Course Description:

Machine learning is concerned with computer programs that automatically improve their performance through experience. Knowledge discovery in databases is concerned with extracting useful patterns or deviations from data using ”data mining” methods. This course introduces students to the primary approaches to machine learning and data mining from a variety of fields, including inductive inference of decision trees, neural network learning, statistical learning methods, clustering, and discovery. Evaluation will be based on the student’s course projects and synopses of assigned reading.

Course Goals:

The goal of this course is to introduce students to current machine learning and data mining methods. It is intended to prepare graduate students with the background with which to undertake research in this area or to apply machine learning and data mining techniques to other areas of research. A course project will be required. Applications of machine learning and data mining appear in many other areas, including computer security, computer vision, marketing, Internet search engines, and medicine.

This course will facilitate a transition from doing course-work to producing publishable research. Skills required to understand, critique, and extend existing research will be emphasized. Upon completion of this course, a student will gained the following:

- a general background in the literature of the field of machine learning and data mining
- deeper knowledge about a subtopic of your choosing

In addition you will have improved and practiced the following research skills

- writing a technical paper in your chosen area
- thinking critically about research papers
- giving a technical presentation
Communication:

Email: You can reach me at brodley@cs.tufts.edu. Every student should have access to email and computer resources (see me if you don’t). Please do drop by unless you have an appointment.

Evaluation:

Class project (50%): This will be a project in an area of your choosing, which is due at the end of the semester. Your grade will be based on several factors, including the quality of your research proposal, project report and project presentation.

Paper critiques (20%): During the semester, you’ll be asked to prepare one-page critiques of the papers that you’re assigned to read.

Class participation (10%): You’ll be expected to participate in class discussions of research papers.

Review (5%): You will review another class members research paper using the standard criteria for machine learning and data mining conferences.

Paper presentation (15%): You will be asked to present a research paper to the class.

Course Project:

You’ll be choosing a research project and writing a term paper. You’ll turn in a draft of your project paper a few weeks before the end of the semester. Part of your project grade will be based on the quality of this draft. You’ll then update your paper based on my feedback and that from your fellow students.

As mentioned above, your course project will be worth 50% of your overall class grade. 55% of this grade will be on your final paper, 20% will be based on your draft, 10% will be based on your proposal, and 15% will be based on your in-class presentation. If there are two people on your project, you will be given a longer time for your presentation and each person should do half.

I’ll be giving you a handout describing this process in more detail, and how to go about finding a project. For now, be aware of these dates:

10/19: Project proposal due in class.
11/21: Turn in paper draft. Bring two copies: one for the professor, and one for a fellow student to review.
11/30: Deadline for reviews of student projects. Make two copies of your comments – one for the professor, one for the paper author(s).
12/07: Final papers are due in class
Course Policies

Absence: All students are expected to attend class. If you can’t make it to a class, talk to me about it beforehand (via email) so that it doesn’t detract from your class participation grade.

Late assignment policy: Barring extenuating circumstances, your critiques, proposal and project must be turned in on the date specified, at the start of class. If you haven’t finished an assignment, turn in what you have on the due date, and it’ll be evaluated for partial credit.

If for some reason you do feel you have extenuating circumstances that you believe justify an incomplete grade in the course, you must make your case to me in writing no later than November 30th.