CS 414: Introduction to Machine Learning

Fall 2010
AEC 500
Course hours: 2:10-3:00 MWF
http://cs.lafayette.edu/~taylorm/cs414
Office hours: Tuesday 1:30-2:30, Wednesday 3:00-4:00, and by appointment
(I should be in my office every week day except Thursdays – feel free to drop by!)

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Office phone: 610-330-5417
(I prefer email over phone calls – I will do my best to respond within 24 hours.)

This course provides an introduction to statistical machine learning. The first third of the class will focus on classification and regression, while the latter two thirds will study Reinforcement Learning. We will discuss practical applications of machine learning as well as introducing theoretical concepts like PAC learning and Occam's Razor.

Prerequisites
You must be able to write non-trivial (i.e., more than 5 pages long) programs in Java, Python, C, or C++. A background in statistics is useful but not required.

Course Objectives
• Discuss the goals and current limitations of machine learning algorithms
• Provide familiarity with a variety of fundamental algorithms
• Complete a team project that implements a more complex algorithm
• Present a machine learning conference or workshop paper to the class

Course Outcomes
After the course, students should have:
• An ability to apply knowledge of computing and mathematics appropriate to the discipline.

Course Schedule
An evolving schedule, along with assignments and lecture slides, may be found on the course webpage.

Assessment Information and Grading Policy
The course grade (subject to change with notice) will be based on:
• 20% homework,
• 15% class participation/presentation, and
• 65% projects.
There will be roughly three homework assignments and three projects during the semester in addition to regular reading. The three projects will be weighted unevenly (20/20/25). The first two projects will be completed individually – you may talk with others about the project but you may not share code. The third project will be a team research project. Groups of 2-3 students will collaborate to define a machine learning project that you are all interested in. My expectation is that all three projects will take a significant effort to complete, with the third requiring more time and thought than the first two.
Attendance is strongly encouraged --- if you are not in class, you cannot participate in the discussion. Just a warning, one of my pet peeves is students arriving late. Please make every effort to arrive on time, but I’d rather have you come in late than miss the class altogether!

Reading assignments will be announced in class and posted on the course webpage. In general, they will not be long, but will be dense. For every class that has a reading assignment, a reading response must be emailed to the professor by 6am the morning of the class. These responses may contain

- reflections on the reading,
- questions the reading generates,
- and/or summaries of the reading.

I expect responses to be ½ to 1 page in length and should not take you longer than 20 minutes to write. The responses will help shape the upcoming class but they will not be individually graded. However, not submitting a response will reduce your class participation grade.

With the exception of reading responses, late work will be accepted, but the grade will be reduced by 10% for every day that it is late (i.e., if a homework is handed in 40 hours late and it is graded as 85/100, the student will receive a 65/100).

**Academic Honesty Statement**

All students are expected to adhere to the college policy on academic honesty as listed in the Student Handbook. Homework will be done individually unless otherwise specified in writing on the assignment. You are allowed to discuss projects with other students but may not share code. Any work that is not fully done by an individual must list all collaborators.

**Request for Accommodations**

In compliance with Lafayette College policy and equal access laws, I am available to discuss appropriate academic accommodations that any students with a disability require. Requests for academic accommodations need to be made during the first two weeks of the semester, except in unusual circumstances, so that arrangements can be made. Students must register with the Office of the Dean of the College for disability verifications and for determinations of reasonable academic accommodations.

**Course Reading List**

Optional textbooks (to be put on reserve in the library)

- Machine Learning, Tom Mitchell, 1997
- Artificial Intelligence: A Modern Approach, Stuart Russell and Peter Norvig, 2009

Text book available on-line:


Papers:

- To be determined, based in part on class interests