Thesis Project Portfolio

Walking in Circles: Combining VR Redirection Techniques

(Technical Report)

Walking the "New World": The Mental Health Repercussions of an Alternate Reality

(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

` Navigating the virtual expanse within the confines of physical reality presents a paradox at the heart of virtual reality (VR) technology. As VR pushes spatial boundaries, it faces the inherent challenge of enabling limitless exploration within the limited confines of users' real-world environments. Furthermore, virtual locomotion must remain natural and intuitive, without inducing disorientation or discomfort. The pursuit to reconcile the infinite possibilities of virtual spaces with the finite nature of our physical ones necessitates a blend of innovative solutions. These solutions must not only address spatial constraints but also cater to the physiological and psychological wellbeing of users, preventing the onset of simulator sickness while enhancing the immersive experience. One such solution is a locomotion technique known as redirected walking. Redirection algorithms subtly manipulate the user's perception of real world space in order to artificially increase the size of a virtual environment.

The technical exploration presents a unique integration of traditional redirection algorithms. The objective of the technical report is to explore the naturalness of virtual environments when fusing continuous redirection and discrete redirection methods, improving immersion of walking in VR in smaller physical spaces. Through a detailed pilot study, the report assesses the efficacy of this combined approach, employing both quantitative measurements and subjective participant feedback. Data smoothing, trajectory normalization, and regression methodologies were meticulously applied to capture and analyze the nuances of user movement, exploring the implications of varied redirection intensities on user perception.

The STS research paper investigates the broader societal and psychological implications of advanced VR technologies, particularly the advent of what might be termed 'Deep-Dive VR'

(DDVR) based on an analysis of previous innovations. It calls for a thorough understanding of how these immersive experiences might shape individual behaviors and societal structure, paving the way for a future where virtual and physical realities are inextricably intertwined.

The technical report's innovative redirection strategies and the STS research paper's sociocultural examination reveal a confluence of how immersive virtual reality will shape a new beginning; a future where VR's potential is fully realized, not just in entertainment, but as a transformative tool, improving mental health and facilitating social interaction. The synthesis of these works underscores the promise of VR technologies in addressing real-world limitations and enriching the human experience, providing a vantage point from which to anticipate and shape the trajectory of VR's integration into our daily lives and wellbeing.