Hall of Shame!

Asiana Airlines interface for sending email or SMS from plane

- Cool, but
  - text entry using this input device is tedious
  - crashes often
- Lost the strong brand value for me
Hall of Fame!

bing.com/weather

- good!
- less clutter
- eye drawn to current weather

bad!
- feels boring

Hall of Fame or Shame?

weather.yahoo.com

- good!
- feels boring
- eye drawn to current weather

- bad!
- feels boring

Hall of Fame!

weather.yahoo.com

- good!
- aesthetic
- clean typography & icons

- bad!
- image is 1st read

Hall of Fame!

iOS yahoo weather

- good!
- aesthetic
- clean typography & icons

- bad!
- image recedes to background w/ flick

CS 147 Introduction & Course Overview

Design Thinking for User Experience Design, Prototyping & Evaluation

Prof. James A. Landay
Computer Science Department
Stanford University
Autumn 2016
September 27, 2016

Who are We?
Health
Enable healthier lifestyles and outcomes
Digital and mobile health are some of the fastest growing industries of our day. As the gap between healthcare and technology is closing, patients and physicians alike are turning to technology-based products to enable more accessible and effective healthcare. From mobile apps that help patients manage their medications to tools that help resource-constrained clinics manage patient pipelines, this intersection of health and technology is ripe with opportunity!
Thurs 5PM-6:50PM

Learning
Design next generation learning experiences
We are constantly learning by acquiring new skills, knowledge, and behaviors. In this studio, we will think about how technology can enable, supplement, or support learning. How can we use technology to support under-resourced demographics or accommodate different learning styles and needs? What kinds of challenges can we solve to help teachers focus on teaching? Feel free to look at and beyond your own learning environment for inspiration.
Friday 9:30AM-11:20AM, 1:30PM-3:20PM

Sherman Leung (Head CA)
- CS Undergrad, CS/MS&E Masters
- Interested in the intersection of healthcare and technology. Involved with digital health
- I play jazz piano, ping pong, and basketball
- Office Hours
  - Tues 11-12pm @NVIDIA Lobby
  - Weds 4:30-5:30pm @Old Union
- Thurs 5PM-6:50PM @Gates 392

Emily Tang
- CS & Psychology Undergrad, CS Masters
- Interested in human behavior, educational equity, and diversity in STEM
- I like corgis
- Office Hours
  - Wednesday 2:15-3:15pm @Lathrop Tech Lounge
  - Thursday 4:30-5:30pm @NVIDIA Lobby
- Friday 9:30AM-11:20AM @380-381T
  - Friday 1:30PM-3:20PM @160-319

Shubha Raghvendra
- HumBio Undergrad, CS Masters
- Interested in product management, diversity and inclusion in STEM, computational biology
- I like museums and ice cream
- Office Hours:
  - Monday 3:30-4:30pm @Huang Coupa
  - Thursday 12:30-1:30pm @Lathrop Tech Lounge
- Fri 8:30-10:20AM @160-317
- Fri 10:30AM-12:20PM @200-124
why is there a photo of mango health here? should we post the TA photos instead?
Emily Tang, 9/27/2016
Dialogue is the oxygen of democracy, and today, much of that dialogue dwells online. How might we leverage technological tools to broaden the reach of that dialogue to marginalized groups? To enrich the online conversation with fact-checking? To present complex information to our end-users -- voters -- in clear, meaningful ways? As the presidential election draws nearer, these questions are pressing and high-impact. Apart from the election cycle, we might also consider technology-enabled strategies to help citizens engage with local governments, or trawl the voting records of elected officials, for example.

Fri 8:30-10:20AM, 10:30AM-12:20PM

Kevin Zhai

- Art Studio Undergrad, CS Masters
- I like to make things
- Office Hours
  - Monday 4:30-5:30pm @Huang Coupa
  - Thursday 3:00-4:00pm @GSB Coupa
- Fri 12:30-2:20pm, 2:30-4:20pm

Fri 12:30-2:20pm, 2:30-4:20pm

Inclusive Design
Products that benefit everyone
- Gaining insights from communities and individuals that might be overlooked by the general population
  - blind, deaf, dyslexic, etc
  - under-represented individuals
    - e.g., women & people of color
- What can we learn when we design specifically for a single person instead of for the “average” person?
- Hopefully, we can improve not only their lives but the lives of everyone around them
- Fri 12:30-2:20pm, 2:30-4:20pm

Fri 12:30-2:20pm, 2:30-4:20pm

Will Kim

- SymSys Undergrad, CS Masters
- Interested in knowledge management
- I like making pots
- Office Hours:
  - Monday 12:30-1:30pm @Lathrop Tech Lounge
  - Friday 12:30-1:30pm @Lathrop Tech Lounge
- Fri 10:30-12:20AM & Fri 1:30PM-3:20PM @100-101K

Food
Redesigning food, from the field to leftovers
- How can we improve the experience around food?
- Burgeoning ecosystem around “revolutionizing food”
  - source (Hampton Creek, Beyond Meat)
  - delivery (DoorDash, GoodEggs, etc.)
  - consumption (Soylent)
  - leftovers (Too Good To Go)
- In this studio, students will focus on learning from the producers to the consumers and everyone in between to cook up valuable ideas
- Ripe with opportunity!
- Fri 10:30-12:20AM & Fri 1:30PM-3:20PM @100-101K

Fri 10:30-12:20AM & Fri 1:30PM-3:20PM @100-101K

Edwin Park

- CS Undergrad, CS Masters in AI & HCI
- Interested in designing better user experiences for artificial intelligence
- I like sports, especially speedskating
- Office Hours
  - Monday 2:30-3:30PM @Lathrop Tech Lounge
  - Wednesday 4:30-5:30pm @Lathrop Tech Lounge
- Friday 9:30-11:20AM @ 320-107
- Friday 1:30-3:20PM @ 160-321
Home
Making homes accessible from anywhere

The Internet of Things (IoT) is starting to integrate into our everyday lives, allowing us to control many physical devices, such as thermostats, refrigerators, and even sprinklers from our wrists or phones. How can you use technology to make homes more accessible? What are some daily tasks at home that could be automated and more efficient?

Friday 9:30AM-11:20AM, 1:30PM-3:20PM

Ash Ngu

- CS Undergrad + Art Studio Minor, CS Masters in HCI
- Interested in the intersection of art, media & technology
- I take photographs and cut hair
- Office Hours:
  - Tues 4:30-5:30p @ Huang Basement
  - Weds 3-4p @ Huang Basement

- Friday 12:30p-2:20p & 2:30p-4p @ 160-321

Art and Culture
Bringing creativity to our communities

Art and culture are integral to a vibrant, diverse, and cooperative community. Appreciation and engagement with art and culture spurs personal growth through self-expression and response, and brings people together over common values and shared experiences.

In this studio, we will build technology that enables people as creators, communicators, and empathetic citizens through engagement with arts and culture. We will seek opportunities where technology can complement our engagement with topics like literature, design, performance, music, journalism, visual arts, and with public spaces like community centers and organizations, libraries, museums, and historical sites.

Friday 12:30p-2:20p & 2:30p-4p @ 160-321

Kat Gregory

- CS Undergrad + CS Masters in AI/HCI
- Currently in a French Rural Village
- I run marathons and love travelling!
- Office Hours:
  - Tu/Th 12:30-1:30pm @Lathrop
  - Friday 8:30-10:20p @ 160-314
    Friday 10:30am-12:20pm @ 160-325

[Micro]Adventure
Help people get out there and adventure

Life’s about the journey, not the destination, yet too often the potential for adventure inherent in this journey is lost. The hunger to discover is easily forgotten in the clockwork treadmill of commutes and demands that powers the hamster wheel of the everyday. Even when actively pursued, the delight of exploration is often overwhelmed by a sea of stressful details regarding metro transfers, luggage, and language barriers. How can we design technology and lower the barrier to exploration? The section seeks design solutions that make it fun and easy to leave your comfort zone, explore new places, and invite others to live more adventurously.

Friday 8:30-10:20p @ 160-314
Friday 10:30am-12:20pm @ 160-325

John Yang-Sammataro (YS)

- BS CS Systems + MS CS HCI
- Spent last year in Asia, a warzone, and an entourage
- I like doing right, building teams, and exploring paths less traveled
- Office Hours: (May change)
  - Weds 3:00pm-4:00pm @ Huang Basement
  - Thurs 12:30pm-1:30pm @ Lathrop Tech Lounge

- Friday: 12:30pm-2:20pm @ 120-59
  2:30pm-3:50pm @ 200-219
Mixed Reality
Merging Real and Digital Worlds

How can we leverage mixed reality - the merging of real and digital worlds through AR/VR to solve current needs? Pokemon Go took the world by storm this summer, but mixed reality spans far more than just games: Have you navigated with Waze recently? Did you know you can virtually try out your IKEA furniture? Mixed reality is even used to build houses. Have you used a Snapchat filter lately?

We will work at the bleeding edge of mixed reality in human computer interaction design. This will be an opportunity to use some of the latest software tools and hardware. It will also require focus and discipline to design problems and needs at a scope that can be accomplished within the quarter.

Friday: 12:30pm-2:20pm @ 120-59
2:30pm-3:50pm @ 200-219

Human-Computer Interaction (HCI)
Approach to UX Design

Human
- the end-user of a program
- the others they work or communicate with

Computer
- the machine the program runs on
- split between clients & servers

Interaction
- user tells the computer what they want
- computer communicates results

Human-Computer Interaction (HCI) Approach to UX Design

"People change their knowledge as they perform, i.e., they learn."
Why is HCI Important?

- Major part of work for “real” programs — approximately 50%
- Bad user interfaces cost
  - money
    - 6% satisfaction → up to 85% profits
    - finding problems early makes them easier to fix
  - reputation of organization (e.g., brand loyalty)
  - lives (Therac-25)
- User interfaces hard to get right
  - people are unpredictable
  - intuition of designers often wrong

Who Creates UIs?

A team of specialists (ideally)

- graphic designers
- interaction / interface designers
- information architects
- technical writers
- marketers
- program managers
- test engineers
- usability engineers
- researchers (ethnographers, etc.)
- software engineers
- hardware engineers
- industrial designers
- customers

How to Design and Build Good UIs

- Iterative development process
- Usability goals
- User-centered design
- Design discovery
- Rapid prototyping
- Evaluation
- Programming

User Interface Development Process

1. Design Discovery
2. Design Exploration
3. Evaluate
4. Specification

- Customers, Markets, Business, Marketing
- Technical
- Legal
- Design
- Engineering

- Review & Iterate
- Work together to realize the design in detail
- Evaluate with Customers

Design Thinking Process

1. Empathize
2. Define
3. Ideate
4. Prototype
5. Test
Iteration At every stage!

Design
Design is driven by requirements
– what the artifact is for
– not how it is to be implemented
– e.g., phone not as important as mobile app

A design represents the artifact
– for UIs these representations include...
  • screen sketches or storyboards
  • flow diagrams/outline showing task structure
  • executable prototypes
– representations simplify

Usability
According to the ISO:
The effectiveness, efficiency, and satisfaction with which specified users achieve specified goals in particular environments

This doesn’t mean you have to create a “dry” design

Usability/User Experience Goals
• Set goals early & later use to measure progress
• Goals often have tradeoffs, so prioritize
• Example goals:
  – Learnable
    • faster the 2nd time & so on
  – Memorable
    • from session to session
  – Flexible
    • multiple ways to do tasks
  – Efficient
    • perform tasks quickly
  – Robust
    • minimal error rates
  – Discoverable
    • learn new features over time
  – Pleasing
    • high user satisfaction
  – Fun

User-centered Design
“Know thy User”
• Cognitive abilities
  – perception
  – physical manipulation
  – memory
• Organizational / educational job abilities
• Keep users involved throughout
  – developers working with target customers
  – think of the world in users’ terms

Design Discovery
Needfinding, Contextual Inquiry & Task Analysis
Observe existing practices for inspiration
Make sure key questions answered

Tuned CI participant
Tuned field work in record store
Concept Videos

- Illustrate context of use rather than specific UI
- Quick to build
- Inexpensive
- Forces designers to consider details of how users will react to the design
- More important when context is not traditional work scenario

Rapid Prototyping

- Build a mock-up of design so you can test it
- Low fidelity techniques
  - paper sketches
  - cut, copy, paste
- Interactive prototyping tools
  - HTML, SketchFlow, Balsamiq, Axure, proto.io, Sketch+Marvel, etc.
- UI builders
  - Expression Blend + Visual Studio, Xcode Interface Builder, etc.

Evaluation

- Test with real customers (participants)
  - w/ interactive prototype
  - low-fidelity with paper "computer"
- Low-cost techniques
  - expert evaluation
  - walkthroughs
  - online testing

Goals of the Course

1) Learn to design, prototype, & evaluate UIs
   - the needs & tasks of prospective customers
   - cognitive/perceptual constraints that affect design
   - technology & techniques used to prototype UIs
   - techniques for evaluating a user interface design
   - importance of iterative design for usability
   - how to work together on a team project
   - communicate your results to a group
   key to your future success

2) Understand where technology is going & what UIs of the future might be like

Course Format

- Interactive lectures ➔ you speak!
- Each week
  - 2 lectures on techniques & background
    • reserved 20-30 minutes team meeting each lecture ➔ you need to be here to work with your team
  - 1 studio hands-on activity or team presentation
- Quarter-long project
- Readings
- Course material will be online
  - slides, exercises, readings, schedule
  - no lecture video (a few from 2014 you can watch if needed)
- Have fun & participate!
How dt+UX Fits into CS Curriculum

• Most courses for learning technology
  – compilers, operating systems, databases, etc.

• dt+UX concerned w/ design & evaluation
  – technology as a tool to evaluate via prototyping
  – skills will become very important upon graduation
    • complex systems, large teams
    • don’t look for large immediate impact in other CS courses

Projects

• Each team will propose a UI-oriented project idea / team
  – fixing something you don’t like or completely new idea
  – based on team needfinding

• Theme
  – each Friday studio has a theme
  – all projects mobile/wearable

• Groups
  – 3-4 students to a group
  – work with students w/ different skills/interests
  – groups meet in class & studio weekly

• Cumulative
  – apply several HCI methods to one interface

Project Process (10 weeks)

• Break into teams (Fri)

• Needfinding
  – In studio presentations & critiques

• Experience prototypes
  – In studio presentations & project selection

• Concept videos
  – In studio viewing & critiques

• Low fidelity prototyping & user tests
  – In studio presentations & critiques

Project Process (10 weeks)

• Medium-fi prototype (using tools)
  – In studio presentations & critiques

• Heuristic Evaluation of medium-fi prototype
  – In studio group merge exercise

• High-fi prototype (code on target platform)
  – Half-way in studio presentations & critiques

• Poster presentations & demos at project fair with industry guests
  – Friday 12/9 6-9 PM
  – your participation is required

Project Process Timeline

Week 1: Needfinding
Week 2: Experience Prototypes & Testing
Week 3: Concept Video
Week 4: Medium-fi Prototype
Week 5: Low-fi Prototype
Week 6: Heuristic Evaluation
Week 7: Project Fair
Books

- *The Design of Sites* by van Duyne, Landay, & Hong
  - online copies of the 3-4 chapters we will use
- We will also hand out other papers, give you web links, & refer to lecture slides
- Recommended textbook

Assignments

- Individual
  - 1-2 presentations each
  - 1-2 written (handed in online)
  - *class & studio participation* (graded)
- Group
  - 10 assignments
  - 5-6 presentations with 3 write-ups + video + poster
  - all group work handed in online
  - team web site & online submission site
Grading

• A combination of
  – individual assignments & presentation (10%)
  – class/studio participation (10%)
  – midterm (20%)
  – group project (60%)
    • presentations/poster (group component)
    • project write-ups

• No final
  – must present at project fair on Fri., 12/9 instead

Tidbits

• Late Policy
  – no lates on group assignments
  – individual assignments lose one letter grade/day

• Course web site

• Studio preferences & team signups
  – https://goo.gl/RNKzJb
  – due Wed at 5 PM

Summary

• UX design is an important part of most of today’s software

• Getting the interface right is hard, but…

• Solution in *Iterative Design* including repeated cycles of
  – Design
  – Prototyping
  – Evaluation

Next Time

• Design Discovery
• Read
  – Holtzblatt & Beyer, Ch. 3 from *Contextual Design*