Seminar on Algorithms and Society

Instructor

Brent Hecht
bhecht@northwestern.edu
brenthecht.com

Logistics

Wed + Fri 11-12:20p
Frances Searle Building (FSB) 2370
EECS 395/495
COMMST 395/495
MTS 525

Summary

Algorithms play a role in an increasing percentage in our lives. They help to define the information we consume, the jobs that are available to us, and even our romantic partners. While these algorithms bring us many benefits – more appealing information, better jobs, better dates – an increasing body of research suggests that they may also have critical negative side-effects or *externalities*. These externalities may be serious: some have attributed recent election outcomes and future massive-scale job loss to algorithms (at least in part), even suggesting that we need a new "societal business model" [1]. In this course, we will first review and discuss this body of research. We will then shift towards developing potential solutions to these problems. Ultimately, my hope is that students who take this course will be better equipped to build technologies that are more likely to have a net positive effect on society.

Course Description

This course is *project-focused*. A large percentage of your grade will be based on a final class project, to be completed individually or in groups. This final project will involve either (1) the design of a system that addresses a negative externality associated with current algorithms (for students interested in product) or (2) the design of a research project associated with these negative externalities (for students interested in research).

Your aim with your course project should be to support your professional goals while at the same time demonstrating excellence in the topic matter of this course. My hope is that those of you who are headed to the job market will be able to use your course project as a shining example in your portfolios for potential employers. Similarly, for those of you who are interested in Ph.D. programs, this course project will be a great opportunity to execute a potentially publishable

research project. In both cases, I look forward to working closely with you to make your project the best it can be.

The course will also be *discussion-focused*. While some course meetings will be in a somewhat traditional lecture format, many will consist all, or in part, of discussion. It is expected that all students complete the assigned readings. Some course meetings will open with a small quiz on the assigned readings in order to support the discussion in class that day. These quizzes will count towards a small portion of your grade (see below).

Learning Objectives

This course has the following learning objectives:

- Become familiar with some of the downsides of computing innovation.
- Given a new computing technology, be able to assess some of the societal downsides that may emerge and compare them to the upsides.
- Be able to critique computing technology in an educated and nuanced factor with respect to its potential societal downsides.
- Contribute to solutions to and our understanding of some of the most prominent societal downsides of modern computing.
- Prepare to build societally beneficial computing technologies.

Grading Policy

Grades are computing as follows:

- Project: 60%
- Discussion Leadership: 25%
- Reading Quizzes: 5% (lowest score is dropped)
- Discussion Idea Submission: 5% (lowest score is dropped)
- Class participation: 5%

Readings

Readings will consist primarily of scientific papers, but textbook chapters and other materials may also appear on the reading list. We will read one book:

- Brynjolfsson, Erik, and Andrew McAfee. *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. 1 edition. W. W. Norton & Company, 2016.

It is currently available on major online booksellers for $10 or less.

Prerequisites and Necessary Background

Students should be comfortable reading papers from the computer science literature. Programming skills are not required but will likely be utilized if they are present.

Workload

This demanding course will require substantial and sustained effort. In accordance with standard university guidelines, students should expect to spend about ten hours per week on this course to

meet the minimum requirements for a C-level grade. Students aspiring to higher grades will need to work harder, more efficiently, or both.

Because of the integrated group activity in the course, students whose work or personal lives would lead them to miss more than one consecutive week of class or more than two weeks total should not enroll in the course. Much of the material covered in this class can be learned in other venues more suitable for students who are unable to commit a semester to the material.

Working in Groups

Working in project groups may be new for some of you and can be challenging for all. Spend time at the start of the course learning about prospective group members. Remember that you will have a better group experience if your group is diverse in talents and interest, but united in goals and compatible in work habits.

Should you encounter problems in group work, please see the instructor as soon as possible. Most group problems can be resolved if they are addressed promptly. In extreme cases, we may rearrange groups.

Work and Expectations

For details about the course project, discussion leadership, and other deliverables in the course, please see the course webpage:

http://www.psacomputing.org/algsoc/

Discussion Leadership

Each student will be required to lead one discussion on readings (some may do this in pairs). As a discussion leader, it is your responsibility to do a small presentation on the most important topics in the reads, identify subjects for class deliberation, plan a brainstorming session around a particularly appealing idea, and so on. *The best discussion leaders will incorporate material outside of the assigned readings*.

Discussion leaders should prepare to lead a 75-minute discussion, but this time may be reduced from week to week.

Participation and Reading Quizzes

As noted above, quizzes on assigned readings that take place at the beginning of class on most Wednesdays will make up a small portion of your grade. The lowest quiz score will be dropped. You will also be graded on the extent of participation in class discussions. If you speak up and express your opinion on a semi-regular basis, you will receive full participation credit.

If participation in group discussion is exceptionally difficult for you for any reason, please talk to me.

Incompletes

Incompletes are only awarded in very rare circumstances when an unforeseeable event causes a student who has completed all coursework to date to be unable to complete a small portion of the work remaining in the course. Because of the heavy groupwork nature of the course, incompletes will generally not be awarded except in cases of severe medical or family emergency. Making up

an incomplete grade will usually require completing a new project. Any incomplete grade will require a written agreement on the work to be completed.

Special Circumstances

Students with special needs or circumstances should contact me as soon as possible to make any necessary arrangements. Because of the extensive group work involved in the class, please be sure to inform your group members should you plan to miss class or be out of town for a lengthy period. As with incompletes, extensions are only granted for unforeseeable events, but arrangements may be made to obtain assignment handouts in advance if needed. Other accommodations, including sign language interpreters, large-print exams, and private exam rooms can be arranged in cooperation with disability services.