

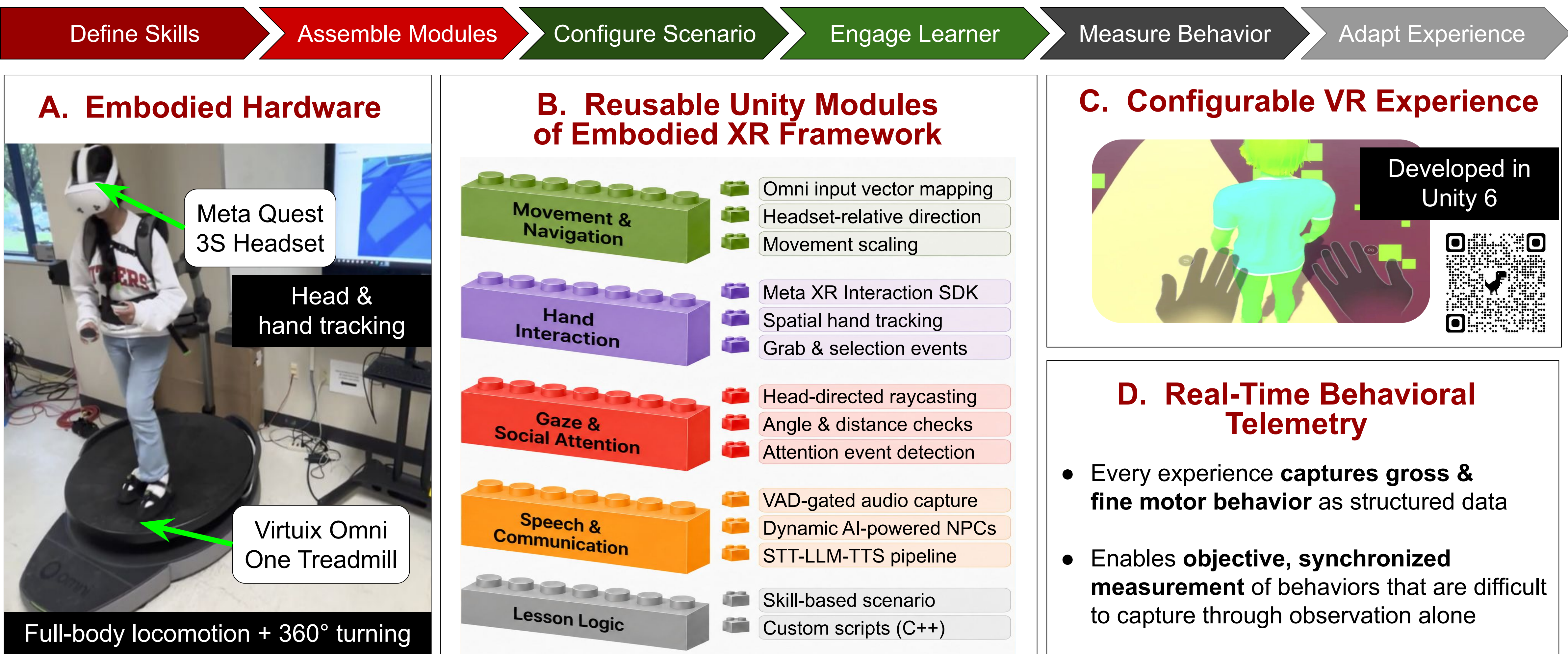
Background & Motivation

- **Virtual Reality (VR)** provides **neurodivergent children** with **safe, repeatable environments** for practicing functional skills
- Many VR systems for neurodivergent therapy remain **seated or stationary**, limiting real-world skill practice and behavioral data capture
- Embodied XR could offer a more **immersive** and **measurable** approach

Research Question

Can a **modular embodied XR framework** provide a foundation for **measuring and training functional gross and fine motor skills** in neurodivergent children?

Embodied XR System Overview



Framework-Enabled Prototype Experience: Multi-Peer VR Tag

Gamified Gross & Fine Motor Task

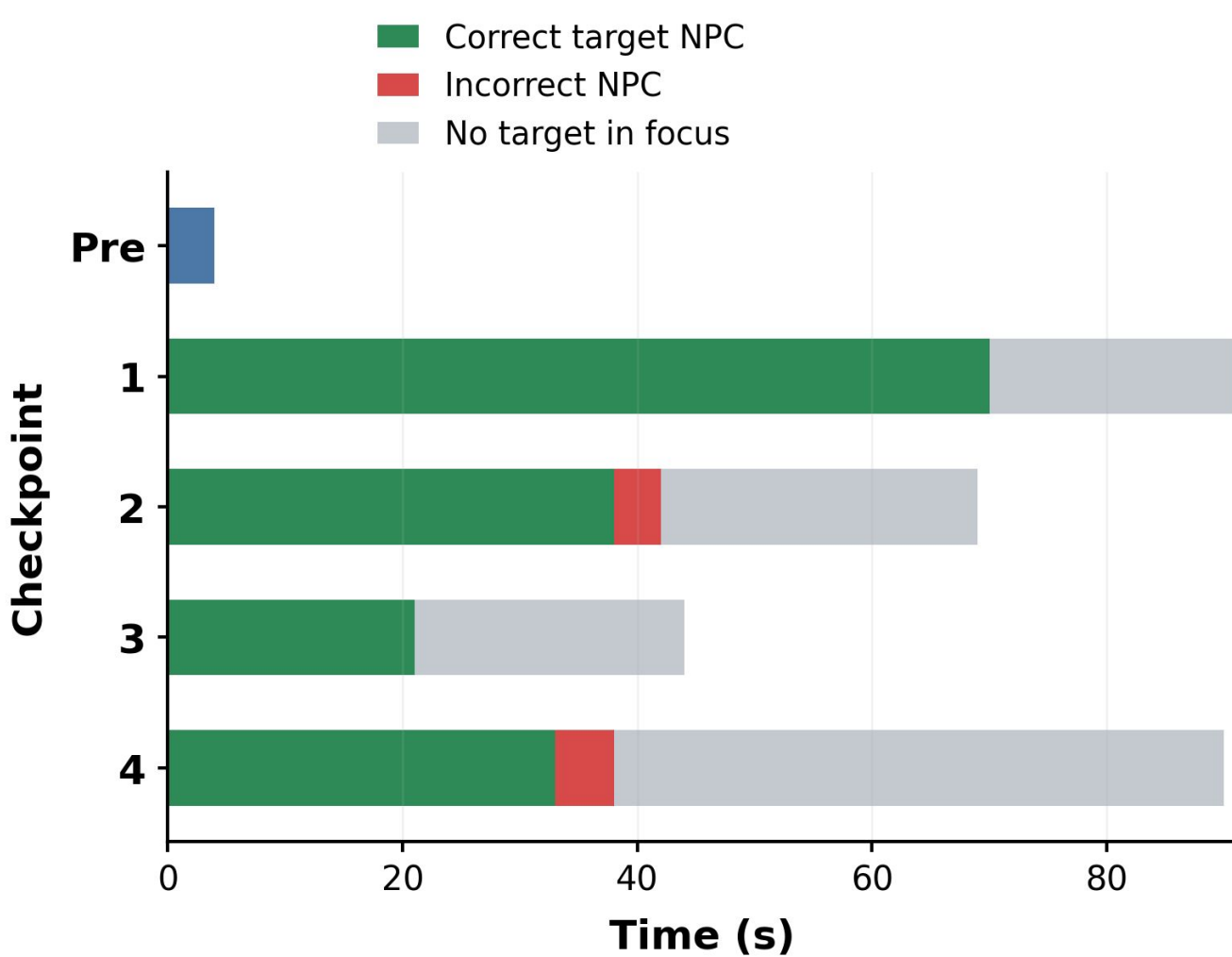
Skills addressed: Selective attention · Instruction following · Hand-eye coordination · Speech initiation
Example measures: Target-selection accuracy · Gaze toward target · Reward-collection timing



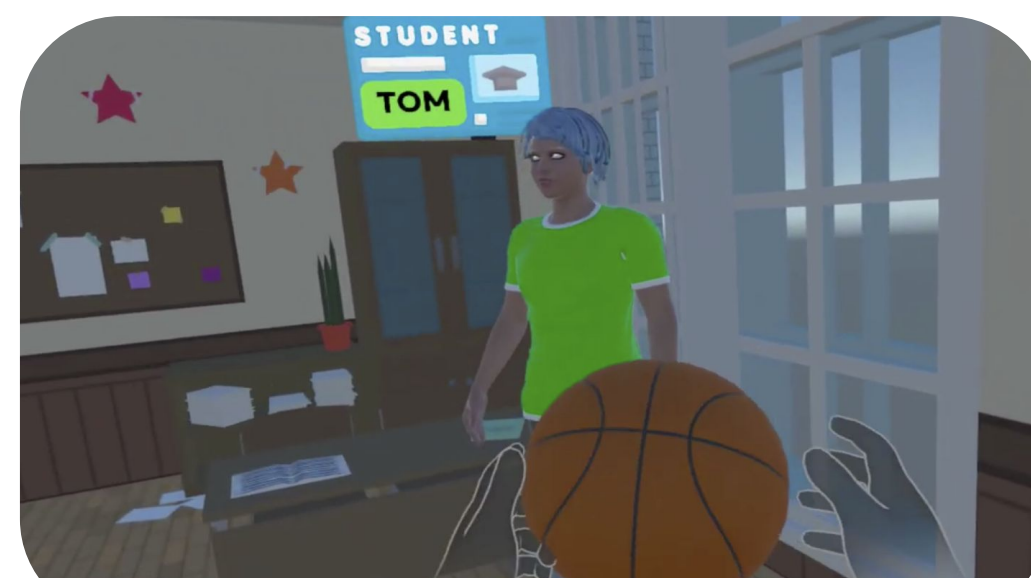
1 Follow Prompt → 2 Chase Target → 3 Collect Coins → 4 Use Speech Power-Up

Sample behavioral data collected during gameplay

Target Gaze by Checkpoint



Other Experiences



Classroom Social Interaction



Competitive Peer Racing

Future Work

- Expand the library of **skill-targeted experiences**
- **Evaluate the framework** through studies with neurodivergent participants
- Collect **repeated-session data** to track **individual behavioral patterns** and **progression** over time
- **Fine-tune AI models** to power **context-aware & clinically grounded** NPCs within framework experiences

Acknowledgements

We thank Dr. Yingying Chen, our advisor; Changming Li, Honglu Li, Dirk Catpo Risco, and Zejun Xu, our mentors; and the teams at Rutgers WINLAB, Virtuix, and the Aiyer Foundation for their mentorship, resources, and support.