



CS 229

Machine Learning

Course Materials

Handouts and Problem Sets

- [Handout #1: Course Information \(HTML\)](#) [\(pdf\)](#)
- [Handout #2: Course Schedule \(HTML\)](#) [\(pdf\)](#)
- [Handout #3: Cover Sheet](#)

Lecture Notes

- [Lecture notes 1 \(ps\)](#) [\(pdf\)](#) Supervised Learning, Discriminative Algorithms
- [Lecture notes 2 \(ps\)](#) [\(pdf\)](#) Generative Algorithms
- [Lecture notes 3 \(ps\)](#) [\(pdf\)](#) Support Vector Machines
- [Lecture notes 4 \(ps\)](#) [\(pdf\)](#) Learning Theory
- [Lecture notes 5 \(ps\)](#) [\(pdf\)](#) Regularization and Model Selection
- [Lecture notes 6 \(ps\)](#) [\(pdf\)](#) Online Learning and the Perceptron Algorithm.
(optional reading)
- [Lecture notes 7a \(ps\)](#) [\(pdf\)](#) Unsupervised Learning, k-means clustering.
- [Lecture notes 7b \(ps\)](#) [\(pdf\)](#) Mixture of Gaussians
- [Lecture notes 8 \(ps\)](#) [\(pdf\)](#) The EM Algorithm
- [Lecture notes 9 \(ps\)](#) [\(pdf\)](#) Factor Analysis
- [Lecture notes 10 \(ps\)](#) [\(pdf\)](#) Principal Components Analysis
- [Lecture notes 11 \(ps\)](#) [\(pdf\)](#) Independent Components Analysis
- [Lecture notes 12 \(ps\)](#) [\(pdf\)](#) Reinforcement Learning and Control

Section Notes

- [Section notes 1 \(pdf\)](#) Linear Algebra Review and Reference
- [Section notes 2 \(pdf\)](#) Probability Theory Review
- Files for the Matlab tutorial: [sigmoid.m](#), [logistic_grad_ascent.m](#), [matlab_session.m](#)
- [Section notes 4 \(ps\)](#) [\(pdf\)](#) Convex Optimization Overview, Part I
- [Section notes 5 \(ps\)](#) [\(pdf\)](#) Convex Optimization Overview, Part II
- [Section notes 6 \(ps\)](#) [\(pdf\)](#) Hidden Markov Models
- [Section notes 7 \(pdf\)](#) The Multivariate Gaussian Distribution
- [Section notes 8 \(pdf\)](#) More on Gaussian Distribution
- [Section notes 9 \(pdf\)](#) Gaussian Processes

Other resources

Advice on applying machine learning: Slides from Andrew's lecture on getting machine learning algorithms to work in practice can be found [here](#).

Previous projects: A list of last year's final projects can be found [here](#).

Matlab resources: Here are a couple of Matlab tutorials that you might find helpful: <http://www.math.ucsd.edu/~bdriver/21d-s99/matlab-primer.html> and <http://www.math.mtu.edu/~msgocken/intro/node1.html>. For emacs users only: If you plan to run Matlab in emacs, here are [matlab.el](#), and a helpful [.emacs's file](#).

Octave resources: For a free alternative to Matlab, check out [GNU Octave](#). The official documentation is available [here](#). Some useful tutorials on Octave include http://en.wikibooks.org/wiki/Octave_Programming_Tutorial and <http://www-mdp.eng.cam.ac.uk/web/CD/engapps/octave/octavetut.pdf>.

Data: Here is the [UCI Machine learning repository](#), which contains a large collection of standard datasets for testing learning algorithms. If you want to see examples of recent work in machine learning, start by taking a look at the conferences [NIPS](#) (all old NIPS papers are online) and ICML. Some other related conferences include UAI, AAAI, IJCAI.

Viewing PostScript and PDF files: Depending on the computer you are using, you may be able to download a [PostScript viewer](#) or [PDF viewer](#) for it if you don't already have one.