Fall 2008

CS 712: Advanced Topics in Artificial Intelligence: Inference Graphical Models

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Information
Syllabus
Selected Readings

Tentative Syllabus

Day	Topic	Reading	Optional Reading
9/16/08	Introduction, factor graphs, self-reduction		Kschischang and Frey, "Factor graphs and the sum-product algorithm," IEEE Transactions on Information Theory, 47(2):498-519, 2001
9/18/08	Message passing algorithms from statistics, computer science and communications		
9/23/08	Variational methods, free energy and Gibbs free energy		M. Wainwright and M. Jordan, "A variational principle for graphical models," In New Directions in Statistical Signal Processing: From Systems to Brain. MIT Press.
9/25/08	Variational methods, Ising models and fixed point iteration		
9/30/08	Bethe free energy and locally consistent marginals		J. Yedidia, W. Freeman and Y. Weiss, "Constructing free-energy approximations and generalized belief propagation algorithms," IEEE Transactions on Information Theory,

51(7):2282-2312, 2005

10/02/08	Regiona-based approximations and generalized belief propogation
10/02/08	Tree based upper/lower bound approximations
10/07/08	Monte Carlo Markov chain (MCMC)
10/09/08	Density evolution
10/14/08	Gibbs measures on trees: uinqueness, extremality, mixing
10/16/08	Tree pruning algorithm
10/21/08	The cavity method
10/23/08	Presentation
10/28/08	Presentation
10/30/08	Presentation
11/04/08	Presentation
11/06/08	Presentation
11/11/08	Veteran's (University Closed)
11/13/08	Presentation