Favoured Attributes of In-Air Gestures in the Home Environment

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outline

- Motivations
- Multimodality
- Gestures
- Feedback Transitions
- Implications
- Future

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motivations

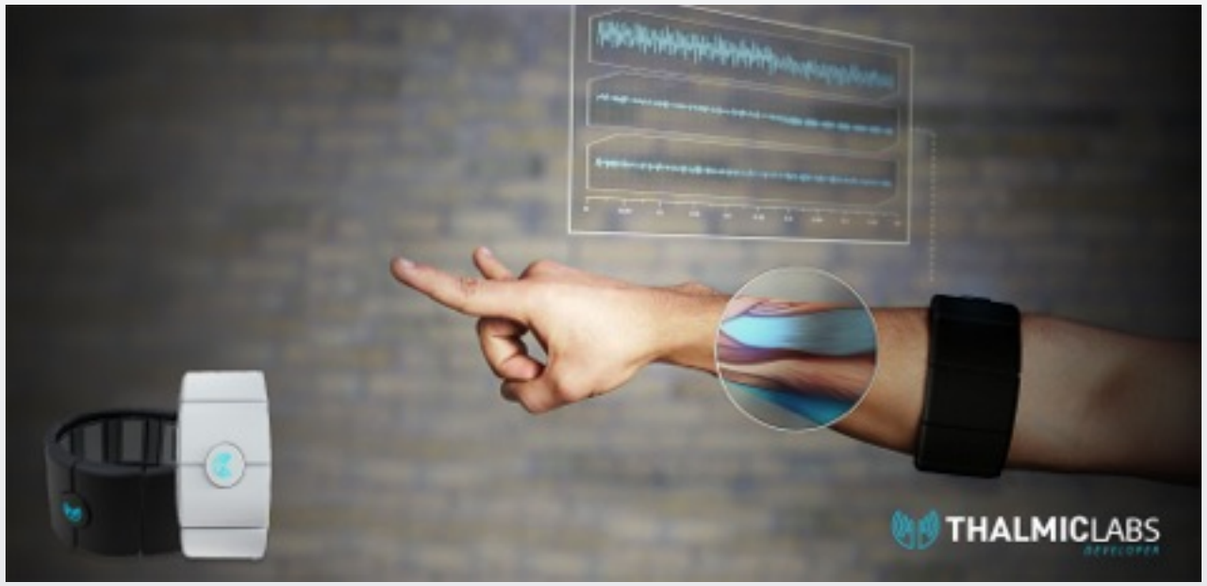
Home Control & Accessibility

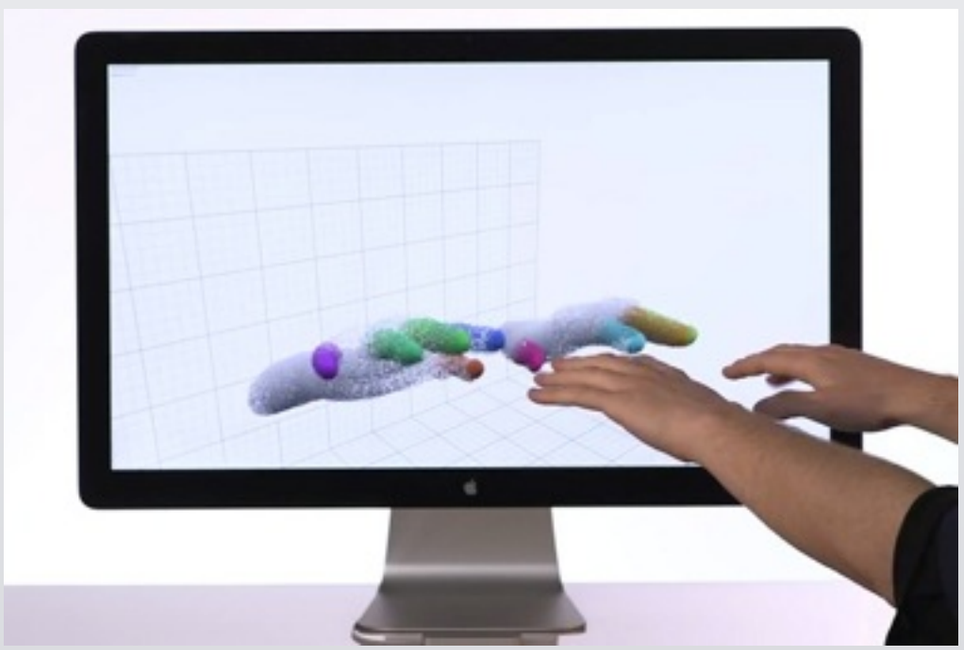
motivations

Home control devices

motivations

Rise of Gestures





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multimodality

- *Study in participants' homes on user-defined multimodal interactions to remotely control fixtures.*

- **Observations**
  All preferred unimodality
  (9/10 preferred gesture-only,
  most localised around the arm).

  Gestural miming of physical interaction or topographical motion of fixture.

  Gazed & orientated towards fixture.

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gestures

Task & Prototype

- Study of in-air gesture preferences across type & delay.
  - *A Kinect recognised an action, altered the colour of a user-facing screen, an iPad was provided to rate gestures on a radio form.*

- **Task 1. 30 Gestures**, *varying across:*
  - *motion/rotation (left, right, forward, back)*
  - *physical effort (point, push, sweep)*
  - *gesture-duration (snap, sweep)*
  - *associated sounds (snap/point, clap/wave)*
  - *one / two hands*

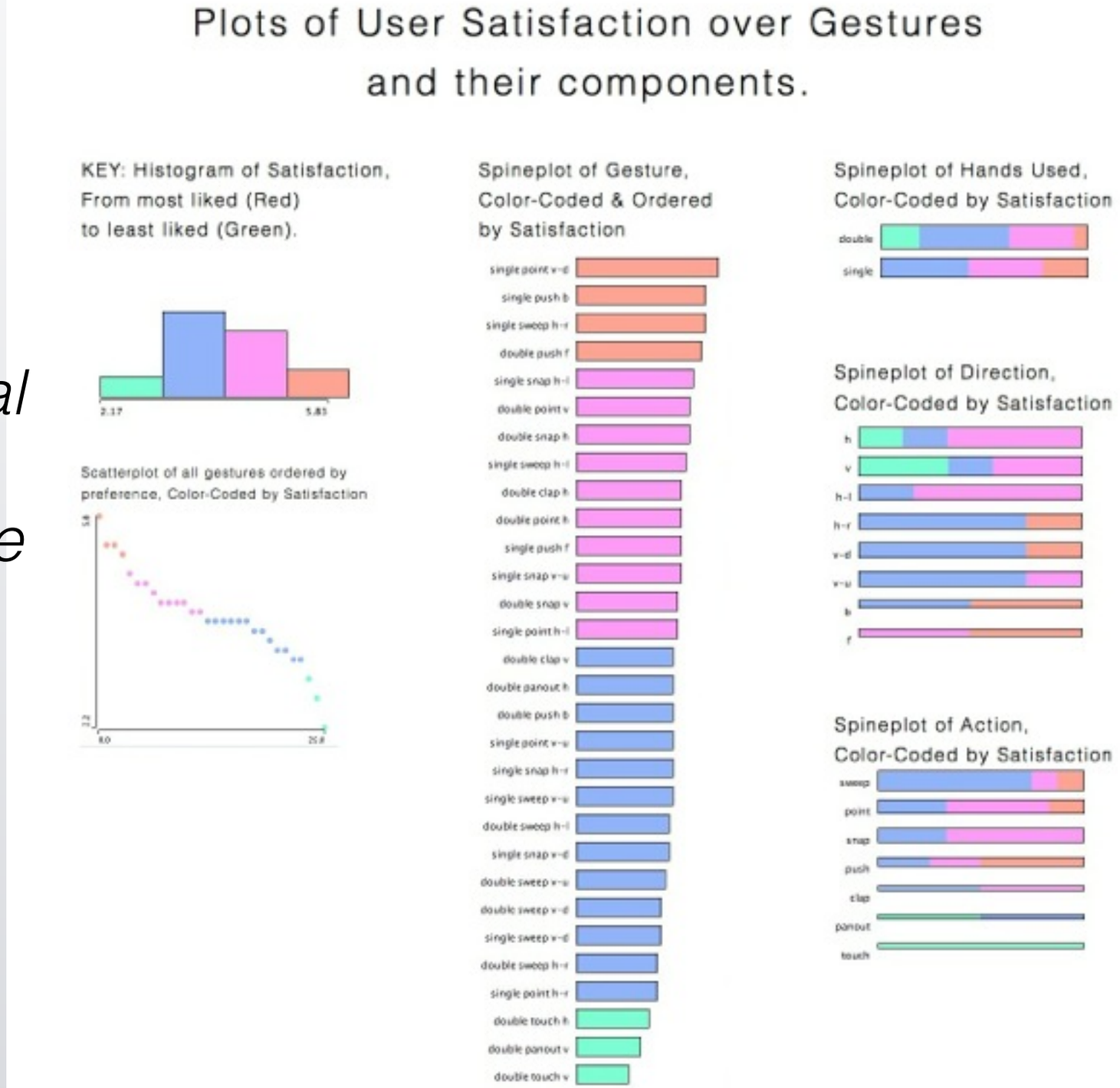
- **Task 2. Feedback Delay**
  - *one defined gesture (open-palm, forward push)*
  - *random range from 0-3 second response delay.*

gestures

- **gestures**
  - one hand
  - wrist/finger centred
  - short execution time
  small gestures, minimal physical effort, maintaining confidence in the system

- **feedback delay**
  notable *rating drop at ~1545±188ms*

Results



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feedback transitions

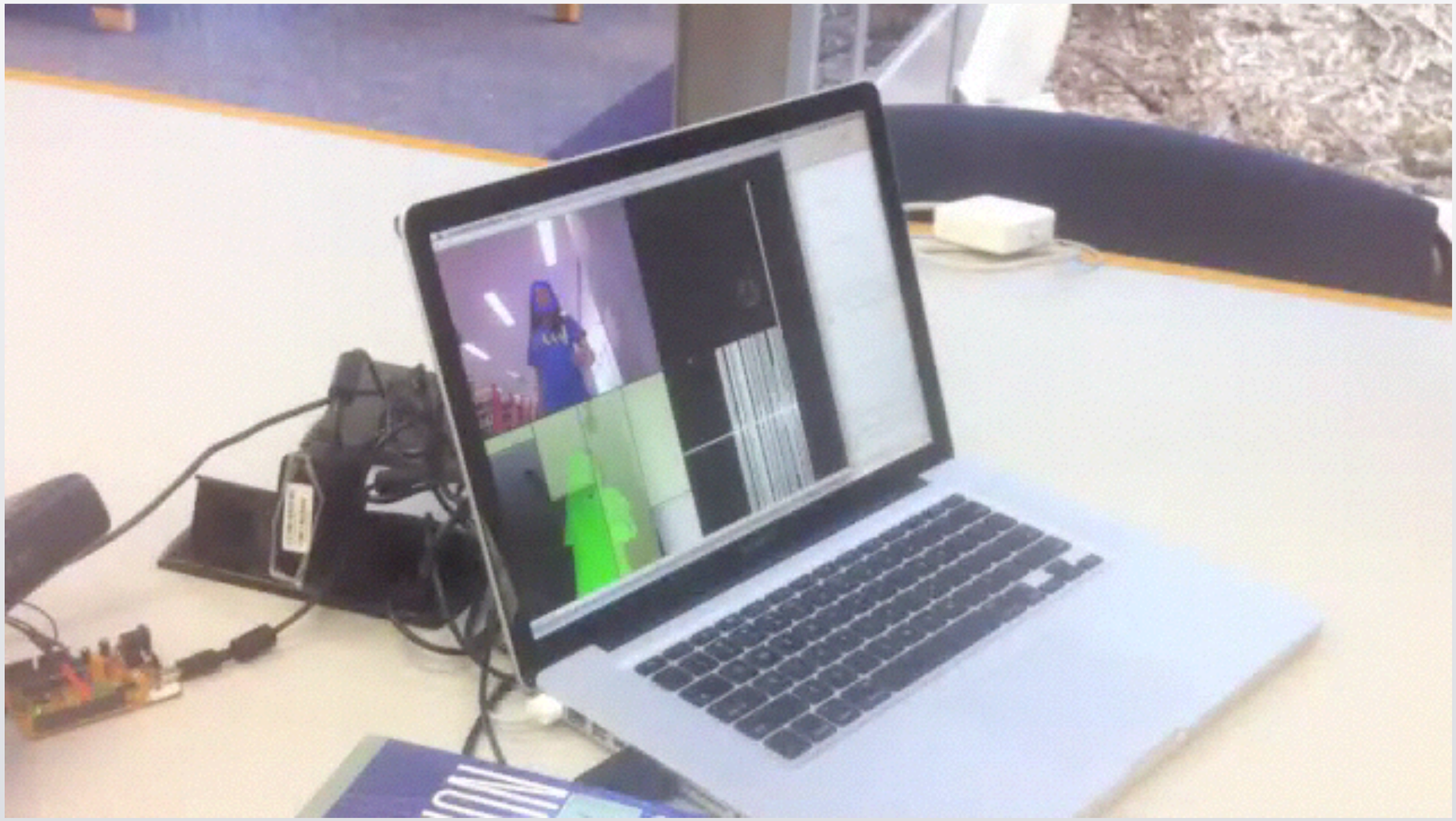
Task

- Use of ‘Point-and-Shoot’, ‘Sweep’, and custom gesture to turn on/off a lamp with user-controlled transition times. Participants identified preferred gestures, and transition-durations.

- *A Kinect recognised participant gestures, an iPad running TouchOSC recorded and controlled lighting fade-in/out times of a lamp.*

feedback transitions

Task & Prototype



feedback transitions

Results

- Transition-duration preference:
  ‘Shoot’ (0.50s), ‘Sweep’ (0.94s)

- *preference for sweep or sweep/wave-like gestures over pointing/shooting*

- correlation of preferred transition-duration to gesture-duration

- desires for direct topographical lamp-brightness to hand-position

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design implications

- **Natural Initiators of gesture recognition**
  such as gaze and orientation of gesture

- **Minimal Effort**
  whilst maintaining user confidence

- **Topographically Mapped Gestures**
  whilst performing a gesture, feedback should correspond with a user's mental model

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future work

- systems for more detailed training data, to abstract gestures for more deployable low-end systems
- exploration of the performance of natural delimiters
- users' spatial mental models of in-air gestures and how they relate to a fixture's shape, movement, and interaction

thank you

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