



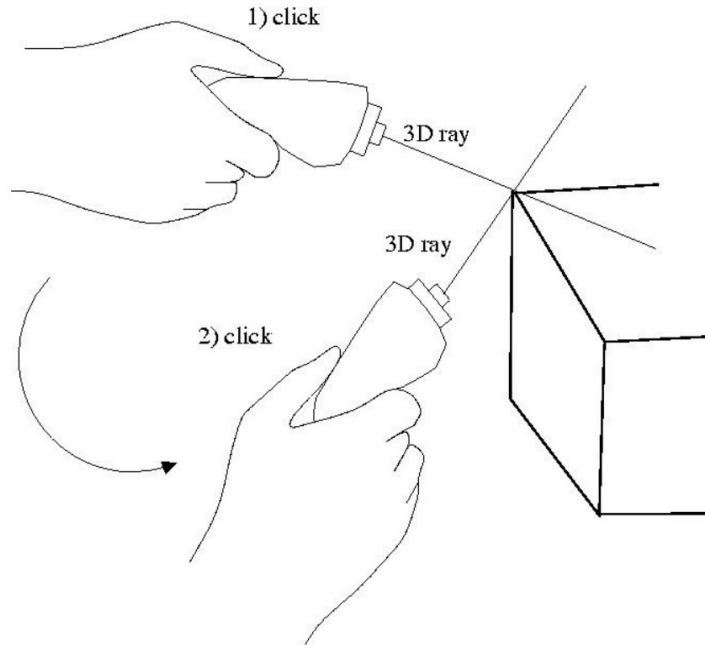
Interactive Image-Based Model Building for Handheld Devices

Aims and Motivations

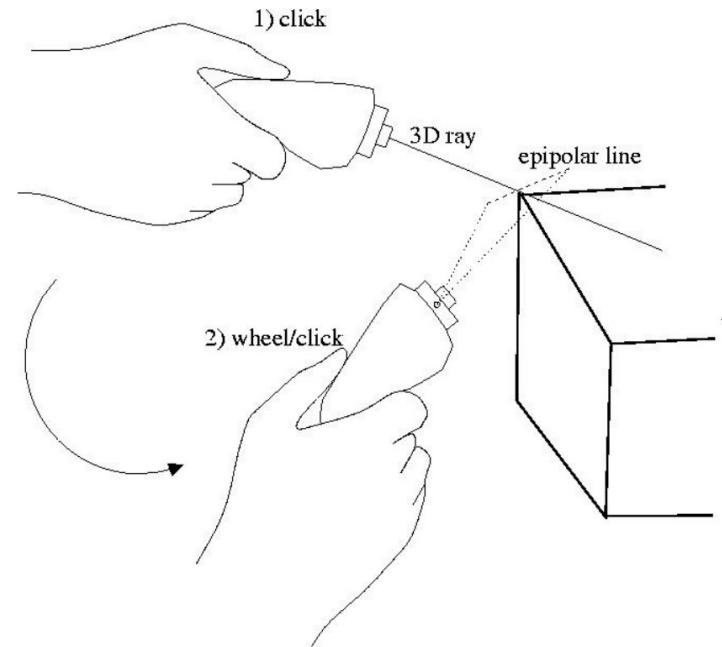
- Having a system that allows online building of 3D wireframe models.
- Design for handheld devices.
- Interested in less textured objects.
- User has more control on what features should be added into a model.
- Choose a hardware reference and techniques to select 3D points from 2D views.



🔥 3D points from 2D Views



Two Clicks



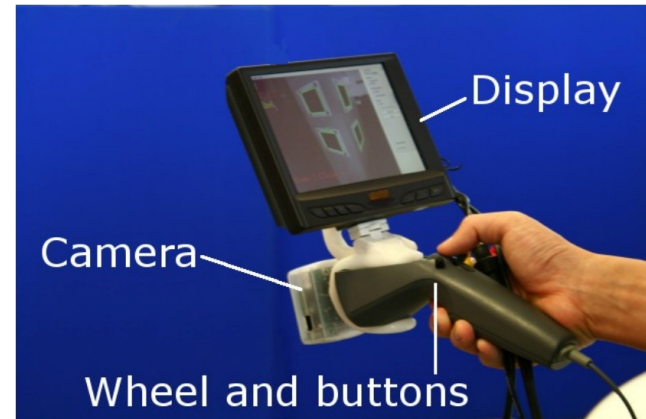
Click and Move

Hardware

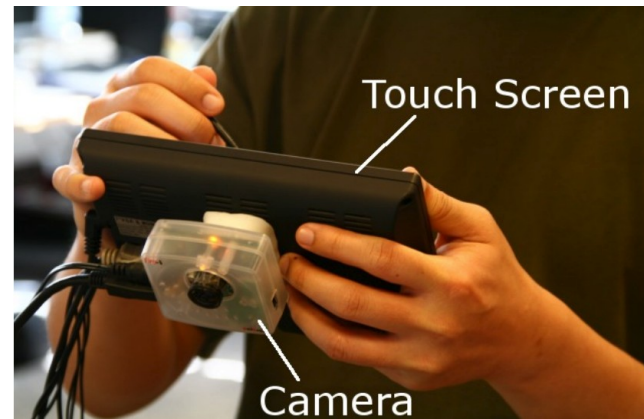
Main Components

- Camera
- Input Device
- CPU

Wand-like Device
(One-handed Use)

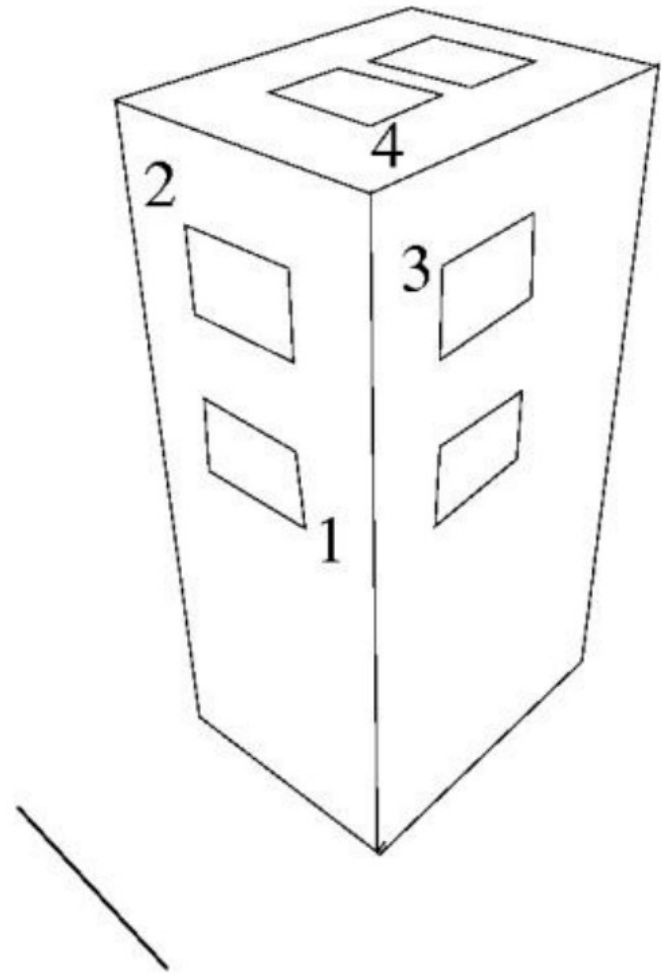


Touch-Screen Device
(Two-handed Use)



🌟 User Study

- Task and Stimuli
 - Track 6 known templates.
 - 4 predefined corners to select.
 - 70, 119, 119 and 132 cm from the ground.

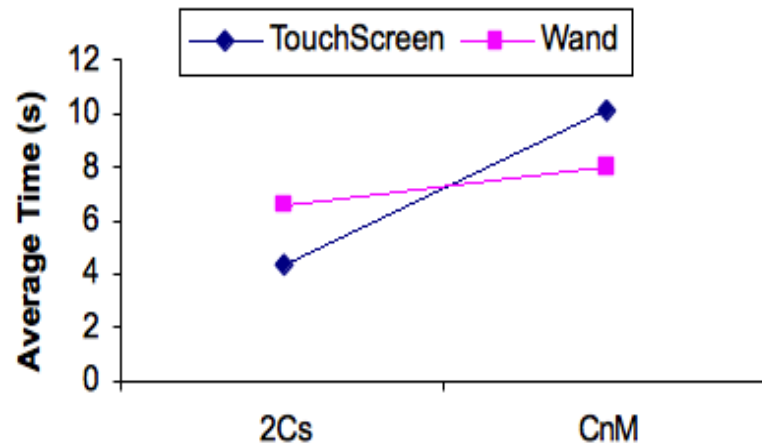
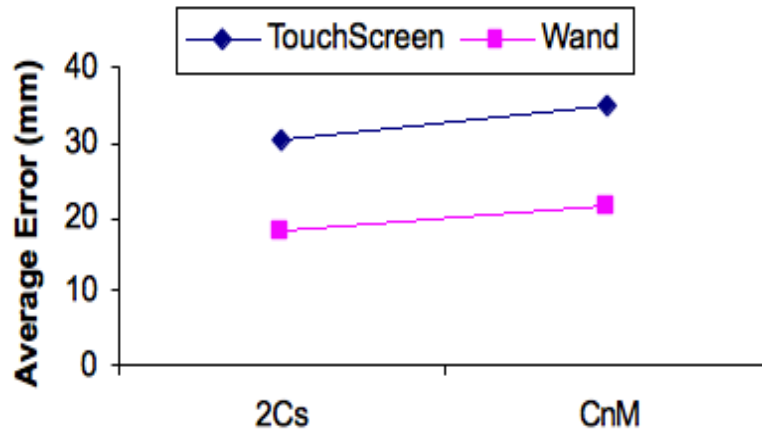


User Study

- Procedure and Design
 - 10 participants
 - 2 Devices and 2 Techniques
 - Randomly select 4 corners.
 - 8 trails per condition.
 - Total $10 \times 2 \times 2 \times 4 \times 8 = 1280$ trails.
 - At the end, participants were asked to rank-order the four conditions.



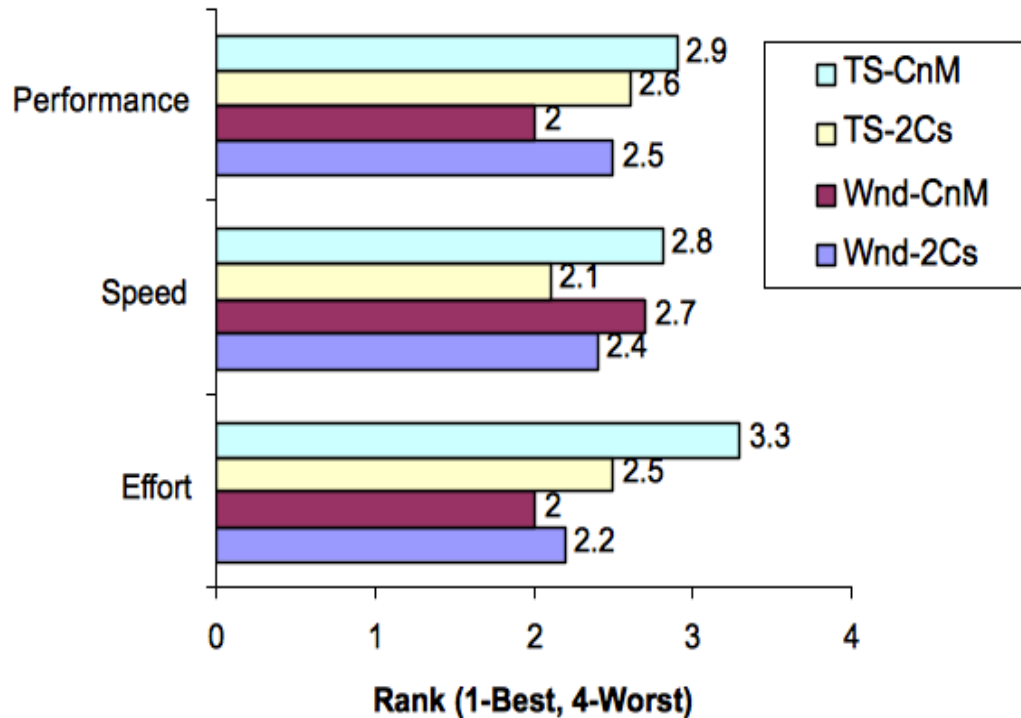
User Study



Univariate ANOVA Test

- Devices have significant effect on error but not techniques.
- Wand gives less mean error compared to Touchscreen.
- Techniques have significant effect on completion time but not devices.
- Using two clicks is faster to complete tasks than using click and move.

User Study



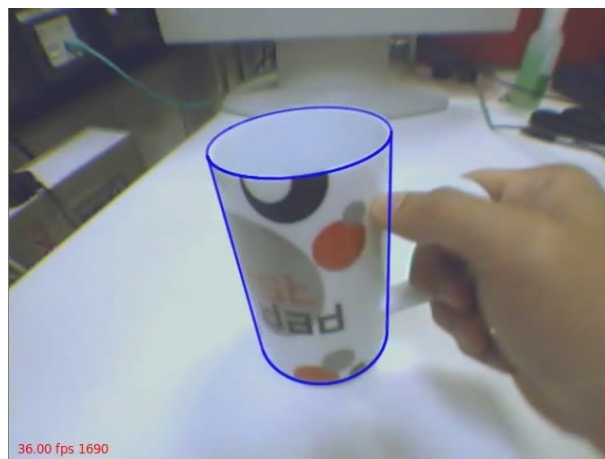
- Touchscreen combined with click and move was the least preferred.
- Both techniques used in Wand were well liked by participants
- Most participants preferred Wand with click and move over Wand with two clicks.

OutLinAR-II

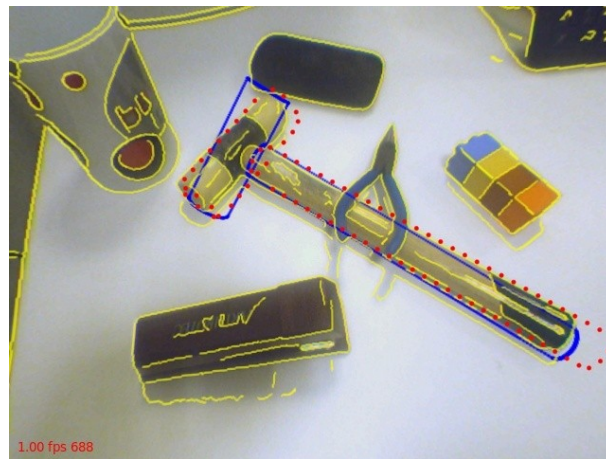
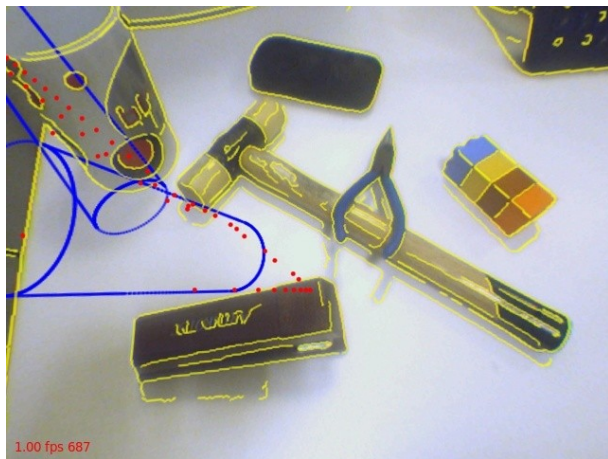
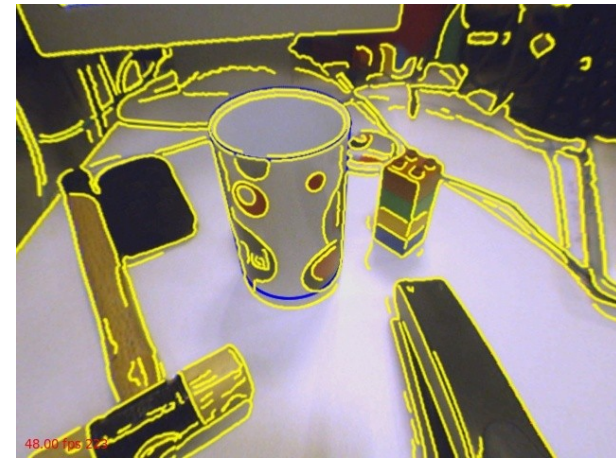
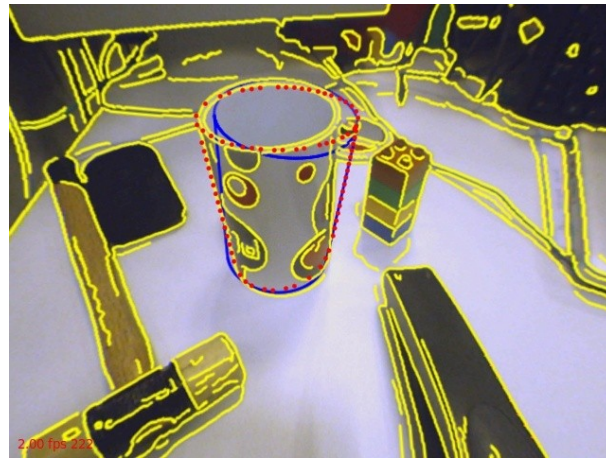
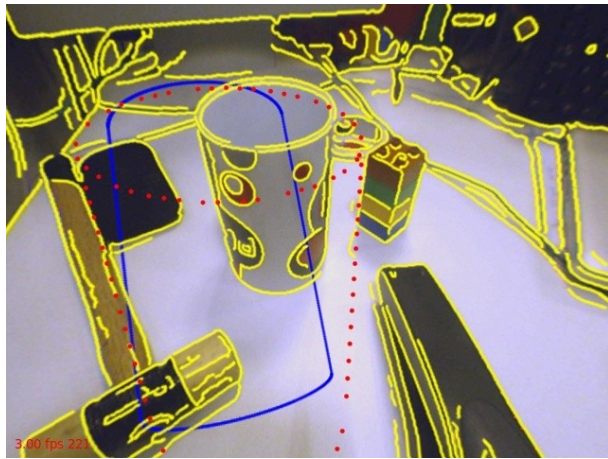
- Touchscreen combined with two clicks was chosen. Why?
 - Our approach does not model the environment to be used for tracking. It will not be stable enough for wand combined with two clicks to work.
 - Vast majority of current mobile devices use a touchscreen.
 - Can implement useful techniques which are difficult to do with the Wand.



OutLinAR-II



Edge-Based Object Detection



Conclusion

- Wand combined with two clicks should be used if a tracker is stable.
- OutLinAR-II is designed for Touchscreen devices.
- Edge-Based Object Detection can detect less textured objects.

