



Computer and Information Sciences
and
Electrical and Computer Engineering
Temple University

Wednesday, February 20, 2008
2:00 p.m. – 3:00 p.m.
Room 126
Engineering & Architecture Building

All are invited to attend

ECE and CIS Seminar

Size-Constancy in the CAVE

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Abstract

The use of Virtual Environments (VE) for research and commercial purposes relies on its ability to generate environments that faithfully reproduce the physical world. However, due to its limitations the VE can have a number of flaws that adversely affect its use and believability. One of the more important aspects of this problem is whether the size of an object in the VE is perceived as it would be in the physical world. One of the fundamental perceptions for correct size is size-constancy. This phenomenon produces the percept that an object is the same size regardless of its distance from the observer despite the fact that the retinal size of the object gets smaller with distance from the observer. We have examined size-constancy in the CAVE and have found that size-constancy is a strong and dominate perception in our subject population when objects are accompanied by the proper monocular cues to depth. Size-constancy changed to a visual angle performance (i.e., object size changed with distance from the subject) when the monocular cues were reduced in the scene. Additional experiments have also shown that errors in accommodation that occur in VE have little effect on the loss of size constancy. Furthermore other cues to depth such as motion parallax are not strong enough to restore size constancy in non-stereo or visually barren environments. As it has been describe for the physical world, our results suggest that it is necessary to provide appropriate monocular cues to depth along with stereo information to elicit a size-constancy response. These results are discussed regarding their implications for viewing objects in projection based VE and the factors that play a role in the proper size of objects in the CAVE.