MHRD
Govt. of India
सत्यमेव जयते

GIAN
GLOBAL INITIATIVE OF ACADEMIC NETWORKS

On
Complex Network Analysis

20th - 24thNovember, 2017

Venue: NKN Room, Tutorial Block, IIT Patna

Organised by

Department of Computer Science andEngineering, Indian Institute of Technology Patna Bihta, Bihar, India.

About GIAN

Govt. of India approved a new program titled Global Initiative of Academic Networks (GIAN) in Higher Education aimed at tapping the talent pool of scientists and entrepreneurs, internationally to encourage their engagement with the institutes of Higher Education in India so as to augment the country's academic resources, existing accelerate the pace of quality reform, and elevate India's scientific and technological capacity to global excellence.

About IIT Patna

Indian Institute of Technology Patna, established in August 2008, is an autonomous institute of education and research in science, engineering and technology located in Bihta, 35 km from Patna. The new campus is spread over 500 acres of green land. As of today, IIT Patna has 10 academic departments that offer B.Tech, M.Tech, MSc and PhD programs. The faculties of this institute come with academic and research training from various institutes of excellence within the country and abroad. The recent publication records of the faculty with several practical constraints appear to be outstanding. It includes many reputed national and international journals.

About CSE Department

The department has three major programs- B.Tech CS, M.Tech CS and PhD. Additionally, there is a M.Tech in Mathematics and Computing program jointly with Mathematics dept. The CSE department is equipped with several research labs. The faculty members of the department are engaged with various research, teaching and administrative activities. The department also has a liaison with reputed national and international Universities.

Teaching Faculty

Dr.Natarajan Meghanathan is a Professor in the Department of Electrical and Computer Engineering, Jackson State University, Jackson, Mississippi, USA. His areas of research interest are: Complex Network Analysis, Wireless Ad hoc and Sensor Networks, Machine Learning and Cyber Security. He has published more than 175 peer-reviewed journals and conference articles and more than 25 book chapters. He serves as the editor-in-chief for three international journals and also serves in the editorial board and program committees for several international conferences. His website and email addresses are: http://www.jsums.edu/nmeghanathan natarajan.meghanathan@jsums.edu

Host Faculty

Dr. Somanath Tripathy is currently the Associate Professor of Computer Science and Engineering Department at Indian Institute of Technology Patna. He was the Associate Dean (Academic), IIT Patna during (2016-17).His current research includes Lightweight Cryptography, Computer and network security, Security and privacy issues in IoT and Cloud Systems. He has published more than 45 papers in high quality International Journals and Conferences. More details in https://www.iitp.ac.in/~som.
Email:-som@iitp.ac.in.

Course Overview

Complex Network Analysis (a.k.a. Network Science) is a rapidly emerging area of interest for both theory and practice. With the phenomenal growth of the Internet, web, social networks, information on biological networks, etc., it is imperative that we need a course that covers the algorithms, techniques and tools to analyze such large-scale networks, visualize and extract useful information (like communities in the networks, robustness to information diffusion, diameter of the network, etc.). Network Science deals with the analysis and visualization of large complex network graphs and the development of efficient algorithms to study the characteristics of networks involving hundreds and thousands of nodes.

Course Objective

1. Analyze the characteristics of complex networks using graph theoretic metrics and paradigms;
2. Generate simulated networks from theoretical models and evaluate their characteristics in comparison with real-world networks;
3. Apply various centrality metrics and related algorithms to determine the topological significance of the nodesin a network;
4. Extract clusters of related nodes using efficient community detection algorithms and evaluate the effectiveness of the partitioning;
5. Use hands-on tools and spectral analysis techniques to analyze datasets corresponding to complex real-world networks

Topics To be covered

20th November- 24th November2017

This course will cover following topics:

1. Graph Theory Fundamentals
2. Degree Distribution Analysis
3. Assortativeness and Maximal Matching
4. Degree and Shortest Path-based Centrality Metrics
5. Computationally-Light vs. Computationally - Heavy Centrality Metrics and Correlation Analysis
6. Hands on Exercises for Centrality and Correlation Analysis
7. Page Rank Algorithm
8. Spectral Analysis and its Applications
9. Modularity and Communities
10. Hands on Exercises for Spectral Analysis
11. Edge Betweenness Centrality and Neighborhood Overlap
12. Community Detection Algorithms
13. Hands on Exercises for Community Detection
14. Random Networks
15. Scale-Free Networks

Who Can Attend ?

- Executives, engineers and researchers from reputed industry and government organizations including R&D laboratories.
- Students at all levels (BTech/MSc/MTech/PhD) or Faculty from reputed academic institutions and technical institutions.

How to Register

Step 1: One Time Registration: In order to register for any GIAN course, candidates will have to get registered at the GIAN Portal of IIT Kharagpur using the following steps.
1.1 Create login and password at **http://www.gian.iitkgp.ac.in/GREGN/index**
1.2 Login and complete the registration form
1.3 Select course to be attended
1.4 Confirm your application and payment information.
1.5 Pay Rs 500 (one time, non-refundable) online through payment gateway.
1.6 Download and print your "pdf file" of your enrollment application form for your personal records and copy of the same to be sent to course coordinator.

Step 2:Pay Institute Registration Fee:

Institute registration fee:

Participants from Abroad	USD 100
Participants from Industry / Academic/ Research Organization	Rs 2000
Students & Research Scholars	Rs 1000

Note 1: Please mention the purpose of payment as "Registration Fees of Gian Course: 171013D04"
Note 2: The course fee will be made half for SC/ST students.

Account Details:

Account Name	Indian Institute of Technology Patna
Account No.	30957551934
IFSC Code	SBIN0017164
Bank Name	State Bank of India
Branch Name	IIT Patna, Bihta Campus
MICR No.	801002005

Step 3: Send the copy of transaction details:
For Registration Confirmation:
Mr. Sanjeet Kr. Nayak: (+91-9473480414)
Email:sanjeet.pcs13@iitp.ac.in

For Other Details:
Dr. Somanath Tripathy: (+91) 612 302 8036
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