Summary 1:

Virtual reality body motion induced navigational controllers and their effects on simulator sickness and pathfinding

VR users often develop simulator sickness (SS) due to the conflicting sensory information perceived between the virtual and real worlds during VR experiences. In hopes of reducing SS, a study was conducted using four different VR navigational controllers, each allowing different levels of body induced motion (TiltChair, Omni-directional treadmill, VRNChair, and Joystick) to test if any reduction in the level of SS existed. (TiltChair is basicly a swivel chair and a balance board combined that is able to gather tilt and rotation measurements. VRNChair is a manual wheel chair that moves by walking.) 20 young adults participated in the study, using each method in a random order with at least one day in between to reduce factors of sickness from previous sessions. Level of SS induced was determined using postural sway measurements obtained using Wii blanace board with eye-open and eyes-close and the result of SS questionnaire (SSQ). Posture way results showed no significant effects other than an increase of SS with increase of time spend in VR for all controller types. This indicates that time is the major factor in causing SS.

BibTeX:

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author={C. N. Aldaba and P. J. White and A. Byagowi and Z. Moussavi},
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abstract={Virtual reality (VR) navigation is usually constrained by plausible simulator sickness (SS) and intuitive user interaction. The paper reports on the use of four different degrees of body motion induced navigational VR controllers, a TiltChair, omni-directional treadmill, a manual wheelchair joystick (VRNChair), and a joystick in relation to a participant's SS occurrence and a controller's intuitive utilization. Twenty young adult participants utilized all controllers to navigate through the same VR task environment in separate sessions. Throughout the sessions, SS occurrence was measured from a severity score by a standard SS questionnaire and from body sway by a center of pressure path length with eyes opened and closed. SS occurrence did not significantly differ among the controllers. However, time spent in VR significantly contributed to SS occurrence; hence, a few breaks to minimize SS should be interjected throughout a VR task. For all task trials, we recorded the participant's travel trajectories to investigate each controller's intuitive utilization from a computed traversed distance. Shorter traversed distances indicated that participants intuitively utilized the TiltChair with a slower

speed; while longer traversed distances indicated participants struggled to utilize the omni-directional treadmill with a unnaturalistic stimulation of gait. Therefore, VR navigation should use technologies best suited for the intended age group that minimizes SS, and produces intuitive interactions for the participants.},
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