

UNIVERSITY OF MADRAS
M.Sc. DEGREE PROGRAMME IN COMPUTER SCIENCE
SYLLABUS WITH EFFECT FROM 2023-2024

Title of the Paper	Machine Learning Practical		
Core–XIII - Practical	II Year & III Semester	Credit:3	536C3E

Objectives:

Make use of Data sets in implementing the machine learning algorithms

Implement the machine learning concepts and algorithms in any suitable language of choice.

The programs can be implemented in either JAVA or Python.

For Problems 1 to 6 and 10, programs are to be developed without using the builtin classes or APIs of Java/Python.

Data sets can be taken from standard repositories

(<https://archive.ics.uci.edu/ml/datasets.html>) or constructed by the students.

Outcomes:

1.	Understand the implementation procedures for the machine learning algorithms.	K1, K2
2.	Design Java/Python programs for various Learning algorithms.	K2, K3
3.	Apply appropriate data sets to the Machine Learning algorithms.	K3, K4
4.	Identify and apply Machine Learning algorithms to solve real world problems.	K4, K5
5.	be capable of confidently applying common Machine Learning algorithms in practice and implementing their own;	K5, K6
K1-Remember;K2-Understand;K3-Apply;K4-Analyze;K5-Evaluate; K6-Create		

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.
3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
4. Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.
5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.

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7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
9. Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

Recommended Texts:

1. Dr. Kamlesh Namdev, LAP LAMBERT ; Lab manual of Machine Learning: Machine Learning Practicals in Python; Academic Publishing; 2021

Reference Books:

1. Introduction to Machine Learning with Python by Andreas C. Müller, Sarah Guido
Released October 2016 Publisher(s): O'Reilly Media, Inc. ISBN: 9781449369415

Web References:

1. <https://www.youtube.com/watch?v=RnFGwxJwx-0>

Mapping with Programme Outcomes:

Mapping with Programmers outcomes*										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	L	S	M	L	M	L	L
CO2	S	M	S	S	S	M	M	L	M	L
CO3	M	S	M	M	S	S	L	L	L	M
CO4	S	L	M	M	M	L	M	L	M	S
CO5	S	S	M	S	L	M	M	L	M	L

S-Strong M-Medium L-Low