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  On surface visibilities in 3D cluttered scenes

  3D cluttered scenes arise commonly in nature, for example, the leaves on a tree in a forest. Such scenes are visually complex and challenging for 3D visual perception, since they consist of many occlusions and surface layers. Despite this complexity, the human visual system seems to function adequately well in 3D cluttered scenes. Here I introduce a probability model of surface visibilities in densely cluttered 3D scenes, which depends on scene parameters such as depth, object size, 3D density, and binocular baseline. I verify the correctness of the models using computer graphics simulations. I also briefly discuss applications of this model to various computational problems in human and computer vision, including binocular correspondence, motion estimation, and segmentation.

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