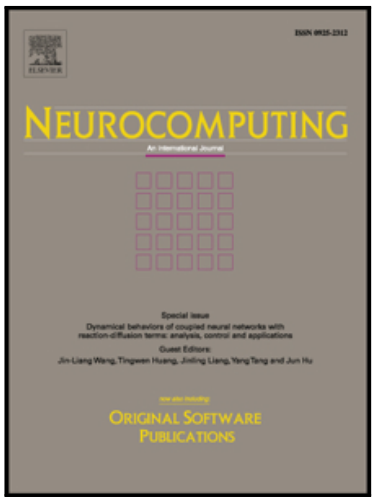

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High Quality Depth Map Estimation of Object Surface from Light Field Images

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Abstract

Light field imaging provides a novel solution to the passive 3D imaging technology. However the dense multi-view sub-aperture images decoded from the light field raw image have extremely narrow baselines, which lead to inconsistent matching with terrible blurriness and ambiguities. This paper presents an accurate depth estimation algorithm for object surface using a lenslet light-field camera. The input data for depth estimation can be both light field videos and images under indoor and outdoor environment. To tackle the continuously changing outdoor illumination and take full advantage of rays, rendering enhancement is performed through denoising and local vignetting correction for obtaining high-fidelity 4D light fields. The novel sub-aperture image pair selection and stereo matching algorithm are proposed for disparity computation. Then we apply the disparity refinement for recovering high quality surface details and handling disparity discontinuities. Finally both commercial and *self-developed* light-field cameras are used to capture real-world scenes with various lighting conditions and poses. The accuracy and robustness of the proposed algorithm are evaluated both on synthetic light field datasets and real-world scenes by comparing with state-of-the-art algorithms. The experimental results show that high quality depth maps are recovered with smooth surfaces and

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