Introduction to HCI

CS 3724
Fall 2005

Who are these people?

- Doug Bowman
- Qing Li

First things first...

- Why are you taking this class? (be honest)
- What do you expect to learn?
- How do you expect to apply this knowledge?

Unlike other CS classes...

- No equations (well, maybe one)
- No proofs
- No algorithms
- Multi-disciplinary
  - psychology
  - graphic design
  - industrial engineering
**Definitions**

- **HCI**: human-computer interaction
- **human**: characteristics of body, perception, cognition, demographics, etc. affect interaction
- **computer**: any interactive system with digital computation components
- **interaction**: communication or dialogue or collaboration between two parties

**Interactive System**

- interactive systems support human activity
- any device whose action follows from the actions of its user **and** whose action is at least partly apparent to the user
- 2-way communication

**User Interface**

- The visible/perceptible parts of an interactive system through which the user and system communicate

**Human Factors**

- human factors generally refers to:
  - psychology of system users (e.g. vision)
  - physiology of system users (e.g. ergonomics)
- this class is really introduction to HCI
Why should you study HCI?

- Myth: Interaction/UI design is the easiest part of a system, and should be done last
- Myth: Programming is the most important skill for system developers
- We want to support human activity, so design with users in mind! (UCSD)
- Technology will not be useful unless it is also usable
- Usable systems lead to more productivity and satisfaction

What are the criteria for success?

- SW Eng. goals are still important:
  - robustness
  - maintainability
  - cost
- HCI goal – usability:
  - user performance (speed, errors)
  - ease of learning, ease of use
  - user satisfaction, physical comfort

Why Usability Engineering?

- Waterfall models of development do not work
  - Too many unknowns (Brooks: No Silver Bullet)
- Need an iterative discovery-oriented process
  - But at the same time need to manage it
- Demands well-defined process with metrics
  - Specifying usability goals as objectives
  - Assessing and redesigning to meet these objectives
  - Manage usability as a quality characteristic, much like modularity or nonfunctional requirements

How Should We Measure Usability?

- Bottom line is whether the users got what they wanted, i.e., is the client satisfied
- Practically speaking, need to break this down so that we can operationalize our objectives
- Our textbook definition:
  The quality of an interactive computer system with respect to ease of learning, ease of use, and user satisfaction
- Can the users do what they want to do in a comfortable and pleasant fashion?
History and Future of HCI

- Much of the class will consider systems that are in use today
- Class projects may speculate on emerging (but feasible) paradigms
- To understand present and future, start with the emergence of HCI

History of HCI

- Early days of computation (pre-WWII):
  - Computer as number-cruncher, black box
  - Batch processing of jobs; lack of interactivity
  - Displays almost non-existent

History of HCI (cont.)

- Vannevar Bush, 1945 "As We May Think"
  - Vision of post-war activities, Memex
  - "...when one of these items is in view, the other can be instantly recalled merely by tapping a button"

History of HCI (cont.)

  - In 1968, workstation with a mouse, links across documents, chorded keyboard
History of HCI (cont.)

- Sutherland (1965) - “Ultimate Display”
  - Data Visualization: “A display connected to a digital computer...is a looking glass into a mathematical wonderland.”
  - Body Tracking: “The computer can easily sense the positions of almost any of our body muscles.”
  - Realistic environments: “A chair display in such a room would be good enough to sit in. Handcuffs displayed in such a room would be confining, and a bullet displayed in such a room would be fatal.”
  - Beyond reality: “There is no reason why the objects displayed by a computer have to follow ordinary rules of physical reality with which we are familiar.”

- Sutherland (1968) - “A head-mounted three-dimensional display”
  - “Sword of Damocles”
  - Precursor of modern VR, AR

History of HCI (cont.)

- XEROX Alto and Star
  - Windows
  - Menus
  - Scrollbars
  - Pointing
  - Consistency

- Apple LISA and Mac
  - Inexpensive
  - High-quality graphics
  - 3rd party applications

History (and future) of HCI

- Large displays
- Small displays
- Peripheral displays
- Alternative I/O
- Ubiquitous computing
- Virtual environments
- Implants

- Speech recognition
- Multimedia
- Video conferencing
- Artificial intelligence
- Software agents
- Recommender systems
- ...
**HCI people at VT**

- Doug Bowman
- Dan Dunlap
- Roger Ehrich
- Steve Harrison
- Rex Hartson
- Deborah Hix
- Andrea Kavanaugh
- Brian Kleiner
- Scott McCrickard
- Chris North
- Manuel Pérez-Quiñones
- Francis Quek
- Tonya Smith-Jackson
- Deborah Tatar
- Woodrow Winchester

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**Textbook**

- Mary Beth Rosson and John M. Carroll, *Usability Engineering: Scenario-Based Development of HCI* (RC)

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**Course information**

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**Other Useful Books**

- Ben Shneiderman, *Designing the User Interface*
- Deborah Hix and Rex Hartson, *Developing User Interfaces*
- Don Norman, *Design of Everyday Things*
- Fred Brooks, *The Mythical Man Month*
Evaluation

- Project: 55%
  - 5 phases @ 10% each
  - Final presentation: 5%
- Mid-term and final: 15% each
- Activities, quizzes, and homework: 15%

Course Webpage

http://courses.cs.vt.edu/~cs3724/fall2005-bowman