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IEEE Signal Processing Society

Special Issue
IEEE SIGNAL PROCESSING MAGAZINE

Special Issue on Signal and Image Processing in Hyperspectral Remote Sensing

Aims and Scope

Hyperspectral imaging has recently emerged as one of the very promising technologies in remote sensing, enabling applications that may have been previously seen as impossible in multispectral imaging. Hyperspectral cameras deployed in current airborne or satellite systems can cover the visible and near-infrared wavelengths at a resolution of 10nm, with more than 200 spectral channels. This vastly increased spectral information content creates a unique opportunity for numerous applications, such as mineral identification, agriculture, environment monitoring, terrain classification, object detection, change detection, and many more. Hyperspectral imaging is also a key technique for planetary exploration, astrophysics, and non-remote sensing problems such as food inspection and forensics. Remarkably, these meaningful and important applications have led to a wide variety of signal processing problems, which have attracted growing attention and contributions from the signal processing, image processing and machine learning communities. In particular, we have witnessed developments that are far from being just a straight application of a signal processing technique. Instead, some of them turn out to provide new insights and open new dimensions for fundamental signal processing research. For example, it has recently become clear that the unmixing topic in hyperspectral remote sensing has formed a new branch of blind source separation techniques, wherein the exploitation of special source characteristics, such as local sparsity, has been found to provide very effective blind separation solutions. The same goes with the classification and detection topics, where the utilization of contextual information or combined spatial-spectral processing has resulted in new paradigms. Moreover, the recent research trend indicates that hyperspectral signal and image processing is embracing frontier signal processing concepts very quickly—this includes sparse signal processing, compressive sensing, and convex and nonconvex optimization, just to name a few.

The aim of this special issue is to gather high-quality tutorial-style articles that introduce key signal processing topics arising from hyperspectral remote sensing, demonstrate the insight and uniqueness of signal processing techniques established in this area, and/or provide overviews of the latest trends. In particular, we wish to shift the perspective from the remote sensing side to signal processing, and extract insight behind the signal processing developments happening in hyperspectral remote sensing. While this is the focus of this special issue, we may also welcome application-oriented papers that can tell a good story regarding how signal processing makes a difference.

Topics of Interest include (but are not limited to):

- unmixing, both linear and nonlinear, and both semisupervised and unsupervised
- classification
- target or anomaly detection at a subpixel level
- coded aperture and compressive sensing
- sparse signal processing, which includes sparse regression, dictionary learning, multiple measurement vector models, etc
- convex and nonconvex optimization
- contextual information or combined spatial-spectral processing
- Bayesian and statistical signal processing
- nonlinear manifold learning, graph theoretic methods
- dimension reduction, subspace identification, non-negative matrix factorization

Submission Process

Articles submitted to this special issue must contain significant relevance to signal processing and its application to hyperspectral remote sensing. All submissions will be peer reviewed according to the IEEE and Signal Processing Society guidelines. Submitted articles should not have been published or under review elsewhere. Manuscripts should be submitted online at http://mc.manuscriptcentral.com/sps-ieee using the Manuscript Central interface. Submissions to this special issue of the IEEE SIGNAL PROCESSING MAGAZINE should have significant tutorial value. Prospective authors should consult the site http://www.signalprocessingsociety.org/publications/periodicals/spm/ for guidelines and information on paper submission.

Important Dates

Tentative Schedule	
White paper (4 pages) due	December 9, 2012
Invitation notification	January 3, 2013
Manuscript submission due	March 22, 2013
Acceptance notification	June 15, 2013
Final manuscript due	August 18, 2013 (strict)
Final Publication	January 2014

Guest Editors

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