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## Dimension Reduction Using Spatial and Spectral Regularized Local Discriminant Embedding for Hyperspectral Image Classification

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### Abstract

Dimension reduction (DR) is a necessary and helpful preprocessing for hyperspectral image (HSI) classification. In this paper, we propose a spatial and spectral regularized local discriminant embedding (SSRLDE) method for DR of hyperspectral data. In SSRLDE, hyperspectral pixels are first smoothed by the multiscale spatial weighted mean filtering. Then, the local similarity information is described by integrating a spectral-domain regularized local preserving scatter matrix and a spatial-domain local pixel neighborhood preserving scatter matrix. Finally, the optimal discriminative projection is learned by minimizing a local spatial-spectral scatter and maximizing a modified total data scatter. Experimental results on benchmark hyperspectral data sets show that the proposed SSRLDE significantly outperforms the state-of-the-art DR methods for HSI classification.

### Keywords

**Author Keywords:** Dimension reduction (DR); hyperspectral image (HSI); local pixel neighborhood preserving embedding (LPNPE); regularized local discriminant embedding (RLDE)

**KeyWords Plus:** FEATURE-EXTRACTION; SUBSPACE PROJECTION; FRAMEWORK; FEATURES; SVM

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