Course Description

Introduction to social processes as viewed through the lens of computer science.
The (adaptive) course outline is:

(1) Introduction to basic social processes and social data.
(2) Basic social network terminology and analysis.
(3) Growth of social networks, power laws and robustness. Link prediction.
(4) Efficiently generating random networks.
(5) Information flow through social networks.
(6) The statistical approach.
(7) Social groups and their evolution
(8) Dynamics and the interplay of information flow and the social network dynamics.
(9) Adversary and hidden networks; extending fragment networks. Trust and opinion dynamics.
(10) Adding back the text: basic sentiment; networked sentiment; entity resolution; role.
(11) Ranking and prominence.
(12) Recommendation systems and collaborative filtering.
(13) Social processes with selfish agents.

Text: Readings will be assigned from a selection of papers, and related text books.

Learning Outcomes. Students entering this course should have a solid background in programming and algorithm design and analysis. This course will build from here to develop an understanding of social processes which operate on massive social graphs. The student should leave the course with the ability to implement a variety of social processes efficiently on large social networks. The student should have an understanding of the theoretical properties of these social processes, and be able to take new social networks and analyse them in the context of the techniques learned. The student should become familiar with the basic notation and algorithms of social processes to the level which would allow him/her to read and critique recent published literature in the field.

Prerequisites

Mathematics: Calculus at the level of MATH-1020 is a minimum; multivariate is much preferred. Familiarity with discrete mathematics and probability theory is highly recommended.
Computing Skills: Ability to program and develop algorithms in some programming language, at a proficiency at least equivalent to CSCI-2300 is required; CSCI-4020 is *strongly* recommended. Students who have never done a serious programming project may have difficulty in this course. Comfort with handling and building algorithms with *large* data sets is highly recommended. We will *not* be offering "debugging help" in this course.

Policies

Grade

This course is heavily project oriented. Homeworks will be handed out roughly once every 2 weeks, and will involve implementing algorithms on a large social network of your choice as well

as theoretical exercises. The homeworks may require you to report results of algorithms on your data. At the end of the semester, each project team will make presentations on the progress of their analysis of the social network they are working on as well as a final presentation on a "complete" analysis of the social network/process of their choice. The project report must be in the style of a 10-page conference paper. Useful places to look for templates of how to write such papers are the conferences SocialCom, WWW, ICWSM. The format of the report will be the IEEE conference style, two column format.
Your grade will be based:

20% on the homeworks;
40% on the progress presentations;
10% on the final presentation;
30% on the final project report.

There is no midterm or final exam.
The progress presentations will be graded **0** or **1** (progress made, and effectively communicated).
To get an **A** you need 95%, **A**− you need 90%, **B+** you need 85%, etc.

Project

The project will be ongoing during the course, based on a social network dataset of your choice. Results will be reported throughout the semester and at your final presentation and project report.

Collaboration

- Collaboration is allowed, in teams of up to 2. You may also work on your own.
- Computer logistics and debugging help can be obtained from anyone, but you should write all the code and report only results from your own programs. Do not destroy any of your code. In the event of strange results, we may ask you to submit your code.
- Books and notes can be consulted but not copied from.

Text

There is no required text. Readings may be assigned from papers; useful texts include:
Networks, Crowds and Markets by D. Easley and J. Kleinberg;
Networks, an Introduction, by M. E. J. Newman

Late Assignments

Late assignments are not accepted, except in institute established illness or emergency.

Academic Honesty

You are expected to treat your work with pride and respect the work of others. In the event that you find someone else's work to be of interest and relevance to any work you will hand in to this course, to the extent that you use their results or techniques, you should: (i) indicate how this third party work was used to solve your tasks, and (ii) achnowledge the original of authors of the work in a bibliography section.

Plagiarizing someone else's work is a **serious issue**. In cases of academic dishonesty, the minimum penalty will be an automatic grade of F, in addition to other institute mandated protocols.