

Multiview Image Blending in the C6

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Introduction

Background and Significance

One common problem with many immersive virtual environments is supporting multiple head-tracked users. This problem is significant because one of the primary goals of having a virtual environment is to allow interaction between multiple users within that environment. Unfortunately only one person may be able to see the environment accurately, while the other people may not have much of an accurate visual frame. The reason for this is that many of the algorithms and hardware used in many of these systems supports a single tracked viewer rather than multiple tracked viewers.

Image blending is a term that Marbach uses when describing his solution to supporting multiple viewers in a standard CAVE immersive virtual environment. Image blending involves each viewpoint being rendered into an off-screen buffer for each head-tracked viewer in the virtual environment. A final composition pass combines the views by computing a per-pixel weighting based on how directly each viewer is observing that pixel. The blend zone refers to the area where each user's viewpoint overlaps.

As mentioned before the problem is that non head-tracked viewers receive sub-optimal views. With better multi-viewer techniques, each user will be provided with the best view possible. The focus of this research is to develop multi viewer projection systems for local collaborative immersive environment in the C6 environment.

Methods and Measures

Sample

The sample collected so far consists of male ($n = 6$) and female ($n = 2$) college students ($N = 8$). This experiment is ongoing and this is the current sample for now.

Measures

Demographic Questionnaire. The demographic questionnaire asks about the participant's age and gender. The questionnaire asks about any current visual problems that the user can report, previous experiences with virtual reality, and any known sicknesses or nausea experienced while in a virtual environment.

Stereo Cue Test: This test is given to ensure that participants can see stereo. The test was created specifically for the C6 and shows participants a series of virtual objects. The participant must report which object looks different from the surrounding objects.

Experiment Paradigm: Participants are shown three sets of randomized two connected lines from three different positions around the C6. Participants must report the angle of each set of lines.

Participants are shown three sets of randomized virtual objects from three different positions around the C6. The participants must report the width and height of each virtual object. After seeing all the sets, participants can freely describe if anything looked unusual.