CS533/CmpE533: Pattern Recognition
Spring 2007-08

Instructor Information
Sohaib Ahmad Khan
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Office Hours: MW 10:15 am – 11:45 am

Class Meeting Times: MW 8:45 am to 10:00 am

Teaching Assistant: Syed Farooq Ali, Rm 437, Library Building, 05030017@lums.edu.pk

Course Status: This is a 3 unit introductory graduate level course on statistical pattern recognition. The course is an elective for senior and graduate students, both for CS and CmpE programs.

Course Description: This course provides an introduction to the area of Statistical Pattern Recognition. The course will be beneficial to graduate students intending to pursue research in this area, as well as in applied fields which use pattern recognition, such as speech recognition, computer vision, image processing, signal classification, optical character recognition and data mining. Major topics covered in the course include supervised and unsupervised learning, Bayesian decision theory, parametric and non-parametric density estimation methods, linear discriminant functions and clustering methods.

Prerequisites
- Probability (Advanced Probability and Random Variables course is highly recommended)
- Linear Algebra (Highly Recommended)
- At least senior-level academic standing

Text Book
Pattern Classification (2nd Ed.), Richard O. Duda, Peter E. Hart, David G. Stork, Wiley-Interscience 2001

Reference Books
- Statistical Pattern Recognition, 2nd Ed, Andrew Webb, Wiley 2002
- Pattern Recognition and Machine Learning, Christopher Bishop, Springer 2006

Programming Environment: MATLAB

Lectures and Attendance Policy
The course will consist of 20 sessions of 75 minutes each, one in-class midterm and one final examination. There is no grade for attendance. However, students missing lectures may find it very difficult to make up for the content covered. In addition, they may miss the quizzes.

Grading
15% Assignments and Computer Exercises
15% Project
10% Quizzes
25% Mid-term Exam
35% Final Exam (Comprehensive)

A Note on Plagiarism: Cheating and plagiarism will not be tolerated and will be referred to the Disciplinary Committee for appropriate action. The instructor will strongly recommend that the strictest possible action to be taken against the students involved in plagiarism.

Students are encouraged to form discussion groups and to discuss the homework amongst themselves. However, the homework that is turned in should be written up without referring to notes from such a discussion. This ensures that one understands the solution, rather than copying it. In addition, students must acknowledge their discussion group on their submitted homework.

Topics
Introduction, Bayes Decision Theory, Parametric Density Estimation, Non-Parametric Density Estimation, Mixture Models (Hybrid Density Estimation) and EM Algorithm, Dimensionality Reduction, Linear Discriminant Functions, Clustering, Support Vector Machines (Tentative)