 ENPM633 - INTRODUCTION TO MACHINE LEARNING

Instructor: Dr. Nikhil Chopra

Lecture Hours/Location: Tu 4pm-6:40pm, JMP 2216

Official Means of Contact: Piazza

Teaching Assistant	Office hours	Link
Abhinav Sagar	Mon 10am-12pm	https://us04web.zoom.us/j/71067607509?pwd=7RgxqNjx39ybBM5EoaO32FY7b2yW0P.1 Meeting ID: 710 6760 7509 Passcode: 1MBsF3

Text: Learning from Data: A Short Course
Authors: Yaser S. Abu-Mostafa, Malik Magdon-Ismail, Hsuan-Tien Lin

Hands on Machine-Learning with Scikit-Learn, Keras, & TensorFlow
Author: Aurelien Geron

Lecture Slides Website: The lectures slides are provided by the book's author, Prof. Magdon-Ismail. They will be used.
http://www.cs.rpi.edu/~magdon/courses/learn/slides.html

Additional lecture slides will be posted on Canvas as needed.

Web Page: Canvas will be the official medium for posting class material such as class notes, homework solutions. We will also use Canvas to send email to the class. It is your responsibility to make sure that your email address on Canvas is correct.

Piazza: Piazza will be the official medium for course-related inquiries and issues. We cannot guarantee prompt response in case you send email to individual instructors/teaching staffs. Further, the instructors/teaching staffs may not respond to the questions asking for information already given in the lectures.
Register: piazza.com/umd/fall2022/enpm633

Course Objectives: This is an introductory course on machine learning. This course will focus on basic algorithms and techniques in machine learning and their practical implementation. The various topics include linear/nonlinear model classification and regression, logistic regression, support vector machines, kernels, decision trees,

ensemble learning, random forests, principal component analysis, and neural networks. Various techniques for improving performance such as input-preprocessing, cross-validation, regularization, and fast optimization will also be discussed. The course will include an end-to-end machine learning project. Prior experience in linear algebra, probability, and python programming is preferred, but not required.

Grade Distribution:	Homework	30%
	Mid Term	30%
	Project	40%

Homework: Assignments will be posted on CANVAS and completed homework assignments should be submitted online. Late submissions will not be accepted (no exception).

Academic Integrity: The University of Maryland has a Code of Academic Integrity, available on the web at https://www.president.umd.edu/sites/president.umd.edu/files/documents/policies/III-100A.pdf. We assume that students are familiar with the principles of the Code, which prohibits cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents, and forging signatures. Students who have questions or concerns about these issues should contact the instructors or view the website for additional information.

Statement on Civility: The University of Maryland and the A. James Clark School of Engineering is expected to be a diverse, open, and tolerant environment within which all ideas, whether popular or not, may be freely discussed without rancor. The instructor of this course is committed to creating an open and accepting environment in which diversity, unique perspectives, and others' world views are respected. Demeaning, intimidating, or threatening behavior is unacceptable and contrary to our basic values and may violate campus policies on student conduct and behavior. As citizens of the university, we take the lead in producing, and take pride in sustaining, an environment that is characterized by tolerance, respect, and civility. This is the hallmark of a university and college that welcomes and values diverse perspectives, intellectual pluralism, and the free and open exchange of ideas.

Equity, Diversity, and Inclusion: The University of Maryland, College Park affirms its commitments to a policy of eliminating discrimination on the basis of race, color, creed, sex, gender identity or expression, sexual orientation, marital status, personal appearance, age, national origin, political affiliation, physical or mental disability, or on the basis of the exercise of rights secured by the First Amendment of the United States Constitution. This Code is

established to prevent or eradicate such discrimination in accordance with due process within the Campus community. In doing so, the Campus recognizes that it must strive actively and creatively to build a community in which opportunity is equalized. To read the entire policy, see appendix A in the undergraduate catalogue. For more information: www.president.umd.edu/policies/vi100b.html

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Tentative Schedule

Week	Date	Topics
1	8/30	Machine Learning Landscape and Learning Problem
2	9/6	Is Learning Feasible
3	9/13	Training vs Testing
4	9/20	VC Dimension
5	9/27	Bias Variance Tradeoff
6	10/4	Linear Model Classification/Regression
7	10/11	Nonlinear Transforms, Overfitting
8	10/18	Regularization-Validation Model Selection
9	10/25	Support Vector Machines
10	11/1	Artificial Neural Networks
11	11/8	Artificial Neural Networks
12	11/15	Convolutional/Recurrent Neural Networks
13	11/22	Unsupervised Learning
14	11/29	Learning Aides
15	12/6	Final Projects Due