图像与信息处理

基于集成成像的深度提取线性插值增强方法

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摘要：

分别用定义的深度提取精密度和深度提取正确度对实验结果进行分析，从结果的整体分布和整体偏差两个方面证明了线性插值对基于集成成像的深度提取具有增强作用。由于单元透镜数量众多，单个图像传感器像素个数有限，传统的基于集成成像的深度提取受到单元图像低分辨率的制约。无需额外的硬件移动，采用线性插值将单元图像像素个数增加一倍，深度提取精密度提升了20%，深度提取正确度提升了15%。集成成像可以同时实现三维场景的重建和深度的提取。这是其他深度提取技术所不具备的特点。通过使用插值后得到的深度信息，使目标物体的重建图像更为清晰。基于集成成像的深度提取可应用于三维场景的背景去除。

关键词：　图像与信息处理　深度提取　集成成像　线性插值　三维场景重建

Enhanced depth extraction based on integral imaging with linear interpolation

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Abstract:

The extracted depth of object points are assessed by two defined evaluation measurements, the depth precision and the depth correctness. The evaluation results prove the enhancement of depth extraction based on integral imaging by linear interpolation method from two aspects, the whole distribution and the whole deviation. Because of the large number of elemental lenses and the limited number of the sensor pixels, the conventional depth extraction technique based on integral imaging is affected by the low resolution of elemental images. The elemental images are scaled to twice by linear interpolation. The precision of depth extraction is increased by 20%. The correctness of depth extraction is increased by 15%. In integral imaging, the reconstruction of three-dimensional scene and the extraction of depth can be completed at the same time. It is the advantage that other methods of depth extraction do not have. The quality of reconstructed image becomes better by using the extracted depth information after interpolation. Depth extraction based on integral imaging can be used in the background removal of three dimensional scenes.

Keywords: image and information processing　depth extraction　integral imaging　linear interpolation　three-dimensional scene reconstruction

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