MSIM/ECE 607 Machine Learning I

Spring 2013, 4:20 pm – 7:00 pm R

Location: GORN 204

INSTRUCTOR:
Jiang Li, Ph.D., Assistant Professor, ECE Department.
Office: 1320 ECSB, Phone: 683-6748, Email: JLi@odu.edu
Office Hours: MR 10:00-11:30AM (Other times by appointment)

REQUIRED TEXTBOOK:

GRADUATE TEACHING ASSISTANT: None
Not all homework and projects will be graded but solutions will be posted afterwards.

PREREQUISITE:
Mathematical preparations in probability, distributions, linear algebra (matrix operation), and calculus are required. Basic computer skills and programming experience with at least one of the following languages: MATLAB, Java, or C/C++.

COURSE DESCRIPTION:
This is an introductory course to Machine Learning, a subfield of Artificial Intelligence. Machine Learning provides a practical treatment of design, analysis, implementation and applications of algorithms, which learn from examples. Topics include multiple machine learning models: linear models, neural networks, support vector machines, instance-based learning, Bayesian learning, genetic algorithms, ensemble learning, unsupervised learning, etc. Some other issues and challenges facing machine learning researchers—overtraining, bias-variance dilemma, models selection, and feature selection, are also discussed.

COURSE MATERIAL WILL BE COVERED, TENTATIVE OUTLINE AND SCHEDUL OF TOPICS:

- Introduction (Jan. 17th)
- Review of mathematics (Jan. 24th, 31st)
- Density estimation (Feb. 7th)
- Bayesian and Instance-based learning (Feb. 14th)
- Linear regression (Feb. 21st)
- Linear classification (Feb. 28th)
  Mar. 11st to Mar. 16th, Spring break, no class.
  Mar. 21st: Midterm, class time
- Multilayer perceptron (Mar. 7th Mar. 28th)
- Clustering (Apr. 4th)
- Support vector machine (Apr. 11st)
• Ensemble learning and Genetic algorithm (Apr. 18th 25th)
• Sparse coding and deep learning (Apr. 25th)

ATTENDANCE POLICY:
Students are expected to attend classes regularly.

DROP POLICY:
As per University guidelines. See the University Calendar for drop dates.

HOMEWORK, MATLAB ASSIGNMENTS:
Homework assignments will be given every one or two weeks. Late submissions will not be accepted.

PROJECTS:
Three regular projects will be assigned to all students. One final project will be given about one or two months before the end of the semester. There is 20% penalty for each late project per day.

SOFTWARE REQUIREMENT:
MATLAB is available on most department laboratory machines. However, other equivalent software can be used or the student can develop his/her own software.

HONOR CODE:
Students are expected to follow the ODU Honor Code for all assignments and exams. Any violations will be dealt with strictly according to university policy. However, this course requires a lot of interaction, and thus discussions of ideas are encouraged. However, the work that you turn in must be your own.

EXAMS:
Midterm: March 21st, 2013 (4:20pm–7:00pm)
Final project: One or two months before the end of the semester, each student will be given one topic to choose as his/her final project. Students are encouraged to come up his/her own project topic as well with the permission of instructor.

GRADING POLICY:
Homework: 10%
Midterm: 25%
Final project: report: 20%, presentation: 10%
Regular projects: 35% (10%+10%+15%)

STUDENT EVALUATION OF TEACHING:
Students will be asked to complete instructor/course evaluation forms at the end of the semester.

DISABILITIES:
Students who have documented disabilities in accordance with university guidelines will be provided appropriate opportunities if the documentation is brought to the instructor's attention. As a faculty member, I am required by law to provide reasonable accommodation to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty at the beginning of the semester and in providing authorized documentation through designated administrative channels.

*If you require an accommodation based on disability, I would like to meet with you in the privacy of my office, during the first week of the semester, to make sure you are properly accommodated.*

**ACADEMIC DISHONESTY:**
It is the philosophy of ODU that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. **ANY CHEATING WILL RESULT IN SEVERE PENALTIES.**