DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE & Affiliated to Anna University, Chennai)
Accredited with 'A' Grade by NAAC, Accredited by TCS
Accredited by NBA with BME, ECE & EEE
PERAMBALUR - 621 212. Tamil Nadu.
website : www.dsengg.ac.in

LABORATORY COURSE PLAN (2024 – 2025 Even Semester)

LAB COURSE TITLE	**MACHINE LEARNINGLABORATORY**			
LAB COURSE CODE	U20IT606			
LAB COURSE STRUCTURE	LECTURE	TUTORIAL	PRACTICAL	CREDIT
	0	0	3	2
REGULATION	BRANCH	YEAR	SEMESTER	ACADEMIC YEAR
2020	IT	III	VI	2022-2023
COURSE INCHARGE				

SYLLABUS

COURSE OBJECTIVE:

- To solve problems using various machine learning techniques with python language.
- To design applications using machine learning techniques with R tool.
- To identify machine learning techniques suitable for given problem.

LIST OF EXPERIMENTS

1. Study and usage of python and R tool.
2. Implement a classifier for the sales data.
3. Develop a predictive model for predicting house prices
4. Implement the FIND-S algorithm. Verify that it successfully produces the trace in for the Enjoy sport example.(Tom Mitchell Reference)
5. Implement a decision tree algorithm for sales prediction/classification in retail sector
6. Implement back propagation algorithm for stock prices prediction
7. Implement clustering algorithm for Insurance fraud detection
8. Implement clustering algorithm for identifying cancerous data

9. Apply reinforcement learning and develop a game of your own.

10. Develop a traffic signal control system using reinforcement learning technique.

TOTAL: 60PERIODS

BIBLIOGRAPHY

TEXT/REFERENCE BOOKS:

1. Russell, Norvig, Artificial Intelligence: A Modern Approach, Third edition, Prentice Hall, 2010
2. I. Bratko, Prolog: Programming for Artificial Intelligence, Fourth edition, Addison-Wesley Educational Publishers Inc., 2011.
3. Hastie, Tibshirani, Friedman. The elements of statistical learning, Second edition, Springer, 2009
4. Tsang. Foundations of constraint satisfaction, Academic press, 1993
5. Daphne Koller and Friedman. Probabilistic Graphical Models - Principles and Techniques,
6. The MIT Press, 2009
7.

HARDWARE:

Standalone desktop

SOFTWARE:

IDLE,ANACONDA, R TOOL, WEKA TOOL.

web link for resource &Virtual lab reference link

W1: https://www.nihlibrary.nih.gov/training/hands-virtual-lab-machine-learning
W2: https://www.vlab.co.in/broad-area-computer-science-and-engineering

EXP. NO.	NAME OF THE EXPERIMENTS	NO. OF PERIODS	CUMULATIVE PERIODS
1.	Study and usage of python and R tool.	8	8
2.	Implement a classifier for the sales data.	8	16
3.	Develop a predictive model for predicting house prices	4	20
4.	Implement the FIND-S algorithm. Verify that it successfully produces the trace in for the Enjoy sport example.(Tom Mitchell Reference)	4	24

5.	Implement a decision tree algorithm for sales prediction/classification in retail sector	4	28
6.	Implement back propagation algorithm for stock prices prediction	4	32
7.	Implement clustering algorithm for Insurance fraud detection	4	36
8.	Implement clustering algorithm for identifying cancerous data	8	44
9.	Apply reinforcement learning and develop a game of your own.	8	52
10.	Develop a traffic signal control system using reinforcement learning technique.	8	60

COURSE OUTCOME

At the End of the Course, the students will be able to:

CO1: Understand the mathematical and statistical prospective of machine learning algorithms through python programming. (K2)

CO2: Understand the basic concepts of deep neural network model and design the same. (K2)

CO3: Analyze the unsupervised models through python in built functions. (K4)

CO4: Analyze the machine learning models pre-processed through various feature engineering algorithms by python programming. (K4)

CO5: Design and apply various reinforcement algorithms to solve real time complex problems. (K3)

CO6: Design and develop the code for recommender system using Natural Language processing. (K3)

CO-PO Mapping:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	1	-	-	-	-	-	-	2	1	-	2
CO2	2	1	-	-	-	-	-	-	2	1	-	2
CO3	1	3	2	2	-	-	-	-	1	1	-	2
CO4	1	3	2	2	-	-	-	-	2	1	3	2
CO5	3	2	1	1	-	-	-	-	2	1	-	2
CO6	3	2	1	1	-	-	-	-	-	1	3	2
AVG:	**2.00**	**2.00**	**1.50**	**1.50**	**-**	**-**	**-**	**-**	**1.80**	**1.00**	**3.00**	**2.00**

ADDITIONAL EXPERIMENTS		
EXP. NO.	**NAME OF THE EXPERIMENTS**	**Identified Resource link**
1	Given a dataset. Write a program to compute the Covariance, Correlation	https://stackabuse.com/covariance-and-correlation-in-python/

	between a pair of attributes. Extend the program to compute the Covariance Matrix and Correlation Matrix	
2	Given a set of sample points in N dimensional feature space. Write a program to fit the points with a hyper plane using Linear Regression. Calculate sum of residual error	https://www.analyticsvidhya.com/blog/2017/09/understaing-support-vector-machine-example-code/
3	Write a program that provides option to compute different distance measures between two points in the N dimensional feature space. Consider some sample datasets for computing distances among sample points.	https://www.geeksforgeeks.org/program-calculate-distance-two-points/
4	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.	https://www.goeduhub.com/3127/demonstrate-the-working-the-decision-tree-based-algorithm
5	Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Python ML library classes can be used for this problem.	https://www.vtupulse.com/machine-learning/k-nearest-neighbour-algorithm-in-python/

MODEL LAB DETAILS

BATCH	REGISTER NO.	MODE OF LAB CONDUCT	DATE	TIMING
1		OFFLINE		

LIST OF QUESTIONS

1.	(a) Write a Python program for the following (String = "Machine Learning") i) Calculate the length of the string. ii) Convert the string from upper case to lower case and viceversa. iii) Perform all the string functions (b) Implement a classifier for the sales data, also show its implementation using Weka tool.

2.	(a) Write a Python Program for the following (List= [Subject name, Subject Code, no.of credits (i) Create one list having five subjects with the subject name, subject code and no.of credits. (ii) Insert one new subject into the list. (iii) Delete an item in a list (b) Develop a predictive model for predicting house prices, also show its implementation using Weka tool.
3.	(a) Write the R program for finding the sequence of numbers from 10 to 30, find its sum and average. (b) Implement the FIND-S algorithm. Verify that it successfully produces the trace in for the Enjoy sport example.
4.	(a) Write the R program for finding the Fibonacci series. (b) Implement a decision tree algorithm for sales prediction/classification in retail sector, also show its implementation using Weka tool.
5.	(a) Write the R program for finding the maximum and minimum value of the given vector. (b) Implement back propagation algorithm for stock prices prediction
6.	(a) Write the R program to create 3x3 matrix and add another matrix of the same size. (b) Implement clustering algorithm for identifying cancerous data, also show its implementation
7.	(a) Write a Python Program for finding the algebraic expression, $3X^2 +4Y^2$ (X=4 , Y=1) (b) Apply reinforcement learning and develop a game of your own
8.	(a) Write the R program for finding the Fibonacci series. (b) Develop a traffic signal control system using reinforcement learning technique.
9.	(a)Write the R program for finding the sequence of numbers from 10 to 30, find its sum and average. (b) Implement clustering algorithm for identifying Brain Tumour.
10.	(a) Write a Python Program for finding the algebraic expression, 3X +4Y+Z (X=3 , Y=2, Z=1) (b) Implement a classifier for identifying cancerous data, also show its implementation in weka tool.
11.	(a) Write a Python program for the following (String =”Reinforcement Learning”) i) Calculate the length of the string. ii) Convert the string from upper case to lower case and viceversa. iii) Perform all the string functions (b)Develop a traffic signal control system using reinforcement learning technique.
12.	(a)Write the R program for reading the contents in the file and print the data. (b)Implement a classifier for supermarket data, also show its implementation in weka tool.
13.	(a) Write the R program for finding the maximum and minimum value of the given vector. (b) Implement clustering algorithm for identifying diabetes, also show its implementation using Weka tool.
14.	(a) Write the R program to create 3x3 matrix and subtract another matrix of the same size. (b) Apply reinforcement learning and develop a game of your own.

VI VA QUESTIONS

1. Why is the Machine Learning trend emerging so fast?
2. Why was Machine Learning Introduced?
3. What are Different Types of Machine Learning algorithms?
4. What is Supervised Learning?
5. What is Unsupervised Learning?
6. What is 'Naive' in a Naive Bayes?
7. What is PCA? When do you use it?
8. Explain SVM Algorithm in Detail
9. What are Support Vectors in SVM?
10. What are Different Kernels in SVM?
11. What is Cross-Validation?
12. What is Bias in Machine Learning?
13. Explain the Difference Between Classification and Regression?
14. What is F1 score? How would you use it?
15. Define Precision and Recall?
16. How to Tackle Overfitting and Underfitting?
17. What is a Neural Network?
18. What are Loss Function and Cost Functions? Explain the key Difference Between them?
19. What is Ensemble learning?
20. How do you make sure which Machine Learning Algorithm to use?
21. How to Handle Outlier Values?
22. What is a Random Forest? How does it work?
23. What is Collaborative Filtering? And Content-Based Filtering?
24. What is Clustering?
25. How can you select K for K-means Clustering?

PREPARED BY
AP/IT

VERIFIED BY
HOD/IT

APPROVED BY

PRINCIPAL