Intensity Normalization of Mobile Laser Scanning Data Based on Lidar Equation

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ABSTRACT:

Mobile laser scanning (MLS) system can rapidly acquire massive road 3-D points and intensity. The acquired road information can be utilized in many applications such as segmentation and classification. Recently, many researches focus on the road object extraction. Most of their methods use the geometric of object in segmentation. However, relatively few studies extract the object based on radiometric properties. Since the inconsistence radiometric performance may affect the results, the intensity of point should be calibrated before feature extraction. The aim of this research is to perform radiometric calibration for multi-strip MLS data. In this paper, we consider the physical model which can be presented by a function of calibrated constant (so-called C_{cal}), the range, the amplitude, the echo width, the laser beam divergence and the reflectivity. The physical model is further used to determine the backscatter cross section of each point. The calibrated constant C_{cal} is calculated based on the reflectance of reference targets. We manually select many patches to determine the calibration constant. Finally, we apply the calibrated constant to obtain the backscatter from all points. The calibration of data was acquired by Riegl VMX-250 mobile lidar system in Taipei City. The discussion of the overlapped area is presented and experimental results can be divided into visual and statistical analysis. The radiometric calibration values in the overlapped area are more consistent and useful for feature extraction.