Automated traffic sign extraction using mobile laser scanning data: A Preliminary Result

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Within the increasing number of vehicles in urban cities, an efficient and accurate traffic monitoring system is in high demand in intelligent urban management. Traffic sign dominates the guidance and supervise of traffic flow, therefore, in order to establish an effective automated traffic sign extraction algorithm as a portion of intelligent urban planning system has become an urgent task. The application of mobile laser scanning (MLS) technology has triggered significant development in recent years; the supplied MLS point cloud has mostly been applied in object-based information extraction. MLS technology is acknowledged as one of the most popular methods for traffic sign extraction nowadays due to its high-retro-reflectivity properties and its high accuracy. This paper has introduced new algorithm for automated traffic sign recognition using MLS point cloud. First, a road filtering algorithm that can hierarchically extract off-road points from raw mobile LiDAR point clouds has been applied, the raw point cloud can be successfully separated into on-road points and off-road points, the off-road points are remained into further processing. Then a segmentation to put off-road points into clusters using Euclidean clustering algorithm has been applied, and by using morphological operation, off-road clusters containing massive linear structures can be detected, and non-linear-information clusters can be removed. Thirdly, based on its high retro-reflectance properties and geometric evaluation by using DBSCAN algorithm and curvature analysis in mobile LiDAR data, sign faces can be accurately distinguished from other linear structures. Experimental results can indicate that proposed algorithm can result in an expected accuracy, and prove that the potential of using MLS point cloud for traffic sign inventory applications is promising.