ECSE 35-6610 Pattern Recognition - Fall 2007

Tuesday & Friday 2:00 - 3:20

Instructor ..... Professor George Nagy (nagy@ecse.rpi.edu)
Office hours ..... Tuesday & Thursday 12:00 - 1:00, or by appointment, JEC 6020, 276-6078
Prerequisites ..... Probability; programming skill
Grading ..... 5 programming assignments 50%
Term paper (due October 16) 10%
Midterm examination (October 19) 15%
Final (as scheduled by the Registrar) 25%
Text ..... Duda, Hart and Stork, *Pattern Classification*, Wiley 2001
..... (may change)

Topics

Linear and nonlinear decision procedures
Parametric and nonparametric classifiers
Adaptation and non-supervised learning
Feature extraction and selection
Parameter estimation and performance evaluation (bias and variance)
Support Vector Machines
Clustering, mixture distributions, Expectation Maximization
Linguistic and style context, Hidden Markov Methods
Applications to Optical Character Recognition

All of the programming assignments will be based on a file of optically scanned typeset characters, which we will use to compare the performance of various classification algorithms.

Course objective

On completion of the course, students should be sufficiently familiar with the formal theoretical structure, notation, and vocabulary of pattern recognition to be able to pursue matters of interest in the current technical literature. They will also understand some of the engineering aspects of a prototypical application of pattern recognition, Optical Character Recognition.

Examinations will be open book, but Cheating (copying on examinations or programs) will result in a grade of F for the course. Discussing programming assignments between students is encouraged, but each team must write a separate program, and a separate report. Assignments up to one week late will be given half marks. Assignments more than one week late will not be accepted. Special considerations will, however, be given to special situations, such as the DQE: they must be negotiated in advance. Grades may be appealed initially to Professor Nagy: if the difficulty cannot be resolved, procedures in the Rensselaer Handbook must be followed.

35-661 Assignments and Due Dates

All assignments are due at the beginning of the class!

1 Moment feature extraction from printed characters 09-11
2 Bayes classifier for binary and Gaussian distributions 9-25
3 Term paper 10-16
4 Nearest-neighbors classifier 10-9
MIDTERM **10-19**
5 Decision tree classifier ..... 10_30
6 Clustering and unsupervised learning 11-13
FINAL **scheduled by the Registrar**