RECUNSTRUCTION OF 3D MODEL OF BUILDINGS MODEL FROM LiDAR DATA USING FUZZY SEGMENTATION

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Abstract: Involving airborne laser scanner (LiDAR) in geomatics, as an active sensor of 3D data acquisition, great evolution happened in data preparing to 3D urban modelling. In consequence a great trend in developers and geomatics science researcher's communities leaded them to develop techniques in extraction and reconstruction of buildings from point cloud. The LiDAR data don't explicitly contain any geometric information and feature of objects. The feature such as planes, lines and corners can be only indirectly extracted by segmentation algorithms. Building reconstruction becomes one of important fields of research in photogrammetry and machine vision. Because of the several problems of manual methods for building reconstruction from LiDAR data such as cost and time, nowadays automatic algorithms and methods for extraction and reconstruction of building have special importance in Geomatics engineering.

The problem of generating 3D model of buildings using LiDAR data, majorly attends to two strategies. First of them is using regularized data (rasterized range image) and the second is implementing irregular row data. In first method the error of interpolation affects the results, significantly when the density of point cloud is low. In the other hand, complexity of computations and impossibility of using image processing operators are the main challenges in implementing second method. In this research a novel method is used for building reconstruction based on using row LiDAR data. For this aim 2D map of the area is used as complementary additional data for finding buildings position in source data. So, the inputs of algorithm will be 2D map and the planar roof segments generated from an adaptive fuzzy segmentation process. Then, with computing the equation of walls planes, resection of roofs and walls plane generates the building model.

This approach was evaluated using some buildings of used data set and the results prove high efficiency and reliability of this method for extraction of buildings.

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