Hyperspectral Image Classification Using Tree Search Algorithm

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Abstract : Remotely sensing image classification becomes a very challenging task owing to the high dimensionality of hyperspectral images. The pixel-wise classification methods fail to take the spatial structure information of an image. Therefore, to improve the performance of classification, spatial information can be integrated into the classification process. In this paper, the multilevel thresholding algorithm based on a modified fuzzy entropy function is used to perform the segmentation of hyperspectral images. The fuzzy parameters of the MFE function have been optimized by using a new meta-heuristic algorithm based on the Tree-Search algorithm. The segmented image is classified by a large distribution machine (LDM) classifier. Experimental results are shown on a hyperspectral image dataset. The experimental outputs indicate that the proposed technique (MFE-TSA-LDM) achieves much higher classification accuracy for hyperspectral images when compared to state-of-art classification techniques. The proposed algorithm provides accurate segmentation and classification maps, thus becoming more suitable for image classification with large spatial structures.

Keywords : classification, hyperspectral images, large distribution margin, modified fuzzy entropy function, multilevel thresholding, tree search algorithm, hyperspectral image classification using tree search algorithm
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