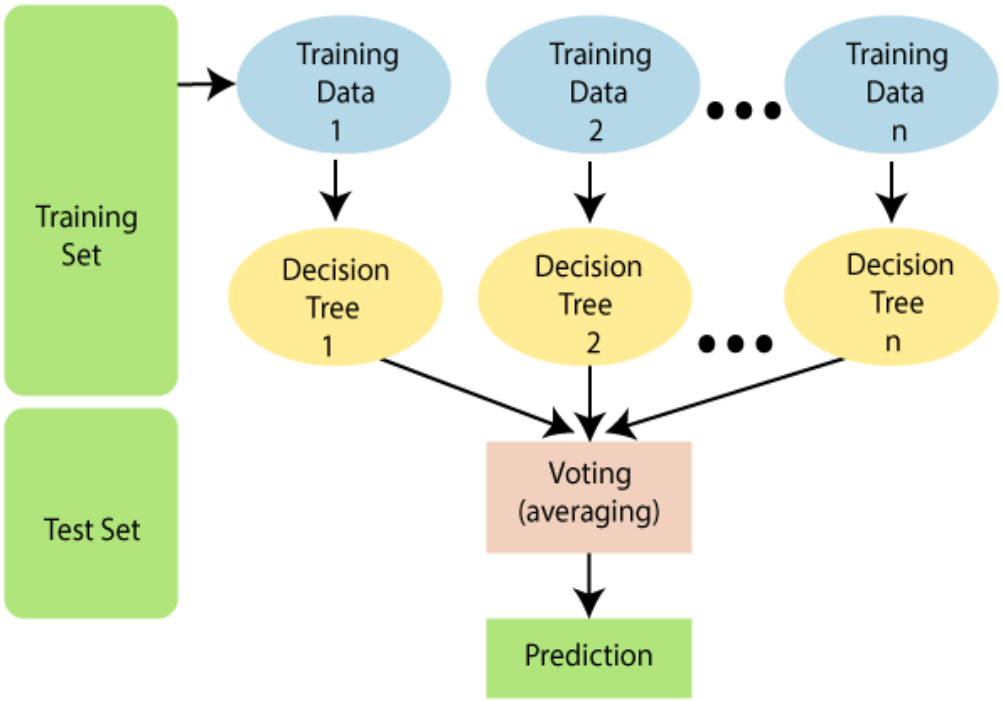
Machine Learning

Experiment No – 05

Aim: Random Forest Algorithm

Theory:

- Random Forest is a popular machine learning algorithm that belongs to the supervised learning technique. It can be used for both Classification and Regression problems in ML. It is based on the concept of ensemble learning, which is a process of combining multiple classifiers to solve a complex problem and to improve the performance of the model."
- As the name suggests, "Random Forest is a classifier that contains a number of decision trees on various subsets of the given dataset and takes the average to improve the predictive accuracy of that dataset." Instead of relying on one decision tree, the random forest takes the prediction from each tree and based on the majority votes of predictions, and it predicts the final output.
- The greater number of trees in the forest leads to higher accuracy and prevents the problem of overfitting.
- The below diagram explains the working of the Random Forest algorithm:



How does Random Forest algorithm work?:

- Random Forest works in two-phase first is to create the random forest by combining N decision tree, and second is to make predictions for each tree created in the first phase.
- The Working process can be explained in the below steps :

- **Step-1:** Select random K data points from the training set.
- **Step-2:** Build the decision trees associated with the selected data points (Subsets).
- **Step-3:** Choose the number N for decision trees that you want to build.
- **Step-4:** Repeat Step 1 & 2.
- **Step-5:** For new data points, find the predictions of each decision tree, and assign the new data points to the category that wins the majority votes.
- **Step-6:** If any reassignment occurs, then go to step-4 else go to FINISH.
- **Step-7:** The model is ready.

Implementation of Random Forest Algorithm

Write a program to implement Random Forest Algorithm for Classification and Take printout with output and attached

Questions:

1. Explain Ensemble Learning Technique
2. Difference Bagging and Boosting Technique

(Subject In-charge)

(Prof.S.B.Mehta)