

CHANGE DETECTION OF BUILDING MODELS FROM AERIAL IMAGES AND LIDAR DATA

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ABSTRACT:

Building models are built to provide three dimensional (3D) spatial information, which is needed for varieties of applications, such as city planning, construction of location-based services, and the like. However, three dimensional building models need to be updated from time to time. Rather than reconstructing building models for the entire area, it would be more effective to only revise the parts that have changed. In this study, we aim at finding changes with 3D building models. The proposed scheme comprises three steps, namely, (1) data registration, (2) change detection of three dimensional building models, and (3) detection of new building models. The first step performs data registration for multi-source data. The second step performs the rule-based change detection, it include examination of spectrum from aerial images, examination of height difference between building models and LIDAR points, and examination of linear features from aerial images. A double-threshold strategy is applied to cope with the highly sensitive thresholding often encountered when using the rule-based approach. In the third step, we detect the LIDAR point clouds in the new building areas by removing vegetation, ground and old building areas. We then use region growing to separate the LIDAR point clouds into different groups. Finally, we use boundary tracing to get the new building areas. Ground truth data are used for validation. The experimental results indicate that the double-threshold strategy improves the overall accuracy from 93.1% to 95.9%. To provide comprehensive observations, the different cases are scrutinized.

TOPIC: Change detection and process modelling

ALTERNATIVE TOPIC: Lidar and laser scanning