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Perspective

Geo Spatial Feature Extraction using LiDAR Data

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DESCRIPTION

Light Detection and Ranging (LiDAR) is an active remote sensing device which measures the range between the target and source by computing the time of travel of fired laser pulse back towards the LiDAR sensor. This device also captures the scan angle of target from the sensor. These two parameter ranges and scan angle are further used to find out the local co-ordinate values of target point using mathematical transformation called geo-location. With the help of in-built Global Positioning System (GPS) in LiDAR device, local coordinate values of target are transformed into global coordinate values and finally a three dimensional dense georeferenced point cloud dataset is generated.

LiDAR delivers certain extraneous information such as Intensity, return number, number of returns, GPS Time etc. which are greatly beneficial for various geo-spatial feature identification, classification and extraction. However, number of returns indicates the total number of returns received at source for a particular fired laser pulse, while return number represents the particular id among the various returns pulse for a single fired pulse. Nowadays, LiDAR has become a reliable, swift and precise technique for collection of topographic data about surface objects in a rapid and cost-effective manner. It provides an accurate alternative for mapping large areas at high resolution as compare to traditional surveying techniques such as photogrammetric system, GPS survey.

LiDAR technology includes less human and atmospheric intervention as compared to conventional surveying and mapping systems including photogrammetric systems. Mapping of trees crown, adjoining corridor, transmission lines and change detection to assess damages after a disaster were not feasible with traditional surveying techniques, nevertheless LiDAR technology has resulted well in such case of mappings. On the basis of carrying platform, laser scanning systems are classified into three categories namely Airborne laser scanning, Terrestrial laser scanning and Mobile laser scanning. These laser scanning systems have great utility and diverse applications.

Airborne laser scanning system has the noble capability to collect accurate and dense elevated measurements i.e. forest mapping, flood mapping, transmission line mapping, glacier mapping etc. Numerous studies show that Airborne laser scanner data were used in order to extract building roof tops, generation of digital elevation models, digital surface models and also in the detection of individual tree crown. However, it is difficult for Airborne Laser Scanning system to capture the side-view geometry of vertical objects including trees, pole like objects and building facades due to the top-down sensing approach. Therefore, it is difficult to detect the tree trunk in case of Airborne Laser Scanner (ALS) data. Data captured by the Terrestrial laser scanning system has the highest accuracy and sampling density among all the laser scanning systems.

CONCLUSION

Mobile laser scanning system allows for fast, efficient and complete geometry acquisition of objects which are located in proximity of street surface. Mobile Laser Scanning (MLS) system takes away the limitation of other laser scanning systems. It allows fast and efficient acquisition of objects, located in the proximity of street surface. MLS data has been widely used for detection of road surfaces. Earlier studies on MLS data show the potential for street objects identification. Although, several methods have been developed in order to process, classify and identify objects using ALS data whereas, only few research works have been proposed on MLS data processing. Algorithms and approaches developed for ALS data processing cannot be directly applied to MLS data processing due to variances in sensing platform.

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