CSE 118 / 218
Ubiquitous Computing
Software Engineering

Instructor: Nadir Weibel

TAs: Vincent Chan, Ruchika Shivaswamy
Who am I?

• Originally from Southern Switzerland (Ticino)
  • Languages: Italian (native), German, French, English and Spanish (basic)

• BSc. and MSc. in Computer Science and Engineering from ETH Zurich (Switzerland)

• PhD. in Computer Science (2009) from ETH Zurich

• Researcher and Lecturer at UCSD in Cognitive Science and Computer Science since 2009
UCSD

- Research Faculty in CSE
  - Ubiquitous Computing and Social Dynamics Research Group
    UCSD@UCSD (http://ubicomp.ucsd.edu)
  - Human-Centered and Ubiquitous Computing Lab (HCC-Ubicomp, CSE 2219)

- Affiliated Faculty in CogSci
  - Distributed Cognition and Human Computer Interaction Lab (http://hci.ucsd.edu)

- Affiliated Researcher with Calit2
  - Center for Wireless and Population Health Systems (http://cwhps.ucsd.edu)
  - The Design Lab (http://designlab.ucsd.edu)

- Research Health Science Specialist at VA San Diego
Ubiquitous Computing

The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.

Mark Weiser
Ubicomp

Ubicomp is an interdisciplinary field that includes technologies that bridge the digital and physical worlds, systems and applications that incorporate such technologies, infrastructures that support them, human activities and experiences these technologies facilitate, and conceptual overviews that help us understand – or challenge our understanding of – the impact of these technologies.
Themes, Applications

- Sensing (temperature, location, emotion, energy)
- Activity recognition (e.g., walking/driving)
- Context-awareness (e.g., smart homes)
- Ambient displays
- Security, privacy
- Social interaction, communication
- Health
- Education
- ICT4D (developing regions)
- Environment
Research Question

How do we best enable access to information in the right way, at the right time and for the right user and situation?
Research Aims

To develop technology that supports knowledge workers’ and end-user’s fluid interaction with information in hybrid physical/digital information spaces.
Chroma - CSE118 (2013)

Chroma: A Wearable Augmented-Reality Solution for Color-Blindness

Presented at Ubicomp 2014, Seattle WA. Best Paper Award Nominee
The Course: Logistics

• Lecture (research topic)
  Thu 2:00pm - 3:20pm, EBU3B 2154

• Discussion (paper discussions in groups)
  Tue 2:00pm - 3:20pm, EBU3B 2154, 2217, 3217

• 12 Hybrid Project Teams (CSE 218/118)

• Team meet-ups (starting week 2) Mon-Fri
  6.00pm-8.00pm, EBU3B (CSE Building) 2109, 3109, 4109

• Web page: http://ubicomp.ucsd.edu/cse118-218
  (temporary: http://weibel.ucsd.edu/ubicomp/cse118-218)

• Piazza: http://piazza.com/ucsd/fall2015/cse118cse218
  > Register today! (group discussions, team formation)
The Course: Academic Preparation

• Directly engage the research literature
  • A good look at the future

• Participatory, loosely structured
  • Mold this course to your interests
  • Get out of it what you put in

• A peek at what grad school could be like, and a preparation for it
  • Analytical thinking, communicating ideas, teamwork
  • Even if you’re not considering grad school…
The Course: Inquiry-based learning

- Lecture on the technology of the week on Thursday
  - Mini-quiz to test understanding of lecture and readings (118)
  - Presentations (218)
- Seminar style, roundtable discussion on Tuesdays
  - You must come prepared for class to discuss
  - We will have some visitors give talks, demos
- Research project
  - 12 groups (5 people) across CSE 118 and 218
  - Experimental hybrid class undergrad/grad
  - Graduate students will additionally lead project management
- The general structure for this course is learning by doing, with help
The Course: Paper Discussion

- Every week a new theme / topic
- Read and annotate ALL the papers for class
  - Dig into background reading if need/want
  - Bring questions to class (more important than answers)

- Take notes
  - Pick one of the readings
  - Fill out the form
    (see “How to read and engineering paper” on web)

- Jump into discussion!
  - Volunteer when you’re ready, be polite but assertive
  - Show respect, encourage balanced participation
  - If you’re late, you can’t participate
Reading / Discussion Evaluation

- How will I grade discussion?
  - quality, not quantity
  - ideas and critique supported by evidence
  - helping group perform at high level (teamwork)

- *How to Read and Engineering Paper*
  - Use reading rubric to frame your note-taking
  - Structure discussion around participation rubric

- Hand-in your marked paper for evaluation
- Answer the summary questions
- Evaluation is based on the available rubrics
The Course: Research Projects

- We will introduce themes next week
- Must be important
- Must be impactful
The Course: Research Projects

- Three Ubiquitous Computing Devices (thanks Moxie Foundation!):
  - The eye-tribe remote eye-tracker
  - MS Kinect
  - Google Glass

- Your own innovative idea
The EyeTribe Eye-Tracking

http://theeyetribe.com/
Kinect
Google Glass

10:42

"ok glass"

ok glass, google...
Ask a question

Web results for awesome

awesome
The Course: Research Project

• Define a team project (3 undergrads, 2 grads) to explore ubiquitous computing
  • Usefulness, scalability, cost, how, effects…
  • Not necessarily big, but insightful or useful
• Come up with own idea or build on existing work
• Goal: having a working prototype by the end of the quarter
  • something that you can demo!
• The best project will participate to the CHI or Ubicomp Conferences
The Course: Living it

- Live the UbiComp lifestyle
- Go mobile: laptop, tablet, smart phone, smart watch…
- Web 2.0: facebook, twitter, …
- Put a small “public display” up at home
- Read about it
  - Subscribe to an RSS feed, mailing list, or magazine
  - ACM TechNews: http://www.acm.org/technews/
  - Wired: http://www.wired.com
- Observe it, talk about it, bring it into discussion
- It’s everywhere around you
Web Page

Syllabus

BACKGROUND AND INTRODUCTION

The advent of affordable sensors and interaction devices (e.g., web cams, mobile phone based sensors, digital pens, Microsoft SenseCam, Microsoft Kinect, Google glasses, portable eye-tracking, etc.) and wireless mobile computing devices (e.g., mobile smart phones, Arduino boards with 802.11b wireless connectivity, etc.) has created boundless opportunities for in-the-world computing applications that can transform our lives.

This course explores these opportunities in the form of both a project-based class and a preparatory course for graduate school. On the one hand we will focus on the development of specific applications and interaction techniques based on those devices. On the other hand, we will learn how to read, present, and discuss research papers from the literature of ubiquitous computing, pervasive computing, and human-computer interaction.

OVERALL PLAN

Every week a new ubiquitous computing concept or device will be introduced and we will discuss the technology behind it, and how it has been used in research (i.e. reading and discussing technical and research papers). In addition we will form teams to undertake small research projects.

The projects will involve the design and implementation of a ubiquitous computing application, based on one of the devices presented in class. We will focus on three technologies: Google Glass, Microsoft Kinect, and the EyeTribe eyetracking. Teams will span CSE 218 graduate students and CSE 118 undergraduates. While both graduate and undergraduate students will work on the development of the applications, graduate students will take an additional leadership and management role in the project.

WEEKLY SCHEDULE

On Thursdays we will introduce new ubiquitous technology, or software engineering techniques, learn about how they work and what can be done with them.

On Tuesdays we will discuss research literature in HCI and Ubicomp. Students will be assigned 2-3 papers to read and understand. In class students will be divided in different groups and rooms to discuss the specific research topics, and will be engaged in continuous self and peer evaluations.

Every team will be required to meet on a regular base every week in one of the CSE-assigned rooms between 6pm-8pm. Work should be done also in other locations and at other times, but the instructors team will be popping into the rooms during the evening time to check on progress and offer advice and help.

WEEKLY TOPICS

Week 01: Introduction to Ubicomp
Week 02: Microsoft Kinect and Depth Cameras
Week 03: Google Glass and Augmented Reality
Week 04: Eye-Tracking and Accessibility
Week 05: TBD
Week 06: TBD
Week 07: TBD
Week 08: TBD
Week 09: TBD

SCHEDULE

Lecture
CSE 218: 2pm-2.40pm
CSE 118: 2.40pm-3.20pm
EBUS (CSE Building) 2154

Group Discussions
CSE 118-218: 2pm-3.20pm
Group A: EBUS (CSE Building) 2154
Group B: EBUS (CSE Building) 2217
Group C: EBUS (CSE Building) 3217

Teams meet-ups (required):
Mon-Fri 6pm-8pm.
EBUS (CSE Building) 2109, 3109, 4109 (see separate page for team assignments)

TEACHING TEAM

Prof. Nadir Weibel
Email: weibel@ucsd.edu
Office: CSE 3224
Office Hours: By Appointment

Vincent Chan (Head TA)
Email: vlich@eng.ucsd.edu
Office Hours:
When: TBD
Where: TBD

Ruchika Shivashawamy (TA)
Email: rshivash@eng.ucsd.edu
Office Hours:
When: TBD
Where: TBD

COMMUNICATION AND EXTERNAL RESOURCES

Piazza: http://piazza.com/ucsd/fall2015/cse118/cse218
GitHub: TBD
Gradescope: TBD
TED: TBD
Visions (I)

UBIQUITOUS
COMPUTING

Xerox Parc, 1991
Visions (2)

Microsoft, 2011
For Next Week

• Register on Piazza and start discussion on groups

• Read course website, especially:
  • How to read an engineering paper
  • Structured form for reading a paper
  • Note taking rubric
  • Participation rubric
Group Formation

- Start NOW to talk with your peers about common interests and cool ideas
- Groups can be heterogeneous, not everybody needs to do hardcore programming, but groups need also designers, managers, etc. Some of you are from outside CSE
- Use Piazza, remember that groups will have to be across CSE 118 and CSE 218
- If you have a good idea, send me a short description and perhaps a sketch I will present it next week during class
- Look on the web for what other people already did (as inspiration only: you should do something new)
Thank you!