

The Effects of Level of Detail and Field of View on Vection in Immersive Virtual Environments

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Illusory self-motion, known as “vection,” is a well-understood phenomenon by psychologists, but little is presently known about how to quantify and evaluate vection, especially in response to virtual environments (VEs). Immersion, or the state of having one’s senses “submerged” in information, lends itself naturally to the study of vection in VEs because real-world motion is perceived in a variety of ways. Being able to predictably increase or decrease vection by adding or removing components of immersion has a wide range of uses in many VEs, from controlling cybersickness to enhancing simulation and interactivity by producing the sensation of real movement.

This experiment focuses on level of detail (LOD) and field of view (FOV) in VEs, and seeks to explore whether they have an impact on vection. Vection is measured based on postural sway and subjective responses of feelings of self-motion. LOD and FOV are some of the easiest immersive qualities to manipulate, but other good research candidates that might influence vection include spatialized audio, field of regard (FOR), and controller interactivity.



The experimental environment is displayed in the CAVE (a four-screen VE display) and consists of a basic “track” – a path through a virtual world with near and far motion stimuli similar to street lights and skyscrapers, respectively. Observers fly through the world using three distinct types of motion: straight, pitched, and strafing. Questionnaires administered after the test suggest that LOD and FOV are perceptible, but not significant, factors in producing feelings of vection, but postural-response data suggests that users have a distinct and measurable subconscious sway along axes of motion.