Scene Transition VR

*Faster techniques are generally preferred by gamers and more gradual transitions are preferred by participants with less experi-ence with 3D gaming and virtual reality.
Points from the study were pulled out with the assumption that those being trained using the construction safety simulator have limited VR experience.

Types of transition techniques tested:

- **Animated Interpolation** - a smooth viewpoint motion from one state to another.
    - *produce the best results for both sickness and spatial orientation*
    - Speeds: slow (1 m/s), medium (3 m/s), and fast (5 m/s)
    - Participants with limited VR experience felt most comfortable with the medium speed
- **Teleportation** - instant change in viewpoint position or rotation; the only technique with participants reporting that their eyes felt tired after a while
    - Instant Change - viewpoint changes state without any delays
        - *the easiest for completing the task*
    - Fade to Black - a fade in/fade out to a black transition scene and then the viewer finds themself in the new state
    - Blurred Fade - also a fadein and out, but this transition is done by blurring the picture and clearing it again
- **Pulsed Interpolation** - the pulsed view is faded in and out to several intermediate points along the path from one state to another
    - number of intermediate points we tested for were 2 (lowest), 4, and 7 (highest)
    - those with less gaming and VR experience felt more comfortable when completing the tasks with more intermediate transition points

The preliminary results show that the tested scene transition tech-niques do not cause much sickness. However, they can cause dis-orientation and make it difficult to track changes going on in the scene

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Travel in Immersive Virtual Environments: An Evaluation of Viewpoint Motion Control Techniques

- gaze-directed steering - the user's view vector (typically the orientation of the head tracker) is used as the direction of motion,
- "pointing" technique - the direction is obtained from the user's hand orientation
- "pointing" techniques are advantageous relative to "gaze-directed" steering techniques for a relative motion task, and that motion techniques which instantly teleport users to new locations are correlated with increased user disorientation.

Gaze-Directed Steering

Advantages	Disadvantages
•steering and view are coupled	•requires much head motion
•ease of use/learning	•less comfortable
•easier to travel in a straight line	•can't look at object & move another direction
•slightly more accurate	

Pointing

Advantages	Disadvantages
•user's head can stay relatively still	•can lead to overcorrection
•more comfortable	•more cognitive load
•can look and move in different directions	•harder to learn for most users
	•slightly less accurate

**I don't think these apply to the situation of transition between scenes, but it does back up the "pointing technique" functionality for moving through a scene the Spring19/Fall20 capstone team developed

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VR Best Practices Guidelines - a decently comprehensive and interesting guide to a lot of different best practices. Content related to movement, but not specifically transitions, is under "Locomotion" (p. 11)

- Clearly describe necessary gestures with text-based prompts (p.4)
- Restrict Motions to Interaction (p.9)
    - Do not instigate any movement without user input (including changing head orientation, translation of view, or field of view)

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- Users should not be thrown immediately into intense game experiences. Start with more sedate, slower-paced interactions that ease them into the game

- Good things to consider when thinking of the final product of the simulation - starting off slow since we don’t expected experienced users