

Review of automatic processing of topography and surface feature identification LiDAR data using machine learning techniques

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SUMMARY

Machine Learning (ML) applications on Light Detection And Ranging (LiDAR) data have provided promising results and thus this topic has been widely addressed in the literature during the last few years. This paper reviews the essential and the more recent completed studies in the topography and surface feature identification domain. Four areas, with respect to the suggested approaches, have been analysed and discussed: the input data, the concepts of point cloud structure for applying ML, the ML techniques used, and the applications of ML on LiDAR data. Then, an overview is provided to underline the advantages and the disadvantages of this research axis. Despite the training data labelling problem, the calculation cost, and the undesirable shortcutting due to data downsampling, most of the proposed methods use supervised ML concepts to classify the downsampled LiDAR data. Furthermore, despite the occasional highly accurate results, in most cases the results still require filtering. In fact, a considerable number of adopted approaches use the same data structure concepts employed in image processing to profit from available informatics tools. Knowing that the LiDAR point clouds represent rich 3D data, more effort is needed to develop specialised processing tools.

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