Task 14: Model Comparison & Best Model Selection

Report

Objection:

The objective of this task is to evaluate and compare the performance of multiple machine learning models using key classification metrics such as accuracy, precision, recall, and F1-score. By training different algorithms on the same dataset and assessing them with consistent evaluation criteria, the task aims to identify the model that performs best and generalizes well on unseen data. This process helps in selecting the most suitable algorithm for real-world deployment based on performance and reliability.

Methodology:

In this task, I have loaded the dataset and performed preprocessing such as feature scaling. Then I have split the data into training and testing sets to ensure fair evaluation. Then I have Trained Multiple machine learning models, such as Logistic Regression, Decision Tree, Random Forest, and SVM, using same training data. Each model predicts results on the test data, and performance metrics like accuracy, precision, recall, and F1-score are calculated. The evaluation results are stored in a comparison table for analysis. I have created the visualization to compare model performances graphically. Based on the evaluation of metrics and generalization ability, the best-performing model is selected and saved for future use.

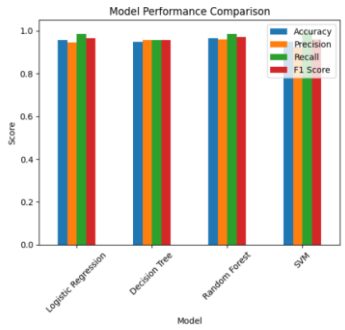

Fig1: performance comparison plot between score and models

Conclusion:

This task demonstrated how different machine learning algorithms can be systematically evaluated and compared using standard performance metrics. By training multiple models on the same dataset and assessing them with accuracy, precision, recall, and F1-score, it was possible to identify the model that performs best and generalizes well to unseen data. The comparison process highlights that no single algorithm is universally optimal, and model selection should be based on objective evaluation results. The best-performing model was selected and saved, completing a practical workflow like real-world machine learning model selection and deployment.