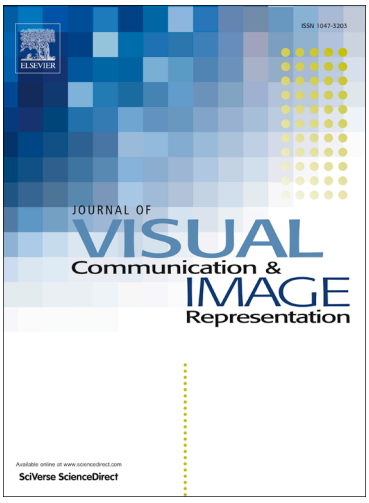

Classification of Hyperspectral Images via Weighted Spatial Correlation Representation

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Classification of Hyperspectral Images via Weighted Spatial Correlation Representation☆

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Abstract

Superpixel segmentation has been widely applied in hyperspectral image (HSI) classification. In this letter, a weighted spatial correlation representation (WSCR) method for HSI classification is proposed where an effective metric spatial correlation representation (SCR) that measures the correlation coefficient (CC) among different pixels in the superpixels is described, which fully utilizes the spatial information and structural features of superpixels. In addition, considering that the contribution of each SCR is different, the gaussian weighted is considered. The proposed method includes the following steps: First, a superpixels image is obtained from HSI based on the entropy rate superpixel (ERS) algorithm. Second, the WSCRs for the training and test samples are calculated. Then, a joint sparse representation (JSR) classification is used to obtain the representation residuals of different pixels. Finally, the class label of each pixel is determined by the defined decision function that combines the WSCR and JSR. Experimental results obtained on two real HSI datasets demonstrate the superiority of the proposed methods compared to other widely used methods in terms of classification accuracy.

Keywords: Hyperspectral image, superpixe, joint sparse representation, correlation coefficient.

1. Introduction

Hyperspectral image (HSI) can reflect the different spectral information and spatial characteristics of surface objects with high spectral resolution and spatial resolution. Thus, different kinds of techniques have been developed for HSI classification[1]-[5]. In addition, HSI has attracted great attention in different application domains, such as monitoring of the environment [6], [7], national defense [8], and precision agriculture [9]-[11].

In the last few decades, some supervised classification and semi-supervised classification methods [12], [13] and [14], [15] have been proposed, such as the support vector machine

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