

COURSE-OUTLINE

Spring 2023

Machine Learning- CSCI 4350

(Hybrid Synchronous class)

Tuesday-Thursday 2:00-3:20 PM

Instructor: Arun Kulkarni, Ph.D. Professor of Computer Science

Office: COB 315.07

Course Description: The course will provide overview of machine learning system and describe algorithms for implementing various stages of a machine learning system. Various stages include preprocessing, classification, clustering, regression analysis, and post processing. These stages can be implemented using statistical methods, non-parametric methods, neural networks, fuzzy inference systems, fuzzy neural systems. Such techniques will be introduced in the course.

Couse Objectives:

This course is designed with the following goals:

- Identify methods for data cleaning, replacing missing data, and normalization
- Develop models for supervised classification using discriminant functions, neural networks and fuzzy logic systems.
- Develop clustering models using K-means clustering, neural networks and fuzzy logic systems.
- Develop software to analyze data using decision trees.

TEXTBOOKS:

Stephen Marsland (2015). Machine Learning An Algorithmic Perspective. CRC Press, Boca Raton, FL.

REFERNCE BOOKS:

- 1) Simeone, Osvaldo. (2023). Machine Learning for Engineers. Cambridge University Press, Cambridge, UK.
- 2) Kulkarni, A. D. (2001). Computer Vision and Fuzzy Neural Systems. Prentice Hall PTR, Upper Saddle River, NJ.
- 3) Sergios Theodoridis (2015). Machine Learning. Elsevier Academic Press.
- 4) Jiawei Han and Micheline (2011). Data Mining – Concepts and Techniques. Morgan Kaufmann, San Francisco, CA.

PRE-REQUISITES: Structured Programming, Linear algebra background

Tentative time allotment for the course will be as follows:

Topic	Hours
Introduction	3
Machine Learning Overview	3
Pre-processing Techniques	6
Feature Extraction	6
Supervised Classification	6
Unsupervised Classification	6
Neural Networks	3
Fuzzy Inference Systems	6
Post Processing Techniques	3

EVALUATION:

90-100	A
80-89	B
70-79	C
60-69	D
0-59	F

SCHEDULE

		Evaluation
Test 1	Thursday, February 23, 2023	70 %
Test 2	Thursday, April 6, 2023	
Final	Tuesday, April 22, 2023	
Class Participation		5 %
Assignment 1	Tuesday, February 21, 2023	25 %
Assignment 2	Thursday, March 2, 2023	
Assignment 3	Thursday, March 30, 2023	
Assignment 4	Thursday, April 20, 2023	

Academic Dishonesty: You are expected to do your own work. You may assist each other with general concepts, but direct assistance with a particular assignment or any attempts to gain an unfair academic advantage will not be tolerated. Cheating is considered a serious academic offense both by the department and the University. It may result in a failing grade from this course for all parties involved. The instructor reserves the right to ask you to explain any assignment that you turn in to judge if the work is actually yours.

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- 2) You are not supposed to talk with anyone or yourself during the test.
- 3) You should be within the camera view all the time. There should be enough light so that they can recognize you.
- 4) You should be dressed properly.
- 5) You can use one or two scratch papers and a calculator during the test.
- 6) You cannot use very big monitors (20 inch or above)
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