Distributed Network Algorithms

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Overview

Distributed network algorithms play a major role in many networked systems, ranging from computer networks (such as sensor networks, peer-to-peer networks, software-defined networks, datacenter networks, networks on chip) to social and even biological networks. Only recently, researchers have started understanding the fundamental mechanisms underlying distributed network algorithms, and developed formal models and designed their own efficient distributed algorithms (e.g., for Internet routing, parallel analytics of big data, or nano-robotics). The goal of this course is two-fold:

- First, we will introduce the fundamental formal models and methods used to reason about the correctness and performance of distributed network algorithms. In particular, we will teach essential algorithmic and analytic techniques which, after the course, are a useful toolbox and allow the students to develop and study their own distributed network algorithms.
- Second, we complement the theoretical lectures with practical case studies, to show the various application domains of distributed network algorithms.

In particular, students will learn about mathematical tools such as randomization, approximation techniques, graph theory, etc., from a distributed computing lens. This active field of research also offers a wide range of research questions.

Internationally acclaimed academics, researchers and practitioners with proven knowledge, experience, and demonstrable ability in teaching, consultancy, research, and training in the field of Distributed Computing will deliver lectures and discuss potential research problems in the course. The course is planned as per the norms set by Global Initiative of Academic Networks (GIAN), an initiative by Govt. of India for Higher Education.

Objectives: The primary objectives of the course are as follows:

- Introduce formal models for distributed network algorithms.
- Introduce essential algorithmic techniques to devise efficient algorithms and analyze them (randomization, approximation, online algorithms).
- Provide students with a set of tools to become independent researchers in the field.
- Highlight open research directions.
- Highlight interesting application domains (Internet, sensor networks, parallel computing, software-defined networks, etc.)

Schedule	**June 27 - July 02, 2016,** 1 Credit course covering 10 lecture hours (2 hours/day) **Number of participants for the course will be limited to fifty.**
You Should Attend If…	▪ you are an computer engineer or research scientist from IT industry, service and government organizations including R&D laboratories interested in designing distributed network algorithms ▪ you are interested to learn about applications of distributed network algorithms ▪ you are a student (BS/BE/BTech/MS/MSc/MTech/PhD) or faculty/research staff from academic institution interested in learning how to do research on and/or work with networked distributed systems
Fees	The participation fees for taking the course is as follows: **Participants from abroad : US $250** **Industry/ Research Organizations: Rs. 10000/-** **Academic Institutions:** **Faculty/Research Staff: Rs. 5000/-** **Student: Rs. 1000/- (Refundable)** The above fee includes all instructional materials, computer use for tutorials and assignments (if any), laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.

The Faculty

Dr. Stefan Schmid is an Associate Professor at Aalborg University, Denmark. His research interests include networked and distributed systems, currently in particular: software-defined networks (wired and wifi), network virtualization, and cloud networks.

Dr. Partha Sarathi Mandal is an Associate Professor of Indian Institute of Technology Guwahati. His research interest is Algorithm aspects of Ad-hoc & Wireless Sensor Network, Distributed Algorithm, and Distributed Algorithms for Autonomous Robots.

Course Coordinator

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