CS 229
Machine Learning
Handout #1: Course Information

Teaching Staff and Contact Info

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Course Description

This course provides a broad introduction to machine learning and statistical pattern recognition. Topics include: supervised learning (generative/discriminative learning, parametric/non-parametric learning, neural networks, support vector machines); unsupervised learning (clustering, dimensionality reduction, kernel methods); learning theory (bias/variance tradeoffs; VC theory; large margins); reinforcement learning and adaptive control. The course will also discuss recent applications of machine learning, such as to robotic control, data mining, autonomous navigation, bioinformatics, speech recognition, and text and web data processing.

Prerequisites

Students are expected to have the following background:
- Knowledge of basic computer science principles and skills, at a level sufficient to write a reasonably non-trivial computer program.
- Familiarity with the basic probability theory. (Stat 116 is sufficient but not necessary.)
- Familiarity with the basic linear algebra (any one of Math 51, Math 103, Math 113, or CS 205 would be much more than necessary.)

Course Materials

There is no required text for this course. Notes will be posted periodically on the course web site. The following books are recommended as optional reading:
Christopher Bishop, Pattern Recognition and Machine Learning. Springer, 2006.
Richard Duda, Peter Hart and David Stork, Pattern Classification, 2nd ed. John Wiley & Sons, 2001.
Tom Mitchell, Machine Learning. McGraw-Hill, 1997.
Richard Sutton and Andrew Barto, Reinforcement Learning: An introduction. MIT Press, 1998

Homeworks and Grading

There will be four written **homeworks**, one **midterm,** and one major open-ended **term project**. The homeworks will contain written questions and questions that require some Matlab programming. In the term project, you will investigate some interesting aspect of machine learning or apply machine learning to a problem that interests you. We try very hard to make questions unambiguous, but some ambiguities may remain. Ask if confused or state your assumptions explicitly. Reasonable assumptions will be accepted in case of ambiguous questions.

A note on the honor code: We strongly encourage students to form study groups. Students may discuss and work on homework problems in groups. However, each student must write down the solutions independently, and without referring to written notes from the joint session. In other words, each student must understand the solution well enough in order to reconstruct it by him/herself. In addition, each student should write on the problem set the

set of people with whom s/he collaborated. Further, because we occasionally reuse problem set questions from previous years, we expect students not to copy, refer to, or look at the solutions in preparing their answers. It is an honor code violation to intentionally refer to a previous year's solutions.

Late homeworks: Recognizing that students may face unusual circumstances and requiresome flexibility in the course of the quarter, each student will have a total of **seven free late (calendar) days** to use as s/he sees fit. Once these late days are exhausted, any homework turned in late will be penalized 20% per late day. However, **no homework will be accepted more than four days after its due date**, and late days cannot be used for the final project writeup. Each 24 hours or part thereof that a homework is late uses up one full late day. To hand in a late homework, write down the date and time of submission, and leave it in the submission box at the bottom of the Gates A-wing stairwell. To get into the basement after the building is locked, slide your SUID card in the card reader by the main basement entrance.) It is an honor code violation to write down the wrong time. Regular (non-SCPD) students should submit hardcopies of all four written homeworks. Please do not email your homework solutions to us. Off-campus (SCPD) students should fax homework solutions to us at the fax number given above, and write "ATTN: CS229 (Machine Learning)" on the cover page. The term project may be done in teams of up to three persons. The midterm is openbook/ open-notes, and will cover the material of the first part of the course. It will take place on **11/8 at 6 pm**, exact location to be determined.

Course grades will be based 40% on homeworks (10% each), 20% on the midterm, and 40% on the major term project. Up to 3% extra credit may be awarded for class participation.

Sections

To review material from the prerequisites or to supplement the lecture material, there will occasionally be extra discussion sections held on Friday. An announcement will be made whenever one of these sections is held. Attendance at these sections is optional.

Communication with the Teaching Staff

We strongly encourage students to come to office hours. If that is not possible, questions should be sent to the **course staff list** (consisting of the TAs and

the professor). By having questions sent to all of us, you will get answers much more quickly. Of course, more personal questions can still be sent directly to Professor Ng or the TAs.
For grading questions, please talk to us after class or during office hours. If you want a regrade, write an explanation and drop the homework and the explanation into the submission box at the bottom of the Gates A-wing stairwell Answers to commonly asked questions and clarifications to the homeworks will be posted on the FAQ. It is each student's responsibility to check the FAQ on a regular basis. Major changes (e.g., bugs in the homework) will also be posted to the class mailing list.