Light Field Reconstruction Using Shearlet Transform

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Abstract—In this article we develop an image based rendering technique based on light field reconstruction from a limited set of perspective views acquired by cameras. Our approach utilizes sparse representation of epipolar-plane images in a directionally sensitive transform domain, obtained by an adapted discrete shearlet transform. The used iterative thresholding algorithm provides high-quality reconstruction results for relatively big disparities between neighboring views. The generated densely sampled light field of a given 3D scene is thus suitable for all applications which requires light field reconstruction. The proposed algorithm is compared favorably against state of the art depth image based rendering techniques.

Index Terms—Image-based rendering, light field reconstruction, shearlets, frames, view synthesis.