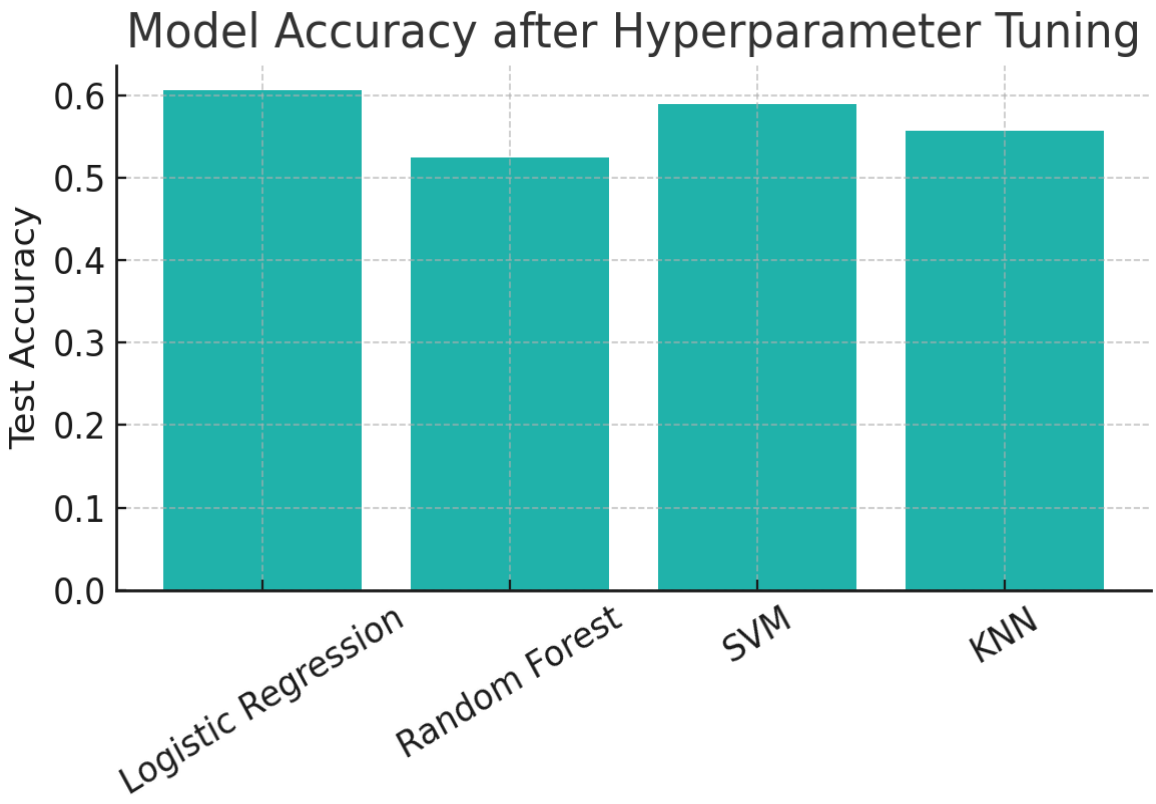
Phase 6 – Hyperparameter Tuning Report

This report presents the results of Phase 6 in the Heart Disease Prediction project. In this phase, hyperparameter tuning was applied to four supervised learning models (Logistic Regression, Random Forest, SVM, KNN) using RandomizedSearchCV. The goal was to improve their performance by selecting the best hyperparameters.

Model	Best Params	Test Accuracy
Logistic Regression	{'solver': 'lbfgs', 'penalty': 'l2', 'C': np.float64(1.6681005372000592)}	0.607
Random Forest	{'n_estimators': 100, 'min_samples_split': 5, 'max_depth': 5}	0.525
SVM	{'kernel': 'linear', 'gamma': 'scale', 'C': np.float64(0.5994842503189409)}	0.590
KNN	{'weights': 'uniform', 'n_neighbors': 12}	0.557

Comparison of Model Accuracies:



The results show that Logistic Regression achieved the highest accuracy after tuning (~0.607). SVM performed close (~0.590), while Random Forest (~0.525) and KNN (~0.557) showed lower accuracy. This indicates that for this dataset, simpler models like Logistic Regression can generalize better. Hyperparameter tuning provided insights into model behavior and ensured fair comparison between algorithms.