

Computer Science 4973/4033/5033: Machine Learning

Instructor: Dr. McGovern

Fall 2006

1 General Information

Class time: Tues/Thursday 12-1:15pm

Class location: Carson 123

Prerequisites: MATH 4753 or ENGR 3293 or IE 3293 or MATH 4743 or permission of the instructor. Prior programming experience is assumed.

Required materials: *Machine Learning*, by Tom Mitchell. Note that the book has a website at <http://www-2.cs.cmu.edu/afs/cs.cmu.edu/user/mitchell/ftp/mlbook.html>. *Reinforcement Learning*. This book is available for free online at: <http://www.cs.ualberta.ca/~sutton/book/the-book.html>

Instructor: Dr. McGovern

- *Office:* EL 144A
- *Phone:* 325-5427 (voice mail available)
- *URLs for class:*
<http://learn.ou.edu>
http://www.cs.ou.edu/~amy/courses/cs5033_fall2006/index.html
- *Personal URL:* <http://www.cs.ou.edu/~amy>
- *Email:* amcgovern@ou.edu
- *Office hours:* To be determined.. Also by appointment. Additional appointments for office hours are scheduled at least 24 hours in advance through email. 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 introduce students to the field of machine learning and to excite them about research in machine learning. Specific topics that will be covered include: decision trees (and probability estimation trees), statistical relational learning (including probabilistic relational models and relational probability trees), neural networks, bayesian learning (including bayes nets and dynamic bayes nets), and reinforcement learning (including advanced topics such as options). Additional topics may be covered based on the students' interests.

Class lectures will focus on the foundations of each topic and projects will draw students deeper into a particular area. Textbook readings will be supplemented with chapters from the *Artificial Intelligence: A Modern Approach* by Russell and Norvig and by recent papers drawn from the *International Conference on Machine Learning*, the *Journal of Machine Learning Research*, and the *Machine Learning Journal*. Seminar style discussions will be strongly encouraged. The final grade will be determined primarily by the projects with homework assignments and class participation making up the remainder. Each student will be required to present their project at least twice to the class.

3 Course Policies

Attendance: We will discuss concepts and examples in class that are not in the text book. Another student's notes are an inadequate substitute for class attendance. You are responsible for everything that is announced in class.

Class Web Page: This class will have two web pages. One is available from my home-page at: http://www.cs.ou.edu/~amy/courses/cs5033_fall2006/index.html. The second web page will use the Desire2Learn software and can be found at: <http://learn.ou.edu>. Login with your 4+4 (first four letters of your last name followed by the last four digits of your student number), using your standard OU password. If you have difficulty logging in, call 325-HELP. This software provides a number of useful features, including a list of assignments and announcements, an electronic mailing list, newsgroups, and grade book. All handouts are available from Desire2Learn. You should check the site daily. When I update the site, I will post an announcement telling you what has been added and where it is located. You are responsible for things posted on the site with a 24 hour delay.

Class Email Alias: Urgent announcements will be sent through email. It is your responsibility to:

- Have your university supplied email account properly forwarded to the location where you read email.
- Make sure that your email address in Desire2Learn is correct, and forwards email to the place where you read it. I'll send out a test message during the first week of class. If you do not receive this message, it is your responsibility to get the problem resolved immediately.
- Have your email program set up properly so that replying to your email will work correctly the first time. You can send email to yourself and reply to yourself to test this. I will not make any attempt to get bounced email messages delivered.

If you need assistance in accomplishing any of these tasks, contact 325-HELP.

Final Examination: The final examination is Friday December 15, from 1:30-3:30. No final examinations can be given early, except as required by University policy. **Note that there is no final examination but we will be meeting during this time period to finish project presentations.**

Newsgroups and Email: The newsgroup on Desire2Learn should be the primary method of communication, outside of class. This allows everyone in the class to benefit from the answer to your question. If you email me a question of general interest, I reserve the right to post your question and my answer to the newsgroup. Matters of personal interest should be directed to email instead of to the newsgroup, e.g. informing me of an extended personal illness. Posting guidelines for the newsgroup are available on Desire2Learn.

Academic Misconduct: All work submitted for an individual grade, including homework and individual projects, should be the work of that single individual, and not her friends, and not her tutor. It is acceptable to ask a fellow student for help as long as that help does not consist of copying any computer code, or solutions to other assignments. Students working on joint projects may certainly help one another and are expected to share code within the project group. However, they may not share beyond the group.

1. Do not show another student (or group) a copy of your projects or homework before the submission deadline. The penalties for permitting your work to be copied are the same as the penalties for copying someone else's work.
2. Make sure that your computer account is properly protected. Use a good password, and do not give your friends access to your account or your computer system. Do not

leave printouts, floppy disks or thumb drives around a laboratory where others might access them.

Programming projects will be checked by software designed to detect collaboration. This software is extremely effective and has withstood repeated reviews by the campus judicial processes.

Upon the first documented occurrence of collaborative work, I will report the academic misconduct to the Campus Judicial Coordinator. The procedure to be followed is documented in the University of Oklahoma Academic Misconduct Code¹. In the unlikely event that I elect to admonish the student, the appeals process is described in <http://www.ou.edu/provost/integrity-rights/>.

Tutors: Tutors can be an excellent source of support for students who are having difficulty in the class, but only if the tutor is aware of the distinction between teaching students the material so that they can do their own work, and doing work for students. Tutors who do work for students are not only failing to help the students learn, they are abetting academic misconduct.

- If your tutor is sitting behind you while you are typing and methodically telling you what to enter, he or she is abetting academic misconduct.
- If your tutor is emailing files containing partial or complete programming projects to you, you will commit academic misconduct if you use those lines in your program.

A more effective use of tutoring services is to do problems that are similar to the assigned work, instead of doing assigned work. For example, it would be fine to work unassigned problems from the textbook with a tutor. This requires significant discipline, both on the part of the tutor and the part of the student. Copying from a tutor is as unacceptable as copying from another student. If your tutor doesn't know how to teach properly, please ask them to call or visit me and I will provide training and guidance. If you are tutoring someone else in the class, you can be accused of academic misconduct if this person copies your work.

Incompletes: The grade of I is intended for the rare circumstance when a student who has been successful in a class has an unexpected event occur shortly before the end of the class. I will not consider giving a student a grade of I unless the following three conditions have been met. 1. It is within two weeks of the end of the semester. 2. The

¹<http://www.ou.edu/studentcode>

student has a grade of C or better in the class. 3. The reason that the student cannot complete the class is properly documented and compelling.

Accommodation of Disabilities: The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. Students with disabilities who require accommodations in this course are requested to speak with the professor as early in the semester as possible. Students with disabilities must be registered with the Office of Disability Services prior to receiving accommodations in this course. The Office of Disability Services is located in Goddard Health Center, Suite 166, phone 405/325-3852 or TDD only 405/325-4173.

Classroom Conduct: Disruptions of class will not be permitted. Examples of disruptive behavior include:

- Allowing a cell phone or pager to repeatedly beep audibly.
- Playing music or computer games during class in such a way that they are visible or audible to other class members.
- Exhibiting erratic or irrational behavior.
- Behavior that distracts the class from the subject matter or discussion.
- Making physical or verbal threats to a faculty member, teaching assistant, or class member.
- Refusal to comply with faculty direction.

In the case of disruptive behavior, I may ask that you leave the classroom and may charge you with a violation of the Student Code of Responsibilities and Conduct.

4 Homework and Projects

Due dates: Homeworks and projects are due at the beginning of class, 12 noon on the day listed in the schedule. Assignments that are turned in between 0 and 24 hours late will be worth 85% and assignments 24-48 hours late will be worth 70% of the grade. In addition, you have one “slack” day to spend however you choose during the semester. This will entitle you to turn in **one** assignment *or* project up to one day late with no penalty. Keep in mind that you only get one of these so use it wisely. No assignments (homeworks or projects) will be accepted beyond 48 hours after the due date.

Projects: Your final project will be due the last week of classes. Per university policy, you may turn this project in prior to pre-finals week if you have completed the project. Please contact me if you wish to present prior to pre-finals week as well.

Project code: Your project code and writeups must be written exclusively by you. **Use of any downloaded code or code taken from a book (whether documented or undocumented) is considered academic misconduct and will be treated as such.** Exceptions from this policy (such as a project that builds on an existing open-source project) may be granted but you **MUST** speak with me first.

5 Grading and Evaluation

Grade calculation: This class will be graded on a curve. Your final grade will be determined as follows:

- Project: 40%
- Homeworks: 50%
- Class participation: 10%

Note that class participation is quite important. This means that attending class, asking questions, and answering questions are all important for your grade. In addition, class participation points will be offered for students who present interesting applications of machine learning that appear in the news.

Undergraduates: Students taking 4033 will have the same grade distribution as students taking 5033. The differences will come in shorter homework assignments and a smaller project.

Grade questions: Please note that I will examine the entire project or homework in question and your final grade may end up lower. All disagreements about the grading of projects or homework must be brought to my attention within one week of when the item was returned.

Online Grade Summary: Desire2Learn has a grade book that is used to store the raw data that is used to calculate your course grade. It is the responsibility of each student in this class to check their grades on Desire2Learn after each piece of the project or homework is returned. If an error is found, bring the document to me and I will correct Desire2Learn.

Borderline grades: Borderline final grades will be decided by your class participation which means that being an active participant in class can push you over a grade boundary.