Agrupación de Subespacios Escasos en imágenes hiperespectrales usando pixeles incompletos [

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text (article)

Analítica

Spectral image clustering is an unsupervised classification method which identifies distributions of pixels using spectral information without requiring a previous training stage. The sparse subspace clustering-based methods (SSC) assume that hyperspectral images lie in the union of multiple low-dimensional subspaces. Using this, SSC groups spectral signatures in different subspaces, expressing each spectral signature as a sparse linear combination of all pixels, ensuring that the non-zero elements belong to the same class. Although these methods have shown good accuracy for unsupervised classification of hyperspectral images, the computational complexity becomes intractable as the number of pixels increases, i.e. when the spatial dimension of the image is large. For this reason, this paper proposes to reduce the number of pixels to be classified in the hyperspectral image, and later, the clustering results for the missing pixels are obtained by exploiting the spatial information. Specifically, this work proposes two methodologies to remove the pixels, the first one is based on spatial blue noise distribution which reduces the probability to remove cluster of neighboring pixels, and the second is a sub-sampling procedure that eliminates every two contiguous pixels, preserving the spatial structure of the scene. The performance of the proposed spectral image clustering framework is evaluated in three datasets showing that a similar accuracy is obtained when up to 50% of the pixels are removed, in addition, it is up to 7.9 times faster compared to the classification of the data sets without incomplete pixels
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