**Practical 5**

**Aim:** The aim of Practical 5 is to implement ensemble algorithms.

**Problem Statement:** In this practical, we will explore ensemble algorithms using Python libraries. We will work with a dataset, perform undersampling to address class imbalance, prepare the data, and apply ensemble methods. Specifically, we will implement a random forest classifier and evaluate its performance using accuracy.

**Algorithms Used Theory:**

1. **Undersampling for Class Imbalance:** We address the issue of imbalanced data by using the undersampling approach. This approach reduces the number of observations for the majority class to balance it with the minority class.
2. **Data Preparation:** We prepare the dataset by normalizing the features to have the same scale. Normalizing the data helps improve the performance of some machine learning models.
3. **Train-Test Split:** The dataset is divided into training and testing sets to evaluate the model's performance.
4. **Random Forest Classifier:** We implement a random forest classifier, which is an ensemble method. The random forest classifier consists of multiple decision trees and combines their predictions to make more accurate classifications.

**Result Analysis:** We observe an accuracy of approximately 63.44% for the random forest classifier. This accuracy metric is used to assess the performance of the ensemble model.

**Conclusion:** Practical 5 demonstrates the implementation of ensemble algorithms, specifically the random forest classifier, to address imbalanced data and make accurate predictions. The accuracy achieved serves as an evaluation metric for the model's performance. Ensemble methods are valuable tools for improving classification accuracy in machine learning tasks.