Model Development Phase

Date	28 July 2025
Project Title	Flight Delays Prediction Using Machine Learning
Maximum Marks	6 Marks

Model Selection Report:

In the forthcoming Model Selection Report, various models are outlined, detailing their descriptions, hyperparameters, and performance metrics, including Accuracy, Precision, Recall, and F1 Score. This report highlights the selected models' effectiveness in predicting flight delays.

Model	Description	Hyperparameter	Performance Metric
Decision Tree	Simple, interpretable tree-based model; captures non-linear relationships and works well on tabular flight data.	Default (random_state=0)	Accuracy Score = 98.9%
Random Forest	Ensemble of decision trees; reduces overfitting, handles feature interactions effectively.	n_estimators=100, max_depth=None, random_state=0, n_jobs=-1	Accuracy Score = 90.7%

SVM	Uses hyperplanes to separate classes; effective on standardized features but slower on larger datasets.	kernel='linear', C=1.0, gamma='scale', random_state=0	Accuracy Score = 80.2%
LGBM	Gradient boosting framework optimized for speed and accuracy; handles large-scale data efficiently.	n_estimators=100, learning_rate=0.1, random_state=0	Accuracy Score = 97.5%