Call For Papers

NIPS Workshop on

Robust Communication Dynamics in Complex Networks

Held at Neural Information Processing Systems (NIPS) conference

Whistler, CANADA: December 12-13, 2003

Information

Workshop URL
www.research.ibm.com/nips03workshop/

Submission
nips03workshop@watson.ibm.com

NIPS
http://www.nips.cc

Dates & Deadlines

October 22: Abstract Submission
October 28: Acceptance Notification

Organizing Committee

Dr. Rajarshi Das
IBM T. J. Watson Research Lab, USA

Prof. Cristopher Moore
University of New Mexico, USA

Dr. Irina Rish
IBM T. J. Watson Research Lab, USA

Dr. Gerry Tesauro
IBM T. J. Watson Research Lab, USA

Invited Speakers

Prof. Kenneth Birman
Cornell University, USA

Prof. Christos Faloutsos
Carnegie Mellon University, USA

Dr. Michelle Girvan
Cornell University, USA

Prof. Bert Kappen
University of Nijmegen, Netherlands

Prof. Jon Kleinberg
Cornell University, USA

Prof. Gyorgy Korniss
Rensselaer Polytechnic Inst., USA

Prof. Marc Mezard
Université de Paris Sud, France

Prof. Jared Saia
University of New Mexico, USA

Dr. Jonathan Yedidia
MERL, USA

Overview and Goals

Large-scale distributed systems with complex patterns of communication between elements abound in both nature (e.g., genetic pathways) and in man-made systems (e.g., Internet, email networks, and the World Wide Web). The main objective of this workshop is to explore how various local communication schemes in distributed systems (e.g., gossip-style/epidemic protocols) and message-passing schemes for inference (e.g., Belief Propagation) may robustly achieve global objectives, such as accurate global computation, in the presence of various forms of noise, errors and attacks, and how their performance is affected by network dynamics and topology. The workshop aims at cross-fertilization among several research areas that has attracted an immense current interest, including:

- belief-propagation schemes for probabilistic inference and their close relationship to free energy approximations
- distributed machine learning which was touched upon in last year's NIPS workshop on Multi-Agent Learning
- statistical dynamics of complex network phenomena, a rapidly growing multi-disciplinary research topic that combines methods from computer science, statistical physics, nonlinear dynamics, econometrics and social network theory to study common problems in many systems exhibiting complex network structure. This topic has attracted much recent attention in the scientific literature as well as in popular publications (e.g., Watts, "Six Degrees: The Science of a Connected Age," 2003), but so far has not been presented at NIPS.

Suggested Topics

The list of possible topics includes (but is not limited to) the following:

- Dynamics and topological properties (e.g., small-world, scale-free, clustering) of real-world large-scale networks (e.g., Internet, World Wide Web, biological pathways, social networks)
- Communication protocols and information propagation algorithms on such networks ('epidemic' protocols, 'gossip-based' algorithms)
- Propagation algorithms for inference on various graphical models such as Markov and/or Bayesian networks, constraint networks
- Free energy (Kikuchi approximations) and related cost functions
- Variants of propagation algorithms (e.g., belief propagation and its generalizations, survey propagation, constraint propagation, etc.)
- Accuracy and convergence of propagation algorithms
- Applications of propagation algorithms to various problems (e.g., web search, distributed computing, error-correcting coding, image analysis, probabilistic diagnosis, collaborative

Format

This is going to be a 2-day workshop. There will be eight invited talks (roughly 40 minutes each) and shorter contributed talks from researchers in industry and academia, as well as a panel discussion. We will hold a poster session if we receive a sufficient number of good submissions. The workshop will emphasize relatively high-level perspectives, including surveys of different fields and problem domains. The workshop is intended to be accessible to the broader NIPS community and to encourage communication between different fields.

Submission Instructions

We invite submissions of extended abstracts (**up to 2 pages, not including bibliography**) for the short contributed talks and/or posters. The submission should present a high-level description of recent or ongoing work related to the topics above. We will explore the possibility of publishing papers based on invited and submitted talks in a special issue of an appropriate journal.

Email submissions to **nips03workshop@watson.ibm.com** as attachments in **Postscript or PDF**, no later than October 22, 2003 .