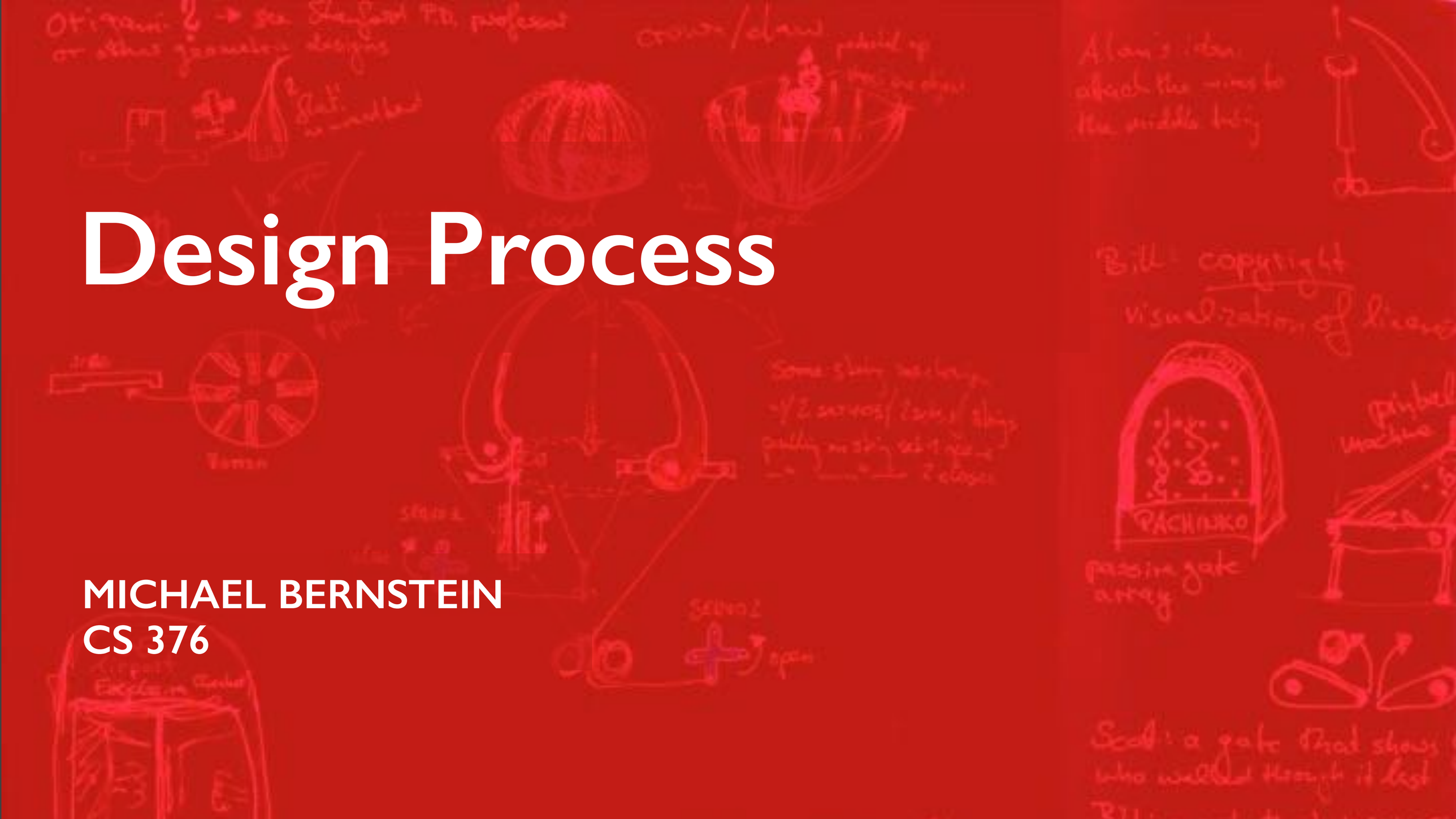
Design Process

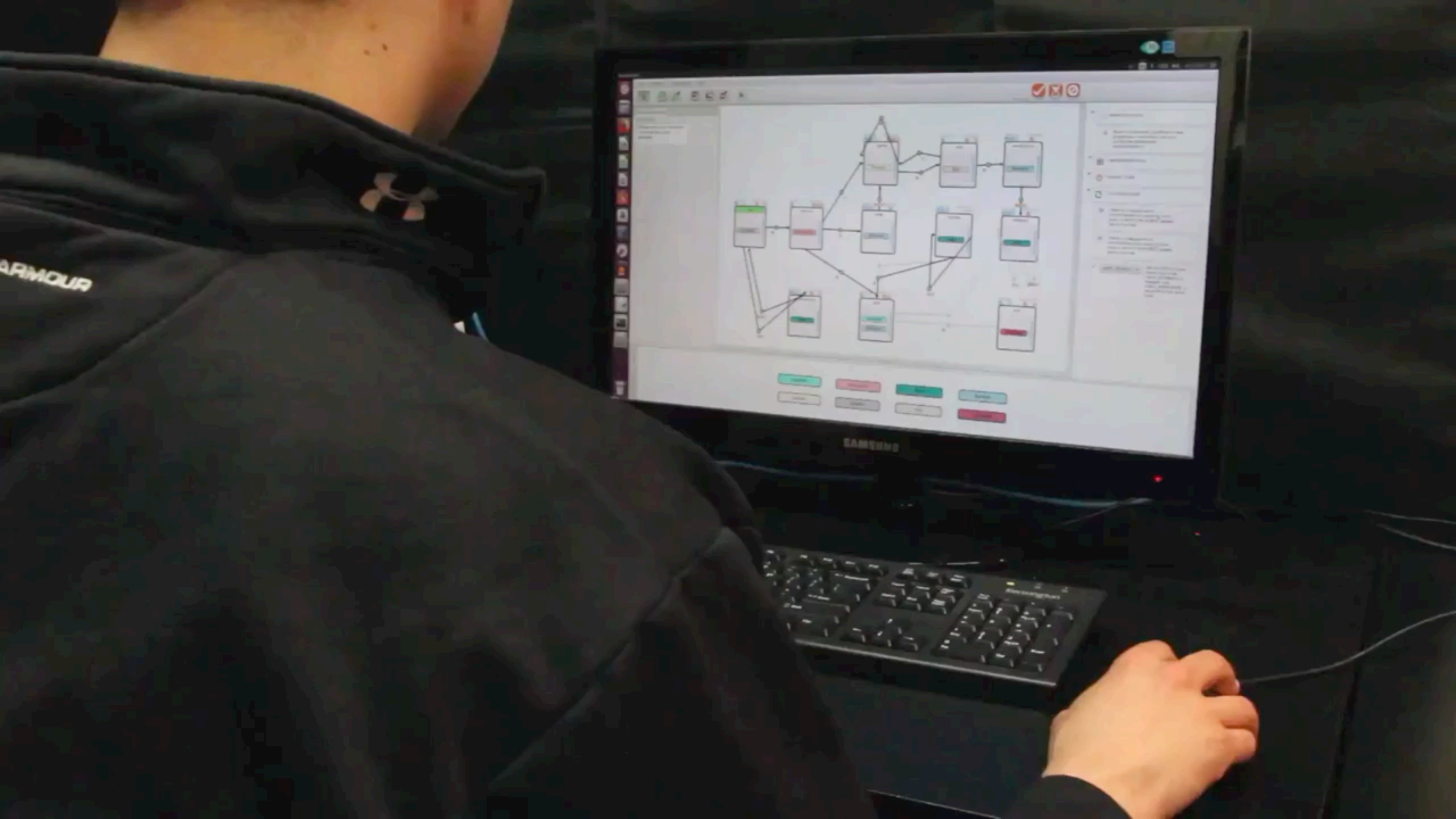


MICHAEL BERNSTEIN
CS 376

Course Overview

INTRO	week 1	Intro to Interaction; Intro to Social Computing
	week 2	Intro to Design; Interaction
DEPTH	week 3	Interaction; Social Computing
	week 4	Social Computing
	week 5	Design
BREADTH	week 6	AI+HCI; Media
	week 7	Foundations
	week 8	Access; Programming
	week 9	Collaboration; Visualization
	week 10	Education; Critiques of HCI

…but first, UIST.



I/O Braid

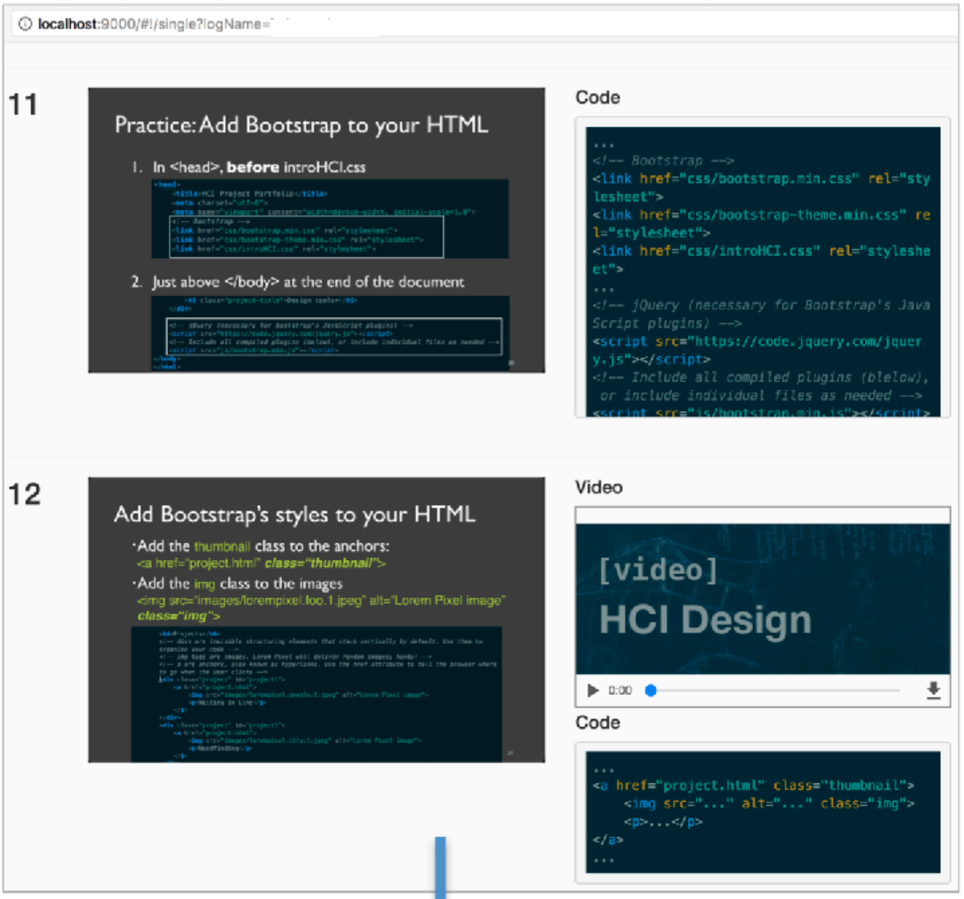
Scalable Touch-Sensitive Lighted Cords Using Spiraling, Repeating Sensing Textiles and Fiber Optics

Alex Olwal
Jon Moeller
Greg Priest-Dorman
Thad Starner
Ben Carroll

Interaction Lab
Google Inc.

olwal.com/iobraid

Take any existing tutorial webpage, such as this one with step-by-step instructions, code examples, & video clips:



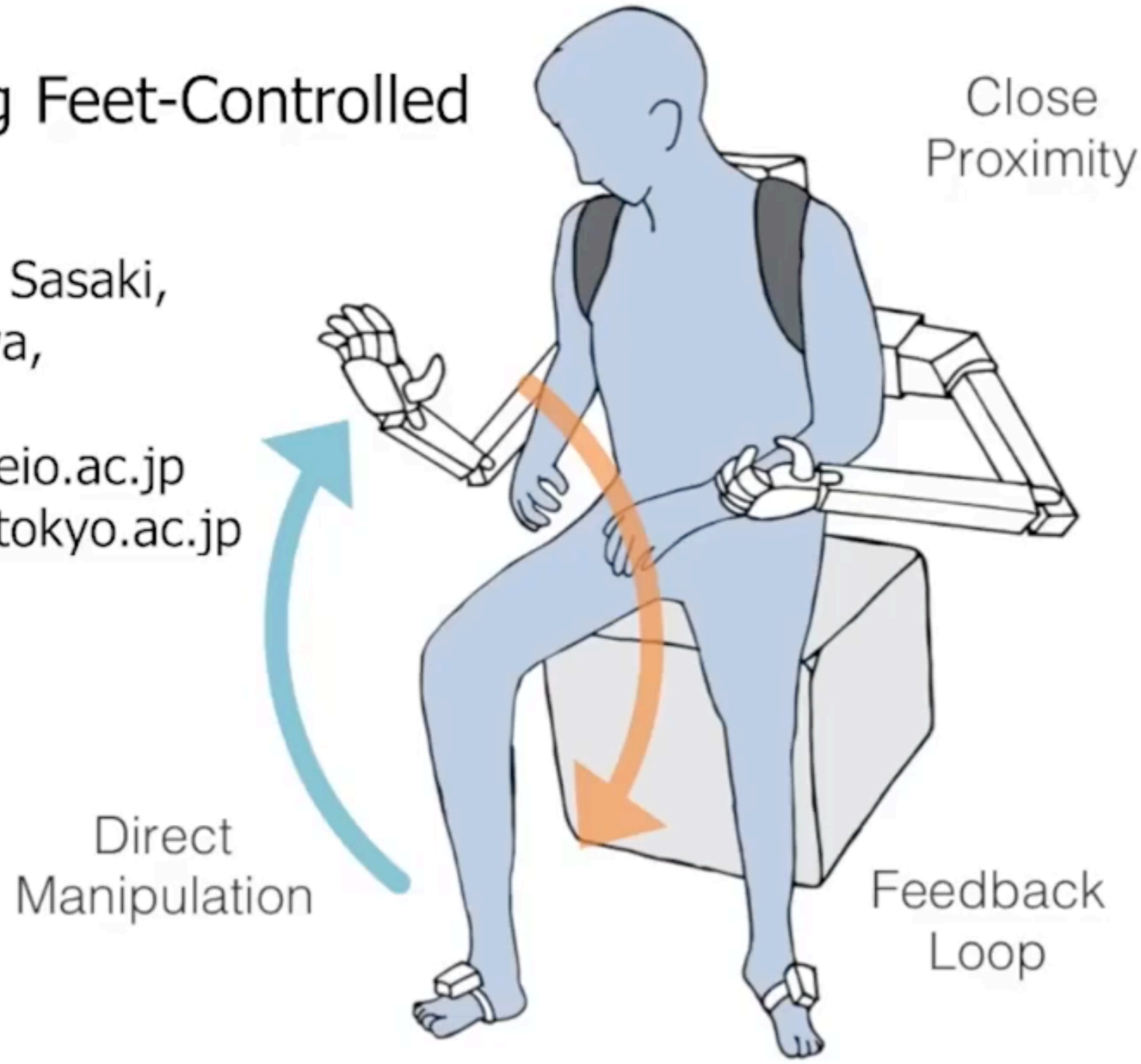
Porta records how users navigated through this tutorial webpage and what actions they took on their computer (e.g., invoking compilers, running shell commands, logging into remote servers).

Porta creates a ***tutorial profile visualization*** that augments the webpage. It shows heatmaps of activity hotspots and event markers that contain metadata, error messages, and screencast videos of user actions.

MetaArms

Body Remapping Using Feet-Controlled Artificial Arms

MHD Yamen Saraiji, Tomoya Sasaki,
Kai Kunze, Kouta Minamizawa,
Masahiko Inami
{yamen, kai, kouta}@kmd.keio.ac.jp
{sasaki,inami}@star.rcast.u-tokyo.ac.jp



Crowdsourcing Similarity Judgments for Agreement Analysis in End-User Elicitation Studies

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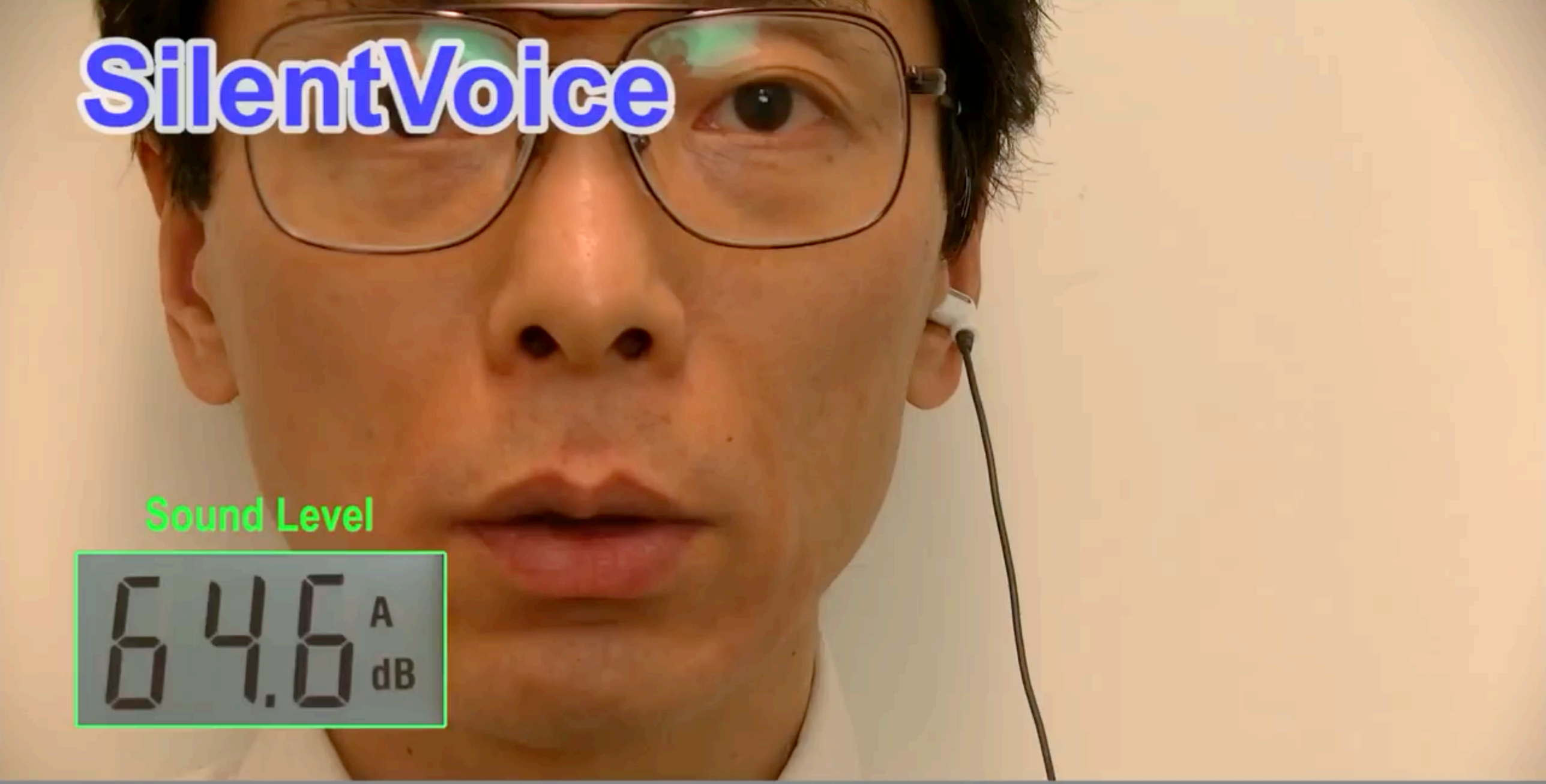
ABSTRACT

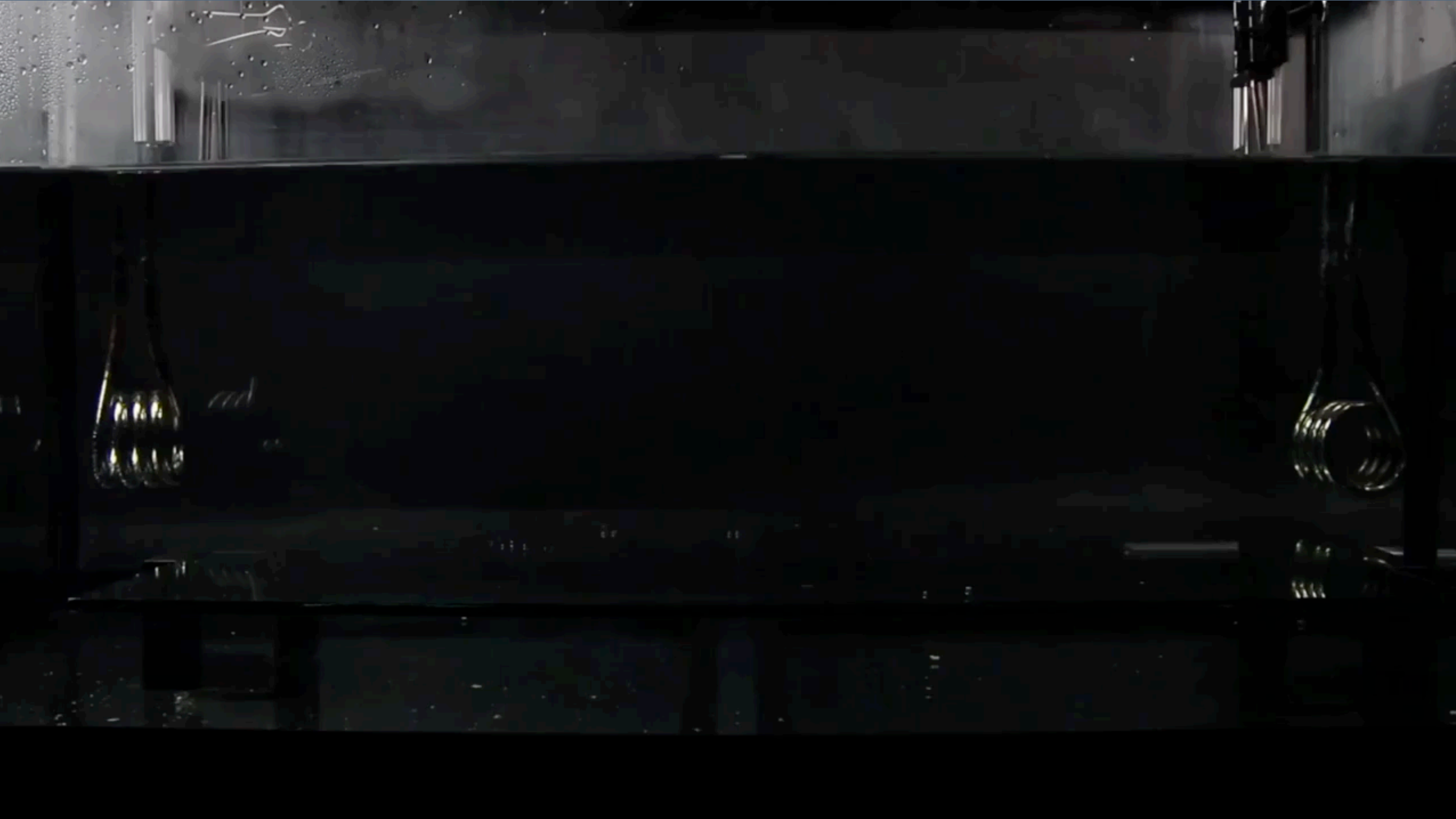
End-user elicitation studies are a popular design method, but their data require substantial time and effort to analyze. In this paper, we present *Crowdsensus*, a crowd-powered tool that enables researchers to efficiently analyze the results of elicitation studies using subjective human judgment and automatic clustering algorithms. In addition to our own analysis, we asked six expert researchers with experience running and analyzing elicitation studies to analyze an end-user elicitation dataset of 10 functions for operating a web-browser, each with 43 voice commands elicited from end-users for a total of 430 voice commands. We used Crowdsensus to gather similarity judgments of these same

By having end users propose interactions, elicitation studies aim to create interaction designs that are more intuitive, *i.e.*, interactions that may be more discoverable, learnable, guessable, memorable, or comfortable. Larger and more diverse sets of participants can improve the intuitiveness of the final set of interaction designs [22].

Despite the popularity of end-user elicitation studies, having been conducted in more than 60 published accounts (*e.g.*, [23,25,27,32]), such studies are laborious to run and analyze, especially grouping elicited proposals based on their similarity. Although including a large and diverse group of end users in elicitation studies is desirable, this practice



This is a demonstrarion of SilentVoice.

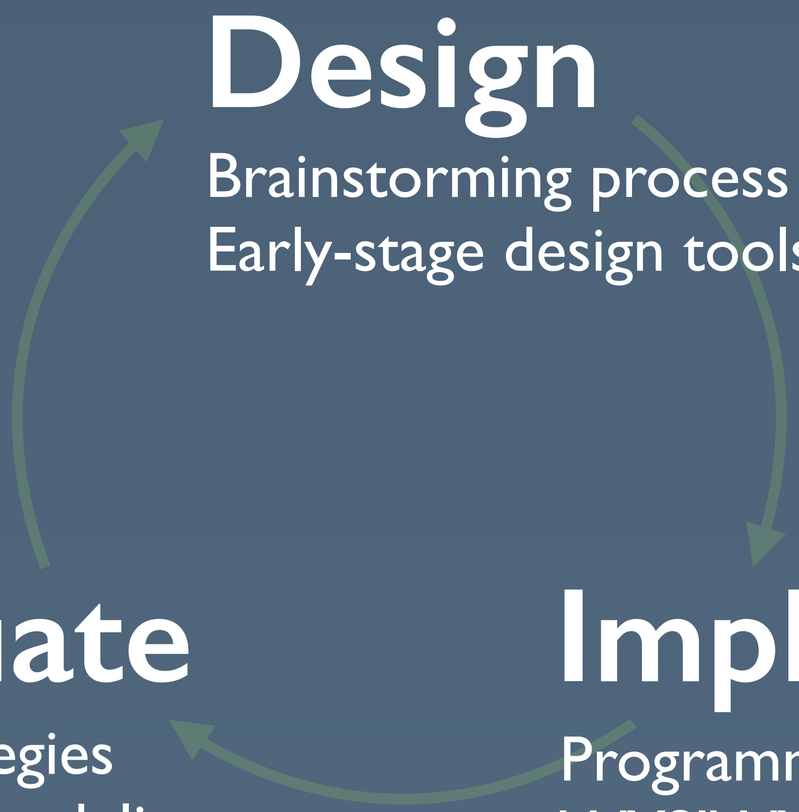


Today

- Design as research
- Design process
- Design resources

Design and creation are not static processes.

They can be studied, supported and improved.



Recall: process improvements to design

Wizard-of-Oz Prototypes

- **An iterative design methodology for user-friendly natural language office information applications** [Kelley, TOIS '84]
  - *"Central to the methodology is an experimental simulation which I call the OZ paradigm, in which experimental participants are given the impression that they are interacting with a program that understands English as well as another human would."*

Recall: Wizard of Oz prototyping as an example

Design as research

Design-oriented HCI

[Fallman, CHI '03]

- HCI is distinct from natural or social sciences: its methodology is based in design
- Design is a context-dependent dialogue with the problem
- Perspectives on design
  - Conservative: as a scientific or engineering endeavor
  - Romantic: "imaginative masterminds equipped with almost magical abilities of creation"
  - Pragmatic: design is a reaction to a context

Research through design

[Zimmerman, Forlizzi, and Evenson, CHI '07]

- How can designers make contributions to HCI research?
- Interaction designers wrestle with wicked problems
  [Rittel and Webber, Policy Sciences '73]
  - Wicked problems: problems whose requirements are contradictory or unknown — no global optimum
- To solve wicked problems: integrate known facts, engineering opportunities, and user research to create a new perspective

The Power of Representation

[Norman, '94; Simon, '81]

- "The powers of cognition come from abstraction and representation: the ability to represent perceptions, experiences, and thoughts in some medium other than that in which they have occurred, abstracted away from irrelevant details."

Example: Number scrabble

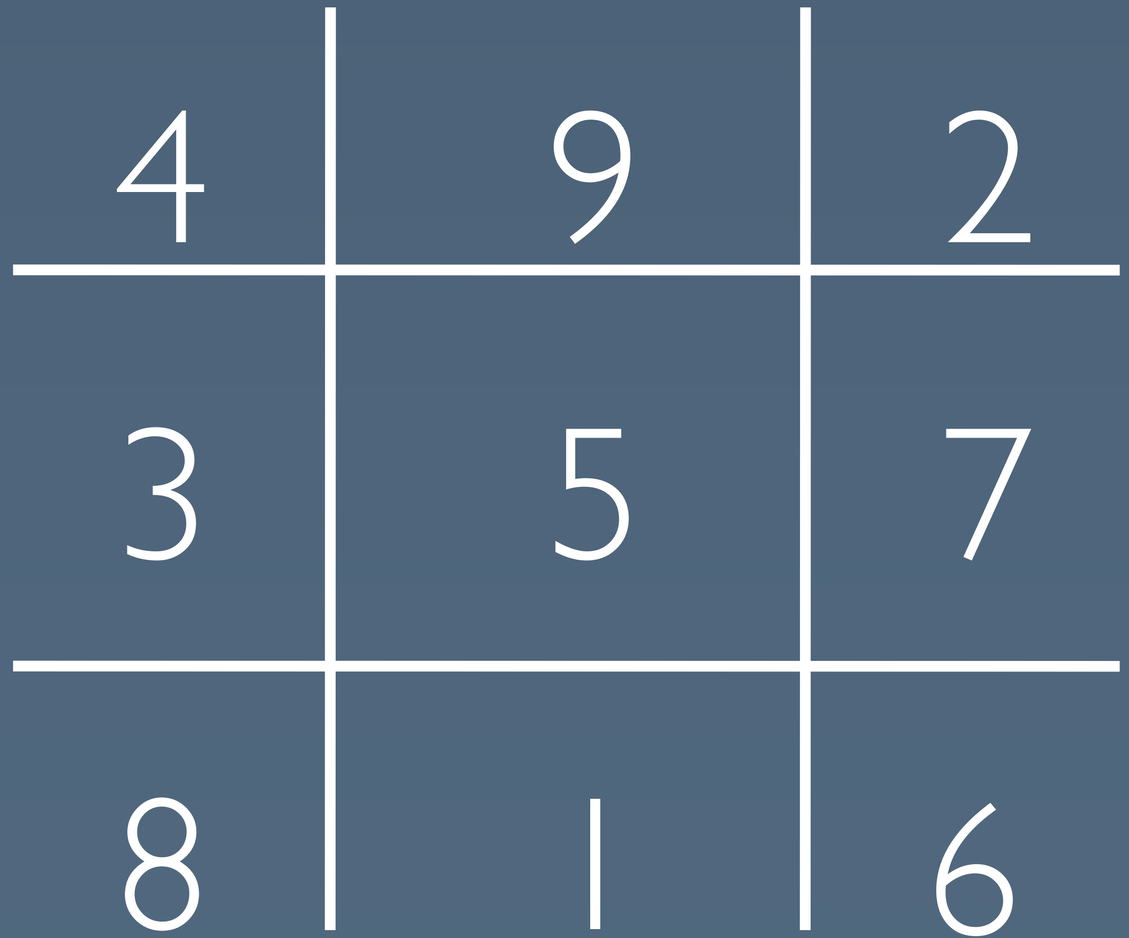
- Take turns picking numbers in 1,2,3,4,5,6,7,8,9 without replacement. Win if three of your numbers add up to 15.

Ready, set, go!

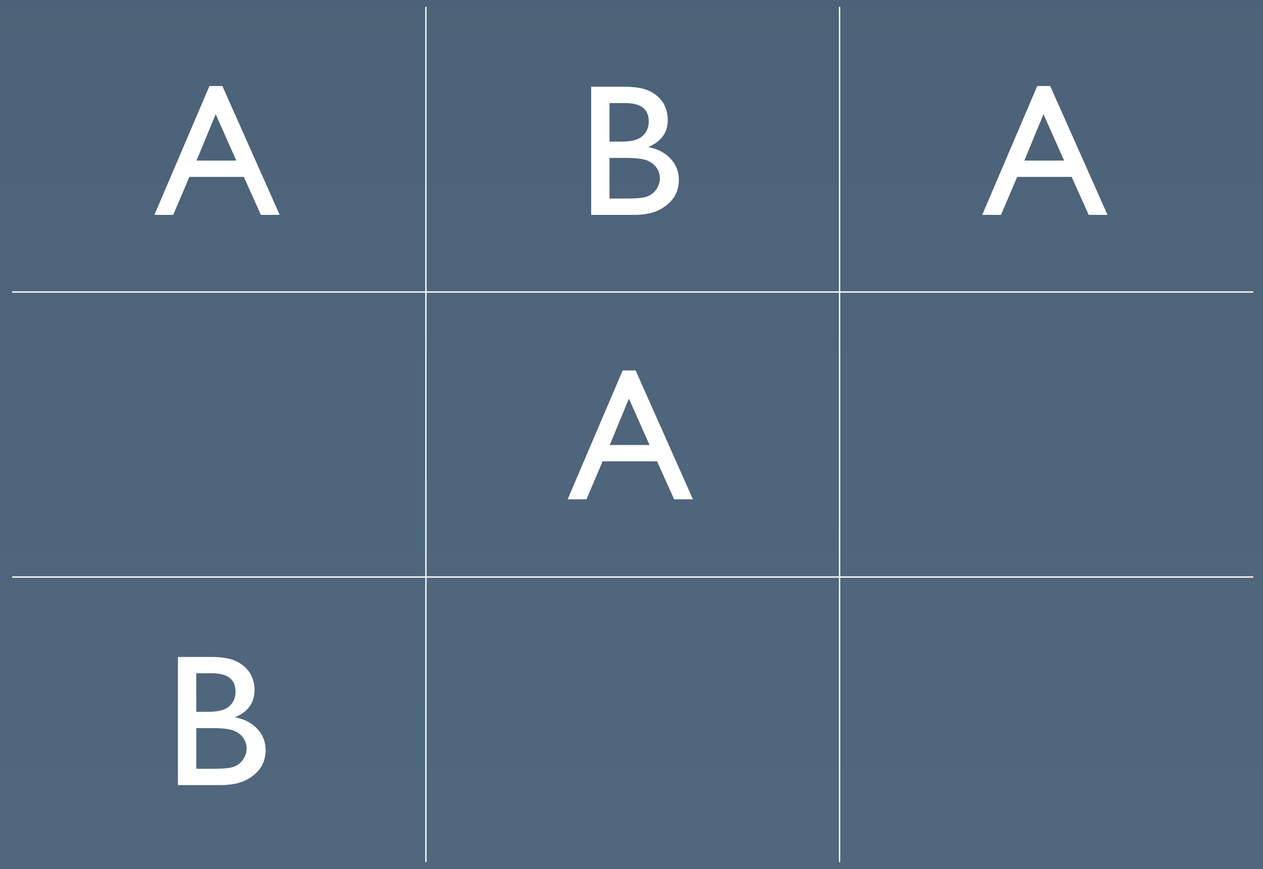
- A takes 8.
- B takes 2.
- A takes 4.
- B takes 3.
- A takes 5.

- What should B do?

Re-encoding number scrabble



Ready, set, go!



Design process

The Reflective Practitioner

[Schön 1984]

- Design is not a "plan, then do" praxis
- Instead, the designer is engaged in an ongoing conversation with the design
- Critically, it's only by observing the result of the doing can the designer engage in reflection

YOU READ THIS

Iterate on a design, or create parallel alternatives?

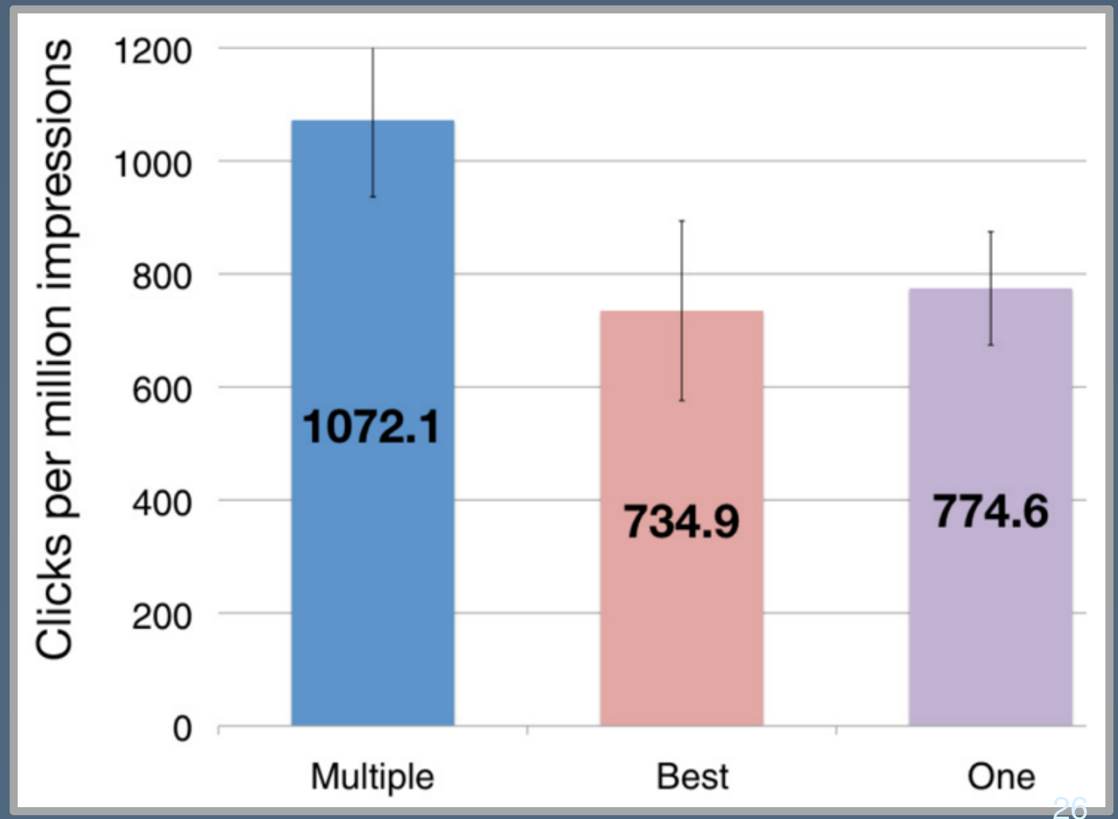
[Dow et al., TOCHI '10]

- Feedback on five iterations or five parallel alternatives
- Quality measured via ad clickthrough
- Designs generated in parallel condition had ~1/3 more clicks

Prototyping dynamics: share one, or share multiple?

[Dow et al., CHI '11]

- When getting feedback from a partner, designers would...
  - Share multiple: design and show three ads
  - Share best: design three and show one ad
  - Share one: design and show one ad



Ethnographic approach to design

[Blomberg and Burrell, HCI Handbook '03]

- Qualitative research methods have matured into a core part of the HCI research toolkit
- A caution from Blomberg and Burrell:
  - "Insights from ethnographic studies do not map directly onto design specifications."
- Instead, ethnographies provide deep insight into the user population and practice

Implications for design?

[Dourish, CHI '06]

- "Ethnography provides insight into the organization of social settings, but its goal is not simply to save the reader a trip; rather, it provides models for thinking about those settings and the work that goes on there."

- "The value of ethnography, then, is in the models it provides and the ways of thinking that it supports."

Scaling the design studio

[Kulkarni et al., TOCHI '14]

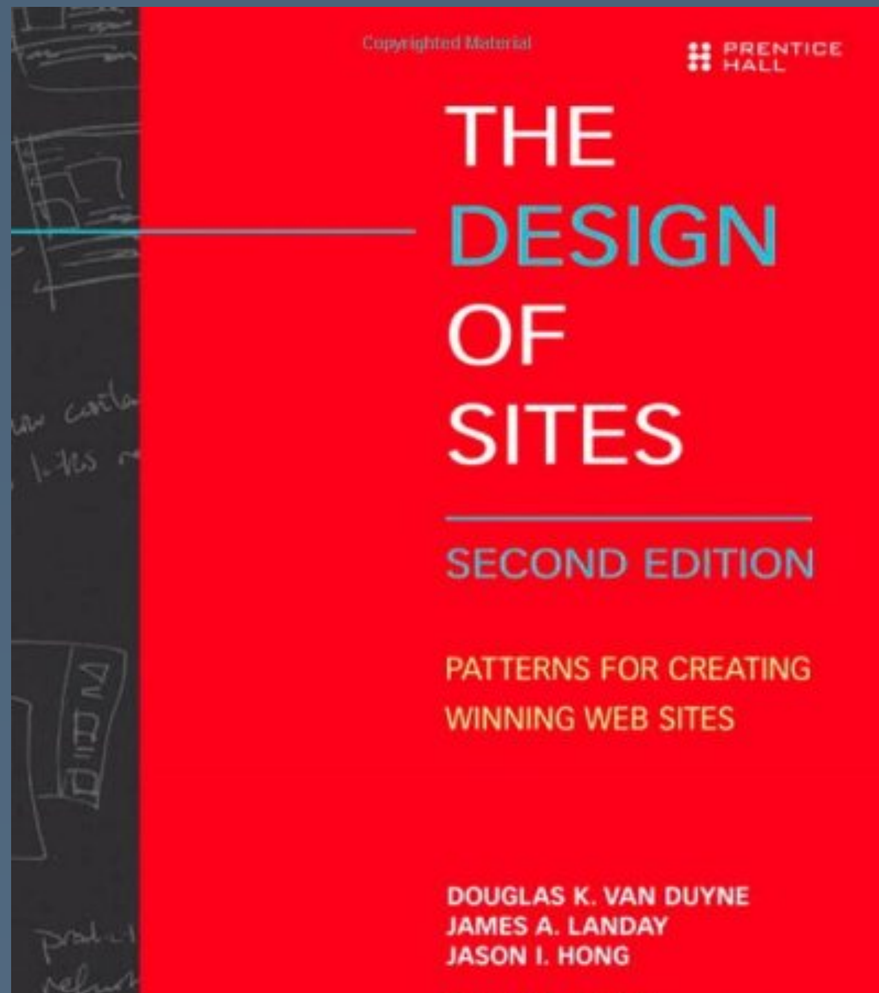
- How can we teach design to millions?
- Klemmer's HCI class on Coursera: thousands of submissions, thousands of students
- Peer assessment: training students to give calibrated feedback on each others' design assignments
- Now deployed to many other classes, including network science, science fiction, english...

Design resources

Design patterns

[van Duyne, Landay and Hong, '06]

- Web design, much like web software, can be characterized by successful design patterns
- Examples...
  - News mosaics
  - Distinctive HTML titles
  - Quick-flow checkout
  - Floating windows

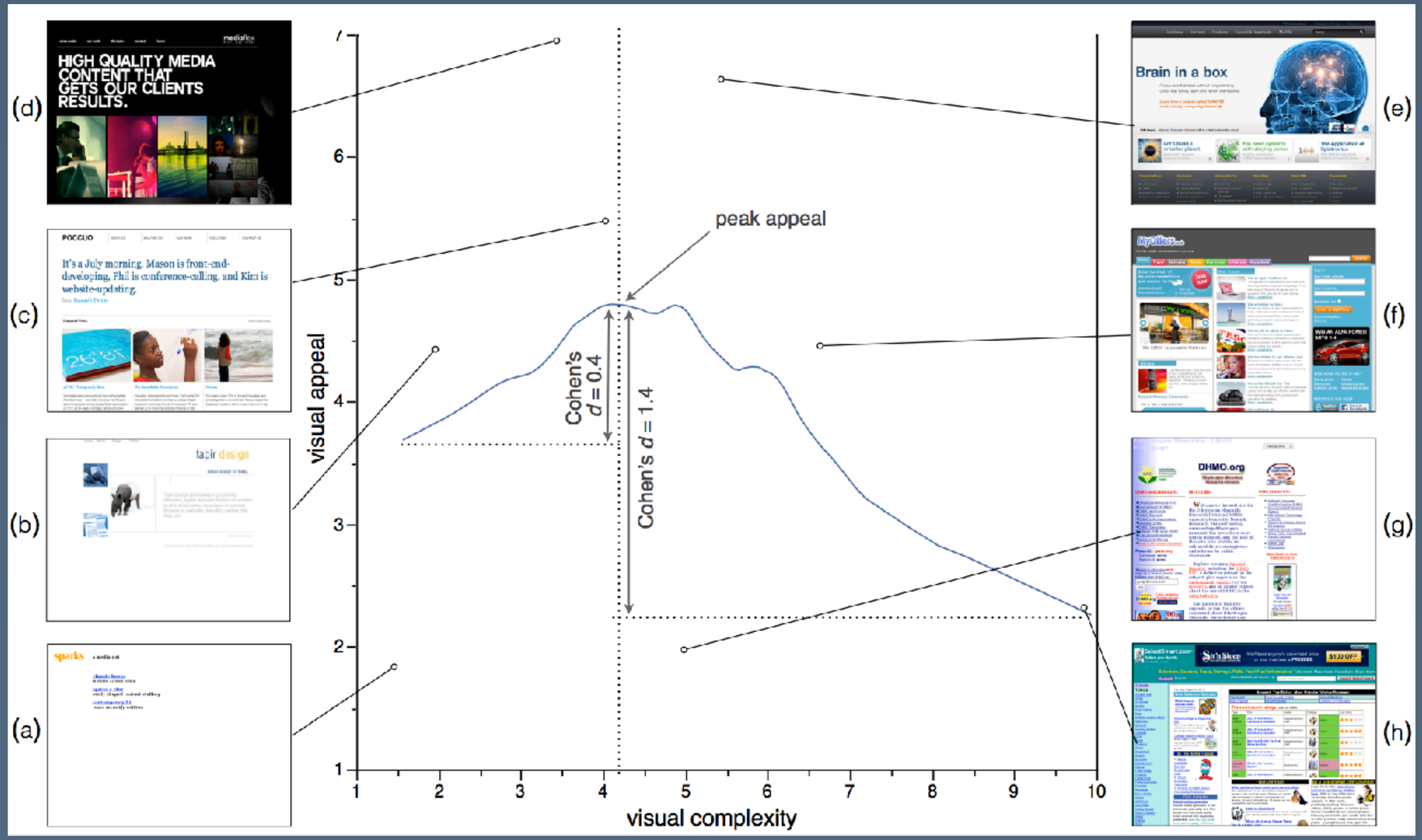


Quantifying Visual Preferences

[Reinecke and Gajos, CHI '14]

YOU READ THIS

- LabInTheWild data via a quiz about which web sites you like



Webzeitgeist

[Kumar et al., CHI '13]

- Crawl the web and index large-scale design elements
- Main idea: what happens if we start data mining designs, rather than user behavior?

ERICA: Interaction Mining Mobile Apps

Biplab Deka, Zifeng Huang and Ranjitha Kumar
{deka2, zhuang45, ranjitha}@illinois.edu

Data-Driven Design Group
University of Illinois at Urbana-Champaign

Skills for design process research

- Experience teaching and doing interaction design — the ability to reflect on…
  - Which feedback loops are too open?
  - Why do design teams succeed and fail?
- What structural support would amplify designers' cognition?