Automatic Thinning of Bare Earth Lidar Point Clouds

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LiDAR technology is becoming popular among Geomatics user community because of the data provided by this technique have high automation quality and high accuracy compared to data captured by other acquisition methods. Although point clouds generated by the LiDAR technology is being used for various applications, mainly it uses for generation of accurate elevation models and other product outputs such as contours, DEM, TIN, etc. With the advent of science and technology, current LiDAR systems are capable to produce over 20 pts $sq^{-1}m$ which leads for billions of points. Now the problem is processing of such high-density datasets with normal desktop or laptop computers. Very often, computers get stuck due to lack of RAM capacity even they are the cutting-edge technology in computers. In the present, many applications have been developed to rarefy the LiDAR point clouds. However, they are unable to preserve the terrain undulation up to optimum level, so that the expected accuracy of LiDAR data for a particular application could not be achieved. This of course, loses the advantage of having LiDAR point clouds. As such, this study develops a new efficient point reduction approach based on split and merge concept giving focus mainly on splitting. The qualitative assessments confirm that the method is able to maintain the terrain undulation which is mainly based on the user input threshold values. The quantitative assessments further said that the maximum deviation exist below to 0.1m which of course acceptable because the deviations fall within the elevation accuracy limit of the point clouds. As such, thinned point clouds obtained from the method will be greatly benefitted to maintain the relevant accuracy of a particular application.

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