

CSCI 560: Neural Networks

INSTRUCTOR:

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Office Hours: Mondays and Wednesdays 7:10 PM - 8:10 PM, Other Times By Appointment

CLASS MEETING TIMES:

Wednesdays 4:30 PM - 7:10 PM, EDS 127
Jan. 16, 2013 - Dec. 8, 2013

TEXTBOOK:

Fundamentals of Neural Networks: Architectures, Algorithms, and Applications,
Laurene V. Fausett, Prentice Hall, 1994 (ISBN 0-13-334186-0)

COURSE DESCRIPTION:

In this course the theory and practice of neural computation are introduced. Inspired from interaction of human neural cells, artificial neural networks are substantially used for many real-world problems: classification, time-series prediction, regression, pattern recognition. We start with the introduction of neural network, and continue with Hebb and perceptron algorithms, which are fundamentals of classification in neural networks. Autoassociative Nets and Iterative Autoassociative Nets are discussed with application on exemplary problems. Furthermore, having discussed the Kohonen self-organizing map, we briefly cover recurrent networks of the Hopfield type nets. Finally, the multilayer perceptron, and the radial basis function network, which are trained using back-propagation, are covered. Advanced programming skills are required.

STUDENT LEARNING OUTCOMES:

- 1) Defining neural network architectures
- 2) To use perceptron learning for classification
- 3) To develop Back-propagation learning schema
- 4) Define classes and methods.
- 5) Utilizing SOMs to cluster given data
- 6) Develop linked data structures.

METHOD OF EVALUATION (Tentative):

Your grade in the course will be calculated as follows:

Homework Assignments:	30 %
Three Exams:	40 %
Final Project:	30 %

Assignment and project deadlines will be strictly enforced. Late work will not be accepted for any reason. I will drop your lowest grade on all three exams. Thus,

if you have to miss one of the three exams for any reason, it will not hurt your grade. Consequently, no make-up exams will be administered.

Your final letter grade will be determined as follows:

- A - total number of points ≥ 89.5
- B - $79.5 \leq$ total number of points < 89.5
- C - $69.5 \leq$ total number of points < 79.5
- D - $59.5 \leq$ total number of points < 69.5
- F - total number of points < 59.5

I reserve the right to curve the grades in the course; however, for a given raw average, you will at least earn the grade letter shown above (if not better). As you will notice, I have already incorporated a standard rounding scheme into the schedule of grades. Thus, please do not ask me to round your grade at the end of the semester.

At the end of every semester, there is always at least one student who asks to have his/her final grade changed due to some external heart-breaking circumstance (e.g. I need an "A" because a "B" will keep my core GPA below 3.0 and I can't graduate.) Don't try this on me! It is a waste of my time and your time. The only time I ever change a grade at the end of the semester is if there is an error on my part in grading.

ACADEMIC ETHICS:

"All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment." (See Student's Guide Handbook, Policies and Procedures, Conduct).

ATTENDANCE POLICY:

Students are expected to be present at all class lectures. If a student is absent from class on the due date of any assignment, they are expected to make alternative arrangements to assure that the assignment is turned in ON TIME. Any student wishing to withdraw from the course must do so officially as outlined in the class schedule. THE INSTRUCTOR CANNOT DROP OR WITHDRAW ANY STUDENT.

COURSE REQUIREMENT DEADLINES:

Credit will be given for ONLY those exam(s), program(s), and/or project(s) turned in no later than the deadline(s) as announced by the instructor of this class unless prior arrangements have been made with the instructor.

ACADEMIC ETHICS AND HONESTY STATEMENT:

Scholastic dishonesty is a violation of the Code of Student Conduct. Scholastic dishonesty includes, but is not limited to, cheating on a test, plagiarism, and collusion. "All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment." (See Student's Guide Handbook, Policies and Procedures, Conduct).

Academic dishonesty includes, but is not limited to, cheating on tests, plagiarism and collusion. **Cheating** includes copying from another student's test or homework assignments or projects or quizzes, using materials not authorized, collaborating with or seeking aid from another student during a test, knowingly using, buying, selling, stealing, or soliciting the contents of an unadministered test, and substituting for another person to take a test. **Plagiarism** is the appropriating, buying, receiving as a gift, or obtaining by any means another's work and the unacknowledged submission or incorporation of it in one's own written work. **Collusion** is the unauthorized collaboration with another person in preparing written work for the fulfillment of course requirements. Academic dishonesty is a serious offense in college. You will be given not only a failing grade on the assignment or test, but also a failing grade for the class. Further, it will result in suspension from college.

PLAGIARISM:

In any written paper or test or assignment or quiz or project including code and/or documentation, you are guilty of the academic offense known as plagiarism if you half-copy or copy another author's sentences, words or any part of the content. **This will result in an automatic grade of "F" for the course.** Hence any of these must be fully avoided in order not to fail the class. Students copying from work done in previous semesters by former students as well as copying from internet sources without proper referencing will result in you failing this course. You cannot mix the author's words with your own or "plug" your synonyms into the author's sentence structure. To prevent unintentional borrowing, resist the temptation to look at the source as you write. The author's words, phrases, sentences must be put in your words and in your way of writing! When you do this, you are demonstrating your ability to understand and comprehend the material!

STUDENTS WITH DISABILITIES:

Students requesting accommodations for disabilities must go through the Academic Support Committee. For more information, please contact the Director of Disability Resources & Services, Halladay Student Services Bldg., Room 303D, (903) 886-5835