

Stereo Camera – based 3D Object Reconstruction Utilizing Semi-Global Matching Algorithm

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Abstract—a 3D reconstruction using stereo cameras still becomes an issue among researchers specialized in computer vision. The corresponding pixel between two images from stereo camera needs to be estimated accurately. One of the widely used methods is Semi-Global Matching (SGM), which uses mutual information (MI) in the form of entropy between two pixels to determine the level of similarity based on the smallest energy (lower cost). The reconstruction result shows the percentage of registered pointcloud is equal to 62.11% where the observation distance ranges are between 1 to 4 meters. In this research, a nearest-neighbor filter is utilized to improve the pointcloud quality where the variations of the neighbor's number are 4 to 128 pixels. The results show that this technique can eliminate the outliers up to 4.9% with the standard deviation of nearest-neighbor distances means equals to 1.0.

Keywords—*stereo camera; 3D reconstruction; semi-global matching; pointcloud;*