SWACSM Abstract

A.R.G! Augmented Reality and Gait: Analyzing the Influence of Cues on Gait Patterns in Augmented Reality

GWENDOLYN R. RETZINGER, RABBANI R. NZEZA, BORNA GOLBARG, WENDY T. PHAM, SEYED MILAD MEHRJOU, SUMMER M. DIAZ, & JACOB W. HINKEL-LIPSKER

Move-Learn Lab; Department of Kinesiology; California State University, Northridge; Northridge, CALIFORNIA

Category: Undergraduate

Advisor / Mentor: Hinkel-Lipsker, Jacob W. (jhlipsker@csun.edu)

ABSTRACT

Use of Augmented Reality (AR) technology for rehabilitation has drastically increased in recent years. While theoretically AR can be used to cue gait adaptations such as changes to step length and cadence through visual and auditory cues, it is still unknown how people respond to the technology. **PURPOSE:** To assess the feasibility of external visual and auditory cues delivered through AR on spatiotemporal gait outcomes in a healthy, young population. **METHODS:** 20 healthy participants between age 18 and 35 were screened and recruited to perform randomized gait trials consisting of four different cueing conditions. The participants wore a Magic Leap One AR headset with a custom-designed cueing application. Participants were instructed to walk 10 steps under one of four cueing conditions provided by the AR application: No Cues (NC) (i.e., natural gait), Visual (V), Auditory (A), and Visual and Auditory (VA). Each condition was completed three times in a randomized order for a total of 12 trials per participant. An Inertial Measurement Unit (IMU) system was used to collect spatiotemporal gait data. A System Usability Survey (SUS) was administered after each participant completed their trials to determine the usability of our novel application and to determine whether the reported usability of the system was related to changes in gait variability . **RESULTS:** Preliminary results indicate all cueing conditions exhibited a significantly faster cadence compared to NC trials. Surprisingly, the cadence variability increased across all A trials. Increased system usability SUS results were significantly correlated with increased percent stance variability across A trials. V trials exhibited significantly decreased stride lengths compared to NC. Combined (AV) cues had no effect on gait outcomes. **CONCLUSION**: Our findings reinforced that certain visual and auditory cues affect gait parameters, albeit in a direction opposite of what was expected (e.g., greater cadence variability with auditory cues). These results provide insight into how healthy populations respond to cues delivered through AR, as well as provide a foundation for future studies to implement this technology with clinical populations such as those with Parkinson's disease.