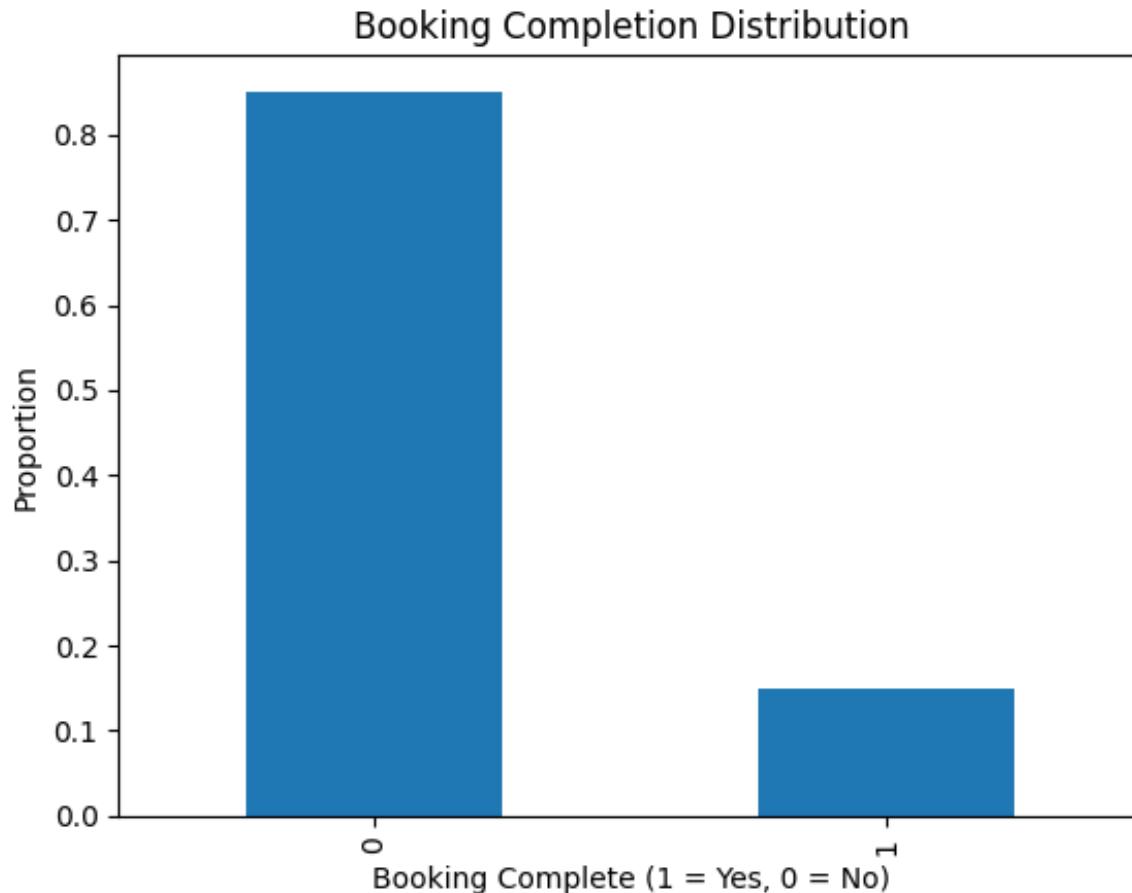


Predicting Customer Booking Behaviour

KRISNA G HEGDE | April 2025

Class Distribution Before and After SMOTE

 This highlights how the SMOTE technique balanced the dataset by oversampling the minority class.



Final Model Performance – Classification Report Table

 This shows how well the model distinguishes between bookings completed and not completed.

Metric	Class 0 (Not Booked)	Class 1 (Booked)	Macro Avg	Weighted Avg
Precision	0.89	0.94	0.92	0.92
Recall	0.95	0.88	0.91	0.91
F1-Score	0.92	0.91	0.91	0.91
Support	8,444	8,565	17,009	17,009
Accuracy				0.91

- The final model achieved **91% accuracy** with balanced precision and recall. It effectively predicts both bookings and non-bookings, making it reliable for customer behavior prediction.

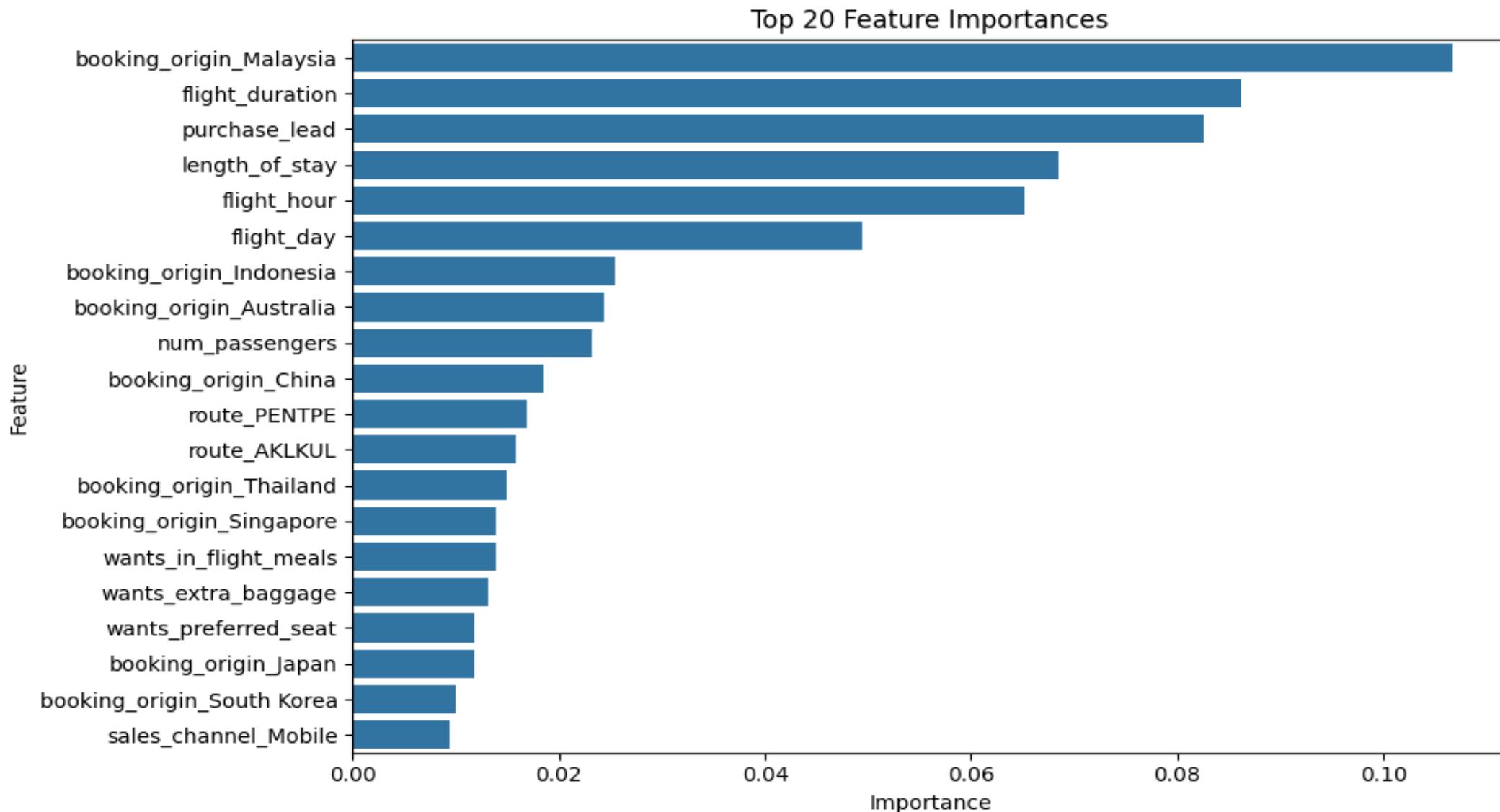
Final Model Performance – Confusion Matrix

	Predicted: No Booking (0)	Predicted: Booking (1)
Actual: No (0)	7990	454
Actual: Yes (1)	1016	7549

Confusion Matrix Summary:

- **True Positives (7549):** Customers who actually booked and were correctly predicted as booking.
- **True Negatives (7990):** Customers who didn't book and were correctly predicted as non-booking.
- **False Positives (454):** Customers predicted to book, but didn't actually book.
- **False Negatives (1016):** Customers predicted as non-booking, but actually booked.

Top Predictors of Booking Completion



Top Influential Features:

-  **booking_origin_Malaysia** – Strongest predictor of booking behavior
-  **flight_duration, purchase_lead, length_of_stay** – Key travel planning factors
-  **flight_hour** and  **flight_day** – Timing impacts booking likelihood
-  **num_passengers** – Group size plays a moderate role
-  **route_PENTPE, route_AKLKUL** – Specific routes influence decisions
-  **Passenger Preferences** – In-flight meals, baggage, and seat selection matter
-  **sales_channel_Mobile** – Booking channel has some influence

Summary & Recommendations

Key Takeaways:

- The model achieved **91% accuracy** with balanced performance on both classes after applying SMOTE.
- **Class imbalance** was effectively handled using SMOTE, improving the prediction of booking behavior.
- Top features contributing to booking prediction include:
 -  booking_origin_Malaysia
 -  flight_duration, purchase_lead, length_of_stay
 -  flight_hour,  flight_day
 -  num_passengers
 -  route_PENTPE, route_AKLKUL
 -  Passenger preferences (in-flight meals, extra baggage, seat selection)
 -  sales_channel_Mobile

Recommendations:

- **Target marketing efforts** on customers with short purchase leads and longer stays.
- **Promote premium add-ons** (like extra baggage, preferred seats) as they indicate higher booking intent.
- Continue to **monitor model performance** and retrain periodically with fresh data.