



## Predicting Holiday Bookings Using Machine Learning

### Objectives:

1. Predict booking completion using customer data.
2. Identify key drivers of booking behavior.

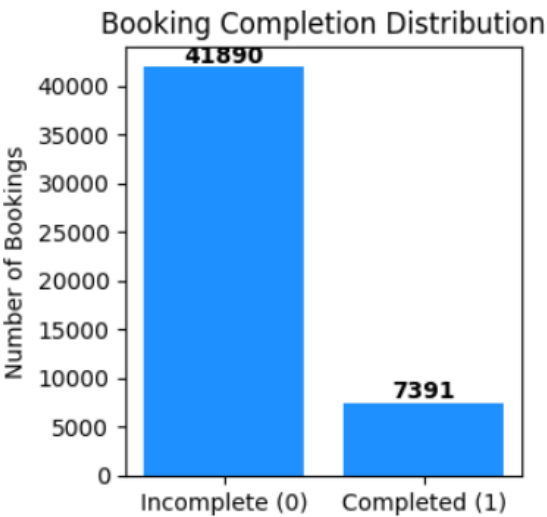
### Methodologies:

1. Cleaned and encoded over 50,000 customer booking records.
2. Engineered key features such as weekend booking, early booking, and short stay.
3. Trained a Random Forest Classifier model for prediction.

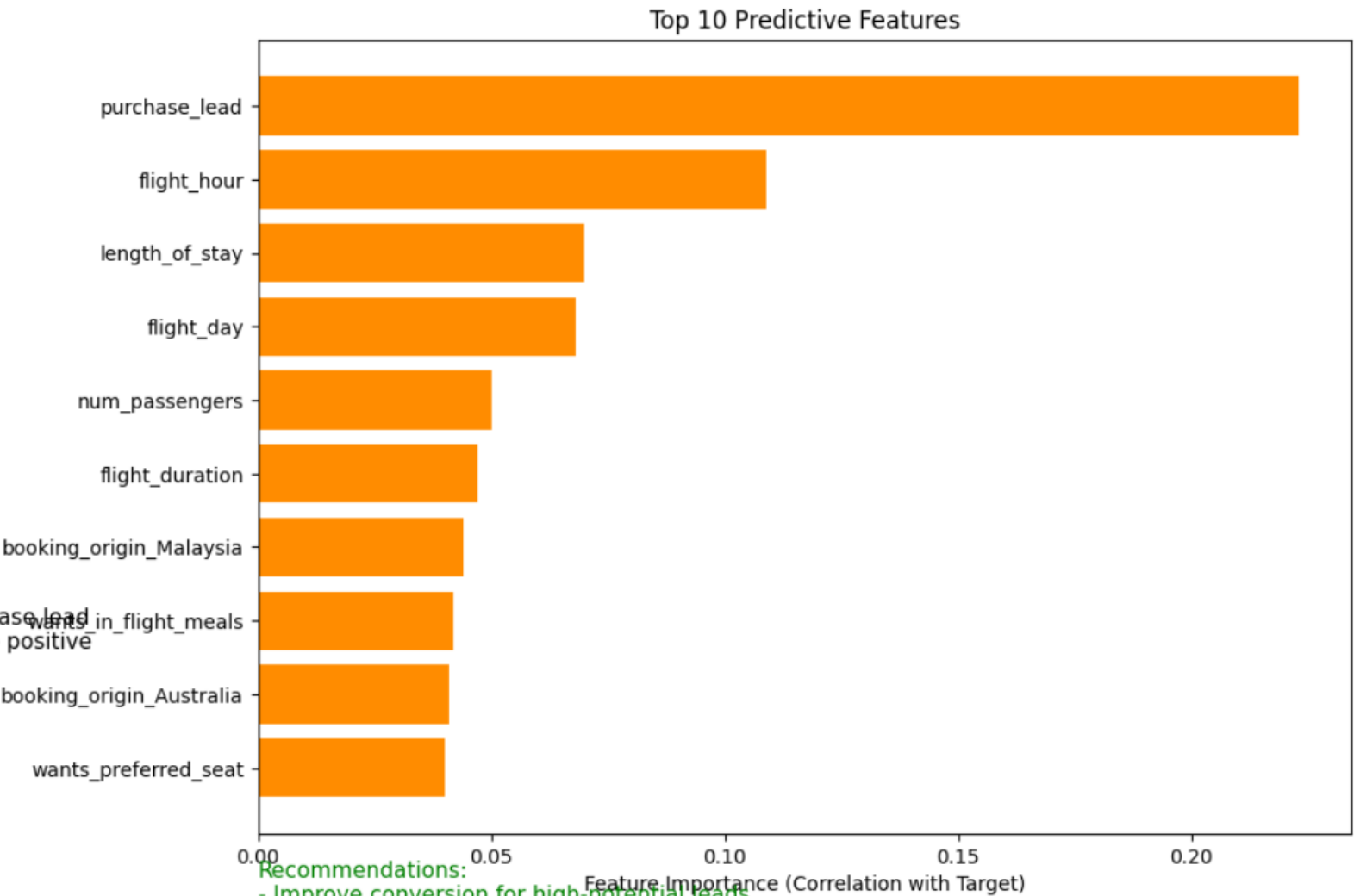
### Model Performance:

1. **Accuracy:** 84.6% — the model correctly predicts booking completion in most cases.
2. **Class Imbalance:**
  - Incomplete bookings (0): Precision 0.86, Recall 0.97, F1-score 0.92 → very good at identifying incomplete bookings.
  - Completed bookings (1): Precision 0.45, Recall 0.12, F1-score 0.19 → struggles due to fewer completed bookings.
3. **Observation:** The model is biased towards the majority class (incomplete bookings), which is expected given the data imbalance.

# British Airways Customer Booking Model - Key Findings



- Dataset Overview:
- 49,281 records, 14 features
  - No missing values, duplicates removed
  - Majority bookings incomplete (0)
  - Most bookings: 1-2 passengers, short purchase lead
  - Minor correlations: meals & seat preference positive



- Recommendations:
- Improve conversion for high-potential leads
  - Address class imbalance in future iterations
  - Deploy model for proactive customer engagement



## **Top Predictive Features**

1. Purchase\_Lead
2. Flight\_Hours
3. Length\_Of\_Stay
4. Flight\_Day
5. Num\_Passangers

## **Recommendations**

- 1.Improve conversion for high-importance features (based on correlation analysis)
2. Address class imbalance in future model iterations
- 3.Deploy model for proactive customer engagement.