Computer Science 5970/5043: Advanced Machine Learning

Instructor: Dr. McGovern
Spring 2008

1 General Information

Class time: TR 3-4:15
Class location: Felgar 334

Prerequisites: CS 4033/5033 and Math 3333 or permission of the instructor. Note that prior programming experience is assumed.

We will also make extensive use of current conference and journal papers.

Course Description: This course focuses on advanced topics in machine learning. Possible topics include graphical models, kernel methods, and statistical relational learning.

Instructor: Dr. McGovern

- Office: EL 144A
- Phone: 325-5427 (voice mail available)
- URLs for class: http://learn.ou.edu
- Email: amcgovern@ou.edu
- Office hours: Tuesday/Thursday 10:30-11:30. Also by appointment. Also available via AIM at dramymcgovern. Please note open door policy on my door and stop by if the door is open.
2 Course Overview

The goal of this course is to train students for research in machine learning by examining the theory underlying the two main foci in much of the current machine learning research: kernel methods and graphical models. The introductory course (CS 4033/5033) is necessarily brief and this course will focus in depth on the two main topic areas. Specific topics include:

- Kernel functions
- Support vector machines
- Support vector regression
- Mixture models
- Proto-value functions and their use in reinforcement learning
- Graphical models (undirected and directed)
- Statistical relational learning
- Non-parametric density estimation (including particle filtering)
- Markov models
- Semi-supervised learning

Although we will use the book for part of the semester, at least 1/3 of the class readings will be drawn from current conference and journal papers. These include the International Conference on Machine Learning, Uncertainty in Artificial Intelligence, Machine Learning Journal, and the Journal of Machine Learning Research.

The course will be project-based with students working on a state of the art project in teams. The grade will be determined from a mixture of homeworks, class participation, and the project.