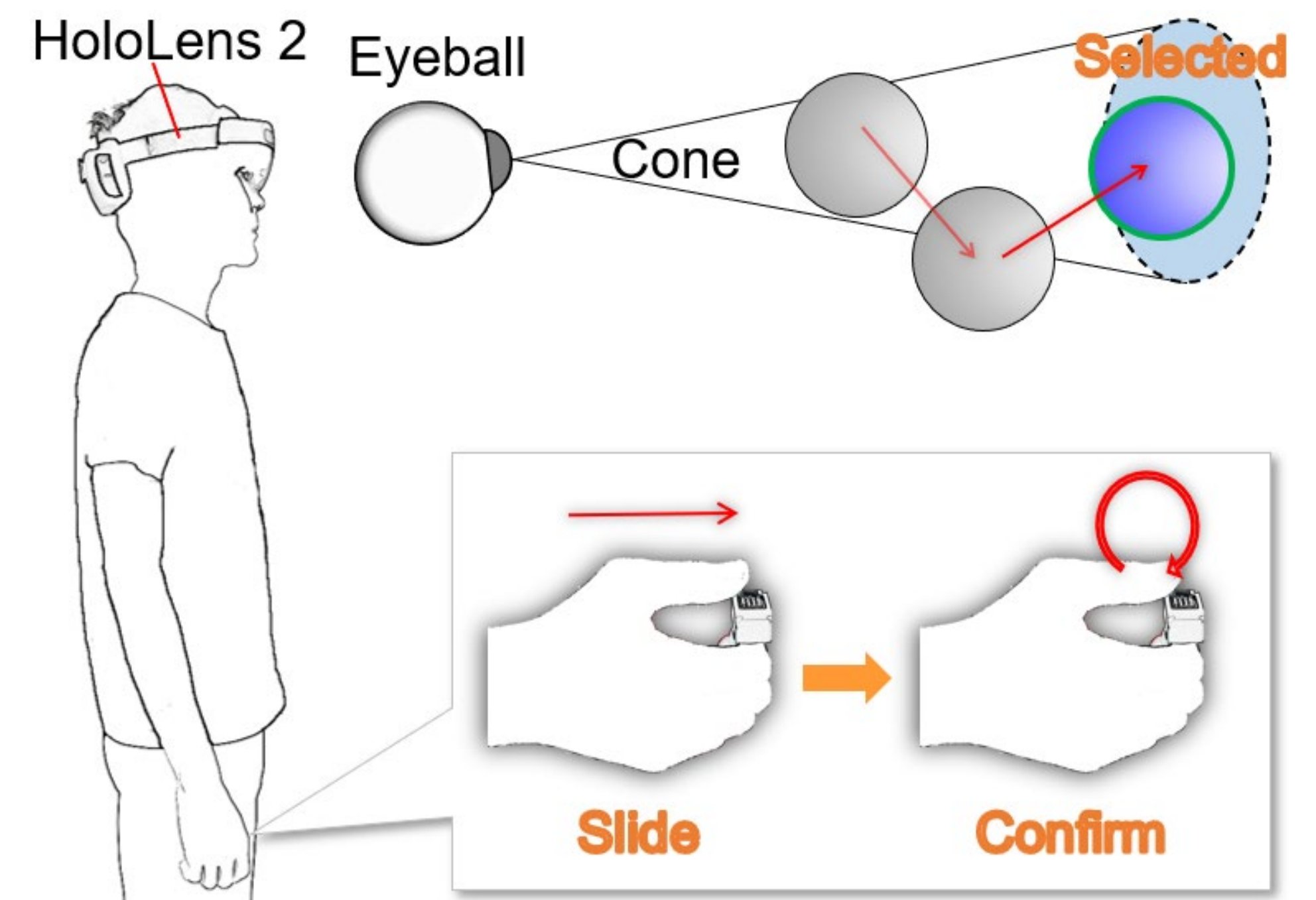# Multimodal Interaction with Gaze and Pressure Ring in Mixed Reality
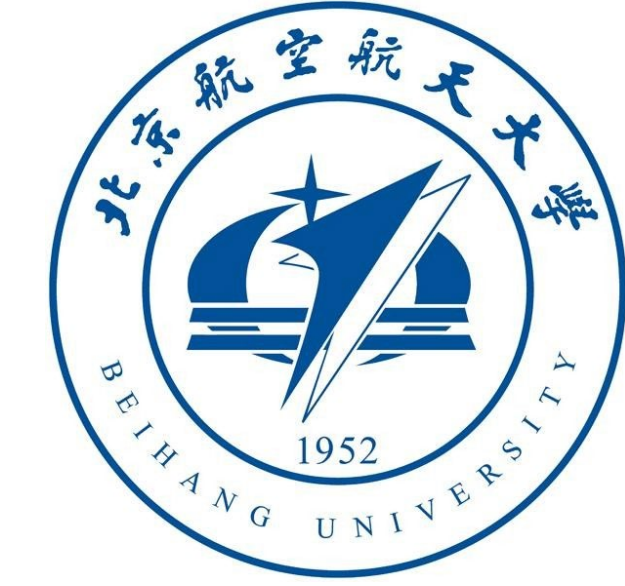
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Hand gestures require AR headset to track hand movements.

Gaze-Gesture interaction uses a pressure ring allowing for more flexible hand movements (**Ours**).

Motivation

- AR combines gesture and eye movements to achieve hand-eye coordination.
- However, hand gestures require AR headset cameras to track hand movements, leading to challenges such as arm fatigue and restricted hand mobility.

Contribution

- **Pressure Ring:** We introduce a wearable interaction module featuring a pressure ring, designed for gesture interaction and enabling seamless interaction without the need for direct hand capture.
- **Gaze-Gesture Interaction:** We propose a novel multimodal interaction technique integrating gaze and gesture for a more natural user experience.

System Design

- This pressure ring equips with a flexible pressure sensor, is worn on the index finger and operated by the thumb.
- The Gaze-Gesture interaction enables users to select and manipulate virtual objects. This system uses an interface where users can adjust their view and interact with objects through a combination of gaze direction and pressure ring inputs.
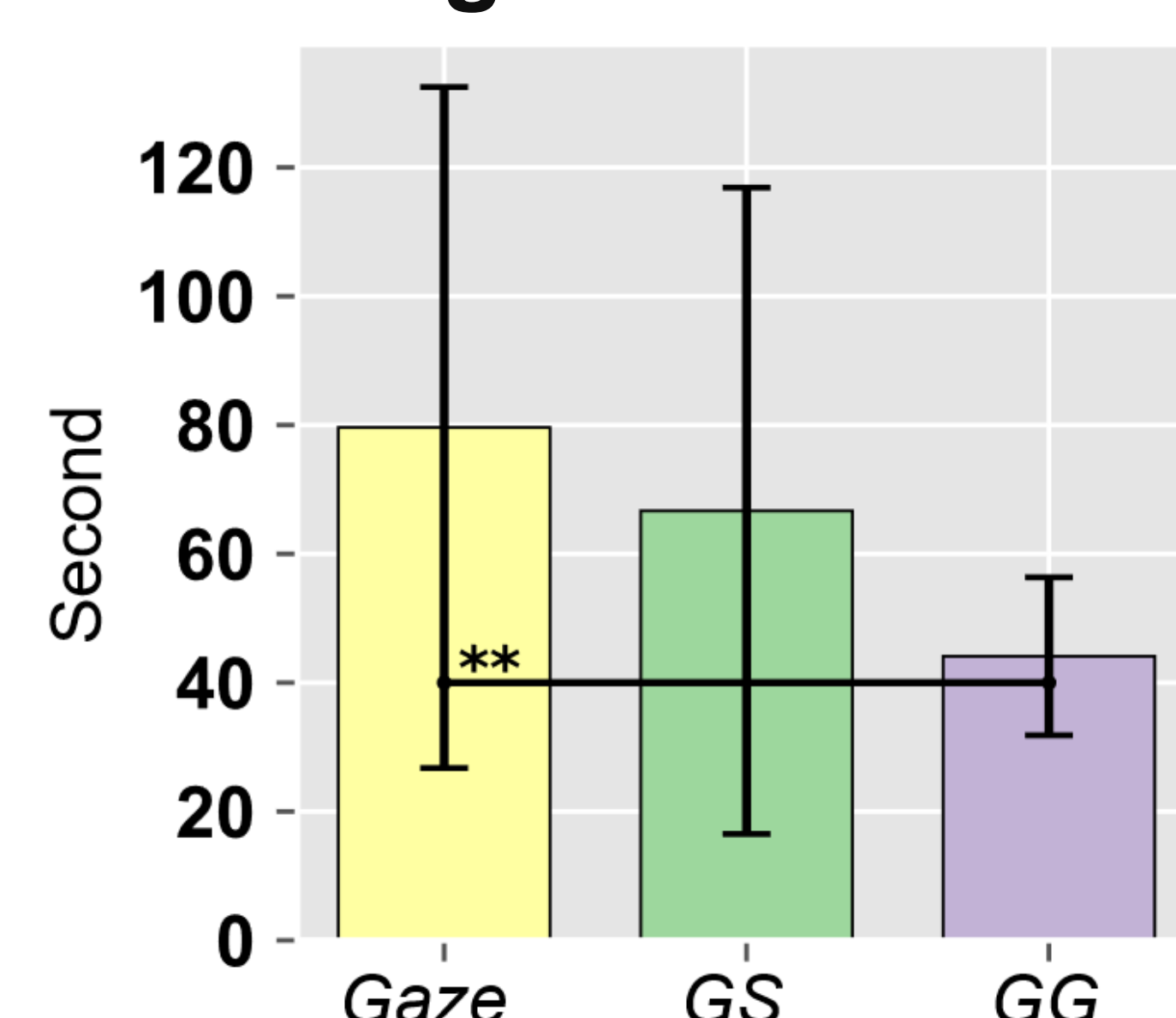
Task Design

- The task involves interacting with spheres occluded by cubes in a virtual space. Participants must select occluded spheres using the interaction system and place them in specific target locations, demonstrating the system's ability to handle complex spatial interactions.

Results

- We conducted experiments with 16 participants using different interaction techniques, including our Gaze-Gesture interaction (*GG*), Gaze-only interaction (*Gaze*), and Gaze-Speech interaction (*GS*).
- The results showed that GG significantly improved average finish times compared to *Gaze* and had a slight advantage over *GS*. This demonstrates the effectiveness of our proposed multimodal interaction approach in AR environments.

Average Finish Times

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