

Gestural Interactions with Medical Holograms in Augmented Reality

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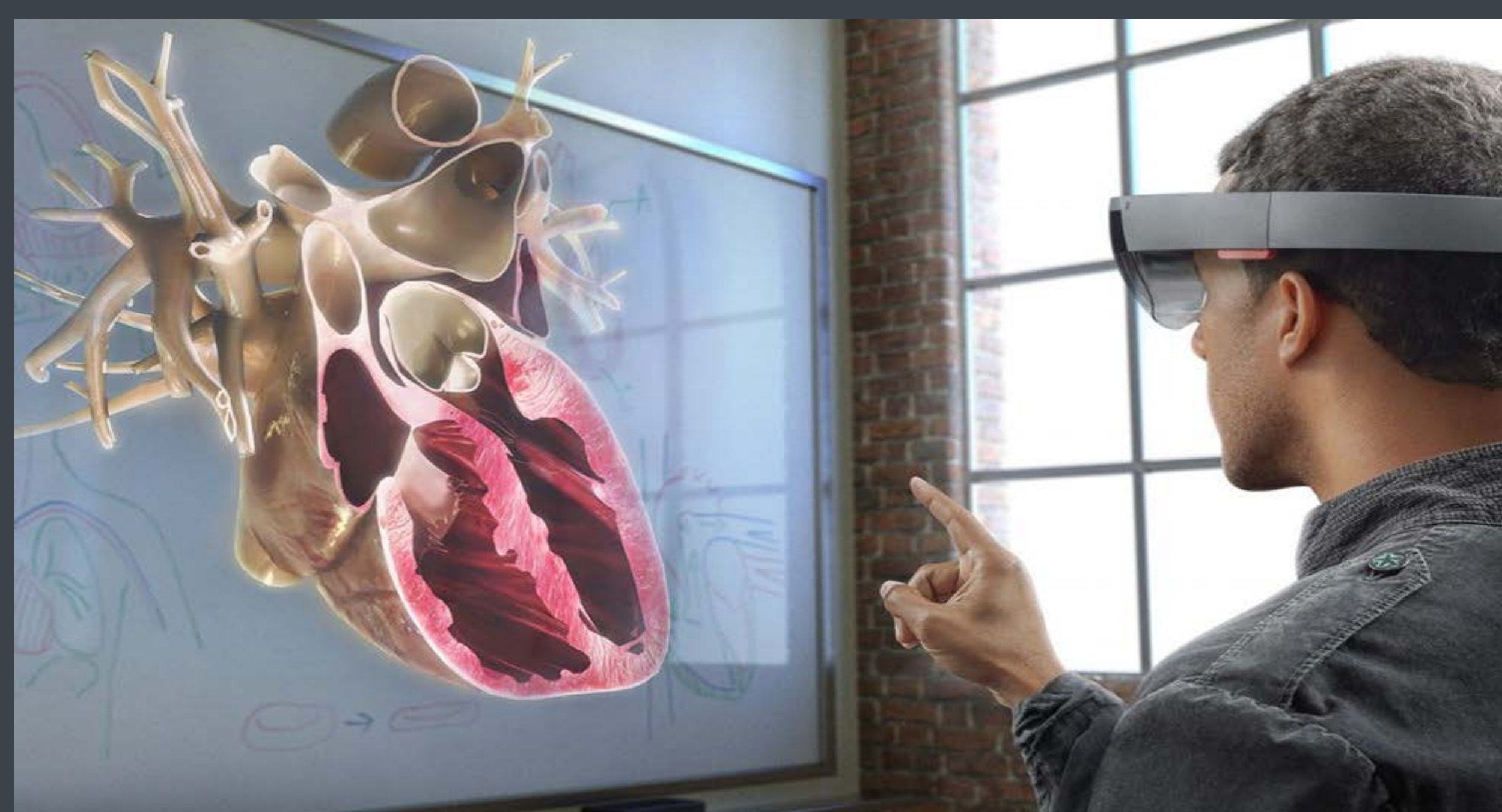
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Medical holograms to help perform surgery [1]

PROBLEM

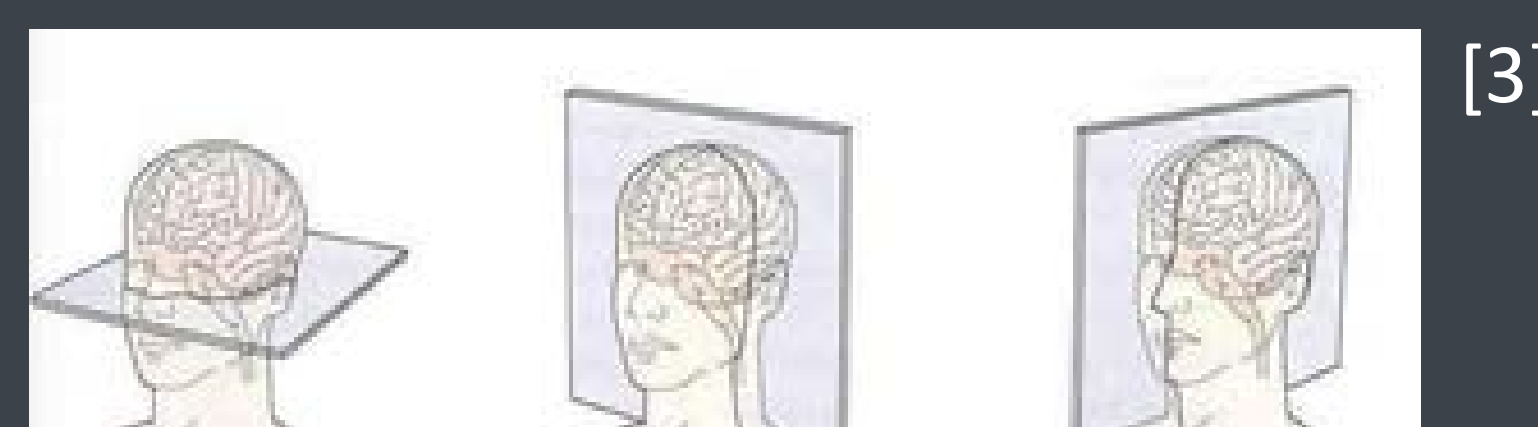
Currently the HoloLens only has 2 gestures for interacting with interfaces in AR, limiting our abilities to explore cross sections of medical holograms. Gestures in the past have mainly been created by system designers and are not necessarily reflective of **user behavior**. With the great advantages AR technology can bring to the medical field it is important to understand **what gestures a user would chose to perform** for very specialized tasks such as interacting with medical imaging.



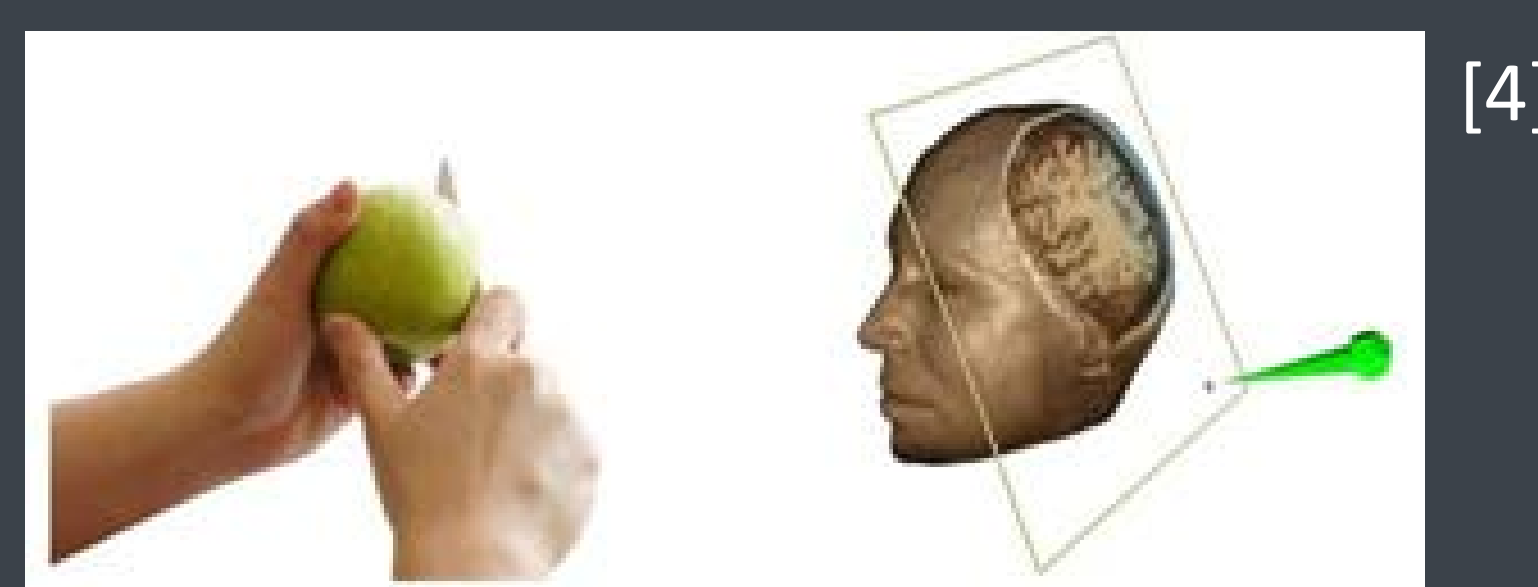
Using the HoloLens to interact with a cross section of a heart [2]

METHOD

A pilot study was conducted with 11 participants to elicit gestures for 21 tasks. The study employed a guesstimate method to elicit gestures. The tasks were designed to replicate actions that users may take while interacting with medical holograms. The gesture were then analyzed to create a complete user-defined gesture set.

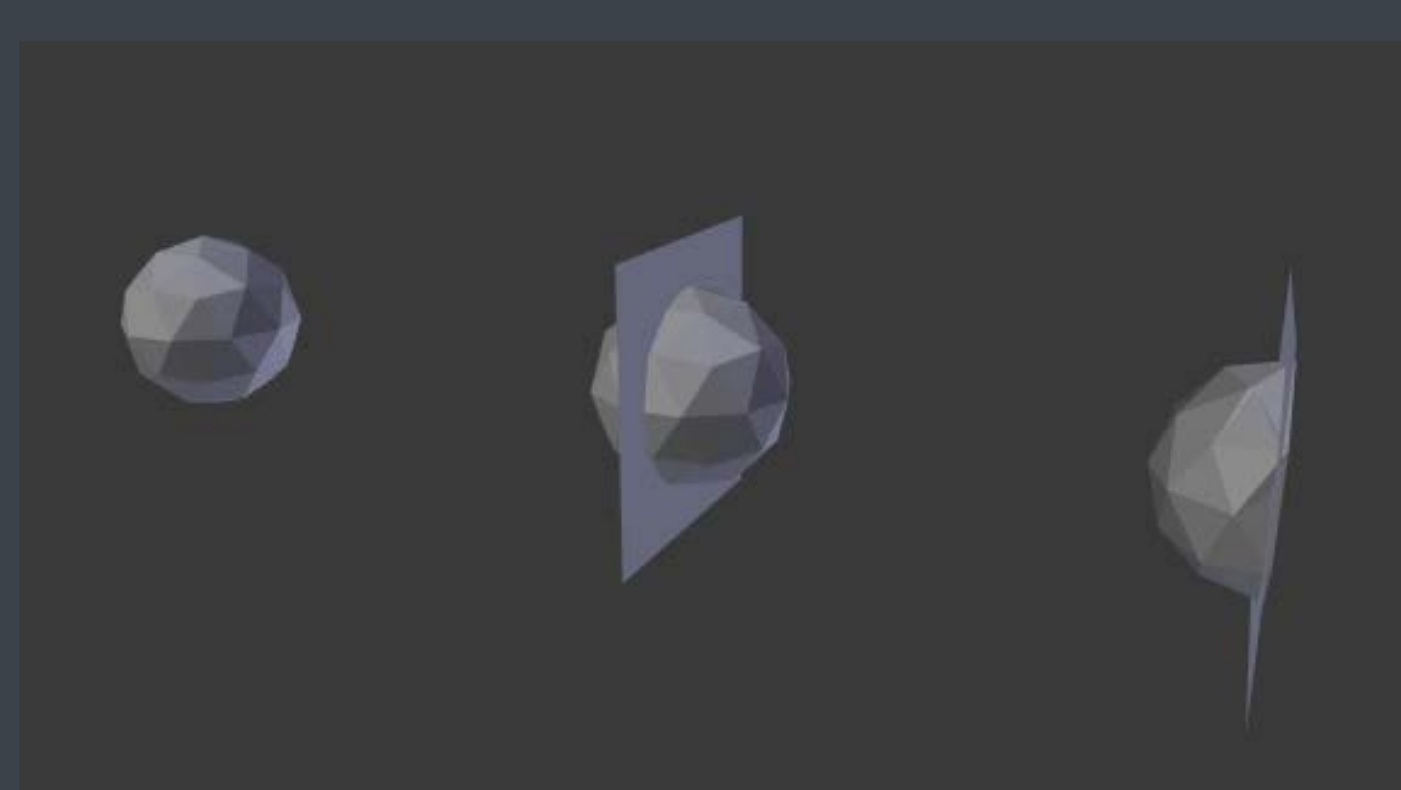
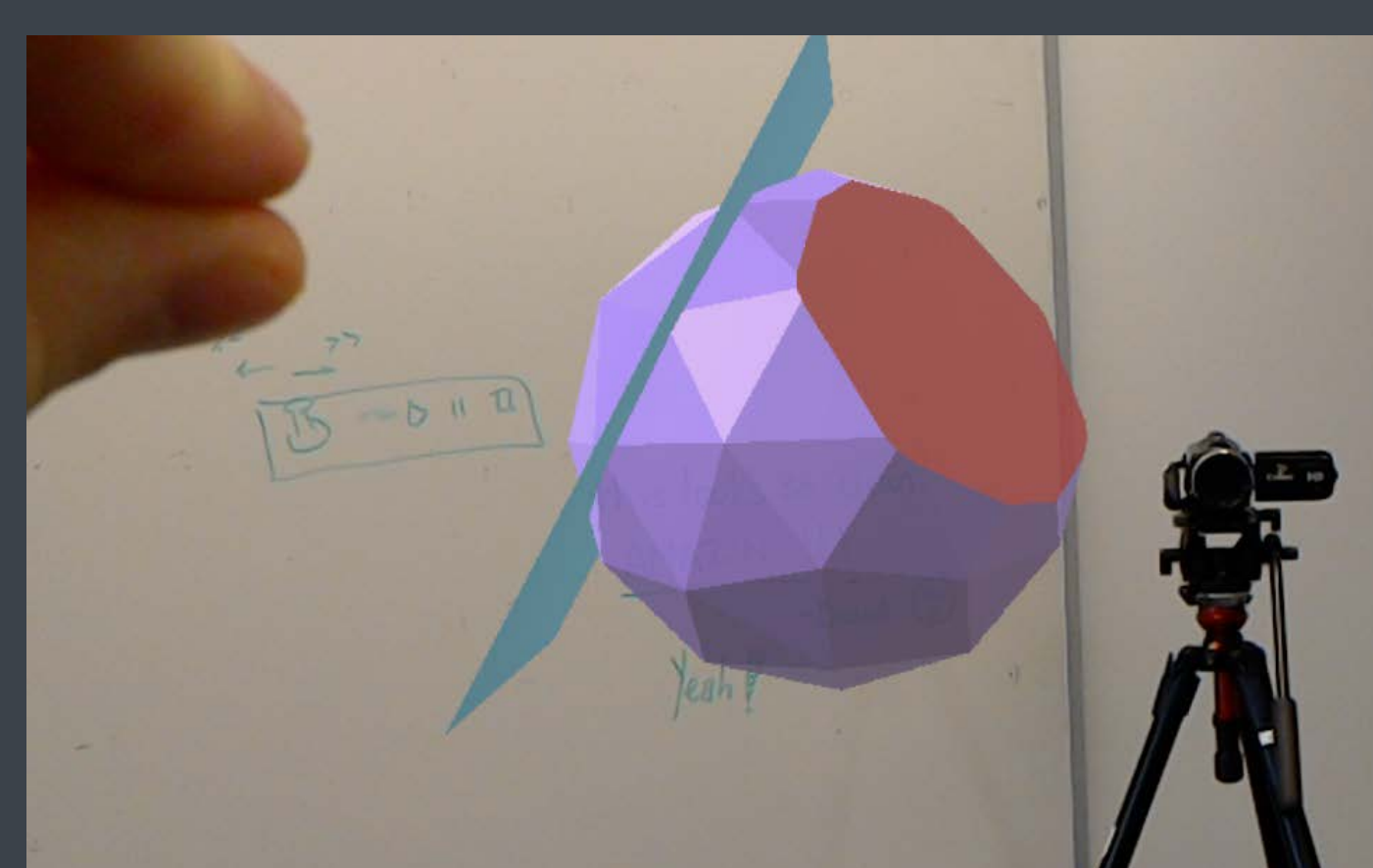
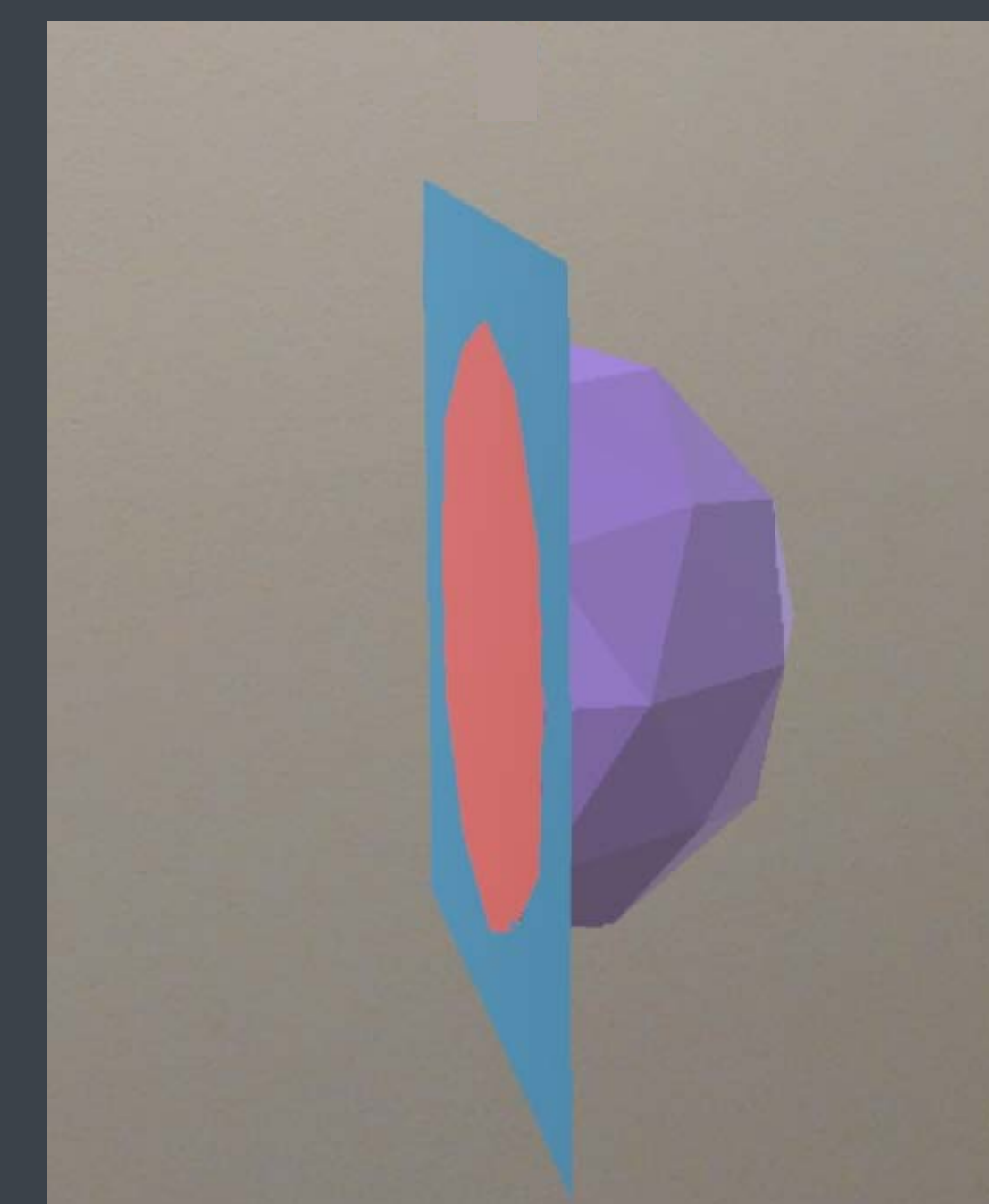


[3]

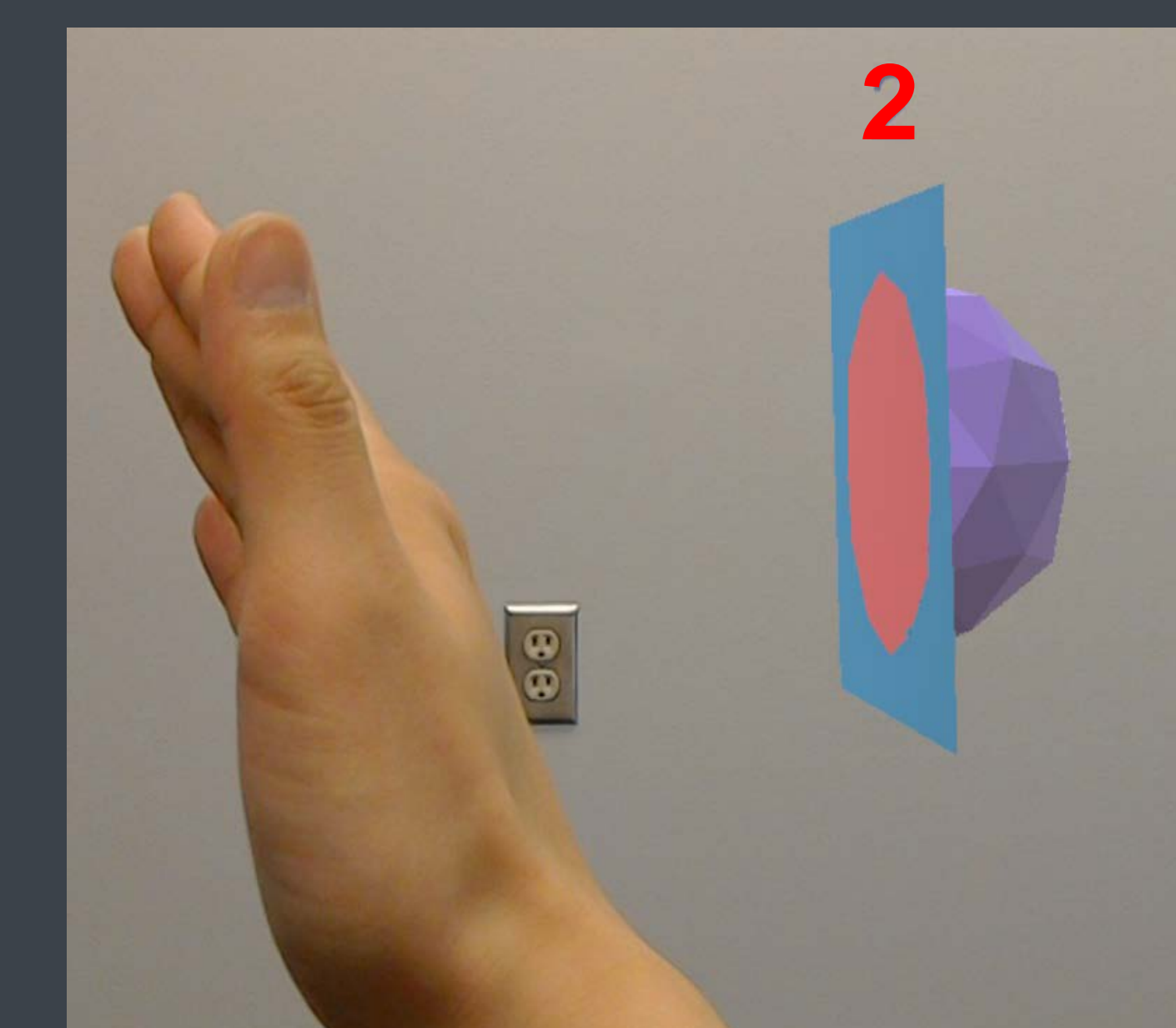
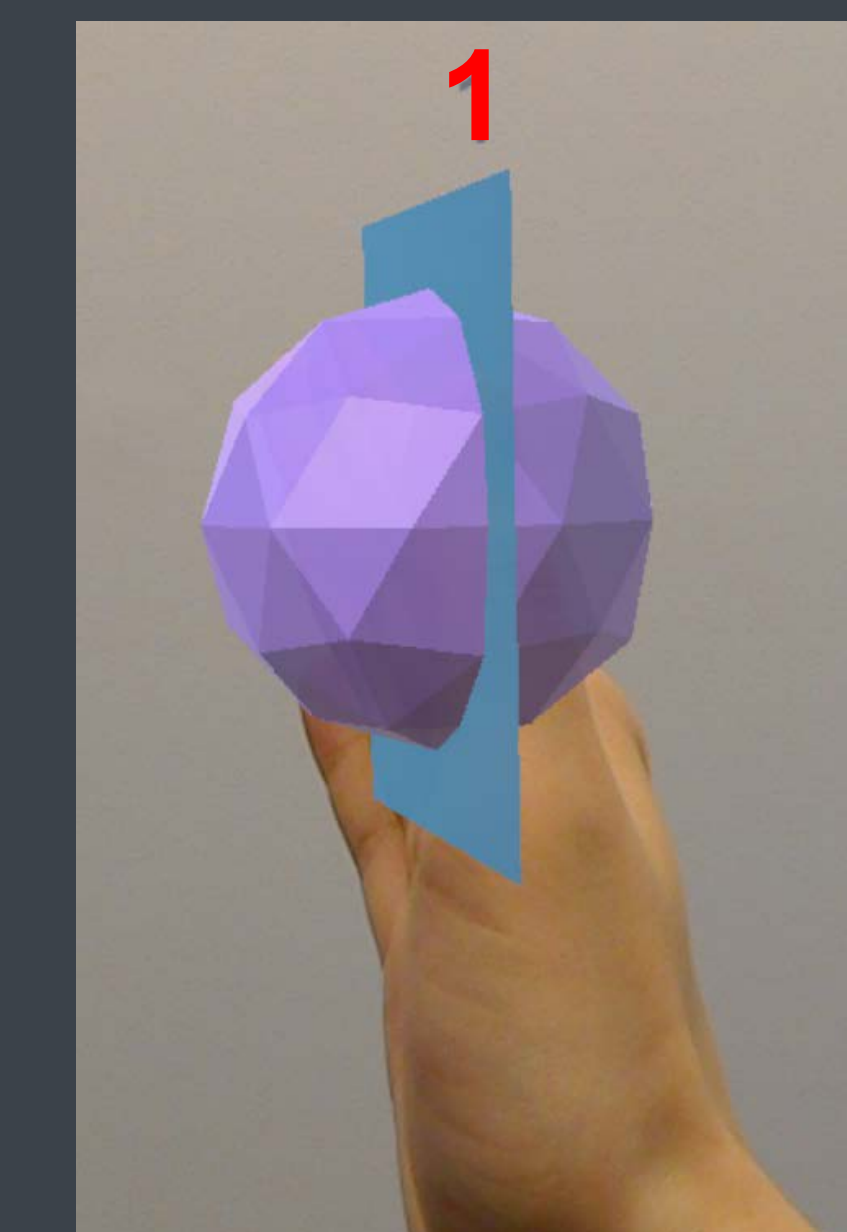


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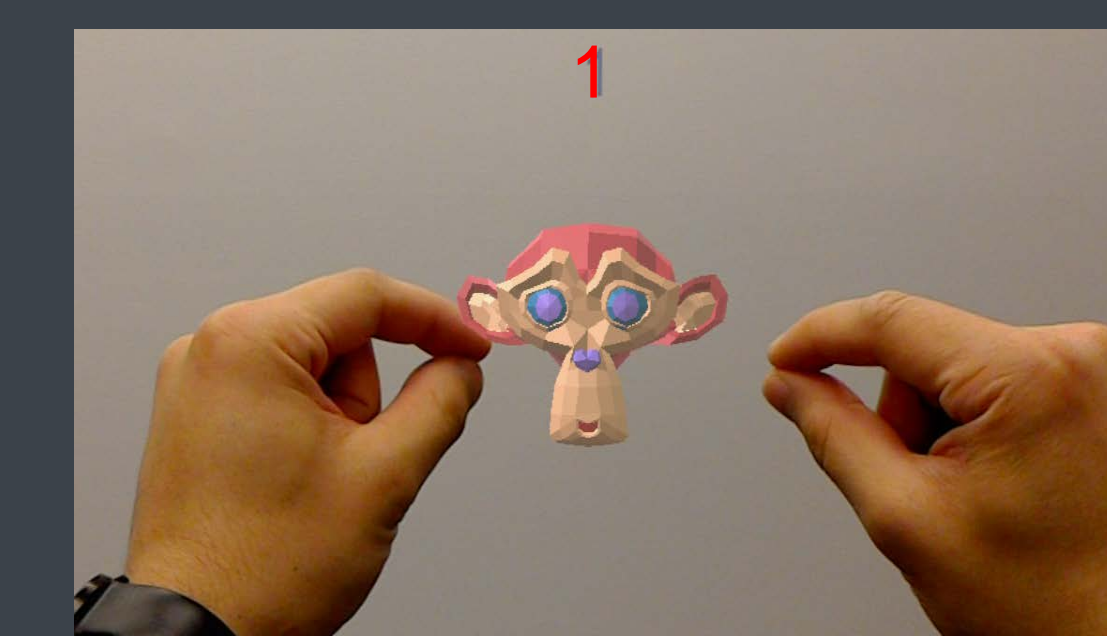
Example of possible interactions with medical holograms and how they were represented with simple models.



Participants were presented with the effects of a gesture then asked to perform a gesture they believe to provoke the action.



Gestures performed by participants



RESULTS

A total of 231 gestures were analyzed to create a complete set of user defined gestures along with agreement scores. The findings suggest that:

- Users prefer performing gestures with **one hand** rather than two
- That touch based gestures influence user **mental models**
- There is a significant difference between mental models of **technical users vs. non-technical users**
- Gestures may not be appropriate for all tasks



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interactions lab

[1] Grey's Anatomy. ABC Studios, 2014.
[2] <https://gearburn.com/2015/05/microsoft-build-2015-roundup/>
[3] <http://www-psych.stanford.edu/~kalina/BB>
[4] <http://ps-medtech.com/how-it-works/>