Syllabus for CSE176-01: Intro Machine Learning

Fall 2021
Instructor: Miguel Carreira-Perpinan

Designation:	CSE 176 Introduction to Machine Learning
Catalog Description:	Survey of techniques for development and analysis of software that learns from experience. Specific topics: supervised learning (classification, regression); unsupervised learning (density estimation, clustering, dimensionality reduction); reinforcement learning; and others. Specific techniques: linear classifiers, mixture models, nonparametric methods, decision trees, neural networks, kernel machines, ensembles, graphical models, Bayesian methods, etc.
Text Books and Other Required Materials:	Instructor's lecture notes.
Course Objectives/ Student Learning Outcomes:	Students who successfully complete this course will have acquired a sufficient understanding of the basic concepts and methods of machine learning to make use of some elementary machine learning techniques in the design of computer systems. They will also come to possess insights concerning the relative strengths and weaknesses of various common machine learning methods. This course is intended to make the vast machine learning research literature accessible to diligent students. Finally, through the completion of individual term projects, students will gain experience in applying machine learning methods to problems of personal interest. Students will: - Apply machine learning techniques in the design of computer systems. - Explain the relative strengths and weaknesses of different machine learning methods. - Demonstrate knowledge of the machine learning literature. - Apply machine learning techniques to a selected problem.
Program Learning Outcomes:	
Prerequisites by Topic:	CSE31 Introduction to CSE II MATH24 Linear Algebra and Differential Equations MATH32 Probability and Statistics MATH141 Linear Analysis I Proficient level of programming skills and of the fundamentals of linear algebra, multivariate calculus and probability.
Course Policies:	
Academic Dishonesty Statement:	a. Each student in this course is expected to abide by the University of California, Merced's Academic Honesty Policy. Any work submitted by a student in this course for academic credit will be the student's own work.

Designation:	CSE 176 Introduction to Machine Learning
	b. You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e mail, an e mail attachment file, a diskette, or a hard copy. Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Policy can also be extended to include failure of the course and University disciplinary action. c. During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.
Disability Statement:	Accommodations for Students with Disabilities: The University of California Merced is committed to ensuring equal academic opportunities and inclusion for students with disabilities based on the principles of independent living, accessible universal design and diversity. I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances. Students are encouraged to register with Disability Services Center to verify their eligibility for appropriate accommodations.
Topics:	Supervised learning; Bayesian decision theory; Parametric methods; Multivariate methods; Dimensionality reduction; Clustering; Nonparametric methods; Decision trees; Linear discrimination; Multilayer perceptrons; Local models; Kernel machines; Graphical models; Hidden Markov models; Bayesian estimation; Combining multiple learners; Reinforcement learning; Design and analysis of machine learning experiments.
Class/laboratory Schedule:	see registrar website
Midterm/Final Exam Schedule:	
Course Calendar:	
Professional Component:	
Assessment/Grading Policy:	Based on lab participation and projects.
Coordinator:	Miguel Carreira-Perpinan
Contact Information:	Email: mcarreira-perpinan@ucmerced.edu Phone: 209-228-4545 Office: SE2-217
Office Hours:	By appointment by Zoom