User Interface
Software & Technology

HCID 520
User Interface Software & Technology
Monday afternoon

December 9

3:45 p.m. / arena

Chairman:
Dr. D. C. Engelbart
Stanford Research Institute
Menlo Park, California

A research center for augmenting human intellect

(1968)
Engelbart’s Vision

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2. Any serious effort to make the world better requires some kind of organized effort;
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4. If you could dramatically improve how we do that, you'd be boosting every effort on the planet to solve important problems—the sooner the better;
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3. Harnessing the collective human intellect of all the people contributing to effective solutions was the key;
4. If you could dramatically improve how we do that, you'd be boosting every effort on the planet to solve important problems—the sooner the better; and
5. Computers could be the vehicle for dramatically improving this capability.
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What did Engelbart anticipate?
The NLS Demo includes...

Personal Computer (→ Apple)
Graphical Interface + Mouse (→ Xerox, Apple)
Hypertext (→ WWW, Berners-Lee)
Text, Structured Data Editing (→ Word, Office)
Networked Computing (→ Ethernet, Internet)
Video Conferencing (→ Skype, FaceTime)
Synchronous & Asynchronous Collaboration (→ Email, “Web 2.0”, Google Docs, etc)
Apple Knowledge Navigator Concept Video
Navigator Video (1987)
iPhone (2007)
Siri (2011)
Sun Microsystems “Starfire” Concept Video
...this vision, from an interaction perspective, is not visionary. It's a timid increment from the status quo, and the status quo, from an interaction perspective, is actually rather terrible.

- Bret Victor
compared to....

“Pictures Under Glass”
Beyond Being Here
[Rather than approximately imitate face-to-face interaction] we must develop tools that people prefer to use even when they have the option of interacting in physical proximity as they have heretofore. To do that requires tools that go beyond being there.

- Hollan & Stornetta, *Beyond Being There*
This talk is about a particular kind of media, which is 'media for thinking in.' And it's about a particular kind of thinking, which is understanding systems.

"Science" is understanding a system in the world. "Engineering" is building a system in the world, where the challenge is often understanding what's being built.

Media are our thinking tools. Our representations of a system are how we understand it.

To understand or build new complex systems, we need powerful new representations, and we need a powerful new medium in which to work with these representations.

Today's representations were designed for the medium of paper. This talk will show examples of new representations for systems, and offer hints as to what a new medium might be like.

Summary of the principles and examples presented in this talk.

All of the examples I've shown here are hints. They are nibbling at the corners of a big problem — what is this new medium for understanding systems?

We must get away from pencil-and-paper thinking. Even when working on the computer, we still think in representations that were invented for the medium of paper.

Especially programming. Programming languages are written languages — they were designed for writing.

We have an opportunity to reinvent how we think about systems, to create a new medium. I don't know what that medium is, but if you'd like to help find it, let me know.
HCID 520
Course Structure
Course Goals

This course is designed to provide a rapid immersion to best practices, tools and applications for prototyping in HCI+D.

We will cover foundational topics in user interface prototyping and development, including the software architectures used to implement user interfaces.

You will gain skills for UI conceptualization, implementation and design collaboration.
Topics by Week

1. User Interface Toolkits
2. Prototyping Dynamics & Tools
3. Spatial Layout
4. Graphics & Animation
5. Pointing & Text Entry
6. Web Development
7. Touch & Gesture
8. Accessibility
9. Sensor-Based Interaction
10. Social Computing
Instructors

Jeffrey Heer
Associate Professor, UW CSE
Co-Founder & CXO, Trifacta
Office Hours: Tue 2:30-3:30, 642 Allen Center

Arvind Satyanarayan
PhD Student, Stanford Computer Science
Co-Founder & Advisor, Apropose
Office Hours: Mon 10:30-12, 674 Allen Center
Class Sessions

**Tuesdays**  Lecture
Read *required* readings, skim *optional* ones
Submit a discussion question by 8am Tues
*(Except for this week! Submit by 8am Thur)*

**Thursdays**  Tutorials & Exercises
Prototyping and skill development
Involves web development (HTML/CSS/JS)
Due the following Monday by 5pm
Schedule

Week 1

Tu 1/5  User Interfaces: Past, Present & Future
- REQUIRED A Research Center for Augmenting Human Intellect (“The Mother of All Demos”). Douglas Engelbart, Bill English. 1968. video
- Optional Media for Thinking the Unthinkable. Bret Victor. 2013. html

Th 1/7  Toolkits, Exercise: Widget Design

Week 2

Tu 1/12  Prototyping
Grading

**Class Participation** (13 points)
10 discussion questions (1 point each)
Participation in class discussions (3 points)

**Exercises** (72 points)
9 prototyping exercises (8 points each)

**Final Exam** (15 points)
An open book, open slides test

100 points total
Discussion Questions

Due 8am the morning of a lecture day. Submit using the Canvas course site. You have one pass for the quarter.

**Good discussion questions** often stem from:
Critiques (positive or negative) of arguments
Analysis of implications or future work directions
Questioning foundational assumptions
Clarification of unclear statements or definitions
Comparison of competing approaches
Questions?
Read the assigned paper on UI toolkits. It’s OK if some concepts are unfamiliar. Feel free to post questions on canvas! Submit a discussion question by Th 8am.

Read the description for Exercise 1. We will post the exercise soon and send out an announcement.