Contextual Classification of Lidar Data and Building Object Detection in Complex Urban Areas

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In this work we address the task of the contextual classification of an airborne LiDAR point cloud. For that purpose, we integrate a Random Forest classifier into a Conditional Random Field (CRF) framework. It is a flexible approach for obtaining a reliable 3D classification even in complex urban scenes. In a second step, building objects are detected based on the 3D classification results. Therefore, the CRF probabilities of the classes are used as features of a 2D multiple label image, which is smoothed with a Markov Random Field. Finally, the 2D binary building object masks are extracted and evaluated by the benchmark.

The consideration of the probabilities enables to cope with noise, on the one hand, and data gaps (evoked by the conversion of the point cloud to the image space), on the other hand. This is an improvement of our previous work, in which morphological operations (opening and closing) were applied. Instead of crisp decisions solely based on the geometry, the probabilities are taken into account now.

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