QUANTITATIVE LIFE SCIENCES SEMINAR

Monday, 18 May 2015 - 14:30 a.m.

L. Stasi seminar room
ICTP Leonardo Building

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Coverage maximization under resource constraints using random walk based strategies

Information dissemination and search in networks are the most frequently performed operations in any large scale distributed system. Maximization of the number of distinctly visited nodes (coverage) under constraints is the prime target of any proposed algorithm for these operations. In order to quickly achieve high coverage, the existing algorithms tend to proliferate message packets at higher rate. Due to the nondeterministic nature of the algorithms, the blind proliferations create many redundant visits in the network which reduces the utilization of available resource. For the first time, we formally capture this existing tradeoff between the available time and available resource to achieve a certain amount of coverage in the network. Using methods from statistical mechanics, we showed that coverage can be optimized, without using any memory, for a certain combinations of resource and time. We also provide the algorithm which can achieve that optimal coverage. For the rest of the combinations of resource and time, we provide a notion of optimality employing a very little amount memory. We test our hypothesis through extensive computer simulations in various kinds of network topologies.

Niloy Ganguly is a professor in the department of computer science and engineering, Indian Institute of Technology Kharagpur. He has received his PhD from Bengal Engineering and Science University, Calcutta, India and his Bachelors in Computer Science and Engineering from IIT Kharagpur. He has been a post doctoral fellow in Technical University of Dresden, Germany. He focuses on dynamic and self-organizing networks especially peer-to-peer networks, online-social networks (OSN) etc. He works on various theoretical issues related to dynamical large networks often termed as complex networks. Specifically he has looked into problems related to percolation, evolution of networks as well as flow of information over these networks. He has worked on He has been collaborating with various national and international universities and research lab including UIUC, TU Dresden, Germany, MPI PKS and MPI SWS, Germany, Microsoft Research Lab, India etc. For further information visit his webpage http://www.facweb.iitkgp.ernet.in/~niloy/