Course Outline
ECE271A – Statistical Learning I
Department of Electrical and Computer Engineering
University of California, San Diego
Nuno Vasconcelos

Your responsibilities in this class fall into three main categories:

1. Class participation and homework 20%
2. Mid-term 35%
3. Final 45%

You are allowed to collaborate on homework as long as you write your solutions independently and acknowledge the collaboration in the problems where it was used. Homework is due one week after the hand-out date. It will have a problem solving component and a component of computer problems. I assume that students have access to Matlab. The computer problems will consist of the application of a number of techniques to a given problem (Cheetah).

Instructor
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Office hours: Fridays 9:30-10:30AM

TA
See website.

Exam dates:

- Mid-term - TBA
- Final - finals week

Text: We will follow closely

- Richard O. Duda, Peter E. Hart and David G. Stork *Pattern Classification.* New York, NY: John Wiley&Sons, 2001.

Supplementary hand-outs will be distributed when appropriate. There are various other books of interest. These are not required but can be used for alternative explanations of the material.

1. C. Bishop, *Pattern Recognition and Machine Learning.* Springer, 2006.
2. T. Hastie, R. Tibshirani, J. H. Friedman, *The Elements of Statistical Learning.* Springer Verlag, 2001.
3. Luc Devroye, Laszlo Gyorfi, Gabor Lugosi, *A Probabilistic Theory of Pattern Recognition.* Springer Verlag, 1998.
4. Andrew Gelman, Donald B. Rubin, Hal S. Stern, *Bayesian Data Analysis, Second Edition*, CRC Press; 2nd edition, 2003.

5. Tom Mitchell, *Machine Learning*, McGraw-Hill, 1997.
6. Christopher Bishop, *Neural Networks for Pattern Recognition.* Oxford University Press, 1996.
7. Vladimir Vapnik, *The Nature of Statistical Learning Theory.* Springer Verlag, 1999.

There is a web page for the course,

`http://www.svcl.ucsd.edu/courses/ece271A/ece271A.htm`

(also accessible from `http://www.svcl.ucsd.edu/~nuno`)

LECTURE SUBJECT	Number of classes
Introduction	1
Bayesian decision theory	2
The Gaussian classifier	1
Maximum likelihood estimation	1
Bias and variance	2
Bayesian parameter estimation	2
Conjugate and non-informative priors	1
Dimensionality and dimensionality reduction	2
The nearest neighbor classifier	1
Kernel-based density estimation	1
Mixture models and EM	3
Applications	1