

[DC] Limb Motion Guidance in Extended Reality

Xingyao Yu,
Visualization Research Center (VISUS),
University of Stuttgart

- Research Direction
 - VR & AR technology grants new possibilities to the movement tutorial. So far, we have run a series of user studies to propose the design implications for MR-based motion guidance in terms of user perspective, visual encoding, and motion features. And I would like to continue my research on:
 - 1) memorability of motion guidance, that is, make the users truly learn a new motor skill.
 - 2) realistic user scenarios, for instance, physiotherapy.

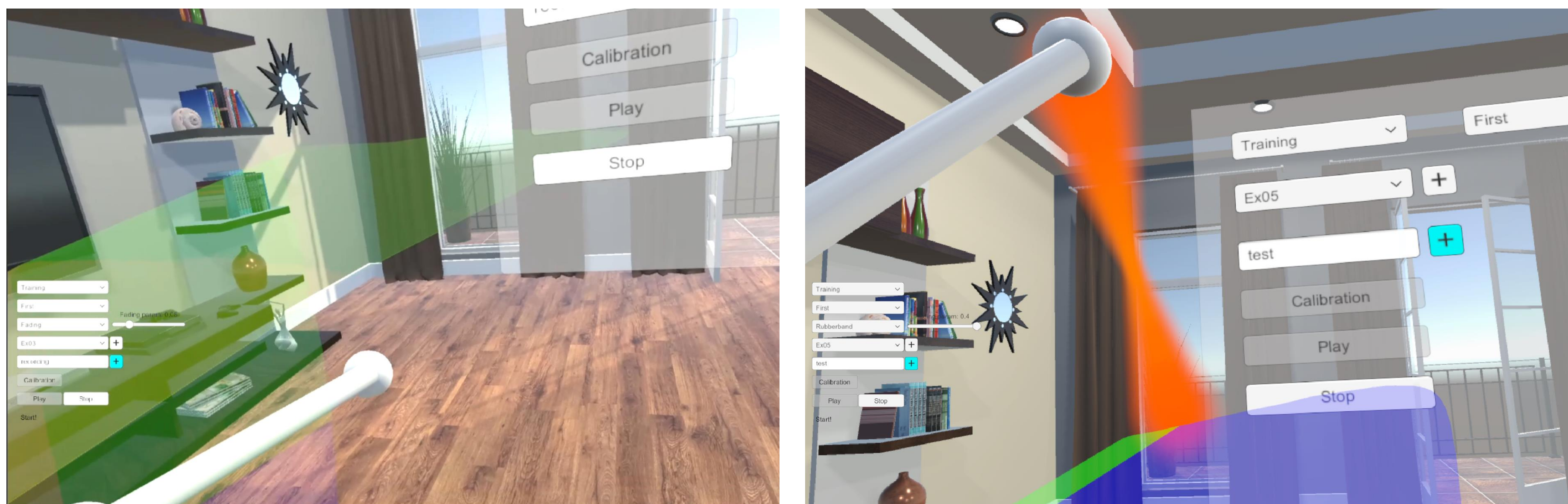


Figure 1. Motion guidance system. (left) with increasing difficulty (descending visibility). (right) visually enhanced error feedback based on the deviation.

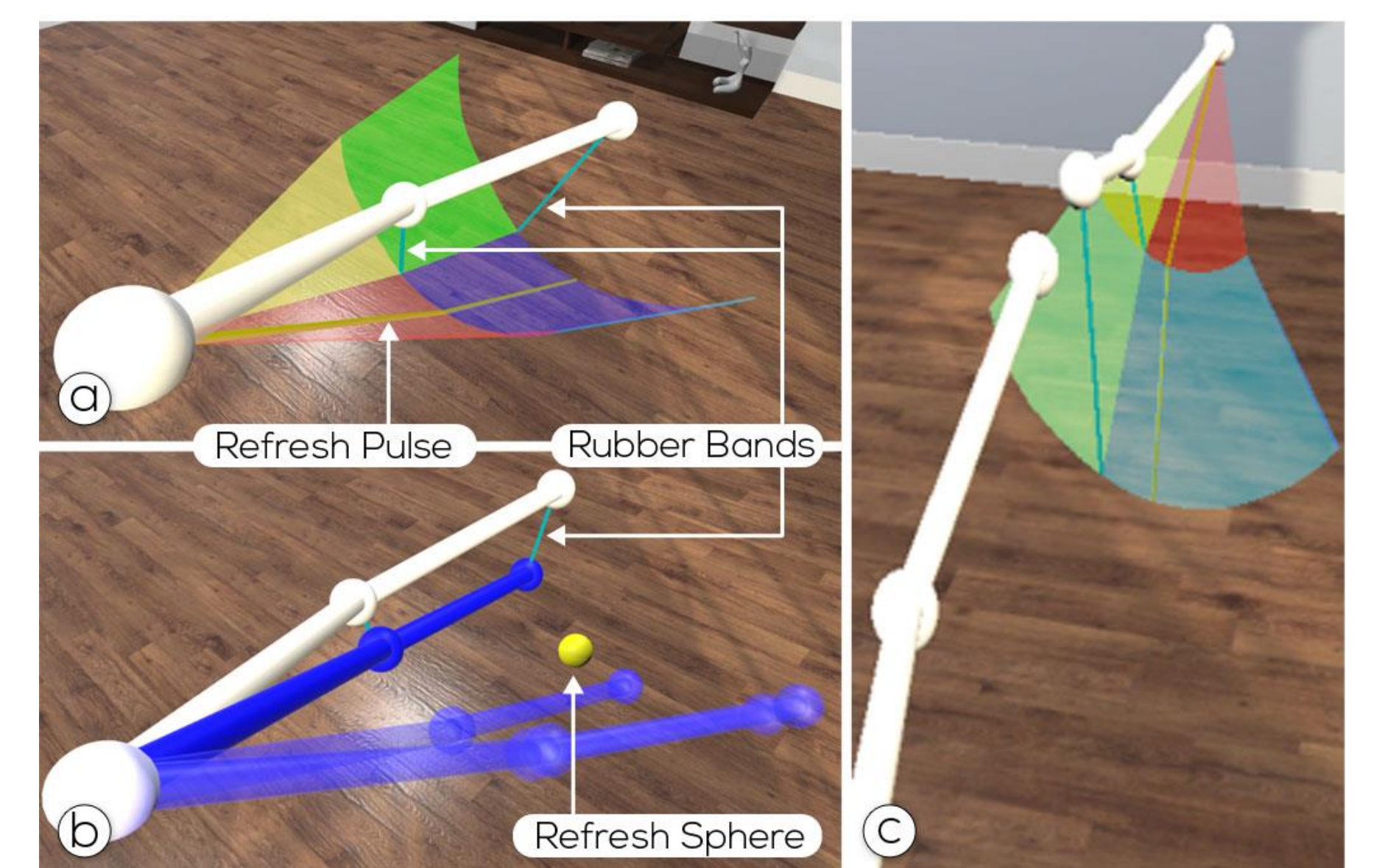


Figure 2. Motion guidance system. (a) continuous instructions in first-person, (b) discrete instructions (c) mirror-person

➤ RG1 - Design Implications

- How to select a viewing perspective?
- How should guidance be visually encoded?
- How do **different motion types** influence the design?
 - The results of our 3 controlled user studies with 41 participants.
 - Perspective matters the most among all the factors for frontal movements
 - Design implications regarding perspective selection and its interaction with motion characteristics, together with the guidance design.

• RG2 - Short-Term Retention

- How to make the users memorize motion guidance faster and perform more precisely?
- Different error feedback mode:
 - Real-time multi-modal movement error vs. post-analysis of movement error
- Increasing difficulty during training
 - E.g. Gradually increase the transparency of the instructions as the number of training sessions increases

• RG3 - Authentic Motion Guidance

- How to apply motion guidance in an authentic use case?
 - The unsupervised practice of physiotherapy movement or work-out
- How to set up the task and what should be the measurement?
 - Physiotherapy movement or workout movement.
 - Movement Precision + muscle activation requirement?

Xingyao Yu, Visualization Research Center (VISUS), University of Stuttgart

This project is funded by Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) under Germany's Excellence Strategy - EXC 2075 – 390740016.

ID: DC 1018