

CSE 5160 Machine Learning

Syllabus

Instructor: Yan Zhang, Email: Yan.Zhang@csusb.edu

Office Hours: TuTh 9:00 AM - 10:00 AM, 2:30 PM - 3:30 PM or by appointment, via Zoom

Lectures: TuTh 04:00 PM - 05:15 PM, via Zoom

References:

1. Tom M. Mitchell, Machine Learning. McGraw-Hill, 1997. Referred to as **[Mitchell]**.
2. Shai Shalev-Shwartz and Shai Ben-David, Understanding Machine Learning: From Theory to Algorithms. Cambridge University Press, 2014. [Free online version](#). Referred to as **[Shwartz&David]**.
3. Kevin P. Murphy, Machine Learning: A Probabilistic Perspective. MIT Press, 2012. Referred to as **[Murphy]**.
4. Hal Daume III, A Course in Machine Learning. [Free online book](#). Referred to as **[Daume]**.

Prerequisites: Semester: CSE 2020 and MATH 2220. Quarter: CSE 330

Grading:

Homework: 50%

Project: 50% (Project abstract 10%, project report 20%, project presentation 20%)

Letter Grade:

93-100% A	90-92% A-
86-89% B+	83-85% B
80-82% B-	
76-79% C+	73-75% C
70-72% C-	
66-69% D+	63-65% D
60-62% D-	
0-59% F	

Course Description

Machine learning is a fundamental topic to understand, design and implement a system with "intelligence". It refers to a system capable of the autonomous acquisition and integration of knowledge. This capacity to learn from experience, analytical observation, and other means, results in a system that can improve its own performance, e.g., speed, efficiency, effectiveness. This course provides a broad introduction to machine learning techniques. Topics include: supervised learning (decision tree, linear regression, logistic regression, naive Bayes, K-nearest neighbors, neural networks, support vector machines), unsupervised learning (clustering, dimensionality reduction), and reinforcement learning. The course will also discuss the applications of machine learning.

Student Learning Objectives

Upon successful completion of this course, students will be able to:

- Explain the differences among the three main styles of learning: supervised, reinforcement, and

unsupervised.

- Implement simple algorithms for supervised learning, reinforcement learning, and unsupervised learning.
- Determine which of the three learning styles is appropriate to a particular problem domain.
- Characterize the state of the art in learning theory, including its achievements and its challenges.

Tentative Topics:

- Introduction to Machine Learning
- Decision Trees
- K-Nearest Neighbors
- Bayesian Classifiers
- Linear Regression
- Logistic regression
- Support Vector Machine
- Artificial Neural Networks
- Clustering
- Reinforcement Learning

Important Rules:

1. The schedule and requirements etc. are tentative. The online version should be the latest one. Please check for changes.
2. Attendance: Lecture attendance is expected.
3. Homework assignments must be individual effort. If it is demonstrated that two or more students have collaborated on an assignment, the assignment grade will be divided among those involved. If you find the solution of a problem on the Internet or other publicly available sources, be prepared to share your grade with the other students who have copied the same answer! Assignments must be submitted before the electronic cut-off time. Submitting incomplete work may get partial marks. If you have any questions or complaints about the marking of your assignment, please clearly explain your concerns in an email, and then email me within one week from date marks are posted. The assignment will be reassessed.
4. If you are sending email to the instructor, please include "**CSE 5160:**" at the beginning of the subject. It is recommended that you always send email messages from your csusb.edu email account. Class announcements will be sent to your CSUSB account. There will be no reply to any free web-based email accounts, Hotmail, Gmail, or yahoo, for instance.
5. Please refer to [Academic Regulations and Standards](#) in the University Bulletin dealing with attendance, evaluation, discipline and withdrawal, especially the Plagiarism and Cheating Policy. Cheating will not be tolerated. Co-operation on programming assignments is generally encouraged, but it must be limited to verbal discussion of concepts; not program code or any other written documentation that is submitted for grading. Copying of assignments or previous solution keys is plagiarism. Knowingly allowing an assignment to be copied will also be treated as plagiarism. The consequence of plagiarism or any other form of cheating (such as copying on a quiz or examination) may range from a zero grade, to failure in the

class, to expulsion from the University.

6. Special needs: If you are in need of an accommodation for a disability in order to participate in this class, please contact the instructor and the Services to Students with Disabilities at UH-183, (909) 537-5238. It is the student's responsibility to seek academic accommodations for a verified disability in a timely manner.