

Laser Intensity-assisted Construction Material Classification in Point Cloud Data using Deep Learning

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ABSTRACT

The state-of-the-art in construction material classification has used various machine learning approaches using 2D color image datasets. However, construction materials are often discolored due to other foreign substances and lighting conditions, making it challenging to classify construction materials only with color information. To address this problem, this study presents a new material classification method employing laser intensity values as another parameter. A hierarchical 3D deep learning approach is adopted for the material classification in laser scanned-3D point cloud data. The deep learning model was trained with a self-developed point cloud dataset, which includes laser intensity value as well as 3D coordinates and color codes. This study conducted a case study at an actual building construction site to validate the proposed classification method. As a result, when additionally using intensity values as an input feature for network training, the accuracy was from 5% to 14% higher than when the intensity was not used. Therefore, we identify that laser intensity can improve material classification results.