DEVELOPMENT OF THE LIDAR DATA PROCESSING SYSTEM FOR THE RAPID GENERATION OF THE TERRESTRIAL INFORMATION

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Keywords: LiDAR, Terrestrial information, DEM, Classification

1. INTRODUCTION

LiDAR(light detection and ranging) data is suited for accurate 3D urban modeling and topographic mapping, 2.5D or 3D terrestrial information generation. Especially, LiDAR data is very useful for generating of the 2.5D or 3D terrestrial information, because the LiDAR systems are capable of measuring precisely the signal strength of the laser pulse that is emitted and reflected by a target on the ground. Our research group is developing the LiDAR data processing system to get the 2.5D or 3D terrestrial information rapidly such as precise DSM/DTM/DEM. The system we are developing has a wide variety of functions such as high-speed 3D display of preprocessed massive LiDAR data, filtering, fast classification etc..

2. STRUCTURE OF THE SYSTEM

In this system, LiDAR raw data via the LiDAR data Input Mode is managed integrately after transforming into multi-band data structure which can be processed in the computer. It can be visualized using optional settings in the 3D Viewer module via color encoding scheme or filtering. Next step, point sets of LiDAR raw data are segmented and classified to generate TIN(Triangle Irregular Network)/Grid model, and it can be used to generate DEM. A common format for saving these point sets(with parameters like x, y, intensity, return, elevation) is the LAS file format. The structure in the proposed system is below.

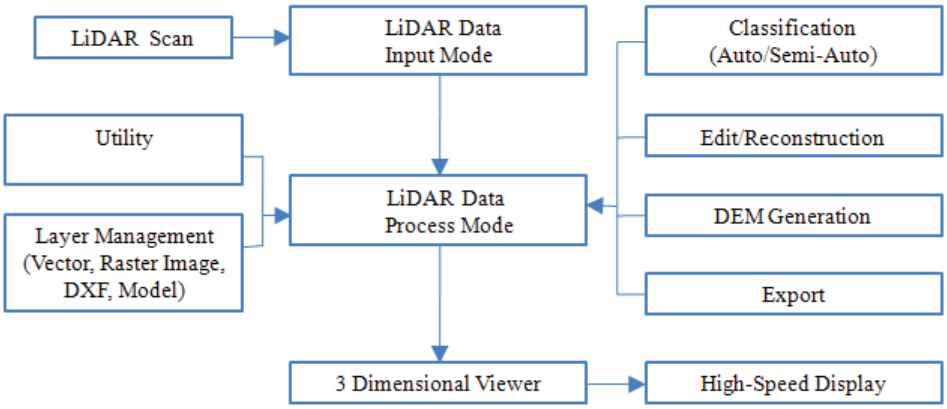

Figure 1 Structure of the system

3. SUMMARY OF MAIN FUNCTIONS

The main goal of this system is to provide high-speed, high performance, low-cost LIDAR data processing system and components to meet the demands of users. According to the goal, all the functional layout and settings are designed interactively. The main functions of each module are explained as following

In the Data Input Mode, LAS format is set for the default data storage, ASCII format x,y,z and user define format for the data compatibility can be used as well. In the Data Preprocessing Mode, it is possible to run data file conversions related with the space segmentation using Pseudo-Grid information. Statistics mode provides users with the histogram information of the height and the intensity, return, and point density of user defined area. In the Data Classification, there are functions such as outlier(low point, air point) removal, filtering, ground/non-ground points classification, and user-defined classification that allow users to classify LiDAR data with the brush or polygon grouping tool.

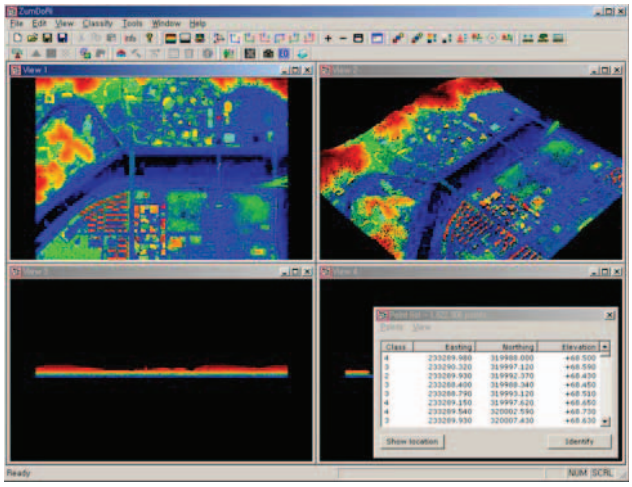

Figure 2 UI of the developed system

4. CONCLUSION

In this paper, we described the practical LiDAR data processing system for generation of the 2.5D or 3D terrestrial information like DEM. The functional figure of the developed system focus on high-speed generation of 3D models and display the processed massive LiDAR point data rapidly. This system provides common input format for saving LiDAR point data with the LAS file format, ASCII format.

5. REFERENCES

[1] Young Jin Lee, Soo Jeong, "Introduction of the LiDAR data processing system", proceedings from the ASPRS 2005 Annual Conference, March 7-11, 2005