

## **New Approach For DTM Generation From Lidar Data**

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Light Detection And Ranging (LIDAR) systems are well known for being capable of providing accurate 3D surface models for various applications. In recent years, automated natural and man-made object extraction from LIDAR data has attracted great attention. To obtain better object detection results, prior knowledge of accurate terrain information is usually essential. Developed using the concepts of perspective projection, a new strategy for fully automatic terrain extraction using only LIDAR data is presented in this work. Non-ground objects can cause occlusions in a perspective projection. By using synthesized projection centers located above the LIDAR point clouds and analyzing the visibility maps in perspective images, we can obtain ideas regarding the division of the Digital Surface Model (DSM) into non-ground points and ground points. The presence of occlusions can be discerned by sequentially checking the off-nadir angles to the lines of sight connecting the perspective center to the DSM points, along a radial direction starting with the object space nadir point. By scanning occlusions from different radial directions with multiple perspective centers, the points producing occlusions can be identified. Using a statistical filter to remove the effects of rough and uneven surface, non-ground and ground points are efficiently separated automatically. The algorithm has been tested using both simulated datasets and real LIDAR points. The results have shown its robustness and effectiveness in hilly and urban areas with complex content.

**KEY WORDS:** LIDAR, Digital Terrain Model, Filtering, Terrain Extraction, Bare Earth.