Feature based disparity estimation using hill-climbing algorithm

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Stereo matching is an active research area in computer vision for decades. This paper introduces a new disparity map estimation algorithm based on image segments. The reference image is segmented using hill-climbing algorithm. The initial disparity map is estimated Scale Invariant Feature Transform (SIFT) feature points matching between two stereo images in each segment by Sum of Absolute Difference (SAD) approach. Next, the initial disparity estimation is improved with Random Sample Consensus (RANSAC) robust plane fitting method. Finally, the disparity plane in each segment region is set by incorporating energy minimization on smoothness constraints between neighboring segments using graph cuts. Experimental results show that the performance of proposed approach on Middlebury test set results are comparable to current state-of-the art approaches and final disparity maps are close to the ground truth data.