EVALUATION OF SPECTRAL AND TEXTURE FEATURES FOR OBJECT-BASED VEGETATION SPECIES CLASSIFICATION USING SUPPORT VECTOR MACHINES

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ABSTRACT:

The use of appropriate features to characterize an output class or object is critical for all classification problems. This paper evaluates the capability of several spectral and texture features for object-based vegetation classification at the species level using airborne high resolution multispectral imagery. Image-objects as the basic classification unit were generated through image segmentation. Statistical moments extracted from original spectral bands and vegetation index image are used as feature descriptors for image objects (i.e. tree crowns). Several state-of-art texture descriptors such as Gray-Level Co-Occurrence Matrix (GLCM), Local Binary Patterns (LBP) and its extensions are also extracted for comparison purpose. Support Vector Machine (SVM) is employed for classification in the object-feature space. The experimental results showed that incorporating spectral vegetation indices can improve the classification accuracy and obtained better results than in original spectral bands, and using moments of Ratio Vegetation Index obtained the highest average classification accuracy in our experiment. The experiments also indicate that the spectral moment features also outperform or can at least compare with the state-of-art texture descriptors in terms of classification accuracy.

TOPIC: Image processing and pattern recognition
ALTERNATIVE TOPIC: Image processing and pattern recognition