**Parameter Optimization of Feature-Aided Dense Matching for Multi-angle Images**

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**Abstract**

Digital Surface Model (DSM), which may be generated from 3D point clouds, is an important data source in various geoinformatic applications. It is a practical way to generate high quality 3D point clouds by matching multiple images. In addition, both of image matching method and parameter selection may influence the 3D point clouds quality.

Semi-Global Matching (SGM) considers connected paths with smoothness constraints. SGM also combines local and global image information so it can get stable results. However, smoothness constraint might be unable to cope with the matching ambiguity in the area with surface discontinuity. With the inclusion of feature constraints, SGM might increase matching quality in edge areas. Central-Left-Right matching (CLR matching) considers local feature constraint using multi-windows to increase matching quality around feature regions. Thus, the integration of CLR and SGM is proposed in this investigation.

In multiple image matching, how to select optimal images is an important task. Traditional, researches use average of all image pairs’ solutions to determine the optimal conjugate points. However, average may let several images which have occlusion area be taken into account. That usually leads to low correlation. In this investigation, a type considering good image pairs with different parameter is proposed. The RMSE of the test cases can reach 0.15m in X and Y directions, and 0.25m in Z direction using DMC-2 camera with 1200m flying height.

**Keywords:** Semi-Global Matching, Parameter optimization, Feature, Aerial image

**Suggested topics:** Data Processing: Data Processing

**Presentation Preference:** Poster