MACHINE LEARNING LAB

Course Objectives:

- The student should be made to study the concepts of Artificial Intelligence.
- The student should be made to learn the methods of solving problems using Artificial Intelligence.
- The student should be made to introduce the concepts of Expert Systems and machine learning.
- To learn about computing central tendency measures and Data preprocessing techniques.
- To learn about classification and regression algorithms.
- To apply different clustering algorithms for a problem.

Course Outcomes:

On completion of the course, the student will be able to:

1. Develop skills to manipulate, clean, and analyse data using Pandas, including creating various data visualizations.

2. Implement and analyse Mean, Median, Variance, Standard Deviation, etc.

3. Apply and evaluate machine learning algorithms such as KNN, Decision Trees, Random Forests, Naïve Bayes, SVM, and K-means for classification, regression, and clustering tasks.

Software Required for ML: Python/R/Weka

List of Experiments

1. Compute Central Tendency Measures: Mean, Median, Mode Measure of Dispersion: Variance, Standard Deviation.

2. Apply the following Pre-processing techniques for a given dataset. i. Attribute selection ii. Handling Missing Values iii. Discretization iv. Elimination of Outliers

3. Apply KNN algorithm for classification and regression

4. Demonstrate decision tree algorithm for a classification problem and perform parameter tuning for better results

5. Demonstrate decision tree algorithm for a regression problem

6. Apply Random Forest algorithm for classification and regression

7. Demonstrate Naïve Bayes Classification algorithm.

8. Apply Support Vector algorithm for classification

9. Demonstrate simple linear regression algorithm for a regression problem

10. Apply Logistic regression algorithm for a classification problem

11. Demonstrate Multi-layer Perceptron algorithm for a classification problem

12. Implement the K-means algorithm and apply it to the data you selected. Evaluate performance by measuring the sum of the Euclidean distance of each example from its class center. Test the performance of the algorithm as a function of the parameters K.

13. Demonstrate the use of Fuzzy C-Means Clustering

14. Demonstrate the use of Expectation Maximization based clustering algorithm