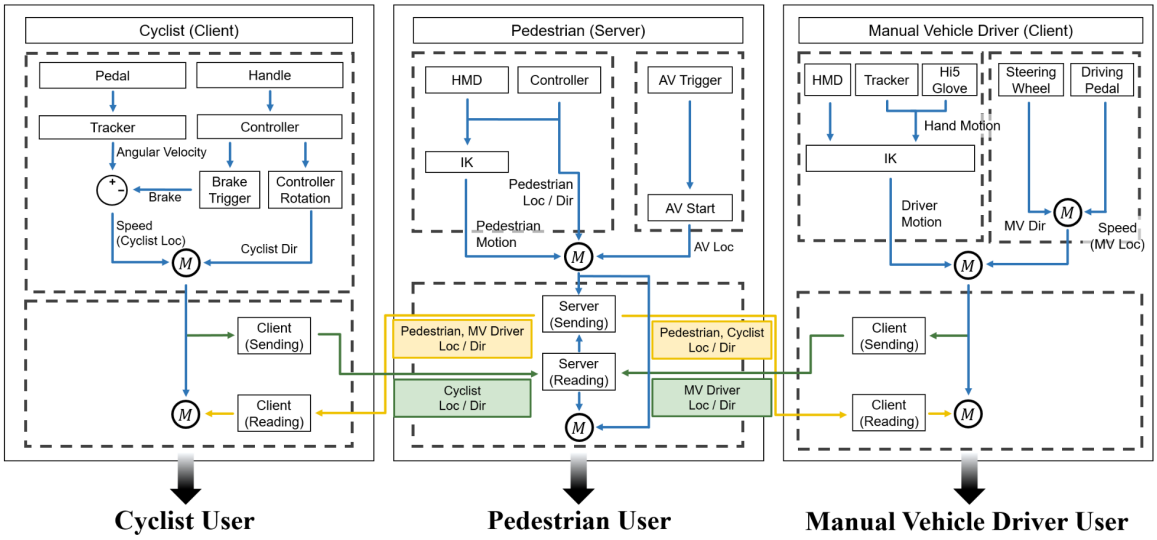
Experimental Setup and System Architecture for eHMI Evaluation in AV-Multi-User Scenarios

System Architecture Diagram



Pedestrian Setup

The pedestrian environment used a wireless HTC Vive Pro Eye HMD to enable unrestricted movement. IK simulated walking motion, and VIVE controllers visualized hand movements for immersion.

Cyclist Setup

Cyclists used a Deuter Trainer Cycle Roller and Elite Sterzo Smart for stability. VIVE controllers managed braking and steering, while a tracker on the pedal detected motion, ensuring realistic dynamics.

Manual Vehicle Driver Setup

Drivers operated an Atomic A3 2-DOF Simulator with a Logitech G920 Steering Wheel. Hi5 VR Gloves captured hand movements, and IK simulated upper-body motion for natural interactions.

Server-Client Communication

The system used Unity with Mirror Networking (https://github.com/MirrorNetworking/Mirror) for client-server architecture. All environments function as clients, synchronized via KCP protocol for low-latency interactions.