Project/presentation

Interactive Prototype (due Dec 3rd)
– Redesign interface based on last round of feedback
– Create working implementation
  • Can include Wizard of Oz parts where justified
  • Can include pre-built (canned) functionality where justified

In class Presentations (Dec 6th)
– 5 min slide presentation (be careful about timing)
– Focus on showing prototype
Final Presentations/Posters

Next Monday Dec 6th in the Wozniak Lounge, 4th floor Soda Hall, 2-5pm

TeamDeca
Jon Stewart Appreciation Club
G7
No Name
Cave Jihad
Education @ Cal
ZooTrippers

The G-12
Bet Intruders
CalVegan
Boom Tho
JohnCannyAppreciationClub
A.R.B.S.
Topics

• **What is a tangible interface?**
• Motivation for Tangible Interfaces
• Examples
• A Taxonomy
What is a tangible interface?

Making bits visible and manipulable
- Ishi

“a user uses their hands to manipulate some physical object(s) via physical gestures; a computer system detects this, alters its state, and gives feedback accordingly”
- Fishkin

Examples we already saw?
Holotoy
Slap Widgets
Final Scratch
Tivoli Radio?
Negdrop?

Topics

• What is a tangible interface?
• **Motivation for Tangible Interfaces**
• Examples
• A Taxonomy
Bandwidth of Human Muscle Groups

Sensori-motor map
An ideal TUI

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Notes:
- Visual Image Store: Processed information is stored temporarily in visual terms.
- Auditory Image Store: Processed information is stored temporarily in auditory terms.
- Working Memory: Information that is currently active and being processed.
- Long-Term Memory: Information that is stored permanently and can be retrieved at a later time.
Abstracting Craft - McCullough

Media that allow direct manipulation + accumulation of experience (craft) are very powerful.
Topics

• What is a tangible interface?
• Motivation for Tangible Interfaces
• Examples
• A Taxonomy
Examples

Doll’s head (1994)
Manipulation of a virtual head with a physical model:
Examples

URP – manipulation of architectural models (1997)
Lighting source controlled as well to simulate time-of-day.

http://tangible.media.mit.edu/projects/
Examples

BitBeads (1998): CPU + LED + communication in each bead. Beads have default behavior and can be strung together to make dynamic patterns. They can also be programmed to do more complex tasks as a 1D cellular automaton.
Digression

Work on composition of beads and blocks led to Lego Mindstorms and was an influence on “Scratch”.

![Diagram of Scratch programming interface]
Examples

Metadesk (1997) – tangible tools and tokens
Examples

Mediabloxks (1999)
• Recording, transport, playback and editing of media
  - Tangible containers
Examples

Actuated Workbench (2002) – tangible tokens
Examples

UPM (Universal Planar Manipulator) 2000
Localized force fields

\[ \propto \rho \]
Examples

Sandscape (2002) – formable shapes
Examples

Topobo (2004)
Examples

I/O Brush (2004)
Disadvantages?
Disadvantages

• Complexity – may need many objects for tokens/containers and even tools.
• Solution?: overload a few objects with different behaviors – like slap widgets.
• Cost – need a lot of functionality in each unit – specialization makes it hard to keep cost down.
• Solution?: leverage other commodity technologies – cell phones, mp3 players, wiimotes etc, and “reskin” them.
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## Taxonomy

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Embodiment

To what extent is the object’s behavior fully “embodied” inside the physical object?

Full
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Environment
Distant
Metaphor

What does the physical object represent, a thing or an action?

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Doll’s head
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URP
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*Toontown*
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Shakepad
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Bitbeads
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I/O Brush
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Marble answering machine
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Curlybot
Abstracting Craft -McCullough
Summary

Tangibles aim to fully leverage the hand-eye capabilities of people.

TUI designs can be extremely simple to learn and use.

Cell phones are capable of many tangible behaviors (using motion sensing, camera, sound).

But for more complex tasks there is a complexity problem – too many gadgets are needed.

Best examples?