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Volume XXXIX-B7

LAND COVER INFORMATION EXTRACTION USING LIDAR DATA

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Abstract. Light Detection and Ranging (LiDAR) systems are used intensively in terrain surface modelling based on the range data determined by the LiDAR sensors. LiDAR sensors record the distance between the sensor and the targets (range data) with a capability to record the strength of the backscatter energy reflected from the targets (intensity data). The LiDAR sensors use the near-infrared spectrum range which has high separability in the reflected energy from different targets. This characteristic is investigated to implement the LiDAR intensity data in land-cover classification. The goal of this paper is to investigate and evaluates the use of LiDAR data only (range and intensity data) to extract land cover information. Different bands generated from the LiDAR data (Normal Heights, Intensity Texture, Surfaces Slopes, and PCA) are combined with the original data to study the influence of including these layers on the classification accuracy. The Maximum likelihood classifier is used to conduct the classification process for the LiDAR Data as one of the best classification techniques from literature. A study area covering an urban district in Burnaby, British Colombia, Canada, is selected to test the different band combinations to extract four information classes: buildings, roads and parking areas, trees, and low vegetation (grass) areas. The results show that an overall accuracy of more than 70% can be achieved using the intensity data, and other auxiliary data generated from the range and intensity data. Bands of the Principle Component Analysis (PCA) are also created from the LiDAR original and auxiliary data. Similar overall accuracy of the results can be achieved using the four bands extracted from the Principal Component Analysis (PCA).

Conference Paper (PDF, 1025 KB)

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