http://ihm.tumblr.com/post/105778492/word-cloud-for-hci-human-computer-interaction

CS5340
HUMAN-COMPUTER INTERACTION

Prof. Andrea Parker, PhD

www.ccs.neu.edu/course/cs5340

TODAY'S CLASS

- Course Overview
  - Service-Learning
- Assignments for next week
- Introductions Activity

----Quick Break----

- Overview of HCI
- Some basic concepts
- IDEO Video

Who Am I?

- B.S. || Northeastern || Computer Science
- Ph.D. || Georgia Tech || Human-Centered Computing

- Microsoft Research
  - Redmond, WA
  - Cambridge, UK

- Interests
  - How do people engage with technology?
    - Socially, culturally
  - HCI + health
    - Equity: SES + race/ethnicity
    - Mobile, Social, Expressive
    - Qualitative Methods

Teaching Assistants

- TA
  - Farnaz Irannejad Bisafar
    - irannejadbisafar.f@husky.neu.edu

- Service-Learning TA
  - Charlotte Gray
    - gray.c@husky.neu.edu

ADMINISTRIVIA

- www.ccs.neu.edu/course/cs5340

- Office Hours
  - 177 Huntington, #908, a.parker@neu.edu
  - By appointment

- Questions & Answers
  - Piazza:
    https://piazza.com/northeastern/fall2016/cs5340/home
- Announcements & homework submissions
  - Blackboard

ADMINISTRIVIA

- Required Text
  - *About Face: The Essentials of Interaction Design*
    - Fourth Edition (2014)
    - by Cooper, Reimann, Cronin, & Noessel **[CRC]**

  - *Interaction Design: Beyond Human-Computer Interaction*
    - Fourth Edition (2015)
    - by Preece, Sharp, Rogers **[PSR]**
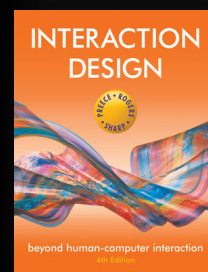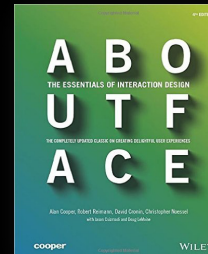
Administrivia

- Additional Readings: Blackboard
  - Research papers
  - Additional chapters
  - Etc.
  - Course Material → Readings

www.ccs.neu.edu/course/cs5340

COURSE OVERVIEW

Topics

- Covered in course
  - HCI theory
    - cognition, modeling user-system interaction, etc.
  - Design
    - interaction design (behavior) + visual design (look)
    - frameworks
  - Empirical Methods
    - Evaluation methods for whole lifecycle

  - Hands-on experience
    (You haven't learned it until you can apply it!)
  - Foundational HCI research
    - Theory, methods, systems

Topics

- On your own
  - GUI programming in your favorite language
- Prerequisites
  - Programming basics (or see me)

REQUIREMENTS

- Weekly Requirements
  - Read (and absorb!) 50-150 pages
  - Individual homework assignments
  - Team project assignments
  - Describe and discuss readings + assignments in class

- Periodic Requirements
  - In-class UX/UI Design Labs
  - Research paper circles
  - Present homework in class

TYPICAL CLASS

1. Admin
2. Hot Topics
3. (interactive) Lecture
4. Overview of next week's assignments

Break

4. Research paper circles & class discussion
5. Lab or homework presentation and discussion by students

Technology In Class

- Laptops/Tablets OK
  - If being used for class-related purposes
- No cell phones

- If using devices, expect to be called upon
- If seen using devices for unrelated purposes, will be asked not to use them in class

Piazza

- Message Board
  - piazza.com/northeastern/fall2016/cs5340

  - **Before sending me an email, post your question here first**
    - Other students may be able to answer the question
    - Others will benefit from the answer to the question

GRADING

- You want an A, I want you to have an A
  - Will require hard work, but it's acheivable

  - Superior, striking, or unexpected pieces of work with excellent effort demonstrating a mastery of the subject matter and a thoughtful use of concepts discussed in class; work that shows imagination, clarity of presentation, originality, creativity, effort, and attention to detail (A)

GRADING

- Good work demonstrating a capacity to use the subject matter, with adequate preparation and clear presentation (B)

- Work that is adequate but that would benefit from increased effort or preparation (C)

- Work that needs more effort (D)

Course Grade Breakdown

- Individual assignments (30%)
  - Each contributes equally
- Course Participation (10%)
  - Hot topics, engagement in class & online discussions, research paper written responses
- Labs (10%)
  - online responses

- Team assignments (T1-T5) (25%)
  - Each contributes equally
- Final prototype & report (T6) (25%)
  - 20% project grade from the instructor +5% peer evaluation

Re-Grade Requests

- Email a written justification for the request to the instructor
  - the aspect of the grade you disagree with,
  - why you believe the grade is incorrect—succinctly and clearly

- Re-grade requests could result in a lower grade being assigned.

Re-Grade Requests

- by the end of the class following the date that the instructor returns the graded material, *regardless of whether the student is in attendance.*

- **Re-grades will not be discussed in person on the date that they are returned.**

Writing Matters

- Writing assignments
  - judged on clarity of presentation as well as content
  - Proofread what you write
  - Have friends proof what you write
  - If you have trouble, visit the Northeastern University Writing Center

- Plagiarism results in a 0; 2nd instance: F in the course
  - OSCCR

WHAT IS PLAGIARISM?

- Northeastern University definition: "intentionally representing the words, ideas, or data of another as one's own in any academic exercise without providing proper citation."

- You must use a citation when
  - Using, word-for-word, text found in other sources (online, in books, etc.)
    - You **must** also use quotations here

  - Paraphrasing (summarizing) others' ideas, information found online/books/etc.

  http://www.northeastern.edu/osccr/academicintegrity

  http://www.princeton.edu/pr/pub/integrity/pages/cite

WHAT IS PLAGIARISM?

- You must use a citation when
  - Describing facts that are not widely known/recognized
    - "We live on planet earth."
      - No citation needed, common knowledge
      - http://www.princeton.edu/pr/pub/integrity/pages/notcommon/

    - "Close to 80% of children eat fewer than the recommended servings of fruit and vegetables each day[1]"

      - [1] Grunbaum JA, Kann L, Kinchen SA. et al. Youth risk behavior surveillance—United States, 2001. *MMWR Surveill Summ.*2002;51:1-62.

    - When in doubt, cite!
    - **Your reports require citations**

What is Plagiarism?

- Essay websites are NOT acceptable sources

- For help: Writing Center
  www.northeastern.edu/english/writing-center

- No tolerance
  - first instance: 0%
  - second instance: F in this course

- Report to OSCCR
  - Potential expulsion

  http://www.northeastern.edu/osccr

Cheating

- Programming Assignments
  - Must acknowledge:
    - graphics
    - sound
    - code

COURSE OBJECTIVES

- By the end of term, you should be able to…
  - Describe and apply user-centered design methods to conduct formative and summative evaluations.

  - Explain and apply core theories and models from the field of HCI.

COURSE OBJECTIVES

- Design and implement useful, usable, and engaging graphical computer interfaces.

- Discuss and critique research in the field of HCI.

- Describe special considerations in designing user interfaces for civic innovation.

Class Participation

- Full participation is a critical part of your learning experience.
  - class discussions, exercises, and your classmates' projects
  - come to class fully prepared (e.g., read all course readings, ready with insights, etc.)

- May be called on even if your hand isn't raised
  - So, in your best interest to be prepared!

RESEARCH PAPER CIRCLES

Reading Research Papers

- Different from reading a textbook?

- Read critically
  - Don't assume author is right! Be suspicious
  - Ask questions, challenge rationale, reasoning, conclusions
  - Scientific contribution
- Read creatively
  - Harder
  - What are the good ideas and how could you take them a step further? Build + improve on them?

Reading Research Papers

- Compare to other papers
- Make notes
- Come to class with at least 1 question + insight

RESEARCH PAPER CIRCLES

- Discuss paper in small groups
  - Summarizer
  - Methods & Results Analyzer
  - Connector: Practice
  - Connector: Research

- Each week, one group will lead the class in a larger discussion

RESEARCH PAPER REFLECTIONS

- Each week with a research paper assigned
  - Blackboard prompt: Discussion board
  - Response due by start of class on the day the research paper is discussed
  - Contributes to class participation grade

LABS

LABS

- Chance to try out concepts learned through reading
- Lab reflections
  - Due Friday by 6pm following the lab (unless otherwise noted)
- Grading
  - A (100%)
    - exemplary work, shows skillful application of concepts
  - B (85%)
    - good work, shows some ability to put concepts into practice
  - F (0%)
    - unacceptable, e.g., no work submitted, or academic dishonesty detected
- Must notify myself & TA of absence *before class*

HOT TOPICS

Hot Topics

- 5-min presentation
- a **recent**
  - commercial product, research innovation, news article, or blog post related to human-computer interaction
- Your presentation **must**
  - discuss the hot topic and its relevance to HCI,
  - explicitly discuss relationship to course readings discussed in class
  - finish in 3-4 minutes
  - use the projector to provide a visual that illustrates the hot topic you are discussing.
- Counts towards class participation grade

HOT TOPICS

- Places to start
  - http://blog.experientia.com
  - http://designmind.frogdesign.com
  - http://uxmag.com
  - http://beautifulpixels.com
  - http://uxmovement.com
  - http://www.uxbooth.com
  - https://www.smashingmagazine.com/category/design/
  - https://techcrunch.com
  - http://arstechnica.com

HOT TOPICS

- Counts towards class participation grade
  - A (100%)
    - exemplary work, shows skillful ability to describe HCI concepts, critique user interfaces, research, and/or practice
  - B (85%)
    - good work, shows some ability to describe HCI concepts, critique user interfaces, research, and/or practice
  - C (75%)
    - average work, shows significant weaknesses in ability to describe HCI concepts, critique user interfaces, research, and/or practi
  - F (0%)
    - unacceptable, e.g., no work submitted, or academic dishonesty detected

Major focus of course

Half of your grade

TEAM PROJECT

TEAM PROJECT GUIDELINES

- Design & evaluate a UI that…
  - …solves real-world problems
    - home buying
    - connecting citizens to government services

- HCI design cycle
  - Evaluate + Design + Prototype + Evaluate

New Urban Mechanics

explores how "new technology, designs and policies can strengthen the partnership between residents and government and significantly improve opportunity and experiences for all"
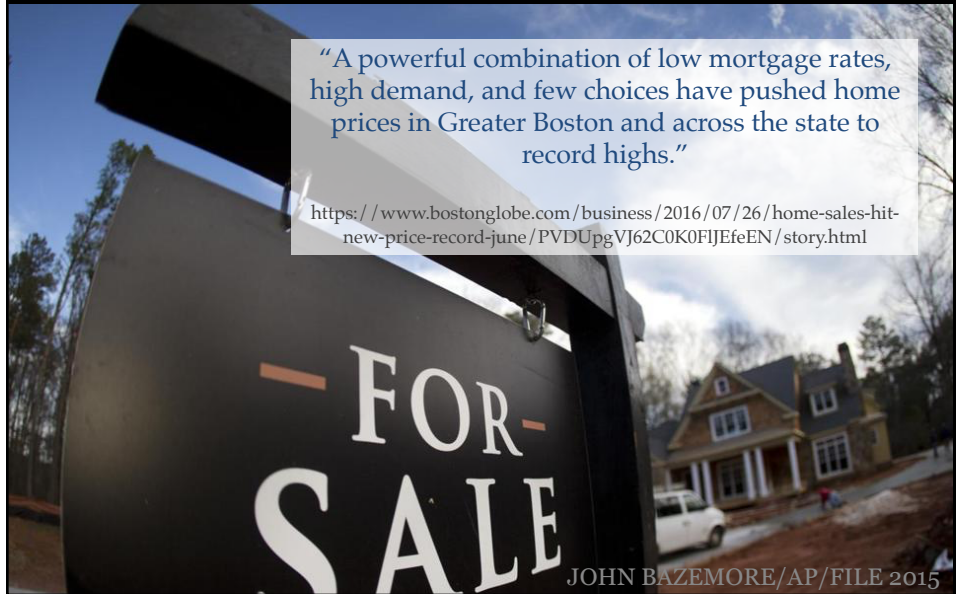
New Urban Mechanics

Catalyzing civic participation
improving streets
increasing educational outcomes
supporting housing stability + ownership

BOSTON HOUSING MARKET

"A powerful combination of low mortgage rates, high demand, and few choices have pushed home prices in Greater Boston and across the state to record highs."

https://www.bostonglobe.com/business/2016/07/26/home-sales-hit-new-price-record-june/PVDUpgVJ62C0K0FlJEfeEN/story.html

JOHN BAZEMORE/AP/FILE 2015

BOSTON HOME CENTER

- Support for
  - Home purchases
  - Improvements
  - Stability (avoiding foreclosures)
- Training & financial help
  - First-time home buyers
  - Classes

MONUM & Boston Home Center

- Project Brief
  - Many challenges
    - Complex process
    - Very competitive
    - Lack of knowledge
    - Financial uncertainty
    - Lack of a trustworthy team
  - Create an app to help overcome those challenges
    - In concert w/classes

Team Project Guidelines

- Your goal
  - Design a home-buying planner app to
    - support those curious, planning, or buying
    - Enable citizen access to government-provided knowledge and resources

- Your project MUST
  - Have a substantial UI
  - Be interactive
  - Work robustly
  - Address the problem chosen for this course
    (connecting citizens with government resources to overcome challenges in the home buying process)

Team Project Guidelines

- Your project SHOULD
  - Be creative
  - Be original
  - Be non-obvious
  - Have a "wow" factor

- Allow you, at the end of this course, to leapfrog your peers with an amazing demo!

Team Project Constraints

- Mobile web application that

- Languages
  - Your choosing

TEAM PROJECT

- Final Showcase
  - You
  - MONUM & Boston Home Center Staff

- Contributing to ongoing research project
  - Technology for civic innovation & wellbeing

TEAM PROJECT
WHY MONUM?

- User-centered design complexity
  - UI + information design that helps lay people comprehend and act upon information about a complex domain

  - Designing one interface that meets the needs of different demographics
    - Low – middle – high income
    - Curious – planning – buying

Team Project
Why MONUM?

- User-centered design complexity
  - Design for interactions amongst stakeholder groups with different priorities, values, knowledge, and skills

  - Keeping users engaged in a process that can be overwhelming, arduous and intimidating

Team Project
Why MONUM?

- And…
  - Civic technology: a domain of increasing visibility
    - Citizen-government engagement
    - Community action
    - Open government

EMPIRICAL STUDIES

- Be prepared to get out into the real world
  - observing and testing "in the field"

- Interact w/ everyday people who may not be tech savvy

- Sensitivity is of utmost importance!

PROJECT IDEA GENERATION

- Brainstorming
- Observation
- Iteration
- Be prepared:
  - To get a good idea, have lots of ideas
  - Do not be surprised if I send you back to the drawing board multiple times

SERVICE-LEARNING

- Form of experiential learning intentionally linking course learning objectives with service

- Mutually beneficial

- Design for users who are likely different from yourself

Computer-Human Interaction

Fall 2016

Charlotte Gray
Service-Learning Teaching Assistant

Northeastern University
Center of Community Service

What is Service-Learning?

- Form of experiential learning intentionally linking course learning objectives with service
- Offered in 52 courses across all colleges
- Form of experiential learning as a teaching/learning tool – hands-on application of class concepts to real societal problems/issues for greater understanding of class material

How does it work?

Mayors Office of New Urban Mechanics – Housing Innovation Lab

   - Three main phases:

1. Conduct needs assessment through interviews
2. Address specific needs from phase 1 by creating prototype solutions
3. Conduct evaluation of prototypes using user-centered design methods

   - Research/evaluation of data gathered from interviews

9/7/16

My Role as your S-LTA

- Be the liaison
- Act as a project manager/logistics coordinator
- Resource for students, community partner, and professor
- Help/participate in research component of project

Contact me:

- *Email*: gray.c@husky.neu.edu
- *Office Hours:* TBD, 232 Hastings Hall/YMCA
- Questions on Piazza

Service-Learning Information

- Friday, September 16th 10-2pm: Volunteer Fair

- Saturday, October 15th: NU Service Day

- Thursday, December 8th 10-11:30am: Fall 2016 S-L Expo 10-11:30am in Curry Student Center

#NUServiceLearning

f /ServiceLearningNU

🐦 @NU_SLearning

📷 @NU_SLearning

S-LOG SLOGatNU.com

Service-Learning at Northeastern

ASSIGNMENTS
FOR NEXT WEEK

Begin T1

- Read through T1 (on website)

- **Due 9/9 @ 6pm**
  - Find a team
  - Email Prof. Parker & the TAs your team names + email addresses

T1

- Team constraints:
  - 4 members (will have a couple 3-member teams)
  - At least 2 teammates should have experience with the same web languages

T1

- Team formation
  - Form in-class
  - And on Piazza
    - Post your technical background/PL preferences
    - UI design + development experience
    - Visual design experience
    - Health/Wellness expertise
    - Methods: qualitative research / design fieldwork?
- Begin background reading

HUMAN SUBJECTS PROTECTION

- Complete training
  - www.northeastern.edu/research/hsrp/training/
  - protection of study subjects
  - ethics
  - by 9/14, 6pm

Also for next week

- Sign up for Piazza
  - https://piazza.com/northeastern/fall2016/cs5340/home

- Read
  - Interaction Design (PSR Chapters 1, 7)
  - Interviews (Patton, on blackboard)
    - Focus on pp 427-428, 439-442, 444-474

Introductions

- Find a partner you do not know
  - 7-minute interview
  - Switch, 7-min interview
- Report back to class w/an introduction

Human-computer interaction is a discipline concerned with

the **design, evaluation and implementation** of **interactive** computing systems for **human use**

and with the study of **major phenomena surrounding them**.

ACM SIGCHI Curricula for HCI

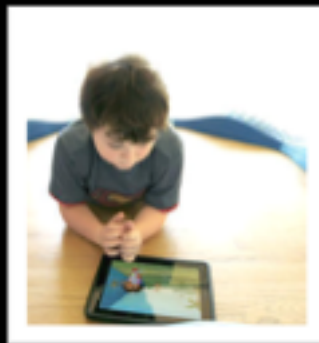# WHAT IS HCI?

What is HCI?

Ethnography

Robotics

Graphics

Human factors

Social Psychology

Computational Linguistics

Cognitive Psychology

Software engineering

Communications

Experimental Methods

Art/Design

What is HCI?

- Interactive computing design & development
  - GUIs
  - Mobile & ubiquitous computing
  - Speech interfaces
  - Touch interfaces
  - Social computing
- Empirical studies of UIs
  - Qualitative, quantitative, mixed, design-based

What is HCI?

- Design… but what do we mean?
  - Interaction Design
    - "creating **user experiences** [with and through interactive computing] that enhance and extend the way people work, communicate and interact"
    - What's on the screen, but more…
    - Empirical study + design ideation + UI programming + graphic design

What is HCI?

- How can we know if a UI is a good one?
- Usability
  - Objective measures
  - Perceived utility, ease of use and efficiency + much more
- and what else?
  - User *Experience*
    - Users' subjective engagement with technology
    - affect, meaning, values, how a system *feels*
    - Satisfying, enjoyable, motivating, aesthetically pleasing, rewarding, etc.

WHY STUDY HCI?

HCI is Important: cost

- Redesign insurance forms to reduce customer errors
  - cost Aus$100,000
  - savings Aus$500,000/year.

- Study of software engineering companies
  - 63% significantly overran budgets
  - Mainly due to usability issues:
    - Frequent change requests by users
    - Overlooked tasks
    - Users' lack of understanding of their own req'ts
   - Insufficient user-analyst communication & understanding

FROM NIELSEN – USABILITY ENGINEERING

HCI is Important: revenue

- UI strongly affects perception of software
- Usable software sells better
  - "Ease of use" ratings
  - Users want to engage with it
    - Meet values, needs

HCI is Important: safety

- "Users' behavior is directly influenced by operating characteristics of the equipment; user interfaces that are misleading or illogical can induce errors by even the most skilled users"

- Many deaths and injuries attributable to poor human interface (hardware & software) design.
  - oxygen flow control knob: problem?
  - smooth rotation but with discrete settings and no flow at intermediates
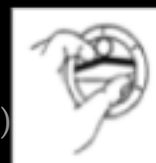
FDA Center for Devices and Radiological Health report

HCI is Important: safety

- Study of a hospital computerized physician order entry system (CPOE)

  - Identified 22 ways in which the system caused patients to get the wrong medicine, e.g.
    - fragmented displays that prevent a coherent view of patients' medications

3/4 of the staff reported observing each of these error risks, indicating that they occur weekly or more often

JAMA. 2005;293:1197-1203

HCI is Important

"A UI that is unattractive, convoluted, or illogical can make even a great app seem like a chore to use.

But a beautiful, intuitive, compelling UI enhances an app's functionality and inspires a positive emotional attachment in users."

– Apple iOS Developer Library

HCI is Transformational

HCI is Transformational

HCI is Transformational

HCI is Transformational

More Reasons to Work in HCI?

- Interdisciplinary work
- Interact with people, learn about them and their work
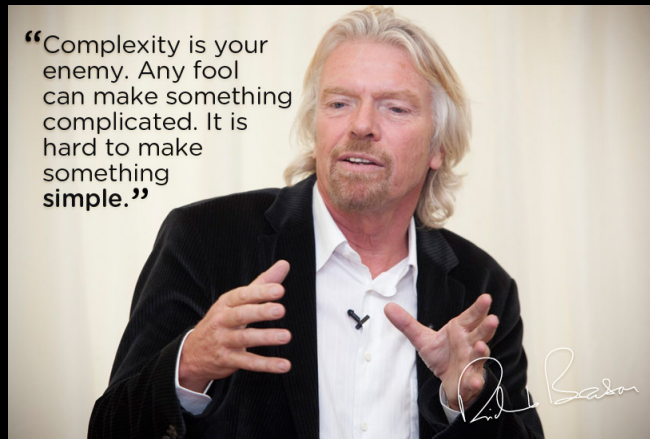- Help people with software that actually works
- Change our industry
- It's cool…

HCI is Cool

Some Basic Issues & Concepts

- Building good UIs is hard

"Complexity is your enemy. Any fool can make something complicated. It is hard to make something **simple.**"

SOME BASIC ISSUES & CONCEPTS

- Building good UIs is hard
  - Understanding people
  - Determining what's "intuitive"
  - Many iterations
  - Much user interaction
  - Many kinds of expertise
  - Dreaming up new frontiers of interaction
  - 45-50% of the design + implementation effort in modern software; 48% of code
    Survey of 74 projects, Myers & Rosson, CHI'92

SOME BASIC ISSUES & CONCEPTS

- Building good UIs is hard
  - Complex tasks & domains
  - Balancing trade-offs
    - Standards (style guides)
    - Competing design principles
    - Aesthetics
    - International audiences
    - Time
    - Contextual constraints / cultures

To Do for Next Week

1. Sign up for Piazza
2. Do Human Subjects Research Protection training
3. Read
   - PSR Ch 1,7
   - Patton
     - Focus on pp 427-428, 439-442, 444-474
4. T1
   - Read through instructions
   - By 9/9 @ 6pm
     - Form teams
   - Start background readings