

MACHINE LEARNING LAB

Course Code: 22CM1105

L T P C
0 0 3 1.5

Course Outcomes: At the end of the Course the student shall be able to

- CO1: Understand the Basic operations of Linear Algebra in Machine Learning.(L2)
- CO2: Use various Supervised Learning techniques like Linear Regression and Nonlinear Regression. (L3)
- CO3: Apply Statistical approaches for multiple Learning techniques. (L3)
- CO4: Construct models for Classification. (L3)
- CO5: Build neural network models. (L3)

LIST OF PROGRAMS:

(Any 12 Programs from the following to be performed)

1. Write a Program to perform the following operations on matrices
 - a) Matrix addition
 - b) Matrix Subtraction
 - c) Matrix Multiplication
 - d) Matrix Inversion
 - e) Transpose of a Matrix

2. Write a Program to perform the following operations
 - a) Find the minimum and maximum element of the matrix
 - b) Find the minimum and maximum element of each row in the matrix
 - c) Find the minimum and maximum element of each column in the matrix
 - d) Find trace of the given matrix
 - e) Find rank of the given matrix
 - f) Find eigenvalues and eigenvectors of the given matrix

3. Write a Program to find the mean, median, standard deviation and mode using user defined functions.

4. Create a data frame with columns at least 5 observations
 - a) Retrieve a particular column from the DataFrame
 - b) Summarize the data frame and observe the statistics of the DataFrame created
 - c) Observe the mean and standard deviation of the data frame and print the values.

5. Write a program to implement the Linear Regression for a sample training data set stored as a .CSV file. Compute Mean Square Error by considering few test data sets.
6. Write a program to implement the Non-linear Regression for a sample training data set stored as a .CSV file. Compute Mean Square Error by considering few test data sets.
7. Write a program to implement the Logistic Regression for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier.
8. 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.
9. Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions.
10. Write a program to implement the Support Vector Machine algorithm to classify the iris data set. Print both correct and wrong predictions.
11. 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.
12. Write a program to demonstrate the working of the decision tree based CART algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
13. Write a program to construct a Regression tree for cost estimation by assuming any numerical dataset.
14. Write a program to calculate the accuracy, precision, and recall for your data set. Assume a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task.
15. Implement a single neural network and test for different logic gates.
16. Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.

REFERENCES:

1. Vijayvargia, Abhishek, *Machine Learning with Python: An Approach to Applied Machine Learning*, BPB Publications, 1st edition,2018.
2. Aurelien Geron, *Hands-On Machine Learning with Scikit-Learn and TensorFlow*, Oreilly, March 2017.
3. Dr. M Gopal, *Applied Machine Learning*, 1st Edition, McGraw-Hill,2018