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IEEE Signal Processing Magazine

Special Issue on *Dimensionality Reduction via Subspace and Manifold Learning*

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The problem of finding and exploiting low-dimensional structures in high-dimensional data is taking on increasing importance in image, video, or audio processing, web data analysis/search, and bioinformatics, where datasets now routinely lie in thousands to millions-dimensional observation spaces. The curse of dimensionality is in full play here: We often need to conduct meaningful inference with limited number of samples in a very high-dimensional space. Conventional statistical and computational tools are often severely inadequate for processing and analyzing high-dimensional data. Although the data might be presented in a high-dimensional space, their intrinsic complexity and local dimensions are typically much lower.

This special issue is to attract articles that cover existing approaches to dimension reduction based on learning of subspaces or submanifolds -- from linear to nonlinear models, from homogeneous to hybrid models, from statistical, to geometric, to algebraic, and to graphical methods. We would also like to feature many successful applications of these new methods, including but not limited to signal/image processing, pattern recognition, bioinformatics, and web data mining. Below is an incomplete list of potential topics to be covered in the special issue:

1. *Kernel PCA and Robust PCA with Incomplete and Corrupted Data*
2. *Generalized PCA and Subspace Arrangements*
3. *Manifold Learning and Dimension Reduction*
4. *Learning of Stratification and Submanifold Arrangements*
5. *Data Clustering and Source Separation Based on Subspace Models*
6. *Dictionary Learning for Sparse Representation*
7. *Algebraic, Geometric, and Topological Methods for Manifold Learning and Clustering*
8. *Applications of Subspace Analysis, Manifold Learning, and Dimension Reduction*

Submission Procedure:

Prospective authors should submit their white papers (2 pages maximum) to the web submission system through IEEE Manuscript Central at: http://mc.manuscriptcentral.com/spmag-ieee.

Schedule:

- White paper due: November 1, 2009

- Invitation notification: December 1, 2009
- Manuscript due: April 1, 2010
- Acceptance notification: July 1, 2010
- Final manuscript due: August 1, 2010