Introduction to Human-Computer Interaction

CS 3724
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Who are these people?

- Rob Capra
- Pardha Pyla
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 proofs
- Only a few equations
- Only a few algorithms
- Multi-disciplinary
  - computer science
  - psychology
  - graphic design
  - industrial engineering
Definitions

- **HCI**: Human-Computer 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
  
  ![Diagram](User ↔ System)
User Interface

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

Human Factors

- Human factors generally refers to:
  - Psychology of system users
    - work processes, decision making
  - Physiology of system users
    - 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?

- Software engineering goals 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?
Past & Future of HCI

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

- 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 (con’d)

- JCR Licklider, 1960 “Man-Computer Symbiosis”
- Tightly coupled human brain and machine, speech recognition, time sharing, character recognition
History of HCI (con’d)

- Douglas Engelbart, 1962
  “Augmenting Human Intellect: A Conceptual Framework”
- In 1968, workstation with a mouse, links across documents, chorded keyboard

History of HCI (con’d)

- 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
- Philip Isenhour
- Andrea Kavanaugh
- Brian Kleiner
- Scott McCrickard
- Chris North
- Manuel Pérez-Quiñones
- Tonya Smith-Jackson
- Deborah Tatar