Comparative Study Of Several Mathematical Methods for building Continuous [1]surface Based On 3D Laser Scanning Clouds[*]

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Abstract

Airborne Laser Scanning ALS or as known as Light Detection and Ranging (LIDAR) is one of the most effective and reliable means of bar earth Topography. It represents the region scanned by a large and dense clouds in 3-D space. However, they are many challenges related to the process of interpolating continuous phenomenon like Digital Terrain Model (DTM) based on known surface values of LIDAR points.

In this paper, comparisons between several mathematical interpolation methods applied on high accuracy and huge laser clouds which only represents the DTM. In order to implicate the aforementioned, a group of a variety of Laser Scanned Areas has been chosen to represent different types of terrain including complex and flat terrain, taking into account that man-made features are not involved in this study and that different Laser Clouds density is used to make the study more general.

A different set of algorithms were applied to conclude which one is more suitable. This step was followed by the comparison between different interpolation results. The results have shown that the Points' Density has a great impact on a manner in which the optimal interpolation method is applied. Moreover, it has proven that the Nearest Neighbor Algorithm is the best applied method compared with the other alternatives

Keywords: Interpolation, Comparative, DTM, Laser cloud, Nearest Neighbor

- For the paper in Arabic see pages (55-66).

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