOLOGY DEMO

THE SOFTWARE ISN'T 100% COMPLETE.

IF IT HAD A USER INTERFACE YOU WOULD SEE SOMETHING HERE... HERE... AND SOMETIMES HERE.

AND THEN YOU'D BE SAYING, "I GOTTA GET ME SOME OF THAT."

ANY QUESTIONS?
Design Artifacts

- How do we express early design ideas?
  - No software coding at this stage
  - Part II of project

- Key notions
  - Make it fast!!!
  - Allow lots of flexibility for radically different designs
  - Make it cheap
  - Promote valuable feedback

*** Facilitate iterative design and evaluation ***
Dilemma

• You can’t evaluate design until it’s built
  ◦ But…
• After building, changes to the design are difficult

• Solution: Simulate the design, in low-cost manner
Four Considerations for Prototyping

1. Representation
   • How is the design depicted or represented?
     – Could be just textual description or can be visuals and diagrams

2. Scope
   • Is it just the interface (mock-up) or does it include some computational component?
Four Considerations (contd)

3. Executability
   • Can the prototype be “run”?
   • If coding, there will be periods when it can’t

4. Maturation
   • What are the stages of the product as it comes along?
     – Revolutionary - Throw out old one prototype
     – Evolutionary - Keep changing previous prototype
Prototyping Terminology

• Early prototyping, Late prototyping
• Low-fidelity prototype, High-fidelity prototype
• Horizontal prototype
  ○ Very broad, does or shows much of the interface, but does this in a shallow manner
• Vertical prototype
  ○ Fewer features or aspects of the interface simulated, but done in great detail
Rapid Prototyping Methods

• Non-computer vs. computer-based

Typically earlier in process  Typically later in process
Non-Computer Methods

• Goal: Want to express design ideas and get quick & cheap opinions on system

• Methods?
Design Description

• Can simply have a textual description of a system design
  ◦ Obvious weakness – it’s so far from eventual system
  ◦ Doesn’t do a good job representing visual aspects of interface
  ◦ Not nearly enough
    ▪ OK for developing ideas
    ▪ Not OK as a way to get meaningful feedback
Sketches, Mock-ups

• Paper-based “drawings” of interfaces
• Good for brainstorming
• Focuses people on high-level design notions
• Not so good for illustrating flow and the details
• Quick and cheap -> helpful feedback
Physical Mock-Ups

- Wooden blocks and labels - device control

(Three versions of a hand-held controller)
Physical Mock-Up

- Styrofoam and Buttons

“Golf Caddy” by:
Chris Hamilton
Linda Kang
Luigi Montanez
Ben Tomassetti
Storyboarding

• Pencil and paper simulation or walkthrough of system look and functionality
  ○ Use sequence of diagrams/drawings
  ○ Show key snap shots
  ○ Quick & easy
Example

- Sketches solves two problems with use of more fully-developed prototypes
  - User reluctance to suggest changes to what might look like a finished product
  - User focus too much on details (graphic design, etc) of UI rather than big picture
Other Techniques

• Tutorials & Manuals
  ◦ Maybe write them out ahead of time to flesh out functionality
  ◦ If it’s difficult to describe, it’s probably difficult to use!
  ◦ Forces designer to be explicit about decisions
  ◦ So putting it on paper is valuable
Computer Methods

• Simulate more of system functionality
  ◦ Usually just some features or aspects
  ◦ Can focus on more of details
  ◦ Typically engaging
  ◦ Danger: Users are more reluctant to suggest changes once they see more realistic prototype
Prototyping Tools - Drawing Pgms.

- Draw/Paint programs
  - Draw each screen, good for look

Thin, horizontal prototype

IP Address

OK   Cancel

PhotoShop, Corel Draw,...
Prototyping Tools - Scripting

• Scripted simulations/slide shows
  ◦ Put storyboard-like views down with (animated) transitions between them
  ◦ Can give user very specific script to follow
    ▪ Often called chauffeured prototyping

  ◦ Examples: PowerPoint/Keynote, Visio, HTML/CSS, Macromedia Director, Dreamweaver
Powerpoint Transition Controls

Mouse click actions:
  Next slide
  Previous slide
  First slide
  Last slide
  Last slide viewed
  End show
  Custom show
  URL
  File
Scripting Example
More Complex Example

Beware!

- More resources
  - 26 minute video from MS (Manuel Clement)
  - PowerPoint Prototyping Toolkit
Macromedia Director

• Combines media with Lingo scripting language
• Concerned with place and time
  ◦ Objects positioned in space on “stage”
  ◦ Objects positioned in time on “score”
• Easy to transition between screens
• Can export as executable or as Web Shockwave file
end repeat
sprite(63).loch = endh
DataTabState = 0

--move into scene

currenth = 918
endh = 648

repeat while sprite(63).loch-3 > endh
if myvartime < the ticks then
  sprite(63).loch=((1.0/5)*(endh-current
  currenth = sprite(63).loch
  myvartime = the ticks + 5
  updatestage
end if
Prototyping Tools - Interface Builders

• Tools for laying out windows, controls, etc. of interface
  ○ Have build and test modes that are good for exhibiting look and feel
  ○ Generate code to which back-end functionality can be added through programming
• Examples: Visual Basic, Flex, Pencil (plug-in for FF), ...
Visual Basic

UI Controls
Design area
Control properties
Audio Interface (Telephony) Builder Tools

- SUEDE - Flow-chart for speech interface
  - Landay et al, UC Berkeley (now U Washington)
- Used for wizard-of-Oz studies
- Could be used to drive real system
Suede
Prototyping Tools

• Good features
  ◦ Easy to develop & modify screens
  ◦ Supports type of interface you are developing
  ◦ Supports variety of I/O devices
  ◦ Easy to link screens and modify links
  ◦ Allows calling external procedures & program
  ◦ Allows importing text, graphics, other media
  ◦ Easy to learn and use
  ◦ Good support from vendor
  ◦ Google “rapid prototyping tools” and find one that works for you.
Prototyping Technique

• **Wizard of Oz** - Person simulates and controls system from “behind the scenes”
  ◦ Use mock interface and interact with users
  ◦ Good for simulating system that would be difficult to build

Can be either computer-based or not
Wizard of Oz Technique

WE HAD TO CUT SOME
CORNERS TO GET THE
DEMO READY THIS SOON.

WALLY IS UNDER THE
TABLE. HE'LL PRETEND
TO BE THE 3-D INTERFACE
THAT WE COULD BUILD IF
WE WEREN'T DOING
USELESS DEMOS.

HE'S A LITTLE
FUZZY. CAN
YOU ADJUST
IT?

TRY THE
ELECTRIC
SHAVER.
Wizard of Oz

• Method:
  ○ Behavior should be algorithmic
  ○ Good for voice recognition systems

• Advantages:
  ○ Allows designer to immerse oneself in situation
  ○ See how people respond, how specify tasks
Review of Prototyping Concepts

- Low-fidelity: Sketches, mock-ups, Scenarios, Storyboards
- Medium-fidelity: Slide shows, Simulations
- High-fidelity: System prototypes, Wizard of Oz