VR But Better: Using Geomagnetic Fields, Bodily Electric Fields, and Pressure Distributions in VR

Evans, Yashua (School: The Academy For Advanced Studies)

VR is a technique that allows people to experience custom realities for purposes in job training, therapy, and entertainment. This is done by projecting a stereoscopic image into the user's eyes and tracking the user's motion in some way. Most VR setups need large areas, cameras, or accelerometers for the experience to immersive. I wanted to explore other methods of tracking and movement in VR to see if there are any other methods that have promising abilities that previously haven't been explored. There are 3 improvements to VR that I explored in this project. These improvements were changing the way you move, the way you are tracked, and the way you interact with VR. To facilitate these improvements I created a Rotational Controller and a Pressure Lattice Mat. The Pressure mat uses the pressure distribution of the user's feet to translate the user in VR while the rotational controller uses Electromyography for control and compasses to track your hand using an arm sleeve. While the Pressure Mat wasn’t fully developed the Rotational Controller provides major improvements to VR, including driftless tracking, strength and exertion detection, and hands-free control. The Rotational Controller however has problems with electrical interference. In conclusion, VR definitely has room to improve in tracking and unexplored options do exist. Integration of Geomagnetic Sensors and Electromyography are definite improvements to VR, while the Pressure Lattice Mat needs improvement.

Awards Won:
Office of Naval Research on behalf of the United States Navy and Marine Corps: The Chief of Naval Research Scholarship Award of $15,000