

Using a Virtual Reality Bike Simulator to study cyclist behavior



Problem description

Virtual Reality (VR) is capable of quickly modifying environment features, providing high immersion, collecting data automatically, ensuring participant safety, and maintaining high experimental control. Combining this with other measurements (e.g., physiological sensors and surveys), VR provides opportunities for researchers to collect multi-dimensional data to study cyclist behavior in great detail. A high-fidelity and low-cost VR bike simulator has been developed at MXR lab that is able to study cyclist behavior when interacting with other road users, including pedestrians, vehicles, and other traffic users. However, there is an ongoing debate regarding the validity of using VR simulators, namely whether cyclists exhibit similar behavior in VR as they do in real life. This master thesis will focus on understanding the level of validity of using a VR bike simulator from the decision-making process, stress level, and physical exertion perspectives.

Assignment

- Review of the state-of-the-art VR bike simulator and its application in studying cyclist behavior
- Experimental design and execution of VR experiment using a developed VR bike simulator.
- Analyzing the decision-making process, stress level, and physical exertion of cyclists.
- Writing a thesis report (and optionally a scientific paper for an international journal).

Candidate

- Willingness and openness to conducting experiments
- Familiarity with Python programming
- Successfully completed the eXtended Reality for Civil Engineering course (CIEM6304) or have experience in VR

Research group

Mobility in eXtended Reality (MXR) Lab, Department of Transport & Planning

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