Announcements

Projects: ready, set, go!
Feedback from CTL

What you ask of yourselves in order to make the class more successful: participate in discussion

What's going well

- Lectures
- In-class polls and seeing disagreements
- Interactive discussion and direct engagement with TA
- TA gives actionable feedback
Feedback from CTL

Suggested improvements

Space office hours out more (yes, let’s do this)

1:1 project advising time outside of office hours (maybe an individual advising meeting with staff while picking projects?)

Deadlines at 5pm and Friday evening don’t allow for work over the weekends or work-study students (Monday project deadlines instead?)

Discussant prep needs more time than just starting at 5pm the night before (please take our survey in your email so we can improve this)
Recall one more time

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
Goal: facilitate rapid iteration

[Hartmann, PhD thesis '09]

Prototypes enable exploration and iteration around concrete artifacts

The more fluid the prototyping process is, the more you can learn before you sink time into engineering
Design tools should...

[Hartmann, PhD thesis ’09]

Decrease UI construction time

Isolate designers from implementation details

Enable designers to explore an interface technology previously reserved to engineers or other technology experts
Today

Rapid prototyping
Exploring alternatives: design galleries
Feedback
Tangible and physical interaction
Rapid prototyping
Recall: Sketching Interfaces Like Krazy

[Landay, CHI ’96]

Combine the fluidity of paper-based sketching with the interactivity of tools

Technique: sketch recognition of basic UI components

Led to many projects on lower fidelity prototyping of interactive systems: let’s tour some of them
DENIM: web storyboarding

[Lin et al., CHI '00]

Enable fluid, informal interactions for web site design

Work at a higher level of abstraction than HTML
Designer’s Outpost

[Klemmer et al., UIST ’01]

Fluid interactive brainstorming that bridges physical and digital artifacts
$1 \textit{gesture recognizer}

[Wobbrock, Wilson, and Li, UIST ’07]

Training an end-to-end ML system for gesture recognition would take thousands of examples and a lot of time—infeasible for prototyping.

The “$1 \textit{recognizer}”: quick 100 lines of code for 97% accuracy with only one example.

Resample, rescale, rotate, and template match.
Exploring alternatives
Design galleries
[Marks et al., SIGGRAPH '97]

Automatically generate perceptually-varying alternatives within a design space

Helps the designer explore other feasible approaches

Now a widely-adopted technique inside of design tools
Recall: Juxtapose
Recall: DesignScape

[O’Donovan, Agarwala, and Hertzmann CHI ’15]

Model graphic design requirements such as alignment and hierarchical segmentation, then generate alternatives
Feedback
Learning Visual Importance
[Bylinskii et al., UIST '17]
Voyant: crowd feedback

[Xu, Huang, and Bailey CSCW ’13]
Physical and tangible interface prototyping
The challenge of physical prototyping

Prototype the bits, or prototype the atoms?

Goal: lower the threshold to prototype interactive systems that depend on electronics and physical materials
The Toastboard
Ubiquitous Instrumentation and Automated Checking of Breadboarded Circuits

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Recall: Juxtapose
Phidgets

The first physical prototyping platform
USB plug-and-programmable I/O
  servos, LEDs, buttons, sliders, etc.

Goal: program physical devices like you would a GUI widget
Led to: Arduino

Maker board for artists, programmers and hobbyists
Led to: Makey Makey

[Silver et al., TEI ’12]

Alligator clips map onto keystrokes
d.tools: prototyping behavior

[Hartmann et al., UIST '06]

Plug-and-play
HW, visual
statechart
behaviors

prototyping with d.tools
Sensor interaction by demonstration

[Hartmann et al., CHI '07]
Fabricating capacitive hardware

[Savage et al., UIST ’12]

Author behaviors, and the software does circuit layout
Replacing electronics with cameras
[Savage et al., UIST '13]

Create the physical prototype in CAD software, then use 3D printing and a camera to try out the interaction without building the electronics.
CircuitStack

[Wang et al. 2016]

Prototype systems more quickly by removing wiring errors.

Author the wiring in software (Fritzing), then print out circuit paper that you can layer into the actual circuit and just place the components.
Scanalogs

[Strasnick, Agrawala and Follmer 2017]

(A) Raw signal from an analog sensor

(B) Conditioning the signal after conditioning
More to come…

Programming (methods for engineering as opposed to prototyping)
AI+HCI (AI as an amplifier for designers)
ICT4D (design methods for developing regions)
Cognition (engineering psychology of design)
Visualization (design of information graphics)
Critiques of HCI (issues derived from our design process)
Discussion

Find today’s discussion room at http://hci.st/room