

The use of subtle illumination cues for human judgement of spatial layout

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Abstract

The interaction of light with surfaces creates complex lighting effects that provide potentially useful information about the spatial relationships between objects. Previous research has shown cast shadows to be effective in determining the 3D layout of a scene. Interreflections are another source of information for spatial relationships; these, however, have been largely ignored in studies of human perception. The purpose of this study was to determine the effectiveness of interreflection for providing cues to contact, and to investigate how interreflection and shadow information combine in the perception of object contact.

Introduction

Determining the spatial relationships between objects in a scene is important for actions such as path planning, object avoidance, reaching, and grasping. In order to determine spatial layout, human vision takes advantage of the effects of surface occlusion of one object by another in the images received by the eyes. For example, if the surfaces are separated in depth, occlusion results in binocular disparity differences for the projections of corresponding feature points in the two eyes. Motion parallax is another well-known cue to surface depth relationships. There are also, so-called pictorial