



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 assistant professor of computer science and a Ramanujan Fellow at IIIT Delhi where he leads a research group, LCS2. He is also heading the Infosys Center for AI at IIIT Delhi. His group broadly works in the areas of NLP and Graph Mining, with a major focus on building machine learning models for cyber-crime and cybersafety. Tanmoy did his PhD from IIT Kharagpur in 2015 as a Google PhD scholar and worked at the University of Maryland, College Park as a postdoctoral scholar before joining IIITD in 2017. He also works on designing lightweight and explainable models for language understanding and graph processing. He has recently authored a textbook on social network analysis. More details: <http://faculty.iiitd.ac.in/~tanmoy/>

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