Overview over User Interface Paradigms

TU München
1. 2. 2004

Christian Sandor
sandor@in.tum.de
Outline

• Overview over User Interface Paradigms
  • Timeline
  • Criterions
• Presentation of Paradigms
Timeline of User Interface Paradigms

- 1977: Virtual Reality
- 1980: Wearable Computing
- 1981 - 1984: WIMP
- 1991: Hybrid User Interfaces
- 1991: Ubiquitous Computing
- 1993: Zoomable User Interfaces
- 1993: Augmented Reality
- 1997: Tangible User Interfaces
- 1998: Multimodality
- 2000: Attentive User Interfaces
Criterions for User Interface Paradigms

1. Principal paper: first publication
2. Definition: what is it exactly?
3. Spirit: what is the philosophy behind it?
4. Example: how does it look like?
5. Prospects: will it be used in the future?
6. Guru: who is the famous guys today?
7. Relations: how does it relate to other paradigms?
Outline

• Overview over User Interface Paradigms
• Presentation of Paradigms
  • WIMP
  • Ubiquitous Computing
  • Zoomable User Interfaces
  • Augmented Reality
  • Hybrid User Interfaces
  • Tangible User Interfaces
  • Attentive User Interfaces
WIMP (1/3)

1. Principal paper:
   • Research at XEROX PARC (1970s) and Apple (1981 - 1984)

2. Definition: Windows, Icons, Menus, Pointer

3. Spirit: Copy everyday world
   • Direct Manipulation
   • Desktop Metaphor

4. Example: almost every GUI today
Wimp (2/3)

• PARC developed: Cursor changes to show system mode, Cursor changes to show context, (Popup, Pulldown, Hierarchical) Menus, Overlapped windows, Tiled windows, Icons, Scroll bars, Push Buttons, Radio Buttons, Check Boxes, Dialog Boxes, Multiple fonts & styles in text, Modeless Interaction, Move/Copy/Delete, Cut/Copy/Paste with a mouse, Selection point between characters

• Movie: First public presentation of the mouse (Engelbart 1968)
5. Prospects: still prevailing paradigm for the next couple of years
6. Gurus: Ben Shneiderman (University of Maryland)
7. Relations: shortcomings inspired most other paradigms

2. Definition:
   - The computer is everywhere and invisible
   - Tabs, pads and boards

3. Spirit:
   - Opposite of Virtual Reality
   - Alan Kay: “3rd paradigm” (after mainframes and PCs)
Ubiquitous Computing (2/2)

4. Example:
   - Standford Flow Menu (2000)

5. Prospects: Will become most important paradigm

6. Gurus: Terry Winnograd (Standford)

7. Relations: Reference frame for most newer paradigms
1. Principal paper:
   Ken Perlin, David Fox: “Pad - An Alternative Approach to the Computer Interface” SIGGRAPH 1993

2. Definition:
   • Content is in a plane in 3D space
   • Camera can be moved
   • Lenses add additional degrees of freedom

3. Spirit: “We believe that navigation in information spaces is best supported by tapping into our natural spatial and geographic ways of thinking”

4. Examples: next page
Introduction to Augmented Reality

TU München

Christian Sandor (sandor@in.tum.de)
Zoomable User Interfaces (2/2)

4. Examples:
   - MacOS X: Expose, Magnification of Dock
   - Perlin’s Fibonacci machine
   - HP’s zoomgraph

5. Prospects: Useful technique, gaining importance

6. Gurus: Ben Bederson (University of Maryland)

7. Relations: ZUI is subclass of 3D User Interfaces
Augmented Reality (1/2)


2. Definition:
   • Registered in 3D
   • Realtime
   • Mixing real and virtual

3. Spirit: Making the unseen visible

4. Example: ARToolkit Demo
Augmented Reality (2/2)

5. Prospects:
   - With HMDs: only very limited applications
   - Projection-based AR is the future

6. Gurus: Lehrstuhl Navab/Klinker (TU München)

7. Relations: Connected with VR through MR (Milgram)
Hybrid User Interfaces (1/3)

1. **Principal paper**: Steven Feiner, Ari Shamash: "Hybrid user interfaces: breeding virtually bigger interfaces for physically smaller computers". UIST 1991

2. **Definition**: Usage of 2D displays combined with AR

3. **Spirit**: Attacking screen space problem with coordinated display through several modalities

4. **Example from original paper** (next page)
5. Prospects: If AR catches on, Hybrid User Interfaces will too.
7. Relations: uses AR
Tangible User Interfaces (1/2)

1. **Principal paper:** Hiroshi Ishii and Brygg Ullmer: “Tangible Bits: Towards Seamless Interfaces between People, Bits and Atoms” CHI 1997

2. **Definition:** Abacus analogy

3. **Spirit:** Follow century long tradition of specialized tools

4. **Example:** Ishii’s Topobo (2004)
Introduction to Augmented Reality

TU München

Christian Sandor
(sandor@in.tum.de)
5. Prospects: Powerful concept; Applicability unclear
6. Gurus: Hiroshii Ishi (MIT Media Lab)
7. Relations: Used as input channel for several other paradigms
Attentive User Interfaces


2. Definition: Measure user’s visual attention and adapt User Interface accordingly

3. Spirit: Model social interactions

4. Example:
   • Vertegaal’s video player
   • Improving the dock (Shumin Zhai)

5. Prospects: Gains importance in Ubicomp

6. Gurus: Shumin Zhai (IBM), Roel Vertegaal(QueensU.)

7. Relations: can be combined with other paradigms
Conclusion

Thank you for your attention!
Questions?

5 minute break now