CS 160 Introduction

Professor John Canny
Spring 2004
Jan 21
Outline

- Who am I?
- HCI introduction
- Course overview
- Project description & handout
- Administrivia
Who am I?

- Professor in EECS
- Ph.D. in CS from MIT 1987
  - Robot motion planning, computer algebra
- Research interests:
  - Educational Technology
  - Context-aware computing
  - Mobile applications
  - Active polymers
  - Privacy and cryptography
- Accent is from South Australia
Human-Computer Interaction (HCI)

- **Humans**
  - A person trying to accomplish something
  - Other innocent bystanders

- **Computers**
  - Run application programs
  - Often remote (client-server)

- **Interaction**
  - Human expresses their wishes to the machine
  - The machine responds
HCI Challenges

Understanding people

* People are not all the same - values very different

* Identity (traits) are both individual and collective

* Tension between designing too narrowly and too broadly

* Diversity in the design team helps
HCI Challenges

Ill-posed problems

* You don’t get to start with a “clean” problem - problem solving is only part of design
* **Defining** the problem is much of the work
* The problem spec may change during design, e.g. in “extreme programming”
Benefits of HCI Skills

CS160 projects are like companies
- Deal with users: understand and involve them
- Communication
- Subjective judgments
- Flexibility and time constraints!

MIT ME survey
User Interfaces (UIs)

Part of application that allows users
* to express their intentions to the machine
* to interpret results of machine actions
User Interfaces (UIs)

HCD = Human-Centered Design
* Understanding user needs
* Design
* Prototyping
* Evaluation
* Final implementation of UIs
Why Study User Interfaces?

- Major part of work for “real” programs
  * approximately 50%
- Many application programs are mostly UI
  * word proc., spreadsheet, PDAs, email, calendars etc.
- You will work on “real” software
  * intended for users other than yourself
Why Study User Interfaces?

- Bad user interfaces cost
  * money (5% ↓ satisfaction → up to 85% ↓ profits)
  * lives (Therac-25)

- User interfaces hard to get right
  * people and tasks are complex
Who builds UIs?

A multi-disciplinary team (ideally)

* graphic designers
* interaction / interface designers
* technical writers
* marketers
* test engineers
* software engineers
* users
How to Design and Build UIs

- Identify and understand users’ needs
- Task analysis & contextual inquiry
- Rapid prototyping
- Evaluation
- Programming
- Iteration
UI Design Cycle

- Design
- Prototype
- Evaluate
Human-Centered Design

- Understanding people
  - “Get inside the user’s head”
  - Keep users involved throughout design

- Psychology
  - Cognitive: perception, movement, memory
  - Social: motives, personalities, group dynamics

- Organizations and knowledge work
Remember that individuals belong to multiple communities - not just trait groups.

Communities are a unifying influence, and allow new products to diffuse (be adopted by new users) in society.
Identity (including community membership) is a strong influence on consumers’ choice of products

Often as important as product performance
A portrait of a character (with a name)

* Name: Jack
* Occupation: Professor
* Values: liberal politics
* Likes: water (swimming, sailing, lying on a beach), Asian food, French food, Italian food, seafood,…
* Dislikes: traffic, bad comedians, bureaucracy,
* Goals: start family, get good education for kids (probably private), build a leading research group in area,…
Users: Personae

* Name: Alice
* Occupation: Just graduated MBA, looking,…
* Values: Family, friends, work in a humane workplace
* Likes: Dinner parties, Working out, One quiet night per week, Paris, Lemon drops (drink), foot massages.
* Dislikes: Chauvinism, aggressive drivers, people who drink more than they should, working after 9pm.
* Goals: management role in a mid-size company - making it a better place
Personae

- More like a *story character* than a description of a community or group

- Q: Why the “unnecessary” detail?
Q: Why the “unnecessary” detail?
A: Narrative detail is generative
   * It helps you generate design ideas
   * helps you visualize the character, and anticipate their needs and wants
   * It helps avoid stereotypes and incorrect assumptions
   * With multiple characters, you can explicitly cover a range of user traits
What a Persona is not

- A description of a real person
- A description of common traits of a group of people
- A stereotype
Creating personas

- Is hard to do – like creating a good story character

- Exercise – pick someone you know, and try listing their values, likes, dislikes etc. then ask them as a reality check

- Helps separate fact from assumption
Task Analysis & Contextual Inquiry

- Observe existing work practices (real users)
- Create examples and scenarios of actual use
- Try-out new ideas before building software
Rapid Prototyping

1. Build a mock-up of design
2. Low fidelity techniques
   * paper sketches
   * cut, copy, paste
   * video segments
3. Interactive prototyping tools
   * HTML, Visual Basic, HyperCard, Director, etc.
4. UI builders
   * Fusion, NeXT, Visual Cafe

Fantasy Basketball
Evaluation

- Test with real users (participants)
- Build models
- Low-cost techniques
  - expert evaluation
  - walkthroughs
Programming

- Toolkits
- UI Builders
- Event models
- Input / Output models
- etc.
Break
Iteration

At every stage!
Goals of the Course

1. Learn to design, prototype, & evaluate UIs
   * the tasks of prospective users
   * psychological issues that affect design
   * techniques for evaluating a user interface design
   * importance of iterative design for usability
   * technology used to prototype & implement UI code
   * how to work together on a team project
   * communicate ideas
      + key to your future success
How CS160 Fits into CS Curriculum

- Most courses for learning technology
  * compilers, operating systems, databases, etc.

- **CS160 concerned w/ design & evaluation**
  * assume you can program/learn new languages
  * technology as a tool to evaluate via prototyping
  * skills will become very important upon graduation
    - complex systems, large teams
  * skills are relevant for other design courses

- All systems have usability issues (unless no-one uses them), even if they are indirect
Project Description

- Each of you will propose a UI or app.
  - fixing something you don’t like or a new idea

- Groups
  - 4-5 students to a group
  - work with students w/ different skills/interests
  - groups meet with teaching staff every two weeks

- Cumulative
  - apply several HCI methods to a single interface
Project Examples

- Biosk - support for biology lab work
- The environment:

![Image of a cluttered desk with papers and equipment]
Project Examples

Biosk - the solution

Protocols

Protocol Operations

View | Edit | Delete

Select a protocol and perform an operation:

test
Running the Gel
Centrifuge 15000g for 1 hr
yadayada

Other Options

New Protocol
New Protocol From Template
Project Examples

- iCurator: Intelligent museum guide
Project Examples

- **iCurator: lo-fi and hi-fi prototypes**
Project Examples

SLnotes: Live in-class note-taking

- Smooth objects (e.g., lines) appear jagged since resolution is too low.
- Anti-aliasing - fill-in some jagged places w/ gray scale or primary colors.
Project Examples

Newsalert: Context-aware notification for smart phones

Based on Qualcomm’s BREW API

Related: Stock Alert and Context-awareness
Project Suggestions

- Home info kiosks (cooking, cleaning)
- P2P tools:
  - bargain hunter
  - recommender
- Memory assistant
  - Use a camera + speech
Project Suggestions (cont.)

- Learning tools
- Games (with some secondary goal, like education)
- Staying in touch with friends and relatives
- Entertainment
Registrations

* Class is larger than usual (two TAs this time), target is 80 students
* We can add a few more – especially non-engineers – project groups are interdisciplinary.

Email jfc@cs or come to office hours (2-3 today).
Administrivia

- John’s office hours
  * Tu 1-2, W 2-3 noon (529 Soda)
  * email jfc@cs for appointments at other times

- Teaching assistants
  * Jane Chiu (pikachiu@uclink4)
  * David Parks (davidp@cs.berkeley.edu)
Administrivia (cont.)

- Discussion sections
  * Thursday 9-10, 10-11, 12-1, 1-2 in 320 Soda
  * new material covered in section - you should attend

- Sections start this week, go to 12-1 or 1-2 if you’re not assigned yet.

- Class ombudsman appointed next class (need volunteer). Relay student concerns to staff.

- First assignment (project proposal) due next Monday in 529 Soda.
Books

- We will mainly hand out papers, give you web links, & refer to lecture slides

- Two recommended textbooks

- Other recommended books on web page
Assignments

**Individual**
* 2 written

**Group**
* 5 written assignments
* 2 presentation/demos with write-ups
Grading

- A combination of
  - Midterm (15%)
  - Final (15%)
  - Individual assignments (15%)
  - Group project (40%)
    + demos/presentation (group component)
    + project write-ups and exercises
    + ratings given by other team members & class
  - In-class quizzes (10%)
  - In-class participation (5%)

- No curve
Assessment

- Guidelines will be given in each assignment
- You should read readings and prepare for class, participation is graded
- **Good communication** expected in oral and written presentations
- Midterm and final
- Groups **self-assess** participation - should monitor it throughout the projects
- Meet with us as soon as problems emerge
Tidbits

Late Policy
* no lates on group assignments
* individual assignments lose 20% per day

Cheating policy (official)
* will get you an F in the course
* more than once can get you dismissed from Cal

More information
www.cs.berkeley.edu/~jfc/cs160/SP04
Summary

- Projects - talk to users, produce a proposal by Mon
- Go to section tomorrow
- Next lecture on history of HCI:
  * Three readings are online