OPTIMIZATION OF PENALTY FUNCTIONS FOR SEMI-GLOBAL MATCHING COST AGGREGATION

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Abstract: The semi-global matching algorithm (SGM) aiming for producing highly dense 3-D point cloud is based on exploring mutual information on a pixel-wise basis. Multi-directional 1-D smoothing constraint by penalty functions is applied to approximate what can be achieved by global stereo matching. The central idea of employing the smoothing constraint is to ease the ambiguity as well as to reduce wrong matches. For that, the purpose of this study is to characterize the smoothing constraint applied in SGM and to tune the terms of the constraint function with respect to the image content so that the smoothing effect can be better obtained and the matching quality can be improved consequently.

Keyword: stereo matching , semi-global matching, penalty function, mutual information