CSCE 496/896: Machine Learning **Fall Semester, 1999**

Course Information

August 23, 1999 *Handout 1*

Up-to-date information will be kept at `http://www.cse.unl.edu/~sscott/CSCE496`.

Prerequisites: CSCE 310 (Data Structures & Algorithms) required, STAT 380/880 (Prob. and Stats.) helpful

Time: 11:30–12:20 Monday, Wednesday, Friday

Classroom: Ferguson 112

Instructor: Stephen D. Scott (sscott@cse), Ferguson 305, 472-6994

Instructor's Office Hours: Monday 9:30–11:00, Thursday 10:30–12:00, and by appointment

Textbook: *Machine Learning*, by Tom Mitchell. McGraw-Hill, 1997.

Course Objectives

In this course you will learn several of the fundamentals and current trends in machine learning. Many of the approaches we will cover are applicable to several areas, including game playing, text categorization, speech recognition, and machine vision. The emphasized topic in this course will be learning different types of classifiers, including decision trees, neural networks, Bayesian classifiers, and instance-based classifiers. We will examine these classifiers' strengths and weaknesses, and will study methods to theoretically and empirically evaluate them. We will also investigate reinforcement learning, which is a useful approach to automated system control. Time permitting, we will also review genetic algorithms and learning sets of rules.

In this course we will follow the book closely, but I will occasionally supplement it with relevant technical papers.

Homework Assignments

There will be 2–4 homework assignments. These assignments will include non-computer-based problems (i.e. more theoretical exercises) and computer-based problems (i.e. implementations). The former is to help you comprehend the theory and the latter is to help you understand how the theory is used in practice. No late homework submissions will be accepted. Thus it is better to submit a partially completed homework assignment than a late one. If you have a valid excuse for a late submission (e.g. illness), contact me as soon as possible.

You may consult each other for assistance on the homework, but you must write up your results in your own words and indicate whom you consulted. I strongly encourage you to use some document processing package (e.g. LaTeX) to write your homework submissions, and to write as clearly and concisely as possible. *Presentation of your results is as important as the results themselves, and will be heavily weighted in grading.* If I cannot understand what you wrote due to poor writing, illegible writing, etc., then I cannot award full credit, even if your answers are correct. Thus I recommend that you ask someone to proofread your write-ups before you submit them, to check for clarity, typographical errors, etc. If English is not your native language, then I *strongly* recommend this!

Finally, ensure that all your files (e.g. program code, homework write-ups) are reasonably well-protected. You will be held partially responsible if someone copies your files and submits them to me as homework solutions.

Topic Summaries

After we complete each topic in lecture, you will submit a brief (1–3 pages) summary of that topic. This is due *one week* after I finish covering that topic in class. *No collaboration is allowed!* Your summary will be based on my lecture, the relevant readings from the text, and any other supplementary material that I hand out. Your summary should include *at least* the following: (a) an overview of the "big picture" of that topic; (b) a description of what you feel are the most and least interesting results related to that topic; (c) 2–3 questions on material that you did not understand from the readings and lectures; and (d) 2–3 interesting research ideas related to this topic. This summary *must be in your own words!* If you merely copy material from the textbook or the papers, you will be severely downgraded. Finally, as with the homeworks and projects, quality of writing and brevity will be heavily weighted in the grading.

Exams

There will be no exams in this course except for the prerequisite test, which will evaluate your understanding of this course's necessary background material as well as your writing ability.

Project

In this course you will do a substantial project. This project can be: (1) a very extensive literature search and summary on a particular topic, (2) a good implementation and evaluation of a known result in machine learning, or (3) a small (but nontrivial) amount of original research related to machine learning. You may work on these projects individually or in groups of two, but if you work in a group of two, then my expectations will be much higher when I grade your project.

You will summarize your project results in a written report and an oral presentation. If your project involves an implementation, then you may be asked to also give a brief demonstration. The written report *must* use a professional writing style similar to that found in an ACM or IEEE journal, including abstract, introduction, summary of related work, your contribution, references, and an appendix (if necessary). The oral presentation will be to the entire class at the end of the semester: during dead week (December 6–10), and if necessary, during the week prior to dead week (November 29–December 3). You will submit your written report to me no later than December 13 (the first day of finals week). In accordance with UNL dead week policies, you have now been informed in writing of the nature and scope of this project prior to the eighth week of classes.

Suggestions for projects can be found on the course's web pages, but you may propose your own topic as well. *You must receive my approval on your topic before proceeding with your work!* To be a valid topic, it must go beyond the scope of the course. So your project could be on a topic we did not cover in class at all, or could more deeply explore a topic we covered in class.

Dumb Question Asker

Before each lecture, I will select a student who will be required to ask three questions during that lecture. During your assigned lecture, you may ask any question concerning any course material that you do not understand. If you completely understand the material, then you may ask any question that you feel would help the other students (even if you already know the answer yourself). If you cannot think of a question to help the rest of the class, then any "dumb question" (e.g. "Who will win the game on Saturday?") will suffice. But you must ask three questions during your assigned lecture.

Grading

The above items will be weighted as follows:

prereq test: 10%	hwks: 35%	proj. report: 25%	proj. pres.: 15%	topic summaries: 10%	subjective: 5%

Your subjective score will be based on your fulfillment of your duties as dumb question asker as well as my impression of your effort put forth to participate in class, participate out of class, and to learn the course material. Thus actively asking questions and making comments in class and seeing me outside of class will help your grade.

In computing your letter grade I will start with the following base scale:

$\geq 90\% = \text{A}$	80–89% = B	70–79% = C	60–69% = D	$\leq 59\% = \text{F}$

You will receive a "+" with your grade if the last digit of your score is a 5 or higher. I will scale up from this base scale if necessary. So if you get an 85% in this class you are *guaranteed* a B+, but your grade might be higher depending on your performance relative to the rest of the class.

In general, students registered for CSCE 896 will be graded more stringently on everything and will have more problems to solve on the homework.

Plagiarism of any kind in this course will result in a grade of F.

Suggestion Box

At `http://www.cse.unl.edu/~sscott/CSCE496/suggestion-box.shtml` is an anonymous suggestion box for this class. I encourage you to submit comments or suggestions regarding my teaching style, course content, etc. You can submit your name and e-mail address with your suggestion, but they are not required.