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RANDOM FORESTS-BASED FEATURE SELECTION FOR LAND-USE CLASSIFICATION USING LIDAR DATA AND ORTHOIMAGERY

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Abstract. The development of lidar system, especially incorporated with high-resolution camera components, has shown great potential for urban classification. However, how to automatically select the best features for land-use classification is challenging. Random Forests, a newly developed machine learning algorithm, is receiving considerable attention in the field of image classification and pattern recognition. Especially, it can provide the measure of variable importance. Thus, in this study the performance of the Random Forests-based feature selection for urban areas was explored. First, we extract features from lidar data, including height-based, intensity-based GLCM measures; other spectral features can be obtained from imagery, such as Red, Blue and Green three bands, and GLCM-based measures. Finally, Random Forests is used to automatically select the optimal and uncorrelated features for landuse classification. 0.5-meter resolution lidar data and aerial imagery are used to assess the feature selection performance of Random Forests in the study area located in Mannheim, Germany. The results clearly demonstrate that the use of Random Forests-based feature selection can improve the classification performance by the selected features.

[Conference Paper](#) (PDF, 2078 KB)

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