

# Sub-pixel Hyperspectral Image Analysis using Piece-wise Convex Spectral Unmixing

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## Abstract

Hyperspectral sensors measure and collect reflectance and/or radiance values over many wavelengths across the electromagnetic spectrum for a spatial area. The imagery collected by these sensors provide spectral and spatial information that can be used for detecting and classifying different materials in an image scene down to the sub-pixel level. Sub-pixel hyperspectral image analysis can be applied to a wide range of applications including remote sensing, landmine and explosive object detection, trace explosives detection and medical applications such as tissue or cell analysis. The overwhelming majority of existing sub-pixel hyperspectral image analysis techniques rely on standard convex linear models to represent hyperspectral data. However, the standard model neglects common non-linear mixing phenomena and the variability observed in spectral data. In this talk, I will discuss novel hierarchical Bayesian methods and fuzzy clustering methods for sub-pixel hyperspectral image analysis which address the non-linear mixing and spectral variability often seen in hyperspectral data.