

Tree Species Classification Using Effective Features of Polarimetric SAR and Hyperspectral Images

Authors : Milad Vahidi, Mahmood R. Sahebi, Mehrnoosh Omati, Reza Mohammadi

Abstract : Forest management organizations need information to perform their work effectively. Remote sensing is an effective method to acquire information from the Earth. Two datasets of remote sensing images were used to classify forested regions. Firstly, all of extractable features from hyperspectral and PolSAR images were extracted. The optical features were spectral indexes related to the chemical, water contents, structural indexes, effective bands and absorption features. Also, PolSAR features were the original data, target decomposition components, and SAR discriminators features. Secondly, the particle swarm optimization (PSO) and the genetic algorithms (GA) were applied to select optimization features. Furthermore, the support vector machine (SVM) classifier was used to classify the image. The results showed that the combination of PSO and SVM had higher overall accuracy than the other cases. This combination provided overall accuracy about 90.56%. The effective features were the spectral index, the bands in shortwave infrared (SWIR) and the visible ranges and certain PolSAR features.

Keywords : hyperspectral, PolSAR, feature selection, SVM

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