Designing Interactive Systems I
Lecture 6: Phases of Technology and Visions of HCI

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Phases of Technology
Force Shifts During Phases of the Technology Lifecycle

- **Enthusiast Phase** (Hobby): “Exploit me!”
- **Professional Phase** (Work): “Help me work!”
- **Consumer Phase** (Life): “Enjoy me!”
- **Baroque Phase** (Life): “Let me do it all!”

Sweet Spot
Crossing the Thresholds of Indignation and Inclusiveness

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**Sweet Spot**

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**Enthusiast Phase**  
(Hobby)  
“Exploit me!”

**Professional Phase**  
(Work)  
“Help me work!”

**Consumer Phase**  
(Life)  
“Enjoy me!”

**Baroque Phase**  
“Let me do it all!”

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Today cell phones have moved beyond the initial enthusiasm phase of "Let me do it all!". They have reached a level of functionality where they support various tasks and are used for communication, navigation, and entertainment. The professional phase, "Help me work!", has enabled users to manage tasks and collaborate more efficiently. The consumer phase, "Enjoy me!", has transformed cell phones into personal entertainment centers.

At the sweet spot, people are eager to adopt new technologies that make their lives easier and more enjoyable. The baroque phase, with its complex interface and features, has led to a need for intuitive and user-friendly designs. As technology adoption evolves, it is crucial to understand the needs and preferences of users to design products that are both functional and enjoyable.
March + April 2008

Crossing the Thresholds of Indignation and Inclusiveness

The phases of technology adoption:

- **Enthusiast Phase** (Hobby)
  - “Exploit me!”

- **Professional Phase** (Work)
  - “Help me work!”

- **Consumer Phase** (Life)
  - “Enjoy me!”

- **Baroque Phase**
  - “Let me do it all!”

Adapted from Bill Moggridge

Obviously, the entire user interface is designed for its initial users and is gradually learned by the general public. Yet, a small group of enthusiasts can reach the baroque phase by requesting additional features. This is the phase when new features are frequently added, leading to slideshows of devoted users displaying their installations.

For example, when TomTom was introduced, its first phase was a personal phase where people used it to get directions to their home. As it became more popular, it entered the professional phase, where it was used as a tool for traffic updates and photo slideshows. Now, it has reached the consumer phase, where people use it as a destination and be on their way.

This is careful design. Some early users even go to great lengths to enhance their device, such as cutting them short, just asking for “Help me work!”

Another sweet-spot indicator is that social behavior around new products changes. For instance, companies that sell phones as a commodity may experience a drop in sales after a new product is introduced. However, companies that sell phones as a service may experience an increase in sales, even after a new product is introduced.
Sweet Spot

- Simplifies your life
- Rule-changing new functionality

Baroque Phase

- Complicates your life
- Feature creep
Visions of HCI
How to Interpret (Past) Visions of HCI

- From today’s point of view:
  - What aspects have become standard?
  - What aspects haven’t? Why?

- From the audience’s point of view back then:
  - What was the vision likely provoking in the audience? Positive / Negative?

- From the author’s point of view:
  - What are the key new ideas?
  - How was the vision prototyped and communicated?
Multimodal interfaces

- Put That There (MIT, 1980)
- Key advances:
  - Recognizing human gestures
  - Combining voice with other input modes
Multimodal interfaces

- Apple Knowledge Navigator (1988)
- Vision video mockup (not implemented)
- Key advances: Got people enticed with ideas of user agents and multimedia
Knowledge Navigator

https://www.youtube.com/watch?v=hb4AzF6wEoc

- Video prototype of a future communication and computation system
- Bruce Tognazzini (TOG), Human Factors Engineering Group, SunSoft, Sun Microsystems
- Goal: Show a system that would be realistic in ten years
  - The story takes place on Nov 16, 2004…
  - Write down: What’s realistic now, what isn’t?
https://www.youtube.com/watch?v=NKJNzxgZyVo0
Starfire: Video Prototyping Guidelines

- Continually question if assumptions are realistic within 10-year timeframe
- Iterate video prototype like any other prototype
- Include things that go wrong in the story
- Avoid impossible hardware designs
- Design interface first, then decide film scenes based on budget
  - E.g., Mouse, Voice, Reverse Angle much cheaper than Gesture, Pen
Starfire: Reading Assignment


• Paper documenting the video prototyping guidelines that evolved from the project

• Online in the ACM Digital Library, and at


• For more information, see Togazzini’s book “Tog on Software Design” (which he had planned to call “Starfire” at first)
Benddesk
Virtual Reality

• Key advance: Producing the illusion of being in a 3-dimensional world of computer-generated objects

• Head-Mounted Display, Ivan Sutherland, University of Utah, 1967
Ubiquitous Computing

• Mark Weiser, Xerox PARC †

• 1991: The Computer For The 21st Century
  • Most profound technologies disappear in fabric of everyday life

• Example: writing
  • Early scribes had to know how to make ink, bake clay,…
  • Today, writing is on candy wrappers
  • A modern world without writing?
  • In comparison, information technology is still at the “scribe” stage

• Example: motors
  • 1900: 1 engine per factory
  • Now 22 motors in your car, hard and unnecessary to notice
Ubicomp Scenarios

• Neighborhood tracks (privacy vs. “coziness”)
• Paper(!) newspaper, but with electronic pen
• Finding lost garage door opener manual
• Foreview car mirror for traffic jams and parking spots and shops
• Fresh coffee indicator
• Collaboration via replicated/miniatuized tabs/pads, awareness, move content to board for active collaboration
• Switch effortlessly between machines, displays, and devices (meeting review example)
https://www.youtube.com/watch?v=b1w9_cob_zw
Ubicomp: PARC Devices

- Must know where they are (crucial to human perception)
  - Knowing room it’s in can make computer adapt significantly, without any AI
- Tabs/Pads/Boards: inch/foot/yard scale, 100s/dozens/1 or 2 per room
  - A tab for each book spine
The PARC Tab

• 1993, ca. 50 deployed in PARC/EuroPARC

• Activated post-it note, can animate objects (find mislaid book,...), voting/consensus tool in meetings

• Use as active badge, identify wearer/object

• Use to shrink windows onto tab to carry with you

• Research product: assumed constant connectivity

• What is today’s Tab? What’s still missing?
The PARC Pad

• Paper crossover with laptop
• Scrap computer (not personal to carry around with you)
• Antidote to windows: who wants 9x11" desk?
• Compare to modern Pads like the iPad: what’s still missing?
The PARC Board

- Used as video screen
- Bulletin board (attuning to reader!)
- Whiteboard
- Flip chart
- Need different UI:
  - Keyboard awkward
  - Menubar hard to reach
  - Shared across Atlantic
Ubicomp vs. PC, VR

• Ubicomp = disappearing computer = augmented reality = calm computing

• Goal is to activate the world, putting computers into everything

• “PC” is just a transition towards real potential of computing, which will focus on human environment
  • Carrying a super-laptop is like owning just one very important book. Even customizing or having millions of it doesn't unleash literacy.
  • Multimedia as used today makes machines even more attention-grabbing, not disappearing
  • Psychological reasons for disappearing technology: Heidegger's hammer, compiling

• ≠ VR: VR lets you explore unreachable worlds but tries to simulate infinite variety of reality instead of augmenting it.
Ubicomp Predictions

• Small displays, faster CPUs: correct
• Battery prediction too optimistic (days of use at 1000x800)
• Memory underestimated
• High-resolution walls (80+dpi, 10s of Mpix) not there yet
• OSs today assume fixed hardware configuration, but in Ubicomp, devices come and go
• Window systems assume fixed base computer
• Ubicomp diversity of input devices not being dealt with well
• Network: Bluetooth LE, problem of multiple connections
Ubicomp Today

• HUC'99 workshop ➔ Ubicomp Conference

• Commercial Tabs, Pads and Boards
  • Hardware, but often still clinging to the desktop metaphor, and not “plentiful”

• One of the most intriguing current visions for the future of HCI and CS

• “As calm as a walk in the woods”