Design

CS 347
Parastoo Abtahi & Danaë Metaxa
Announcements

Extra session: methods and stats
Led by Danaë next Wednesday, 5 PM

If you don’t know

how to do a t-test, one-way and two-way ANOVA, or chi square,
how to write up the results and effect size for a paper,
join!
Announcements

Project Brainstorm Round 1 due before lecture on Wednesday

Grading rubric
Collectively, the abstracts will be graded out of 10 points.

<table>
<thead>
<tr>
<th>Category</th>
<th>Insufficiency</th>
<th>Adequacy</th>
<th>Proficiency</th>
<th>Mastery</th>
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</thead>
<tbody>
<tr>
<td>Research contribution</td>
<td>1: Ideas are present, but they do not clearly articulate why they represent significant new knowledge to HCI or why they have wide applicability.</td>
<td>3: The ideas demonstrate incremental new knowledge in HCI and have only minor generalizability.</td>
<td>5: The ideas introduce moderate new knowledge to HCI and are typically generalizable.</td>
<td>7: The ideas introduce creative new knowledge to HCI and are strongly generalizable.</td>
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<td>7 points</td>
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<td>Feasibility</td>
<td>1: The ideas have not been scoped to be completable in ten weeks.</td>
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<td>3: The ideas have been scoped to be completable in ten weeks.</td>
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<tr>
<td>3 points</td>
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</table>
Announcements

Project Brainstorm Round 1 due **before** lecture on Wednesday

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Google Scholar search results for "User-Defined Gestures for Surface Computing".

**User-defined gestures for surface computing**

JO Wobbrock, MR Morris, AD Wilson - ... on human factors in computing ..., 2009 - dl.acm.org

Many surface computing prototypes have employed gestures created by system designers. Although such gestures are appropriate for early investigations, they are not necessarily reflective of user behavior. We present an approach to designing tabletop gestures that ...
Announcements

Thinking ahead to Project Brainstorm Round 2

Find a team!

Mixer ten minutes before the end of class this week
Articulating research contributions

Goal: work your muscles for what a research contribution in HCI looks like.

Pick papers that we’ve read, and riff to generate three ideas for follow-up research that could be done in the scope of this class.

These are not necessarily ideas that you need to follow up on with your project. We are evaluating your ability to generate them.
Most common critiques

Not being clear on what problem you’re solving, or why it matters

Not being clear about the method you’re using, or algorithm/system you’re proposing

“Bag of cool ideas” as opposed to one novel insight carried to its logical conclusion

Evaluation: how do you know if you’re right?
Questions?
Course Overview

Week 1: Intro to Interaction; Intro to Social Computing
Week 2: Intro to Design; Interaction
Week 3: Methods; Interaction
Week 4: Social Computing
Week 5: Design
Week 6: AI+HCI; Media
Week 7: Accessibility; ICT4D
Week 8: Foundations; Cognition
Week 9: Collaboration; Programming
Week 10: Visualization; Critiques of HCI
Design is not a static process.

It can be studied, supported, and improved.
How might we facilitate and empower this process?
Brainstorming process
Early-stage design tools

Design

Evaluate
Study strategies
Cognitive modeling

Implement
Programming tools
WYSIWYG design tools
Rapid prototyping tools
“Enlightened trial and error outperforms the planning of flawless intellect.”

— David Kelley, also Donald Schön
Reflective practitioner

How does design work? Why does it work?

Donald Schön [1984] studied a variety of professionals, including designers, and articulated a theory of the how and the why that has remained influential.
Reflective practitioner

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, allowing them to improve
Reflective practitioner

Implication:

To improve the process, encourage more rapid reflection, or improve the quality of the reflection

To improve the tools, create alternatives that make reflection easier to do or more informative

You’ll read an excerpt from this book
Major themes of design research

Process

Tools
Design process

To improve the process, encourage more rapid reflection, or improve the quality of the reflection.
Improve the process, improve the output.

The design process we teach in human-computer interaction need not be fixed!

Many techniques we use today were once prototyped in research labs.
Wizard-of-Oz Prototypes

[Kelley, TOIS ’84]

An iterative design methodology for user-friendly natural language office information applications

“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.”
How many designs? [Tohidi et al. 2006]

Prior practice: create your prototype, then show it to people to get feedback. But is this optimal?

Study design:
- Method: show participants low fidelity prototypes for a redesigned smart thermostat and ask for feedback
- Control: show participants just one design (‘the best’)
- Treatment: show participants three designs

Measure: quantitative ratings of the design, as well as valence of the verbal feedback
How many designs? [Tohidi et al. 2006]

“We found that when presented with a single design, users give significantly higher ratings and were more reluctant to criticize than when presented with the same design in a group of three.”

Why do you think this is? [1 min]

- Weakening demand characteristics
- Breaking out of functional fixation
Participatory design

[Schuler and Namioka ’93]

Problem — the design process creates a power imbalance: the designer is in charge, and the user stakeholders are passive.

Participatory design is an alternative process, originally developed in Scandinavia (where everything is beautifully designed), that involves the stakeholders deeply in all stages of the design process: initial exploration, problem definition, developing ideas, evaluation

How will this help? What issues might crop up? How might you manage them? [ 1 min]
Elicitation studies

[Wobbrock and Morris 2009]

When entering a new design space (e.g., large multitouch tables, AR, mid-air interaction), how do we know which gestures would be the most effective for non-technical people?

Concept: tell people the command, and ask them to gesture in a way that they think should invoke that command. Then, look for agreement amongst these spontaneous gestures.
Elicitation studies

[Wobbrock and Morris 2009]

Select Single₁: tap
Select Single₂: lasso
Select Group₁: hold and tap
Select Group₂ and Select Group₃: Use Select Single, or Select Single₂ on all items in the group.

Move₁: drag
Move₂: jump
Object jumps to index finger location.

(What are the trade-offs with this method?)
Design tools

To improve the tools, create alternatives that make reflection easier to do or more informative
Sketch as input

[Landay, CHI ’96]

Tighten the reflective loop by letting me create the low-fidelity prototype more quickly
Sketch as input

[Landay, CHI '96]

Led to: Balsamiq
How might we prototype an iPhone in thirty minutes?
Explore alternatives

Tighten the loop by allowing me to explore design spaces and alternatives on a live version

[Hartmann et al., UIST 2009]
Explore alternatives

Led to:
Inventing on Principle
[Victor 2012]
What’s difficult about design research?

Design tools:
Slight accelerations are easy; larger-scale improvements are not

Design process:
Multidimensional and difficult to measure
What’s exciting about design research?

Existing creation tools are getting better every day

The design process is now an accepted practice in industry, but still malleable

Your contributions are generative: they lead to new designs and programs that others will create tomorrow
When discussing a potential partnership with someone, you should discuss

your **background** (e.g., programming proficiency or other skills you bring),

**availability** (e.g., your time zone, working evenings or mornings? weekends?),

**motivation level** (ambition for a Turing award? Or to just barely graduate?),

and **grading** (credit no credit, vs. letter grade).

It's important to be honest with your partners up front, and to follow through on commitments you make.
See you on Wednesday :)  

Action items

  Studio room: if you need to find team members
  TAs’ office: if you don’t have a studio or an assigned discussant date

Before class on Wed: project brainstorm round 1

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