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Title:MAP-GUIDED HYPERSPECTRAL IMAGE SUPERPIXEL SEGMENTATION USING SEMI-SUPERVISED PARTIAL MEMBERSHIP LATENT DIRICHLET ALLOCATION

Many superpixel segmentation algorithms which are suitable for the regular color images like images with three channels: red, green and blue (RGB images) have been developed in the literature. However, because of the high dimensionality of hyperspectral images, these regular superpixel segmentation algorithms often do not perform well. Although there are some authors who have modified some regular superpixel segmentation algorithms to fit the hyperspectral image, many still underperform on complex data.

In this thesis, to solve this problem, we introduce a hyperspectral unmixing based superpixel segmentation that leverages map information. We call this approach map-guided semi-supervised PM-LDA superpixel segmentation. The approach uses auxilliary map information to guide segmentation. The approach also leverages spectral unmixing results to provide improved results compared with segmentation based on raw data.

We test our proposed method on two real hyperspectral data, University of Pavia and MUUFL Gulfport Hyperspectral Data. In these experiments, our proposed method achieves better results compared to other state-of-the-art algorithms. We also develop new cluster validity metrics to evaluate the results.