Course CodeCourse TitleCOMP 4641Social Information Networks Analysis and Engineering

Course Description

This course is an introduction to social information network analysis and engineering. Students will learn both mathematical and programming knowledge for analyzing the structures and dynamics of typical social information networks (e.g. Facebook, Twitter, and MSN). They will also learn how social metrics can be used to improve computer system design as people are the networks. It will cover topics such as small world phenomenon; contagion, tipping and influence in networks; models of network formation and evolution; the web graph and PageRank; social graphs and community detection; measuring centrality; greedy routing and navigations in networks; introduction to game theory and strategic behavior; social engineering; and principles of computer system design. Students who do not have the prerequisites but with equivalent background may seek approval from the instructor for enrollment in the course. Prerequisite(s): (COMP 2011 OR COMP 2012H) AND MATH 2111 AND (ELEC 2600 OR IEDA 2510 (prior to 2018-19) OR IEDA 2520 OR IEDA 2540 OR MATH 2411 OR MATH 2421 OR MATH 2431)

List of Topics

* Introduction

- * Network properties and models
 - o Basic network properties and web graph
 - o Six degree of separation
 - o Models of the small world
 - o Strength of the weak ties
 - o Finding communities and clusters in networks
 - o Centrality and its application
 - o Power-law and preferential attachment
- * User behaviours and influence
 - o Cascading behaviour in networks
 - o Models of network cascades
 - o Cascades in viral marketing and the blogosphere
 - o Influence maximization in networks
- * Machine learning on networks
 - o Graph neural networks
- * Social networking services
 - o Recommender systems
 - o Miscellaneous topics

Textbook

N/A

Reference books

Networks, Crowds, and Markets: Reasoning About a Highly Connected World by David Easley and Jon Kleinberg. Cambridge University Press (July, 2010). ISBN: 978-0521195331.

Grading Scheme

3 assignments: 25% Midterm: 20% Final examination: 55%

Course Intended Learning Outcomes

N/A

Assessment Rubric

N/A

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