DEM GENERATION FROM AIRBORNE LIDAR DATA BY AN ADAPTIVE DUAL-DIRECTIONAL SLOPE FILTER

C. Wang[*a] Y. Tseng[a]

[a] National Cheng-Kung University, Geomatics, No.1, University Road, 701, Tainan, Taiwan

Technical Commission VII Symposium 2010

KEY WORDS: LIDAR, Generation, DEM/DTM, Aerial, Classification

ABSTRACT:

An airborne LiDAR system is capable of collecting three-dimensional information over a large area effectively. Because of the rapid data collection, DEM generation using airborne LiDAR data has become a standard process since last decade. Filtering out non-ground points from point clouds to obtain terrain relief is the key process for DEM generation from airborne LiDAR data. Many filtering methods have been proposed for this process. Basically they can be categorized into three main approaches: linear regression methods, slope based methods, and morphology based methods. Filters apply a certain assumption of smooth terrain, which cause an over-filtering problem in some terracing fields and cliff areas. This paper proposes a dual-directional adaptive filter based on a slope filter to deal with this problem. While the original slope filter is performed according to its whole adjacent covered window, the dual-directional adaptive filter is designed along an alternative direction in one dimension. The main difference between them is the designed filter shapes. The adaptive filters of different directions are complementary to each other, so that over-filtering situation can be avoided. Comparing with original slope-based filter and the commercial software TerraScan, our method shows better results in handling data of abrupt surfaces. The data used for comparison is the ISPRS test data. The variance, omission errors and commission errors are shown for the comparison. Our method has better performance in avoiding over-filtering situation and can keep as good accuracy as the compared methods.

TOPIC: Lidar and laser scanning
ALTERNATIVE TOPIC: Not Specified