Visual Cues for Perceiving Distances from Objects to Surfaces

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Abstract

An accurate perception of the distance between an object and a nearby surface can increase a viewer's sense of presence in an immersive environment, particularly when a user is performing actions that affect or are affected by this distance. Two experiments were conducted examining the effectiveness of stereopsis, shadows, and interreflections at conveying this distance information. Subjects performed simple tasks based on the perception of the distance between a fixed surface and an approacing object in a virtual environment. In the first experiment, only stereopsis had a statistically significant effect on subject performance. In the second experiment, a different methodology was used, and all three cues (stereopsis, shadows, and interreflections) were shown to be statistically significant distance cues.