EXPLORING THE DESIGN OF IN-AIR GESTURES

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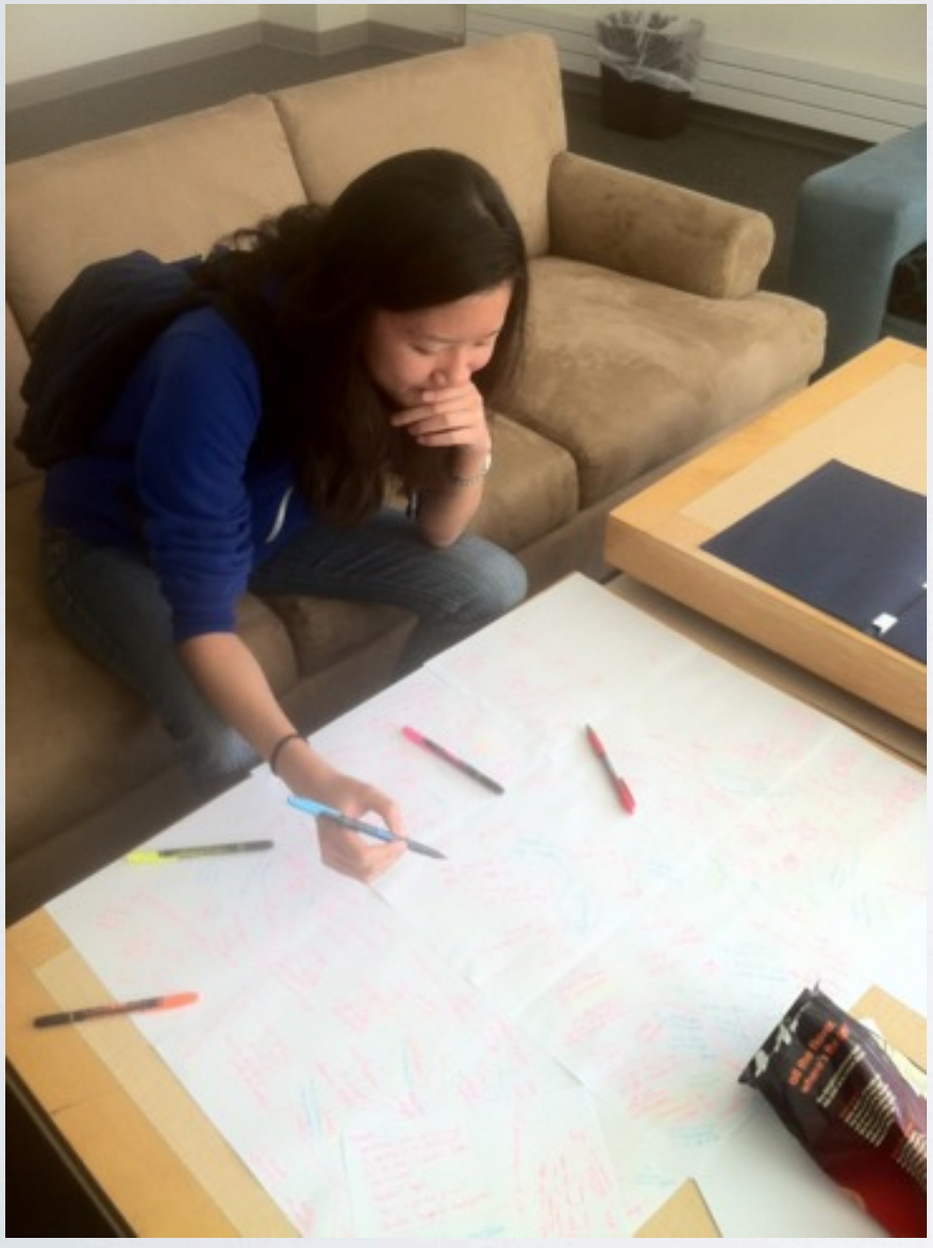
Cogs 160
Sprint 2012

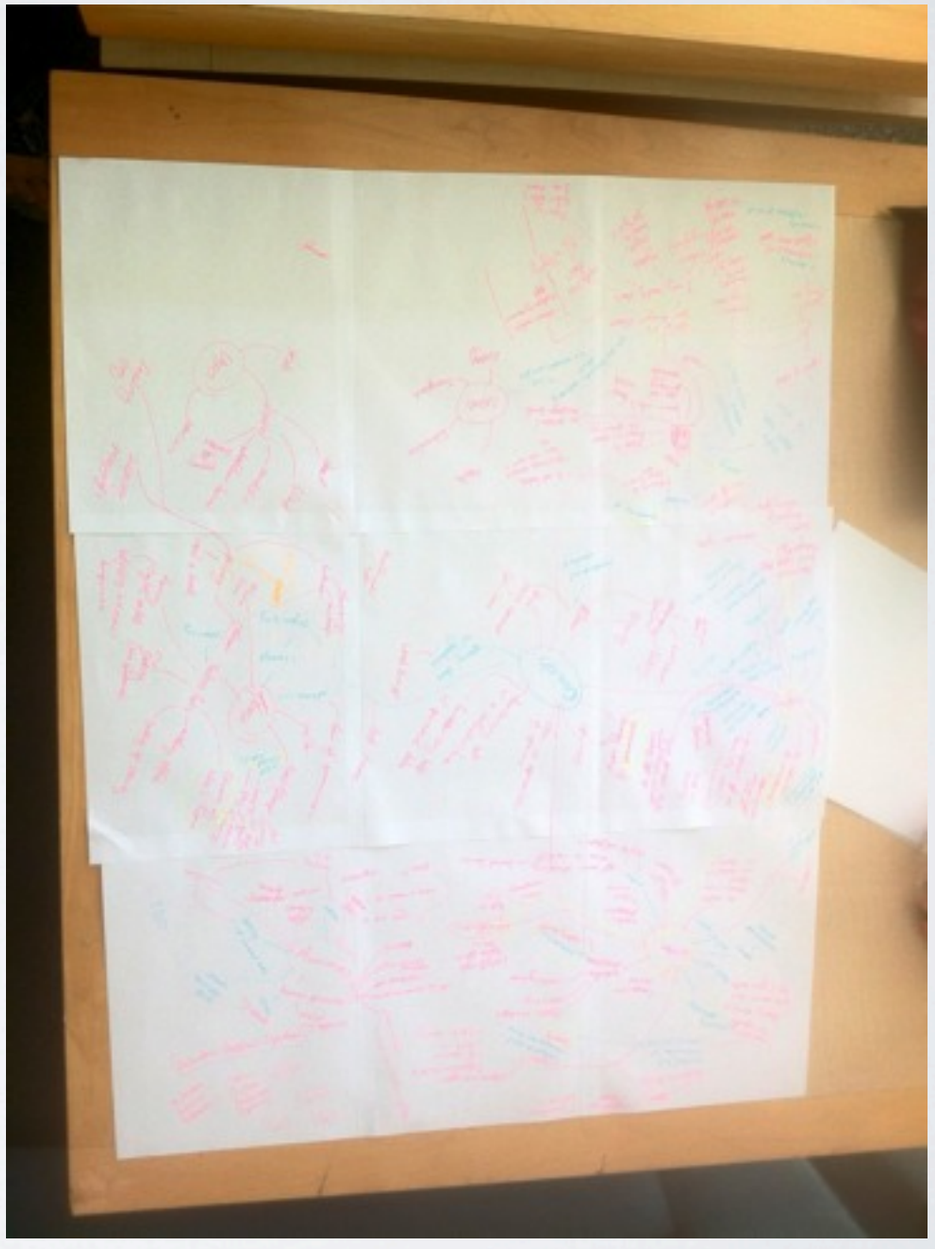
OUTLINE

- First Iteration
- Second Iteration
- Third Iteration
- Conclusions

1. INITIAL CONCEPT

- remote multimodal gestures in the home environment





1. MOTIVATIONS FOR INITIAL CONCEPT

- remote
  - physically inaccessible fixtures, bridging the gap of remote-access
- in-air gestures, etc.
  - alternative to existing interfaces
- home environment
  - daily life, safety, privacy

1. INITIAL CONTEXTUAL INTERVIEWS

- Questions
  - Preferred modes and contexts of remote interaction with fixtures. Open ended towards end.
- Results
  - Unimodal preference for voice or hand gestures.

2. REFINED CONCEPT

- Focus on in-air gestures.
- System
  - Microsoft Kinect.
  - Feedback = Color change.

2. TESTING

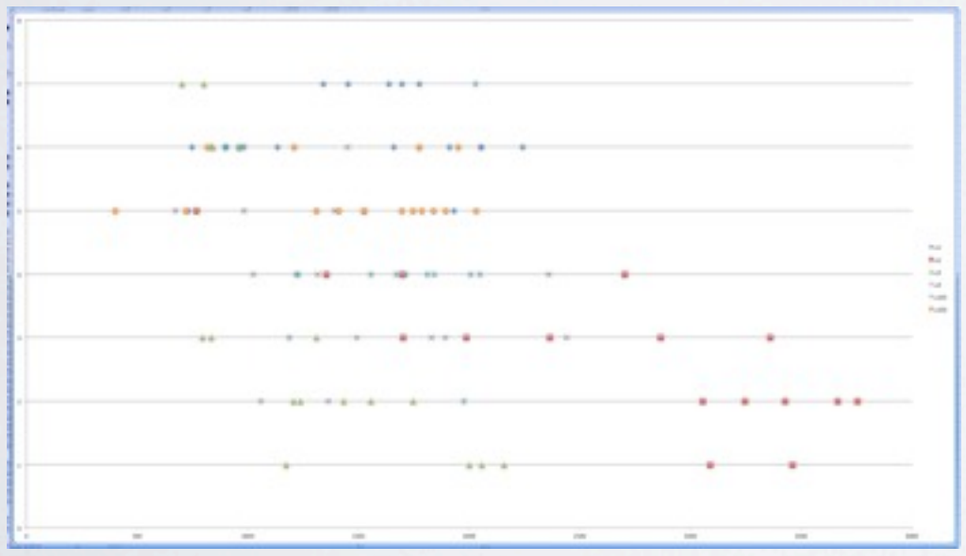
- users:
  - 6, right-handed, college students of varying disciplines.
- Questions:
  - user satisfaction of gestures, and of feedback delay.

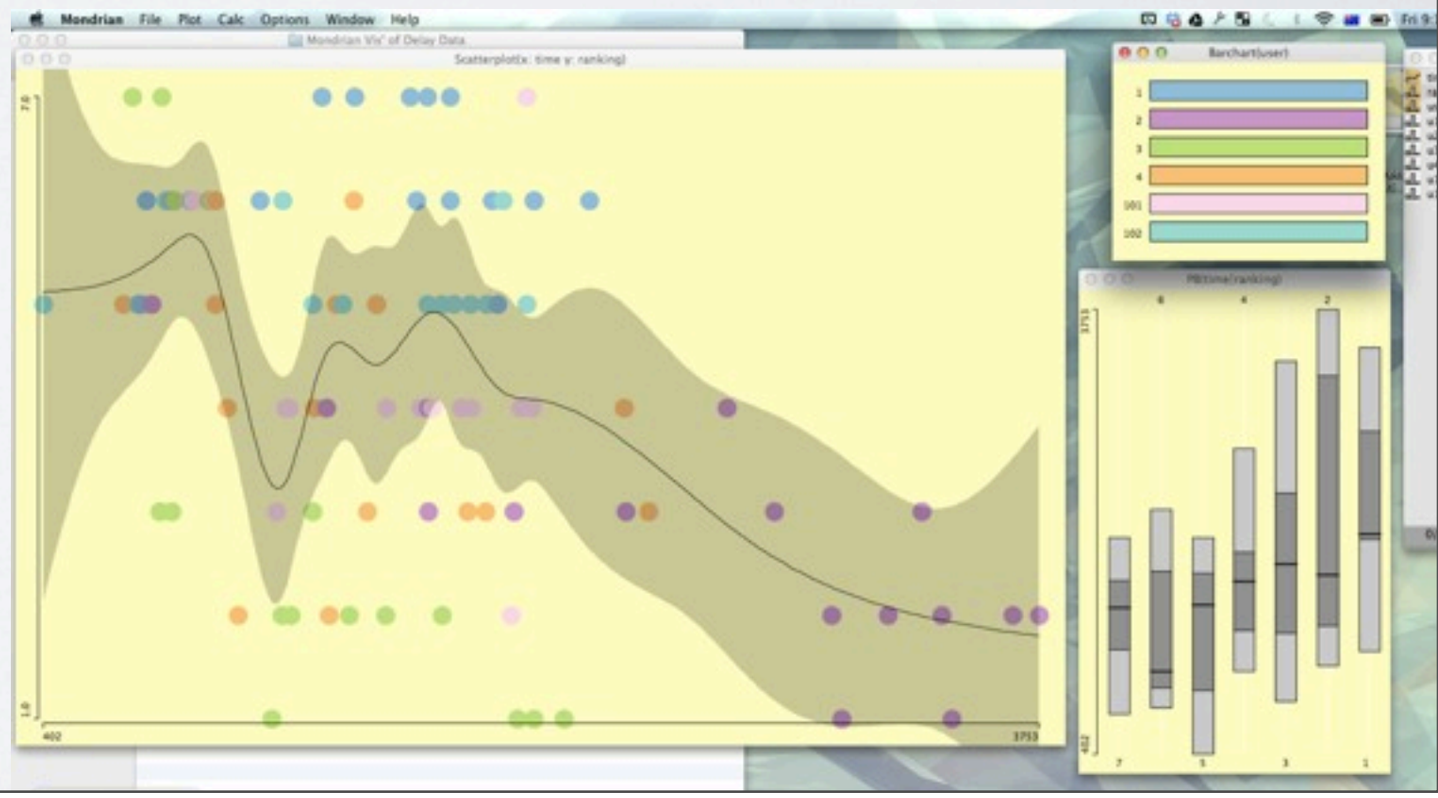
2. TESTING RESULTS

- preference for one-handed gestures, less arm movement, shorter execution time, and sound was not a factor.

- A balance of user-system confidence and physical effort.

- Feedback delay:





3. CURRENT CONCEPT VIDEO

3. RE-DESIGN

- System Changes
  - More context (added a lamp)
  - continuous feedback (fading in/out)
  - Refined gesture set (small, varied durations)

- Technical System Design / User Test Re-Design
  - OSC Interface, iPad data recording, Depth Cameras, Arduino
  - Slider-dependent user input over surveys.
  - Anthropomorphic delimiters.

3. USER TESTS

- Questions
  - User preference of fade time across different small gestures.
- Results

- CONTEXT MATTERS.
- Preferred fade-in duration follows gesture duration, personality/mood/ intention of the user.
- Short “classy” fade-ins (~500-1000ms) actually preferred over instantaneous fades.

4. EVALUATION

- Preferred Gestures require minimal physical effort, whilst a strong system-user confidence is maintained.

- Feedback response time is dependent on context and other factors.

- Preferred feedback transition times correlate with preferred gesture duration.

4. FUTURE WORK

- There are many factors to be considered in the design of fine-gestures in home interactions. Beyond feedback response time, e.g. functionality, history, context of fixtures).

- An anthropomorphic system (gaze & finger tracking) and neuroscience-derived computational systems (place and grid cells, synaptic plasticity, image compression (abstracting data from detailed systems to train efficient systems).

- Easier deployment for technological probing.