Assignment Part 2:

In continuation of Assignment 1, answer the following questions considering the same dataset and the problem shared in part-1. The primary objective of this assignment is to deepen understanding and practical skills in machine learning model selection and evaluation, fine-tuning hyperparameters for each classifier to optimize their performance and then critically evaluate the results using various evaluation measures.

1) **Model Building [2.5 M]**

   Build ML models using K-Nearest Neighbors (K-NN), Naive Bayesian, Random Forest, and Adaboost

2) **Performance Evaluation [1 M]**

   Do the prediction for the test data and display the results for the inference. Evaluate the performance of each classifier using the following evaluation measures: Precision, Recall, F-score, Accuracy, and Misclassification Rate. Comment on the performance of these models. **Answer without comment will not be awarded marks.**

3) **Fine-Tuning Hyperparameters [2.5 M]**

   You are required to explore the hyperparameter space for each classifier, utilizing techniques such as grid search or randomized search, to find the optimal combination of parameters that maximizes performance metrics.

4) **Performance Evaluation [1 M]**

   After fine-tuning the hyperparameters, retrain all the models and evaluate the performance of each classifier using the following evaluation measures: Precision, Recall, F-score, Accuracy, and Misclassification Rate

5) **Comparison and Analysis [3]**

   Compare the performance of each classifier and provide a detailed analysis of the results. Recommend the ML model that, in your opinion, demonstrates the most favorable performance and justify your choice.

Note: The assignment is designed to foster critical thinking, problem-solving, and practical skills in machine learning model selection and evaluation.