

IEEE Signal Processing Magazine

Special Issue on Graphical Models in Signal Processing

Graphical models, referred to in various guises as “Markov random fields,” “Bayesian networks,” “factor graphs,” “influence diagrams,” “decision networks,” or “structured stochastic systems,” are an elegant marriage of graph theory, probability theory and decision theory. They yield a unifying perspective on many graph-based and multi-resolution algorithms in signal processing and communications, and they provide a firm foundation for the design and analysis of new methods. They are of particular value in areas of signal processing that overlap with machine learning, time series analysis, spatial statistics and optimization.

The purpose of this special issue is to provide an overview of recent developments and open problems in the theory and practice of graphical models, including applications to problems in signal processing and related fields, and including connections to other areas of engineering, statistics, physics and applied mathematics in which graphs and probabilities come together.

This Call for Papers is an invitation for contributed articles, having a tutorial flavor, covering recent developments in the theory and practice of graphical models that would have broad appeal to the signal processing community. Tutorial-style papers are solicited from the following non-exhaustive set of topics:

Scope of Topics

- Dynamical, spatial and relational graphical models
- Graphical models and networks (e.g., sensor networks, social networks)
- Bayesian nonparametric models
- Variational, Markov chain Monte Carlo and sequential Monte Carlo methods for inference
- Distributed inference and decision-making
- Inverse problems, tomographic reconstruction, phase wrapping
- Applications to communications, including channel identification and equalization
- Applications to speech processing and image processing
- Applications to bioinformatics and systems biology

Submission Procedure

Prospective authors should submit white papers to the web submission system at <http://www.ee.columbia.edu/spm/> according to the following timetable. White papers, limited to 2 pages in the IEEE single-spaced double-column format, should summarize the motivation, the significance of the topic, and an outline of the content.

Schedule (all deadlines are firm; no exceptions)

White paper due:	August 1, 2009
Invitation notification:	September 15, 2009
Manuscript due:	December 15, 2009
Initial notification:	March 15, 2010
Revised manuscript due:	April 15, 2010
Final notification:	June 1, 2010
Final manuscript due:	July 1, 2010
Publication date:	November 1, 2010

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