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FILTERING AIRBORNE LIDAR DATA BY AN IMPROVED MORPHOLOGICAL METHOD BASED ON MULTI -GRADIENT ANALYSIS

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Abstract. The technology of airborne Light Detection And Ranging (LIDAR) is capable of acquiring dense and accurate 3D geospatial data. Although many related efforts have been made by a lot of researchers in the last few years, LIDAR data filtering is still a challenging task, especially for area with high relief or hybrid geographic features. In order to address the bare-ground extraction from LIDAR point clouds of complex landscapes, a novel morphological filtering algorithm is proposed based on multi-gradient analysis in terms of the characteristic of LIDAR data distribution in this paper. Firstly, point clouds are organized by an index mesh. Then, the multigradient of each point is calculated using the morphological method. And, objects are removed gradually by choosing some points to carry on an improved opening operation constrained by multi-gradient iteratively. 15 sample data provided by ISPRS Working Group III/3 are employed to test the filtering algorithm proposed. These sample data include those environments that may lead to filtering difficulty. Experimental results show that filtering algorithm proposed by this paper is of high adaptability to various scenes including urban and rural areas. Omission error, commission error and total error can be simultaneously controlled in a relatively small interval. This algorithm can efficiently remove object points while preserves ground points to a great degree.

[Conference Paper](#) (PDF, 376 KB)

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