

Suggested topics:

New Generation Sensors and Applications-Lidar

Paper title:

3D RECONSTRUCTION BY COMBINING TERRESTRIAL LASER SCANNER DATA AND PHOTOGRAMMETRIC IMAGES

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Preference between oral and poster presentation:

oral presentation

Abstract:

3D reconstruction of outdoors objects by means of terrestrial laser scanner (TLS) point clouds has been one of the most important and reliable technical methods. However, TLS point clouds have two main drawbacks. They don't have sufficient information about the object texture, and sometimes a complete perspective of the facades cannot be got due to some irregular circumstances. Photogrammetric images contain the required texture and can be used to generate dense point clouds by further processing. Therefore, a flexible approach for getting 3D information from photogrammetric images is applied within this paper. Two steps are taken in this approach. Firstly, Structure from Motion reconstruction is used to derive orientations and sparse surface information. Secondly, with the resulting orientations and information, the SURE software, which is developed by the Institute for Photogrammetry of the University of Stuttgart, is applied to obtain very dense point clouds. Before 3D modeling, these two kinds of point clouds have to be brought into a common main reference system by means of a Helmert (seven-parameter) transformation and the ICP algorithm, but in an extended version considering degraded observations of both point clouds merged with each other. Based on the processed point clouds, Leica Cyclone software and Trimble's Sketchup software can be used to produce geometric and texture wrapped model. The textured model is shown and the quality of modeling and visualization is validated.