SOCIAL NETWORK ANALYSIS

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PRE-REQUISITES : Python programming, Probability and Statistics, Machine Learning

INDUSTRY SUPPORT : Any social media company, E-commerce company, etc

COURSE OUTLINE :

Networks are a fundamental tool for modeling complex social, technological, and biological systems. Coupled with the emergence of online social networks and large-scale data availability in social sciences, this course focuses on the analysis of massive networks which provide many computational, algorithmic, and modeling challenges. The course will cover research on the structure and analysis of such large networks and on models and algorithms that abstract their basic properties. We will explore how to practically analyze large-scale network data and how to reason about it through models for network structure and evolution. Topics covered in this course are how information spreads through society; robustness and fragility of networks; algorithms for the World Wide Web; prediction and recommendation in online social networks; representation learning for large networks; etc.

ABOUT INSTRUCTOR :

Prof. Tanmoy is an associate Professor in the Dept. of Electrical Engineering, Indian Institute of Technology Delhi (IIT Delhi), India since September 2022. I am also an associate faculty of the Yardi School of Artificial Intelligence, IIT Delhi. I am an ACM's Distinguished Speaker (2023-2025). I was a Ramanujan Fellow from 2018-2023. Before joining IIT Delhi, I served as an Assistant Professor (May 2017 - Dec 2021) and an Associate Professor (Jan 2022 - Aug 2022) in the Dept of CSE, Indraprastha Institute of Information Technology Delhi (IIIT Delhi), India. I also served as the head of the Infosys Centre for AI (CAI) at IIIT Delhi before joining IIT Delhi. I obtained my PhD as a Google PhD scholar from the Dept. of CSE, Indian Institute of Technology, Kharagpur, India in September, 2015. Following this, I joined University of Maryland, College Park as a Postdoctoral Researcher. My broad research interests include Natural Language Processing, Graph Neural Networks, and Social Computing.

COURSE PLAN :

Week 1: Introduction ; Tutorial 1: Introduction to Python/Colab ; Tutorial 2: Introduction to NetworkX - Part I
Week 2: Network Measures ; Tutorial 3: Introduction to NetworkX - Part II
Week 3: Network Growth Models
Week 4: Link Analysis
Week 5: Tutorial 4: Graph Visualization Tools ; Community Detection - Part I
Week 6: Community Detection - part II
Week 7: Link prediction
Week 8: Cascade Behavior and Network Effects
Week 9: Anomaly detection
Week 10: Introduction to Deep Learning ; Graph Representation Learning - Part I
Week 11: Graph Representation Learning - Part II ; Tutorial: Coding on Graph Representation Learning
Week 12: Applications and Case Studies ; Conclusion