

# EECS 510 STATISTICAL PATTERN RECOGNITION – Spring 2012

Instructor: Ying Wu (yingwu@eecs.northwestern.edu)  
 Time & Place: Tu/Th 2:00-3:20pm Tech M164  
 Course Web: <http://www.eecs.northwestern.edu/~yingwu/teaching/EECS510>

	Week	Date	Lectures and Discussions	Chapter	Readings
I.	W-1	3/27(Tu)	Introduction	1	[Jain00]
		3/29(Th)	Bayesian decision and estimation	2,3	
	W-2	4/03(Tu)	PCA/LDA	3	
4/05(Th)		Independent component analysis		[Hyvarinen00]	
W-3	4/10(Tu)	Nearest neighbor classification	4		
	4/12(Th)	Advanced nearest neighbor classification		[Weinberger06]	
II.	W-4	4/17(Tu)	Nonparametric density estimation	4	[Comaniciu02]
		4/19(Th)	Linear Discriminative Models	5	
	W-5	4/24(Tu)	Support vector machine	5	
		4/26(Th)	Kernel machines		[Burges98]
	W-6	5/01(Tu)	Feed-forward Neural Networks	6	
		5/03(Th)	Feature Extraction and Selection	9	
	W-7	5/08(Tu)	Advanced boosting	9	[Freund96][Schapire03]
5/10(Th)		EM and Spectral Clustering	10	[Shi97]	
III.	W-8	5/15(Tu)	Dimension reduction and embedding		[Tenenbaum00][Roweis00]
		5/17(Th)	Bayesian networks	2.11	
	W-9	5/22(Tu)	Dynamic Bayesian networks	3.10	
5/24(Th)		Markov random fields		[Freeman99]	
W-10	5/29(Tu)	Project Presentations (I)			
	5/31(Th)	Project Presentations (II)			

- [Jain00]: A. Jain, R. Duin and J. Mao, “Statistical Pattern Recognition: A Review”, *IEEE T-PAMI*, 22:4-37, 2000.
- [Hyvarinen00]: A. Hyvarinen and E. Oja, “Independent Component Analysis: Algorithms and Applications”, *Neural Networks*, 13(4-5):411-430, 2000.
- [Weinberger06]: K. Weinberger, J. Blitzer and L. Saul, “Distance Metric Learning for Large Margin Nearest Neighbor Classification”, *Neural Information Processing Systems*, 2006.
- [Shi97]: J. Shi and J. Malik, “Normalized Cuts and Image Segmentation”, *Proc. IEEE Conf. on Computer Vision and Pattern Recognition*, 1997.
- [Comaniciu02]: D. Comaniciu and P. Meer, “Mean Shift: A Robust Approach Toward Feature Space Analysis”, *IEEE T-PAMI*, 24(5):603-619, 2002.
- [Burges98]: C. Burges, “A Tutorial on Support Vector Machines for Pattern Recognition”, *Data Mining and Knowledge Discovery*, 2:121-167, 1998
- [Tenenbaum00]: J. Tenenbaum, V. de Silva, and J. Langford, “A Global Geometric Framework for Nonlinear Dimensionality Reduction”, *Science*, 290:2319-2323, December 2000.
- [Roweis00]: S. Roweis and L. Saul, “Nonlinear Dimensionality Reduction by Locally Linear Embedding”, *Science*, 290:2323-2326, December, 2000.
- [Steyvers02]: M. Steyvers, “Multidimensional Scaling”, *Encyclopedia of Cognitive Science*, 2002
- [Schapire03]: R. Schapire, “The Boosting Approach to Machine Learning: An Overview”, *Nonlinear Estimation and Classification*, Springer, 2003.
- [Freund96]: Y. Freund and R. Schapire, “Experiments with a New Boosting Algorithm”, *Proc. Int’l Conf. on Machine Learning*, 1996.
- [Freeman99]: W. Freeman and E. Pasztor, “Learning Low-level Vision”, *Proc. IEEE Int’l Conf. on Computer Vision*, 1999.
- [Lafferty01]: J. Lafferty, A. McCallum and F. Pereira, “Conditional Random Fields: Probabilistic Models for Segmenting and Labeling Sequence Data”, *Proc. Int’l Conf. on Machine Learning*, 2001.