Stanford University
Department of Statistics

DEPARTMENTAL SEMINAR

4:15pm, Tuesday, May 24, 2011
Sequoia Hall Room 200
Cookies served at 3:45pm, 1st Floor Lounge.

Speaker: Yoram Singer, Google

Title: Entire Relaxation Path for Maximum Entropy Models

Abstract:
We describe a relaxed and generalized notion of maximum entropy problems for multinomial distributions. By introducing a simple re-parametrization we are able to derive an efficient homotopy tracking for the entire relaxation path. The end result is an algorithm that can provide optimal probabilistic estimates for any relaxation parameter using linear space and sub-linear time. We also show that the Legendre dual of the relaxed maximum entropy problem is the task of finding the maximum-likelihood estimator for an exponential distribution with L1 regularization. Hence, our solution can be used for problems such as language modeling with sparse parameter representation. We describe a simple large deviation bound that holds for any relaxation parameter and conclude with a demonstration and a discussion of potential applications.

Acknowledgements:
The roots of this line of work go back to an open problem posed by the late Sam Roweis in summer 2009 during our collaboration at Google. The talk is mostly based on recent joint work with Moshe Dubiner from Google. Thanks also to Han Liu (Johns Hopkins), Will Neveitt (Google), and John Duchi (UC Berkeley) for their contributions to the original problem.