



JOHNS HOPKINS
BLOOMBERG
SCHOOL of PUBLIC HEALTH

Department of Biostatistics

BIOSTATISTICS SEMINAR

Learning Discrete Graphical Model Structure

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Abstract

Undirected graphical models, also known as Markov random fields, are widely used in a variety of domains, including biostatistics, natural language processing and image analysis among others. They compactly represent distributions over a large number of variables using undirected graphs which encodes conditional independence assumptions among the variables. Recovering this underlying graph structure is thus important for many of these applications of MRFs, especially under constrained settings where the number of variables is large, and the samples are limited.

In this talk, we will cover three recent approaches for recovering discrete graphical model structure. In the first, we investigate the use of sparse and group-sparse regularization, when combined with pseudo-likelihood-like approximations to the graphical model log-likelihood. In the second, we investigate the use of state-of-the-art variational approximations to the graphical model log-likelihood instead. In the third, we study the use of a simple greedy procedure that iteratively adds and deletes edges. We discuss conditions under which each of these methods can be guaranteed to succeed, with high probability, in recovering the underlying graph structure even under high-dimensional settings.

Joint work with Ali Jalali, Christopher Johnson and Eunho Yang.

**The Johns Hopkins Bloomberg School of Public Health
Department of Biostatistics, Wednesday, November 16, 2011
Room W2030 School of Public Health, 4:00-5:00pm (Refreshments: 3:30)**

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