SJSU SAN JOSÉ STATE UNIVERSITY

College of Science · Computer Science

Introduction to Machine Learning Section 03

CS 171

Spring 2025 In Person 3 Unit(s) 01/23/2025 to 05/12/2025 Modified 01/23/2025

Contact Information

Instructor: Nagib Z Hakim, PhD

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Office Hours: Wed 5:00pm - 5:50pm

Course Information

The course format is In-Person

Class Days/Time: Mon-Wed 6:00pm – 7:15pm

Classroom: CL 238

Course Description and Requisites

Covers a selection of classic machine learning techniques including backpropagation and several currently popular neural networking and deep learning architectures. Hands-on lab exercises are a significant part of the course. A major project is required.

Prerequisite(s): CS 146 (with a grade of "C-" or better). Computer Science or Software Engineering majors only.

Letter Graded

Classroom Protocols

Cheating and plagiarism, including from AI tools, will not be tolerated and will be sanctioned per University and Department guidelines. .

Students must be respectful of the instructor and other students. For example, no disruptive or annoying talking.

Turn off cell phones during class.

Class begins on time

Valid picture ID required at all times

Program Information

Diversity Statement - At SJSU, it is important to create a safe learning environment where we can explore, learn, and grow together. We strive to build a diverse, equitable, inclusive culture that values, encourages, and supports students from all backgrounds and experiences.

Course Learning Outcomes (CLOs)

The focus of this course will be machine learning, with examples from various domains of applications. After completing this course students will be able to:

(CLO1) Understand, explain, and implement a variety of machine learning techniques

(CLO2) Apply the appropriate models to specific tasks and application domains

(CLO3) Analyze results, assess model performance, and mitigate issues

(CLO4) Present the results using common ML performance indicators and charts

Course Materials

Textbook

Machine Learning: An Algorithmic Perspective, Second Edition, 2014, Chapman and Hall/CRC

Authors: Stephen Marsland

ISBN-13 : 978-1-4665-8333-7 (eBook - PDF)

Other Readings

- Andrew Ng Stanford / Coursera class notesLinks to an external site.
- Machine Learning with Applications in Information Security, by Mark Stamp, published by Chapman Hall/CRC in 2017. ISBN-10 : 1138626783, ISBN-13 : 978-1138626782

- Deep Learning (Adaptive Computation and Machine Learning series) by Ian Goodfellow, Yoshua Bengio, Aaron Courville. ISBN-13: 9780262035613, ISBN-10: 0262035618

Course Requirements and Assignments

Faculty Webpage and mySJSU messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on Canvas Leaning Management System course login website at http://sjsu.instructure.com. You are responsible for regularly checking with the messaging system through MySJSU at http://my.sjsu.edu (or other communication system as indicated by the instructor) to learn of any updates.

Course Requirements and Assignments

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at http://www.sjsu.edu/senate/docs/S12-3.pdf.

Homework, Exams and a Final Project are expected for this class. Homework is due on Canvas by midnight on the due date. Each assigned problem requires a solution and an explanation (or work) detailing how you arrived at your solution. Cite any outside sources used to solve a problem. When grading an assignment, I may ask for additional information.

NOTE that University policy F69-24 at http://www.sjsu.edu/senate/docs/F69-24.pdf states that "Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.

Grading Information

Breakdown

Homework: 25%

Exam 1: 25%

Exam 2: 25%

Semester grade will be computed as a weighted average of the scores obtained in each of the four categories listed above. Some assignments or tests might be adjusted to a bell curve. No make-up tests or quizzes will be given, and no late homework (or other work) will be accepted. Also, in-class work must be completed in the section that you are enrolled in.

Criteria

Determination of Grades

Nominal Grading Scale

Percentage	Grade
97 – 100+	A+
93 – 96	A
90 – 92	A-
87 – 89	B+
83 – 86	B
80 – 82	B-
77– 79	C+
73 – 76	C
70 – 72	C-
67 – 69	D+
63 – 66	D
60 – 62	D-
0-59	F

University Policies

Per University Policy S16-9 (PDF) (http://www.sjsu.edu/senate/docs/S16-9.pdf), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on the Syllabus Information (https://www.sjsu.edu/curriculum/courses/syllabus-info.php) web page. Make sure to visit this page to review and be aware of these university policies and resources.

Course Schedule

The schedule is subject to change with fair notice communicated via Canvas course page Course Schedule

Week	Date	Topics
1	27-Jan	Introduction
1	29-Jan	Linear model regression
2	5-Feb	Logistic Regression
2	7-Feb	Python tutorial / Sklearn modules and algorithms
3	12-Feb	Discriminant Analysis: Naïve Bayes, SVM, Kernels. Multi-class
3	14-Feb	Perceptron, dense NN
4	19-Feb	Result Analysis and Visualization
4	21-Feb	Deep NN Layers for image Classification
5	26-Feb	Keras library
5	28-Feb	Computer Vision Applications
6	3-Mar	Data Preprocessing, feature extraction
6	5-Mar	Recurrence, RNN: GRU, LSTM
7	10-Mar	decision trees

7	12-Mar	Boosting
8	17-Mar	PCA, Factor Analysis
8	19-Mar	Clustering Analysis: Kmeans, DBScan and variants
9	24-Mar	Review Session
9	26-Mar	EXAM 1
10	31-Mar	Vacattion
10	2-Apr	Vacation
11	7-Apr	Generative models: GAN
11	9-Apr	Recommendation Systems 1:
12	14-Apr	Recommendation system 2
12	16-Apr	Knowledge Representation: Embeddings
13	21-Apr	Attention: The Transformer
13	23-Apr	Pretrained models: BERT
14	28-Apr	LLM: From BERT to GPT to Chat-GPT

14	30-Apr	Reinforcement Learning
15	7-May	Project Presentations 1
15	9-May	Project Presentations 2
16	14-May	Industry Speaker Session
16	16-May	Exam2