

Customer Booking Prediction Model

Machine Learning Analysis for Airline Industry

50,000

Total Records

14

Features

68.6%

Incomplete Bookings

31.4%

Completed Bookings

Business Challenge

Predicting customer booking completion to optimize conversion rates and reduce abandonment in the airline booking process.

Dataset Overview

Comprehensive dataset including passenger preferences, flight details, booking patterns, and completion status across multiple continents.

Model Performance Analysis

Random Forest Classifier Results

All Features Model

88.05%

Features: 20 variables

AUC: 0.818

Training Accuracy: 99.98%

Top 4 Features Model

85.73%

Features: booking_origin, length_of_stay, flight_duration, purchase_lead

Training Accuracy: 96.92%

Model Selection

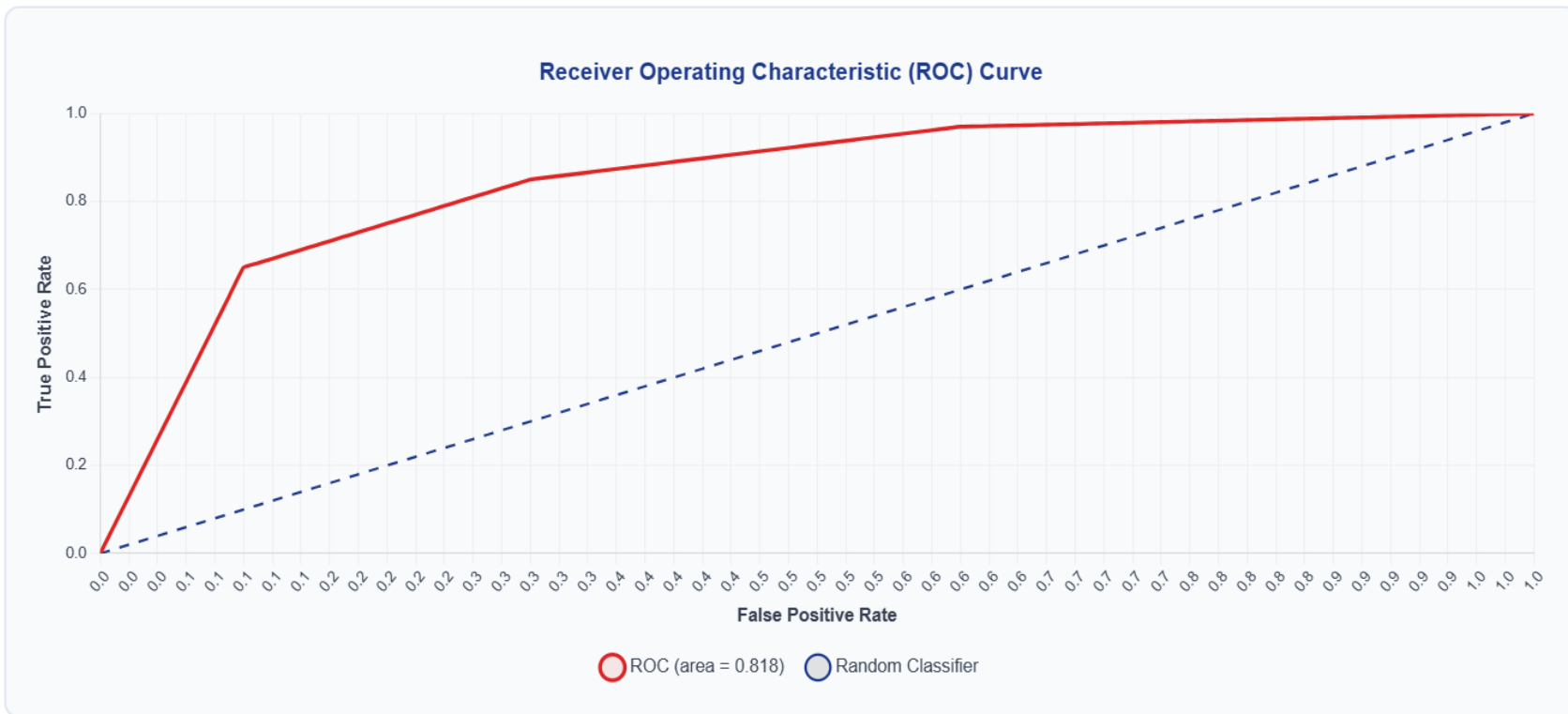
The all-features model demonstrates superior performance with 88.05% accuracy and strong generalization capability.

Overfitting Analysis

High training accuracy (99.98%) vs test accuracy (88.05%) suggests some overfitting, but performance remains robust.

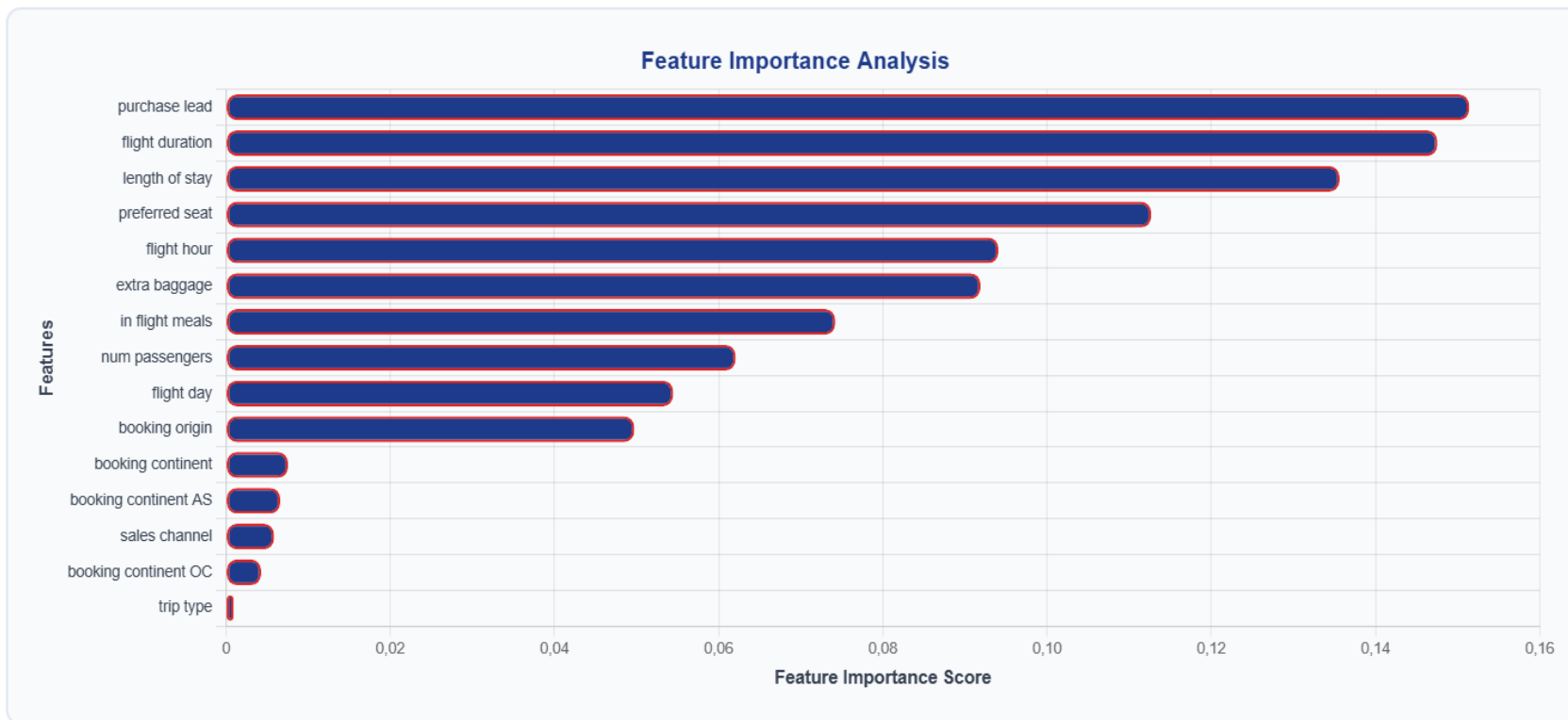
ROC Curve Analysis

Model Classification Performance



Feature Importance Ranking

Key Drivers of Booking Completion



Critical Success Factors

Detailed Analysis of Most Influential Variables

Purchase Lead Time

15.14%

Flight Duration

14.75%

Length of Stay

13.56%

Preferred Seat Request

11.27%

Flight Hour

9.41%

Extra Baggage Request

9.19%

In-flight Meals

7.42%

Number of Passengers

6.21%

Planning Behavior

Early booking patterns and trip duration planning are critical indicators of customer commitment to complete purchases.

Service Value Perception

Customers requesting premium services (preferred seats, extra baggage, meals) show higher booking completion rates.

Strategic Recommendations

Model Implementation: Deploy the Random Forest model with 88.05% accuracy to identify high-risk booking abandonment cases in real-time.

Customer Segmentation: Focus retention efforts on customers with short purchase lead times and basic service preferences, as they show higher abandonment risk.

Revenue Optimization: Implement targeted interventions for bookings with specific flight duration and timing patterns to maximize completion rates.

Operational Excellence: Leverage feature importance insights to optimize booking flow and reduce friction points in the customer journey.

Next Steps: A/B test intervention strategies, implement real-time scoring, and continuously monitor model performance with new data.