CS160: User Interface Design

Maneesh Agrawala, Spring 2012

Generated random password is: 'bGmunHz8wCq4fFLq!ti7#sHt#qG:sc/fm1:'

Make sure you write this down because it will be needed for future upgrades.

http://stackoverflow.com/questions/288777
The Desktop Metaphor...

Is this a good idea? When?

http://www.bumptop.com
How about this?

Jeff Han, Perceptive Pixel
Where do I need to turn?

Where do I need to turn?
Instructor: Maneesh Agrawala

Associate Professor in EECS, joined Berkeley in 01/2006

Work in HCI, Graphics and Visualization

- Visual Interface Design
- Perception & Cognition of Displays

GSI: Nicholas Kong
Topics for Today

1. Course Overview
2. Project Description
3. Course Mechanics
4. Assignments + Petitions
Course Overview

HCI, UI, Usability, Iterative Design

This Course

Is about reliably building very good interactive systems

This semester we focus on Kinect applications

The goal is not to build a working system, but an interactive prototype

We place emphasis on fieldwork, rapid prototyping and user testing to find the right design and avoid obvious and not-so-obvious mistakes
Human-Computer Interaction (HCI)

**Human**
- End-user of program
- Others (friends, collaborators, coworkers)

**Computer**
- Machine program runs on
- Often split: clients & servers

**Interaction**
- User tells the computer what they want
- Computer communicates results

User Interfaces (UIs)

**Part of application that allows**
- People to interact with computer
- Computer to communicate results

**Can include hardware design**
- Buttons, sliders, other sensors

**HCI = design, prototyping & evaluation of UIs**
Why Study User Interfaces?

"The results show that in today's applications, an average of 48% of the code is devoted to the user interface portion. The average time spent on the user interface portion is 45% during the design phase, 50% during the implementation phase, and 37% during the maintenance phase."

- Myers & Rosson, CHI'92

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**Why Study User Interfaces?**

**Major part of work for “real” programs (approx 50%)**

**You will work on “real” software**

Intended for people other than yourself

**Bad user interfaces cost**

Money, Lives, Votes, …

**User interfaces hard to get right**

People are unpredictable
Life-Threatening Errors

1995 American Airlines jet crashed into canyon wall, killing all aboard

On approach to Rozo airport in Colombia
Pilot skipped some approach procedures
Pilot typed in “R” and system completed full name of airport to Romeo
Guidance system executed turn at low altitude to head for Romeo airport
9 seconds later plane struck canyon wall

Is the pilot to blame?

http://en.wikipedia.org/wiki/American_Airlines_Flight_965

Who Builds Interfaces?

Ideally a team of specialists

- graphic designers
- interaction / user experience designers
- technical writers
- marketers
- test engineers
- software engineers
- customers
Building Successful Interfaces

1. Task analysis & contextual inquiry
2. Rapid prototyping
3. Evaluation
4. Iteration: Back to 1
Task Analysis & Contextual Inquiry

- Observe existing practices
- Create scenarios of actual use
- Create models to gain insight into work processes

Rapid Prototyping

- Build a mock-up of design (or more!)
- Low fidelity techniques
  - Paper sketches
  - Cut, copy, paste
  - Video segments
- Interactive prototyping tools
  - HTML, Flash, Javascript, Visual Basic, C#, etc.
- UI builders
  - Interface Builder, Visual Studio, NetBeans
Evaluation

Evaluate analytically (no users)

Test with real target users

Low-cost techniques
experts evaluation
walkthroughs

Higher cost
Controlled usability study

Goals of the Course

Learn to design, prototype, evaluate interfaces

• Discover tasks of prospective users
• Cognitive/perceptual constraints that effect design
• Techniques for evaluating an interface design
• Importance of iterative design for usability
• Technology used to prototype & implement UI code
• How to work together on a team project
• Communicate your results to a group

Many of these will be key aspects of your future jobs
CS160 and the CS Curriculum

Most courses for learning algorithms and technology
Compilers, operating systems, databases, etc.

CS160 concerned with
design, implementation & evaluation
We assume you are comfortable programming
Technology as a tool to evaluate via prototyping

Class Project Overview

Kinect Applications, Developed in Teams
**Theme: Kinect Applications**

*Kinect applications are different:*

- User is physically active
- Touch-free interaction
- I/O constraints (slow text entry, display varies)
- Sensing:
  - Hands/head/body 3D position, orientation, velocity, acceleration
  - Color camera
  - Microphone
- Wearable?

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**Inspiration: Media Browser**

Use Kinect to browse hierarchical menu

![Media Browser](image_url)

Valkyrie Savage and Steve Rubin CS 260 Fall 2011
Inspiration: Media Browser

Use Kinect to browse hierarchical menu

Why is this a good idea?
• What situations?
• What types of users?

You will each individually implement such a browser to learn how to program the Kinect

Inspiration: Target Specific Users

Galen Panger CS260 Fall 2011
Inspiration: Target Specific Users

Inspiration: Powerpoint Control

Galen Panger CS260 Fall 2011

AirTouch Presenter
Inspiration: Powerpoint Control

Alex Jones' Powerpoint Controller: http://www.youtube.com/watch?v=e9_ehn3Wk5s&feature=related

Inspiration: Shadow Puppets

http://design-io.com/
Inspiration: Virtual Clothes Room

Fitnect.com

Inspiration: Other Forms of Input

Google Voice Search - http://www.youtube.com/watch?v=y3zT1wK17A
Inspiration: Music Creation

Smule.com - http://www.youtube.com/watch?v=RhClq7EAljA

Inspiration: Kinect Effect

Microsoft.com
Course Platform

Buy a Kinect if you can (about $125 = cost of textbook)
   We may have a few loaners to share, but having your own will make things much easier for you
   See course wiki for more on how to buy a Kinect

Development path
   Kinect SDK requires Windows 7 + Vis. Studio 2010
   Windows is available from MSNDAA (see programming assignment 1)
   VS 2010 is available from Dreamspark (see programming assignment 1)

125 Cory Hall has development tools installed
   You may use your own Windows laptop or a Mac with Bootcamp

Project Constraints

Must make use of Kinect in a non-trivial way
   Think about why Kinect provides an appropriate interface
   Target specific users
   Target specific applications

Must solve a real-world problem
   Not simply a game, especially if similar game already exists

Target user group cannot be overly broad
   College students is too broad a group

Can’t just implement a Media Browser
Teams

Project groups will form in week 2
- 4-5 students to a team
- You’ll work with students with different skills/interests

Cumulative
- Apply several HCI methods to a single interface

Course Mechanics

Office Hours & Sections, Course Wiki, Assignments
Prerequisites

**You must be comfortable with programming**
Individual programming assignments require you to write code in C# with Windows Presentation Foundation (WPF)

**You must be able to attend one of the four sections**

**You must commit to working with your assigned team on your group project**

Office Hours, Sections

**Office Hours**
- Maneesh: M 3:30-4:30pm in 535 Soda (+by appt)
- Nick: HMMB (Hearst-Mining) 354, M 1-2pm and Tu 2-3pm
- Anuj: HMMB (Hearst-Mining) 354, W 3-4pm and F 3-4pm

**Sections (405 Soda Hall)**
- Tu 11-12noon, 3-4pm
- Th 1-2pm, 2-3pm
- Section starts next week
- 1st half of the semester: Lecture material + Kinect code
- 2nd half of the semester: Design Critiques
Programming Environment Setup

125 Cory Hall: Windows machines already setup
GSI Nick Kong will walk over there after this lecture

Instructions on wiki for setting up your own
Windows machine or Mac with Bootcamp

GSIs will help you setup your machine tomorrow!
Th Jan 19, 1-3pm 405 Soda Hall
Bring your laptop

Readings

Readings are very important to the class
Make sure you do the reading before class.
Midterm will include topics only covered in readings

Most readings will be posted on wiki
Some require username/password: cs160/cs160Readings

Online reading discussions (ongoing assignment)
You must post one substantial answer or comment per lecture, by 9am before each class. We will not accept late comments. Comments are the major factor in your class participation grade

Reading Responses

Your response should summarize the most important ideas from the reading and raise questions/thoughts you might have had while reading.

We will occasionally post discussion questions to the wiki you should answer in the response

Responses can be as short as 3-4 sentences (a paragraph) but should be substantive
Reaching Us

Questions about course material, tech support?
Q&A System Piazza: piazza.com/class#cs160
Use Piazza before emailing us if you can!

Private questions:
Email: cs160@imail.eecs.berkeley.edu
Mail sent here will get the fastest response
Please avoid mailing us directly

Assignments

Four individual programming assignments during first half of semester. Goals:
• Make sure you have the skills to implement your group project
• Individual performance metric

One or two design assignments

Group project assignments throughout semester
Workload

Assessment

The goal of CS160 is to teach you to design and evaluate interfaces

Specific assessment guidelines will be given in each assignment

Good communication expected in oral & written presentations

Groups self-assess participation
Grading

1. Participation (Class, section, Q&A - 10%)
2. Individual Programming Assignments (25%)
3. Midterm (25%)
4. Project Assignments (40%)

Policies

Late Assignments
- Most assignments will be due before class on the due date
- Group assignments will not be accepted late
- Individual assignments lose 33% per day (weekends count)

Cheating (official)
- Will get you an F in the course
- More than once can get you dismissed from Cal
Assignments

Assignment 1: Course Petition

Due Friday, Jan 20, 5pm

Both enrolled and waitlisted students have to submit

Information will determine admission


CS160 Course Petition, Spring 2012

Everyone in the class, whether you are enrolled or on the waitlist, must submit the following course petition.

We will use the petition information to determine which waitlisted students are admitted to the class. Enrolled students who do not submit a petition will be dropped.

Note that the majority of the work in this course is conducted in the form of a semester-long group project. Unlike other courses, dropping the course before the end of the semester has negative consequences for you and your group members. Do please make sure to answer the question about your commitment to staying in the course.

Required

Name: *

Birthday email address: *

Major: *

Year:
- [ ] freshman
- [ ] sophomore
- [ ] junior
- [ ] senior
- [ ] masters student
- [ ] PhD student
- [ ] Other: *

GPA: *
Assignment 2: Create Wiki Account

Due Friday, Jan 20, 5pm Use Your Full Name

Due Midnight Friday Jan 20, 2012

5 Points

To participate in the wiki, you will need to create an account. Please use your full name as your username. Note that your username should contain a space between the first and last name. Include a valid email address when you create the account as shown in this sample text. Afterwards, please add some descriptive information about yourself on your personal page - while your log name needs to be the person first at the top of the page to ensure your personal page. Here is an example.

Create account

Create account

Assignment 3: Individual Design Exercise

Due by 2pm Monday Jan 30; 25pts

Design Brief: Redesign Berkeley Time

Grading details on the web (25 points total)
Submission must be posted to wiki.

Get started early! Testing takes time.
Assignment 4: Programming WPF

**Due:** Mon Jan 30, 2pm - 20pts

Instructions on wiki

**Goals:**
- Set up programming environment
- Learn Windows Presentation Foundation (WPF)
- Construct a hierarchical menu with at least two options, each of which must contain at least two options
Reading Assignment

The Design Cycle and Brainstorming

Submit response by 9am Monday via wiki/google form.

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