عنوان مقاله:

Sub-pixel classification of hydrothermal alteration zones using a kernel-based method and hyperspectral data; A case study of Sarcheshmeh Porphyry Copper Mine and surrounding area, Kerman, Iran

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خلاصه مقاله:

Remote sensing image analysis can be carried out at the per-pixel (hard) and sub-pixel (soft) scales. The former refers to the purity of image pixels, while the latter refers to the mixed spectra resulting from all objects composing of the image pixels. The spectral unmixing methods have been developed to decompose mixed spectra. Data-driven unmixing algorithms utilize the reference data called training samples and end-members. The performance of algorithms using training samples can be negatively affected by the curse of dimensionality. This problem is usually observed in the hyperspectral image classification, especially when a low number of training samples, compared to the large number of spectral bands of hyperspectral data, are available. An unmixing method that is not highly impressed by the curse of dimensionality is a promising option. Among all the methods used, Support Vector Machine (SVM) is a more robust algorithm used to overcome this problem. In this work, our aim is to evaluate the capability of a regression mode of SVM, namely Support Vector Regression (SVR), for the sub-pixel classification of alteration zones. As a case study, the Hyperion data for the Sarcheshmeh, Darrehzar, and Sereidun districts is used. The main classification steps rely on 20 field samples taken from the Darrehzar area divided into 12 and 8 samples for training and validation, respectively. The accuracy of the sub-pixel maps obtained demonstrate that SVR can be successfully applied in the curse of dimensional conditions, where the size of the training samples (12) is very low compared to the number of spectral bands (165).

کلمات کلیدی:

Hydrothermal Alteration, Hyperspectral Remote Sensing, Soft Classification, Spectral Unmixing, Support Vector Regression (SVR)

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