

Detailed Urban Object–Based Classifications from Worldview–2 Imagery and LiDAR Data: Supervised Vs. Fuzzy Rule–Based

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SUMMARY

Detailed and small scale mapping of urban surface materials is challenging and difficult; due to spectral and spatial heterogeneity of pervious and impervious surfaces. This paper investigates the comparative assessment of object-based classifications including fuzzy rule-based and supervised Support Vector Machine (SVM) to perform detailed characterization of urban classes. In this study, image classifications were applied to combine the attributes of WorldView-2 (WV-2) imagery and LiDAR data. Image segmentation and merging objects was used for both classifiers to construct the spectral, spatial, textural, and elevation attributes. Classification result of supervised SVM contained mixed objects and misclassifications of impervious surfaces and other urban features. This classification achieved 85.02% overall accuracy. Rule-based classifier performed better than supervised SVM resulting in finer discrimination of spatially and spectrally similar objects. The overall accuracy of rule-based classification was 93.07%. This study showed that, rule-based feature extraction more accurately can characterize the heterogeneities and diversities of urban areas. This approach was flexible in extracting the urban targets from WV-2 imagery and LiDAR data. Therefore, effective separation of urban surface materials was achieved by rule-based classifier.