

3D STEREOSCOPIC IMAGE GENERATION FROM MONOCULAR VIEW IN STRUCTURED ENVIRONMENTS

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ABSTRACT. *With the rapid growing need for 3D image generation, distribution and display as well as the large repository of 2D images in the Internet, creating 3D stereoscopic images from 2D images has becoming an important and urgent issue in recent years. The key step in conversion from 2D to 3D is depth map generation. For the step of depth map generation, most existing methods are based on focus & blur cues or vanishing point detection. In this work, we propose a novel depth map generation method based on plane extraction and demonstrate that the plane extraction step is crucial for accurate and reliable depth map generation. The main idea of the proposed plane extraction algorithm is to detect corners and edges simultaneously based on autocorrelation function of the 2D image with optimized parameters with the aid of kernel density theory. After extracting the foreground and partitioning the background into several planes, it is very convenient to accurately estimate a relative depth map with the cues of planar geometric features. The depth map is then used to generate the stereo pair before obtaining the final image with 3D effect. Experimental results validate the superior performances of the proposed method with comparison of the state-of-art method.*

Keywords: 3D stereoscopic image, Depth map, Plane extraction, Structured images

1. **Introduction.** The coming major advancement in television is well expected to be stereoscopic three-dimensional television (3D-TV). With the advent of advanced 3D display techniques, the demand for 3D contents has been increasing rapidly. However, there exist barriers for the acquisition of 3D real-world scenes: an expensive stereo-camera system is needed for directly capturing 3D images; even when the stereo-camera system is available, highly-skilled camera technicians who can control the camera appropriately are still necessary [1]. Since there is a large depository of 2D images available and shareable in Google or Flickr, it is rational that the conversion of 2D images to 3D images is one way to alleviate the predicted lack of program material in the early stages of 3D-TV rollout. In this way, the 3D contents of the existing 2D images/videos will have the opportunity to be rendered in 3D display devices.