National Security Education Center

A CONSORTIUM OF LANL INSTITUTES

UNCLASSIFIED

Information Science and Technology Seminar Series

Max Welling
UC Irvine

"Improving Belief Propagation with Cycle Bases and Cluster Cumulants"

Wednesday, April 18, 2012
3:00 - 4:00 PM
TA-3, Bldg. 1690, Room 102 (CNLS Conference Room)

Abstract: In this talk I will discuss two distinct methods to improve generalized belief propagation (GBP). The first method provides new guidance as to what clusters of variables (or regions) to choose for executing GBP. I will focus on loop-structured regions and expose an elegant relation between GBP on loop-region graphs and the theory cycle bases. The second method I discuss is a new cluster-cumulant expansion at any fixed point of GBP, which provides an alternative to Cherkov & Chernyak's loop-series. I will show that the cluster-cumulant expansion is defined for arbitrary alphabets, generalizes to arbitrary region graphs, has fewer terms than the loop series (e.g. all disconnected clusters have a zero contribution) and empirically seems to be more accurate than the loop series. I will end with some future directions.

Biography: Max Welling is a Professor of Computer Science at UC Irvine with a joint appointment in the statistics department. Before joining UCI he held postdoctoral positions at Caltech (1998-20000), University College London (2000-2001) and the University of Toronto (2001-2003). He received his PhD in 1998 in theoretical physics. He is associate editor in chief of the IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), and the associate director of the Center for Machine Learning and Intelligent Systems at UCI. He also serves on the editorial boards of JMLR and JML and was an associate editor for Neurocomputing, Journal of Computational and Graphical Statistics and TPAMI. In 2009 he was the conference chair for AISTATS.

He received multiple grants from NSF, NIH and ONR-MURI among which an NSF career grant in 2005. He was recipient of the Dean's midcareer award for research in 2008 and the ECCV Koenderink Prize in 2010. His research focuses on large-scale statistical learning. He has made contributions in distributed Bayesian learning, variational Bayesian learning, learning of Markov random Field models, approximate inference in graphical models, hierarchical models of complex cells and products of expert models, algorithms for learning image taxonomies, visual object recognition, information retrieval, image de-noising, and statistical shape analysis. He has over 100 academic publications.

Los Alamos NATIONAL LABORATORY EST.1943

UNCLASSIFIED

For more information contact Misha Chertkov, chertkov@lanl.gov, 695-5684.
Hosted by the Information Science and Technology Center (ISTC)