University of Colorado at Colorado Springs

CS 586: Syllabus

Machine Learning

TR 4:30-5:45 p.m.

Location: Eng 103

Objective:	Develop an understanding of selected techniques employed in computational learning. Learn how computational learning can be used in various application areas. Learn by research and self-reading, and by project design and implementation.
Instructor:	Jugal Kalita (255-3432)
Office:	Engineering 178

Text Book

Please buy these two books. I am **not** ordering the books through the bookstore. Please order them from an online bookstore like Amazon.com. Have them at hand by the first day of classes.

- *Introduction to Machine Learning, 2nd Edition* by Ethem Alpaydin (EA), MIT Press 2010. This book is officially priced at $55 by the publisher, but is available from Amazon.com for about $37.
- *Machine Learning* by Tom Mitchell (TM), 1997, McGraw-Hill. It is a smallish book, about 400 pages, with a price tag of between $45-70 or so at Amazon.com. It is one of the all-time best text books on the topic of Machine Learning, although it's a bit dated now. You can buy used.

Topics

Tentatively, the topics covered will include Introduction (TM1, EA1, EA2), Decision Tree Learning (TM3, EA9), Bayesian Learning (TM6, EA3), Hidden Markov Models (EA15), Clustering (EA7), Kernel Machines (EA13), Dimensionality Reduction (EA6), Reinforcement Learning (TM13, EA18), Combining Multiple Learners (EA17), Design and Analysis of Machine Learning Algorithms (EA19). We may cover the chapters only partially. I may also provide handouts from other sources.

Grading Scheme

The grading scheme is comprised of a home work assignments and a semester-long project.

- I will give you 2 or 3 homework assignments. Assignments are worth 30% of the grade.
- 10% of the grade will be based on class participation. You should read the material taught and be able to participate in class discussions. Regular attendance is absolutely necessary. If you miss more than 4 classes, I will reduce your signed latter grade by a step unless you provide me with satisfactory explanation.
- 60% is based on a semester project. This includes 3 write-ups and 3 presentations. You are required to write a 2-3 page proposal (you must have done some reading of scholarly articles[1] and provide references) you give me by the 4th week of the semester. You will also do a 3-5 page midterm report and demo. You are required to write a detailed 8-10 page final report and and do a demo. The final report is due on the last day of classes. Use IEEE journal author style for all your reports.[2].

  The proposal (write-up plus presentation) is worth 10%, the midterm (write-up plus presentation) 15% and the final (write-up plus presentation) 35%.
- Presentations: You have to do a brief proposal presentation for your semester project in the class. You will have to do a mid-term presentation. This mid-term presentation is going to be your mid-term exam. Your final exam is going to be an oral presentation of your project as well. All presentations will be in a conference-like format. The amount of time you have for the three presentations will depend on the number of students enrolled in the class. We have 13 students in the class right now. I will wait till the second week of classes to see how many students are enrolled in the class to schedule the talks.

Note: If you have special reasons for not being able to hand in an assignment on time or take an examination on a scheduled date, please make prior arrangements with the instructor. If you can't come to the class on the day of your presentation for unavoidable reasons, you must make the presentation available through Youtube or Skype, or somehow make a video recording of the presentation available in addition to your slides. Please email me the slides by 2 PM on the date when your presentation is scheduled. If you fail to do so, I may not allow you to present in the class.

Further Note: If you do a particularly good job on your project, we should talk so that we can submit the paper to a conference or a journal as is or with further work.

[1] Visit http://scholar.google.com and http://citeseer.ist.psu.edu (Citeseer) to search for scholarly articles.

[2] On Google, search for "IEEE Guide for Transactions Authors" to find the style files. In particular, use IEEE PAMI Author Guidelines