TAKE MY HAND: AUTOMATED HAND-BASED SPATIAL GUIDANCE FOR THE VISUALLY IMPAIRED - PAPER STUDY

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INTRODUCTION

Generates verbal audio instructions.

AUDIO FEEDBACK

Uses vibration patters to convey information to the user.

HAPTIC FEEDBACK

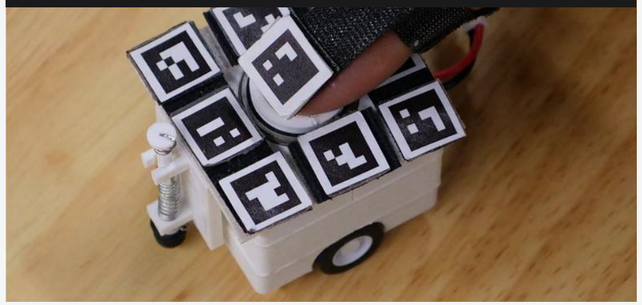
MOTIVATION

Limited applicability in noisy or context-sensitive environments.

Increased end user’s mental load.

FINGERROVER

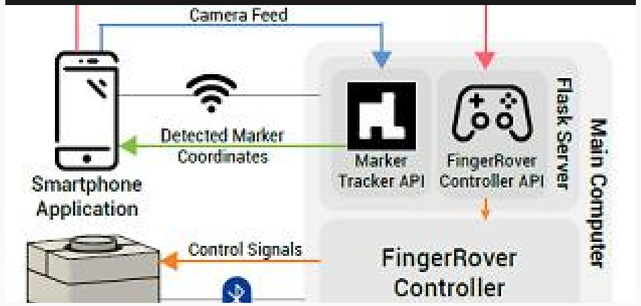
Architecture



- Automated Hand-Based Spatial Guidance.
- User’s hand is moved from one point to another.
- On-finger 2-wheeled miniature robot.

- A central server controls the system.
- Smartphone camera captures ArUco markers.
- Minimizes the distance between FingerRover and the target point.

Control System



DESIGN PHASE

Test the prototype
during development.

PRELIMINARY PHASE

Blindfolded participants
with normal vision.

FINAL PHASE

Visually impaired
participants.

RESULTS

- Significant task completion time benefits for accuracy-demanding tasks.
- Tasks that involved more movement, took longer due to the FingerRover's low velocity.

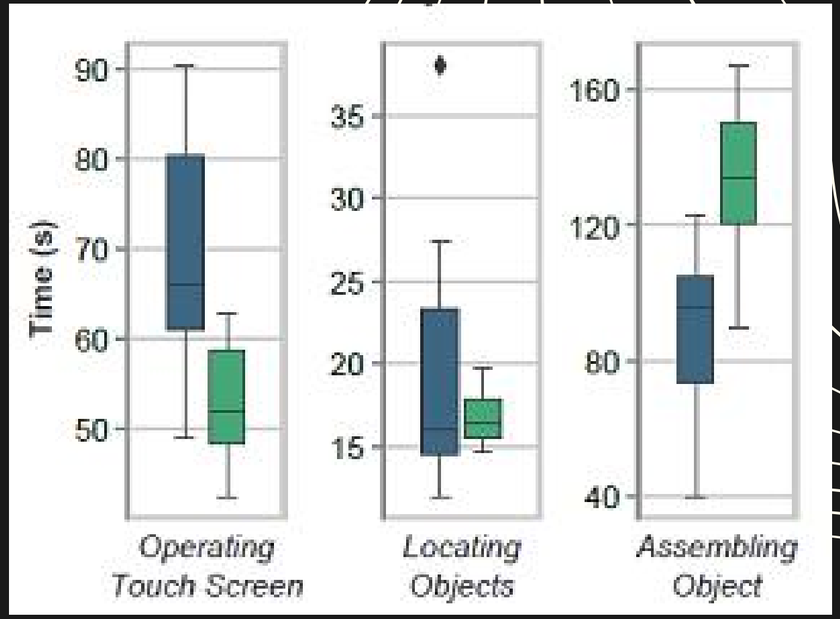


Figure 1: Task completion time for the final phase. Spatial (green) vs. audio (blue) guidance.

CONCLUSION

Spatial guidance is useful for interfaces valuing input accuracy and scenarios with costly error corrections.

Spatial guidance complements, but does not replace, audio and haptic feedback, enhancing accessibility.

THANK YOU