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# A NEW OBJECT BASED METHOD FOR AUTOMATED EXTRACTION OF URBAN OBJECTS FROM AIRBORNE SENSORS DATA

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Abstract. The classification of urban objects such as buildings, trees and roads from airborne sensors data is an essential step in numerous mapping and modelling applications. The automation of this step is greatly needed as the manual processing is costly and time consuming. The increasing availability of airborne sensors data such as aerial imagery and LIDAR data offers new opportunities to develop more robust approaches for automatic classification. These approaches should integrate these data sources that have different characteristics to exceed the accuracy achieved using any individual data source. The proposed approach presented in this paper fuses the aerial images data with single return LIDAR data to extract buildings and trees for an urban area. Object based analysis is adopted to segment the entire DSM data into objects based on height variation. These objects are preliminarily classified into buildings, trees, and ground. This primary classification is used to compute the height to ground for each object to help improve the accuracy of the second phase of classification. The overlapping perspective aerial images are used to build an ortho-photo to derive a vegetation index value for each object. The second phase of classification is performed based on the height to ground and the vegetation index of each object. The proposed approach has been tested using three areas in the centre of the city of Vaihingen provided by ISPRS test project on urban classification and 3D building reconstruction. These areas have historic buildings having rather complex shapes, few high-rising residential buildings that are surrounded by trees, and a purely residential area with small detached houses. The results of the proposed approach are presented based on a reference solution for evaluation purposes. The classification evaluation exhibits highly successful classification results of buildings class. The proposed approach follows the exact boundary of trees based on LIDAR data which provide above average classification results for the trees when compared to the assumed ideal circular shaped trees in the reference data.

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