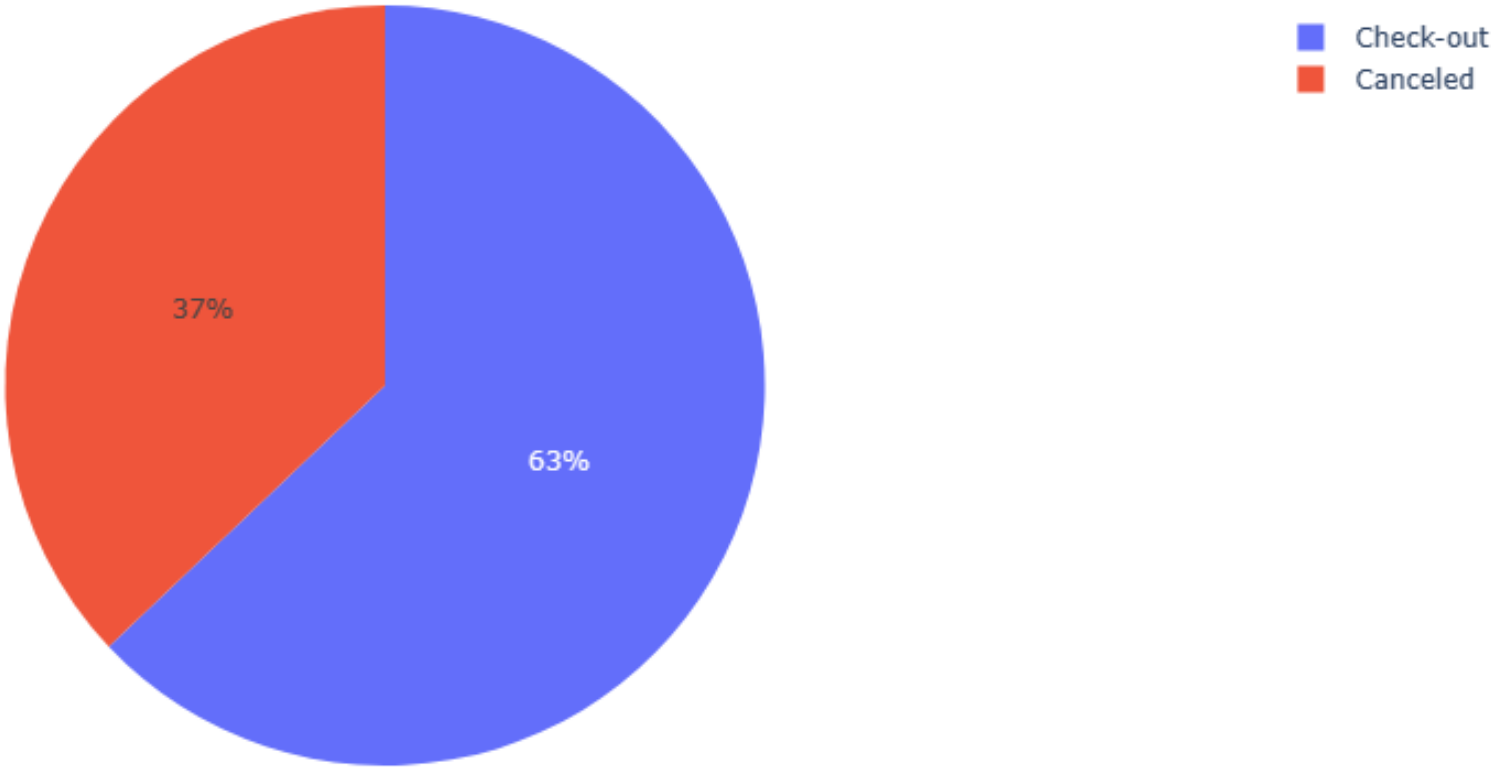


Hospitality AI-ML Case Study

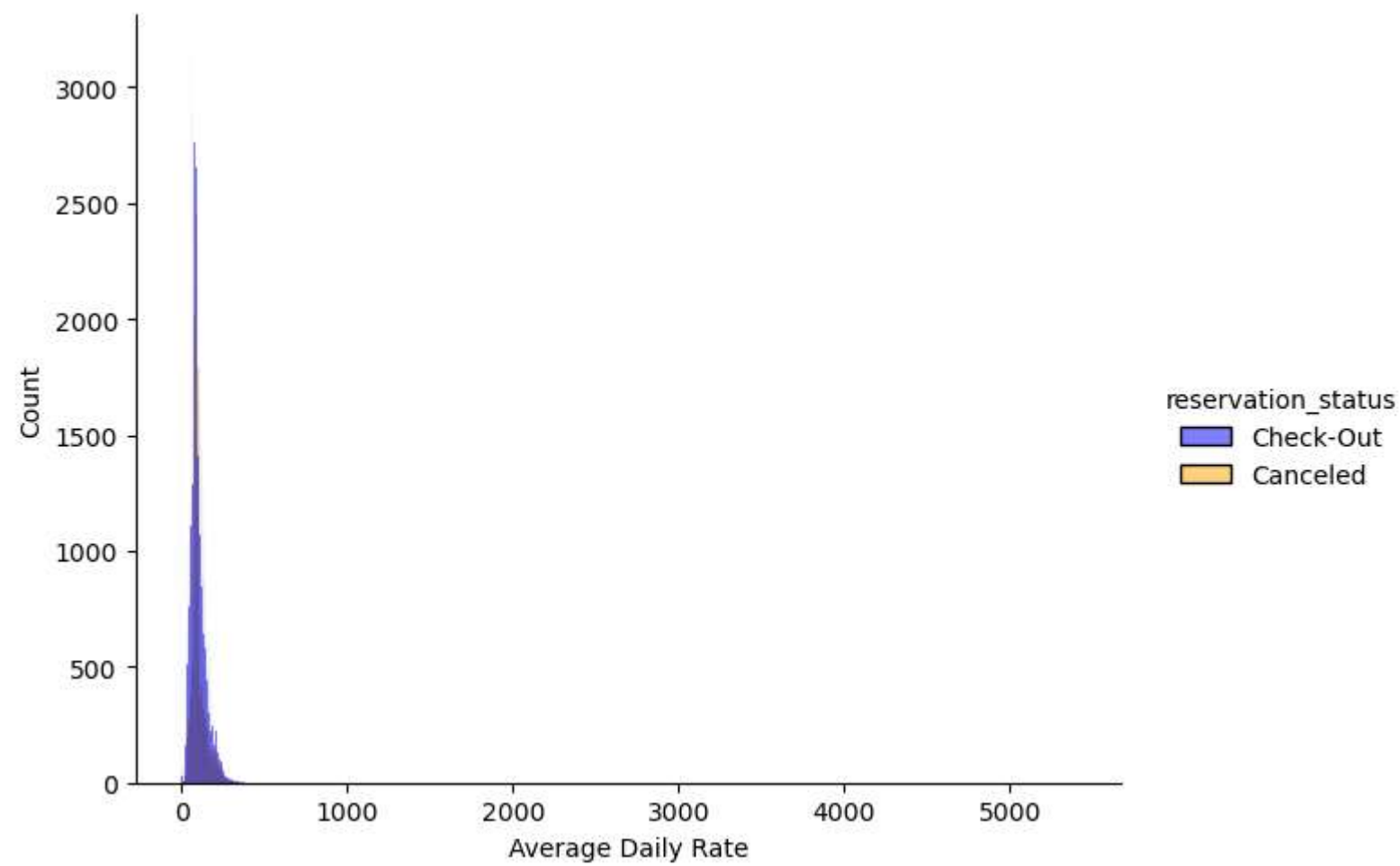
The hospitality industry heavily relies on the efficient management of hotel bookings to maintain customer satisfaction and maximize revenue. One important aspect of this is predicting the reservation status of hotel bookings, such as whether a reservation is going to be confirmed, cancelled. Auto-ML algorithms can be trained on historical data to identify patterns and predict the reservation status of future bookings. This can help hotel management to allocate resources effectively and make informed decisions to minimize losses due to cancellations and no-shows, while ensuring that they have enough rooms available to meet demand. In this study, we aim to develop a model to accurately classify the reservation status of hotel bookings based on various features such as booking time, room type, and customer profile.

Class Distribution

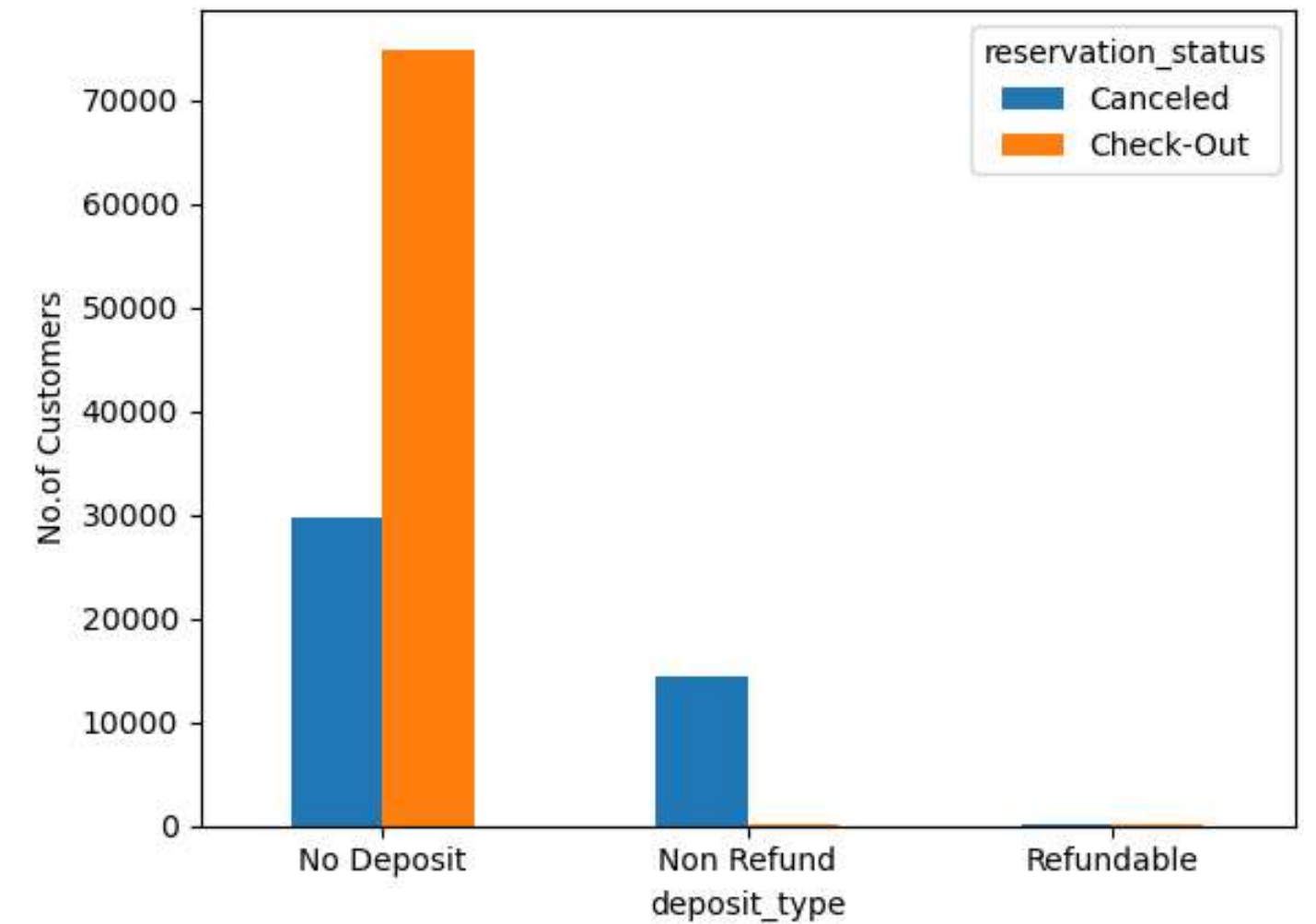


Booking Status	Count
Check-out	75166
Canceled	44224

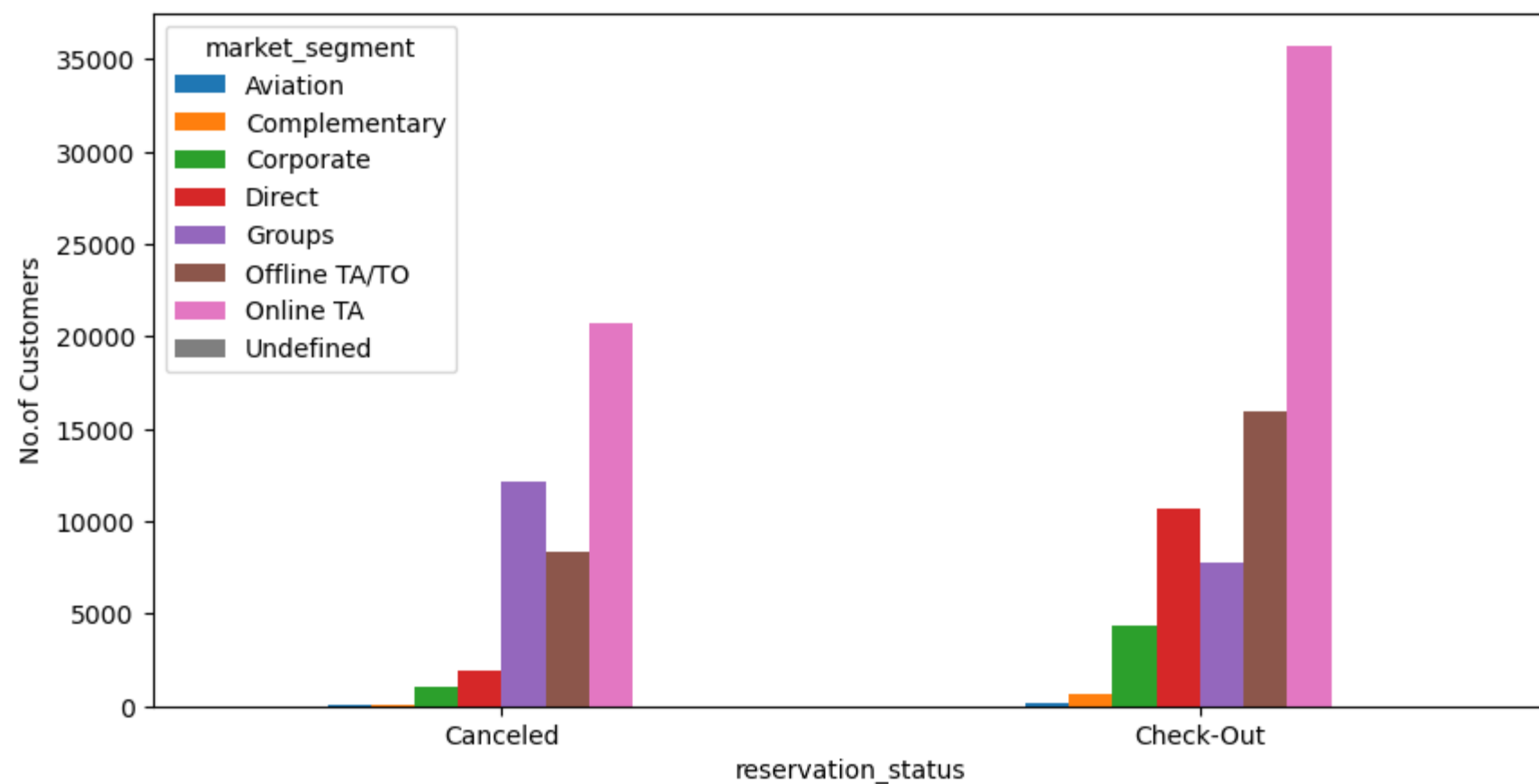
Features Responsible



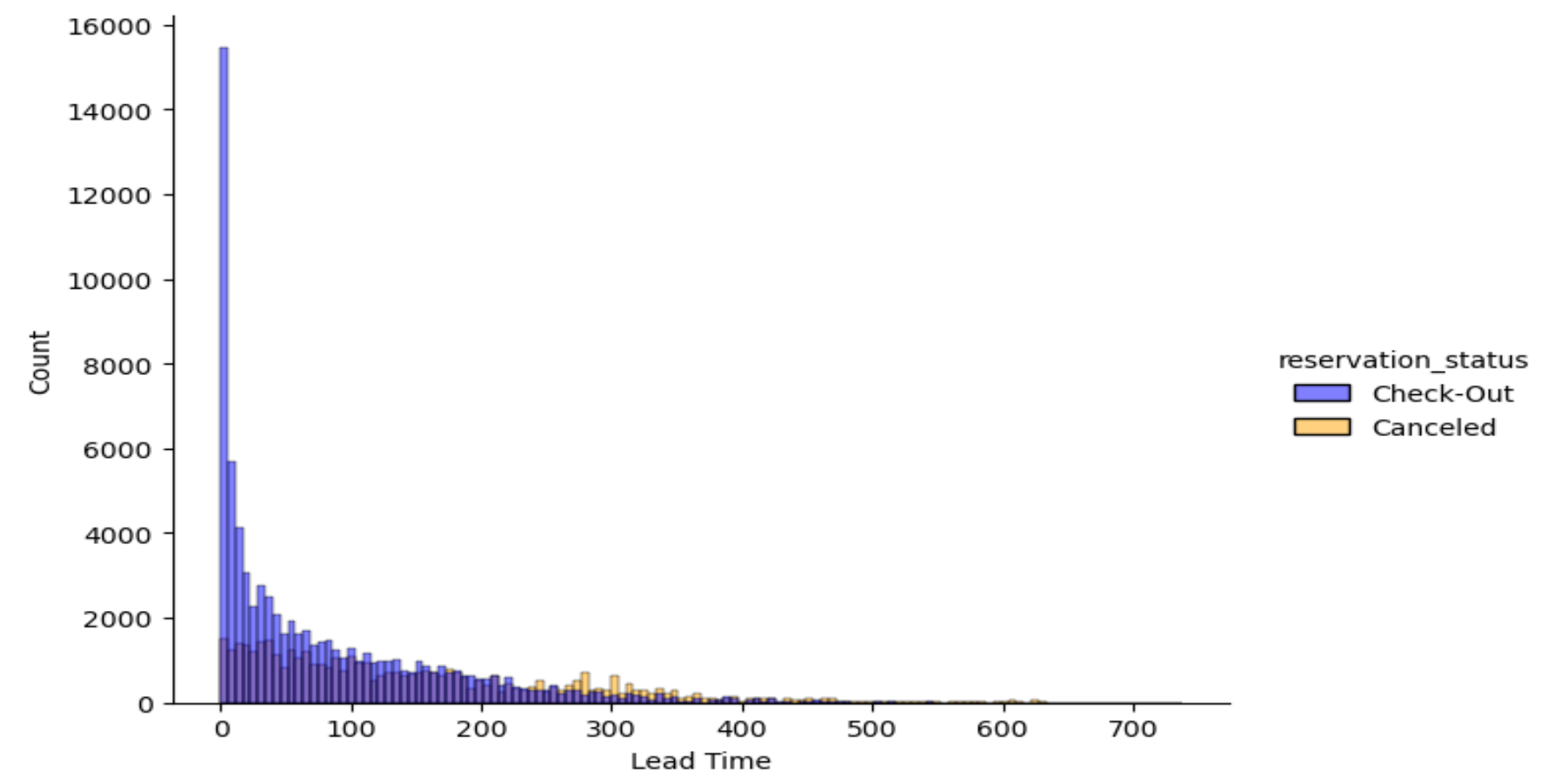
Average Daily Rate: The average daily rate (ADR) measures the average rental revenue earned for an occupied room per day. Calculated by dividing the sum of all lodging transactions by the total number of staying nights.



Deposit Type: Indication on if the customer made a deposit to guarantee the booking. No Deposit, Non-Refund and Refundable are the available types of deposit.



Market segments in hotel booking refer to the different types of third party agents who provide services to help customers to book a hotel room based on their specific needs, preferences, and characteristics



Lead Time: Number of days that elapsed between the entering date of the booking into the Hotel Property Management System and the arrival date.

Auto-ML Methodology Results

Case	Percentile	No. of Features	Random Forest	Decision Tree	XGBoost	ANN	MLP	Avg. Accuracy
Case 1	25	25	94.16	82.43	94.91	79.07	89.9	88.09
Case 2	50	49	95.96	84.64	97.9	96.78	99.34	94.92
Case 3	75	73	97.02	87.47	99.57	77.75	99.36	92.23
Case 4	90	88	96.98	87.45	99.59	78.74	99.05	92.36

- Based on our observation , XGBoost was the best performing algorithm with 99.59% accuracy in 90th percentile.
- 50th percentile is the best percentile with an average accuracy of 94.92%.

Conclusion

In conclusion, predicting the reservation status of hotel bookings is an important task for the hospitality industry to optimize hotel occupancy and revenue. Through the use of Auto-ML algorithms, we can accurately classify whether a hotel booking will be cancelled, or check-out. This can help hotels better manage their resources and improve their overall performance. This data set contains booking information for a city hotel and a resort hotel, and includes information such as when the booking was made, length of stay, the number of adults, children, and/or babies, and the number of available parking spaces, among other things. The dataset has 1,19,390 records with 16 Categorical Features and 14 Numerical Features. 63% of the dataset shows reservation status for the hotel bookings are Checked-out.

For classification, models were created with algorithms using Auto-ML techniques like Decision Tree, Recurrent Neural Network, Multilayer Perceptron, Random forest and XGBoost . With these models, performance measurement values were obtained for feature sets of 25, 49, 73 and 88. The Auto-ML algorithms were able to predict whether a hotel booking reservation status is canceled or checked out with an average accuracy between 88% – 95% and helped to identify factors that determine hotel booking reservation status . The major factors include Lead time, Average daily rate, Deposit type and Market segment. When the results are examined, it is observed that with the addition of each new feature, the success of classification decreased. Based on the performance measurement values obtained, it is possible to say that the study achieved success in classifying whether a hotel booking reservation status is canceled or checked out.

Overall, Auto-ML is a powerful tool for the hospitality industry, offering businesses the ability to improve the booking experience for their customers through personalized recommendations and optimized pricing strategies. By leveraging Auto-ML, hotels and resorts can enhance customer satisfaction and increase revenue, leading to long-term success.