



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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SHORT ABSTRACT

Stereo correspondence finds corresponding matching pixels in the stereo image pairs. The difference between the coordinates of these matching pixels gives the disparity value, which in turn can be used for finding the depth information of a scene.

In last few decades, a number of stereo matching methods have been proposed for different Computer Vision applications, such as robot navigation, 3D modelling, object detection, tracking etc. In view of this, a new Gabor feature-based stereo matching method is proposed. Our method mainly has four steps, namely matching cost computation, cost aggregation, disparity map computation using Winner-Take-All (WTA) selection, and finally disparity map refinement. In our proposed method, local features extracted by using Gabor wavelet in spatial domain are used for matching cost computation. Subsequently, Kuwahara filter is employed for cost aggregation to smooth the estimated disparity map by preserving the disparity discontinuities.

The estimation of a fine disparity map is quite challenging in presence of occlusion. For this, a novel occlusion detection method is proposed by only using a single disparity map instead of two disparity maps employed in existing methods. Finally, a novel occlusion filling method is proposed to get a fine disparity map. For this, a disparity value of a neighbouring non-occluded pixel is assigned to a selected occluded pixel. Experimental results demonstrate that our proposed disparity map estimation algorithm can give a fine disparity map in presence of occlusion, which is suitable for many applications.

Additionally, the accuracy of proposed Gabor wavelet features in representing an image is experimentally studied for different Gabor wavelet parameters. Also, the behaviour of the Gabor features is analyzed for radiometric variations.