A Data-Driven System for Quantifying User Cybersickness in Virtual Reality

Short title: CyberScore
Faculty: Dr. Stephen Gilbert <gilbert@iastate.edu>, Dr Michael Dorneich <dorneich@iastate.edu>, Dr Jonathan Kelly <jonkelly@iastate.edu>
Graduate mentors: Stephen Fieffer and Ghazal Shah Abadi
REU Interns: Jacob Becker, Alexa Hatcher, Jake Shaheen

Project Summary
Cybersickness, when you feel sick from wearing a virtual reality (VR) headset, interferes with the widespread adoption of VR. Understanding an individual's susceptibility to cybersickness and identifying the greatest contributing triggers is critical for guiding effective and satisfying use of VR applications. Currently, cybersickness susceptibility is measured based on one's motion sickness history or post-exposure assessments like the Simulator Sickness Questionnaire (SSQ). However, numerous different variables withing the virtual environment influence cybersickness levels, so the same person may have a different SSQ based on different experiences. One solution is to create a standardized assessment environment that puts users through cybersickness calibration process to develop a sickness profile for the user. The benefit of this is a standard measurement method that takes in a range of variables and can be used across labs and universities.

Photo credit: https://github.com/VRatPolito/CET-VR

In this project, REU students will build a test environment that takes different data types such as in-game factors, physiological factors, and self-reported scores into account which will produce a cybersickness scorecard. The team will work to understand the problem, determine what similar tools already exist, and develop strategies to decide the most appropriate approach. Technical challenges include polling real-time data, working with physiological sensors, and interpreting different types of data streams. The end goal of this project is to demonstrate a working prototype of their application, and if possible, valid with an initial user study.