Using Mobile Mapping System and Geospatial Data to Reconstruct Three Dimensional Road Model

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Abstract

The technology of Mobile Mapping System (MMS) is growing rapidly, which can acquire the image sequences and the position data more efficient and effective. Thus, the integration of MMS and remote sensing data is an important task in geospatial technologies for various applications, such as, road model reconstruction, building up three dimensional attribute database, and so on. This research integrated MMS data, airborne LIDAR and cadastral maps to reconstruct detailed road models. Because of the diversity and complexity of road types, the primary objective of this research is to reconstruct the road model and build up attribute database.

The proposed scheme comprises four major parts, (1) ribbon-style 3D road model reconstruction, (2) feature extraction, (3) road sign recognition, and (4) data integration. In ribbon-style road model reconstruction, the proposed method integrates vector-based topographic maps with height information from airborne LIDAR data to reconstruct LOD-1 road model. Secondly, in order to locate the region of interesting (ROI), Line Segment Detector (LSD) is employed for line feature extraction and the geometric property of roads is used to filter the irrelevant features. Subsequently, three dimensional coordinates of ROI are calculated using collinearity condition equations. In the third part, a proposed pattern recognition method is used to recognize ROI with road sign templates. Finally, recognized road signs and attribute information are placed to corresponding locations of LOD-1 road model based on the calculated coordinates. The experimental result shows that using proposed algorithms, integrated MMS data and other geo-information can reconstruct highly detailed road models with attribute database.

Keyword: Mobile mapping system, road model, pattern recognition.