AIRLINE CUSTOMER SATISFACTION

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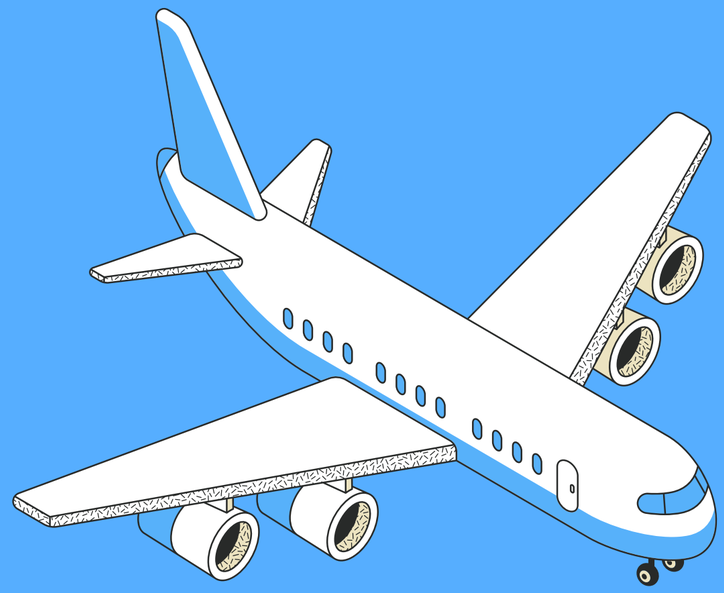


OUR TEAM

Akshay Thirumal

Henry Wan

Karim Alami

Meghana Nekkanti

PROBLEM OVERVIEW

Predict future customer satisfaction for Invistco Airlines based on collected feedback from passengers

Identify the factors that influence customer satisfaction and determine the feasibility of converting neutral and dissatisfied customers into satisfied passengers

EXPLORATORY DATA ANALYSIS

DATA SET DESCRIPTION

Source

- https://www.kaggle.com/datasets/teejmahal20/airline-passenger-satisfaction

Collection Date

- May 5th, 2023

Total number of Records

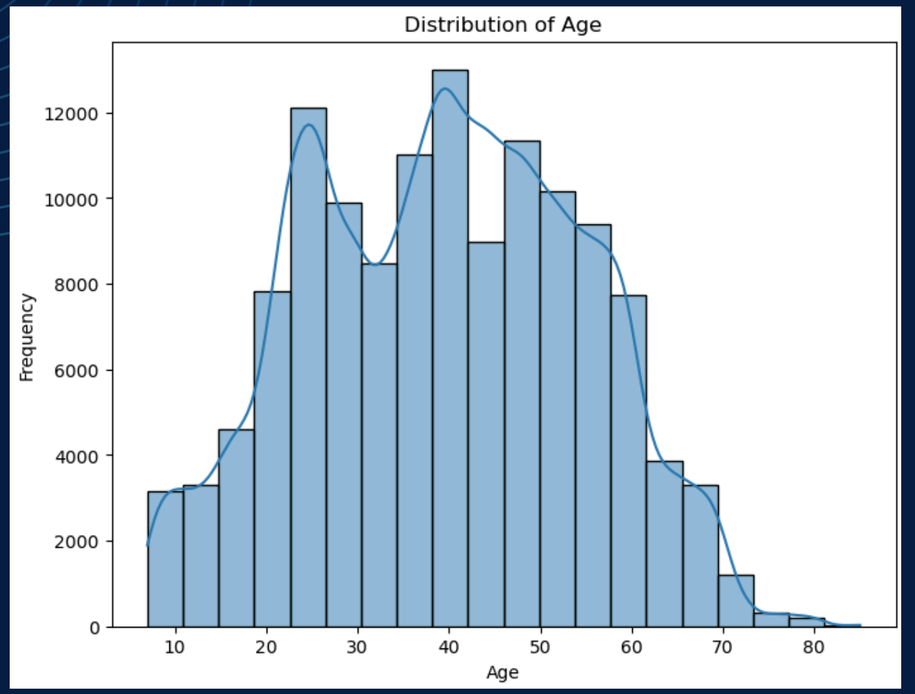
- 129,880 rows

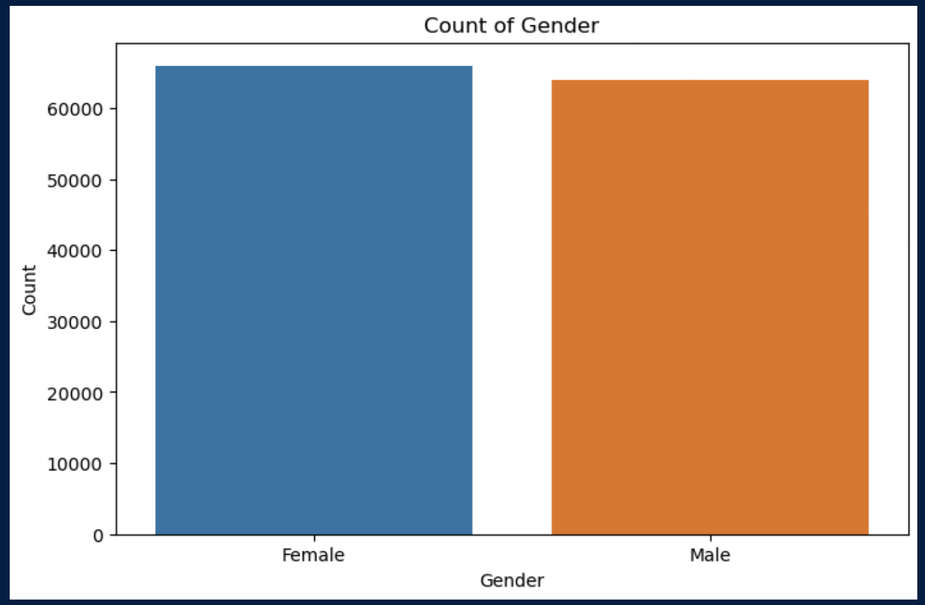
Variables

- 23 columns
- Categorial ratings from 1 to 5
- Numerical
- VARCHAR

Passenger Demographics

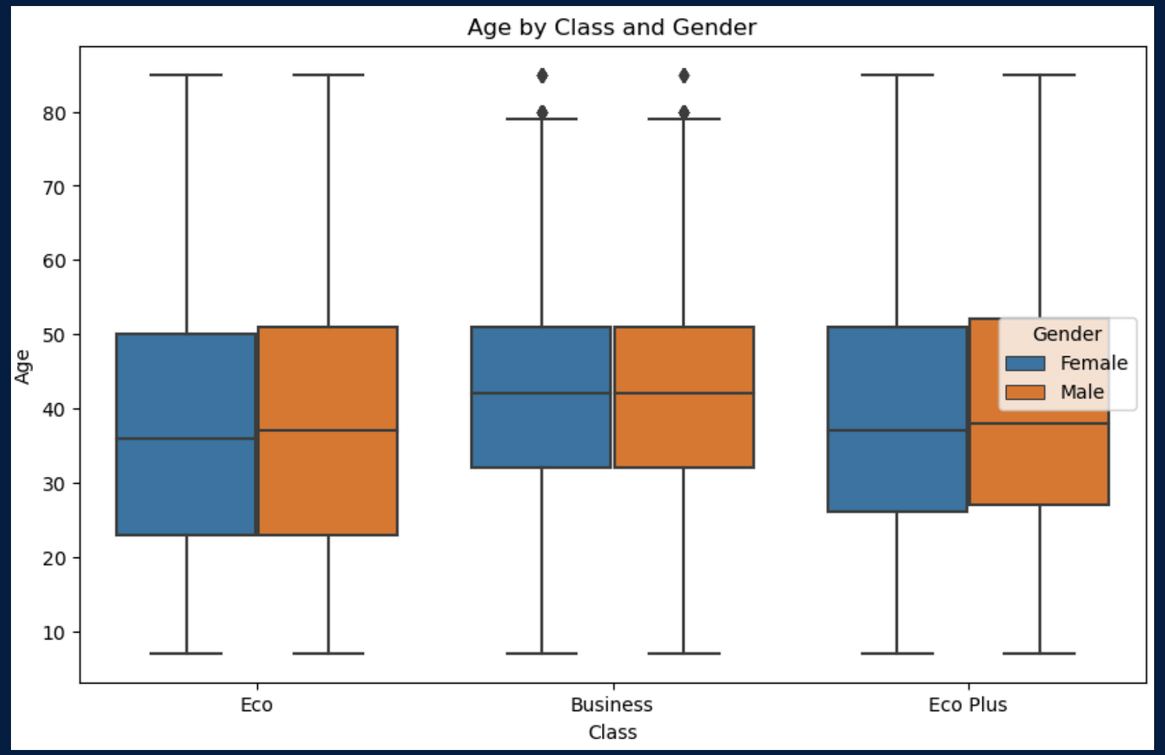
- The age distribution falls from 7 to 85 years old
- The majority of the passengers range from 20 to 60 years old
- The gender breakdown is 51% Female (52,727) to 49% Male (51,177)





Passenger Demographics

- Business class has a higher median age compared to Eco and Eco plus
- Business class also has lower max age with the exception of outliers
- All classes tend to have a diverse mix of gender and ages

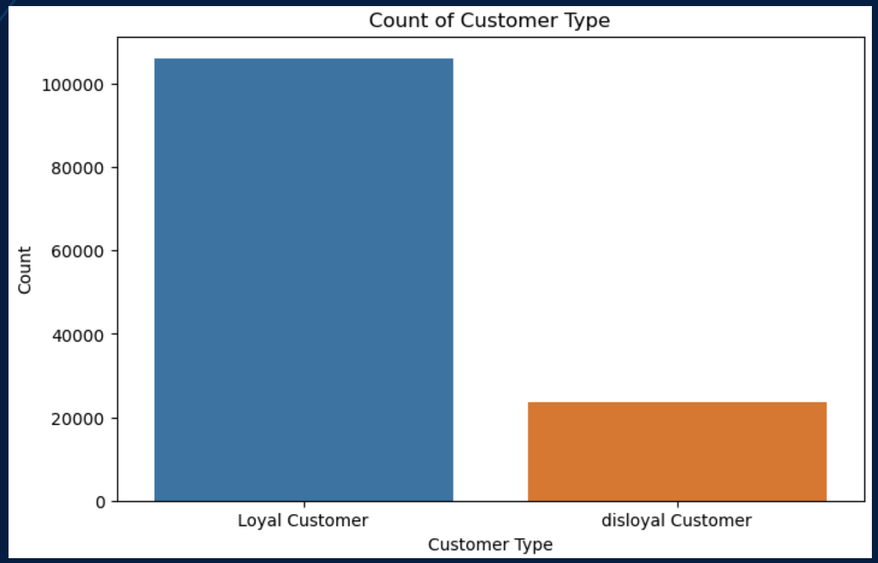


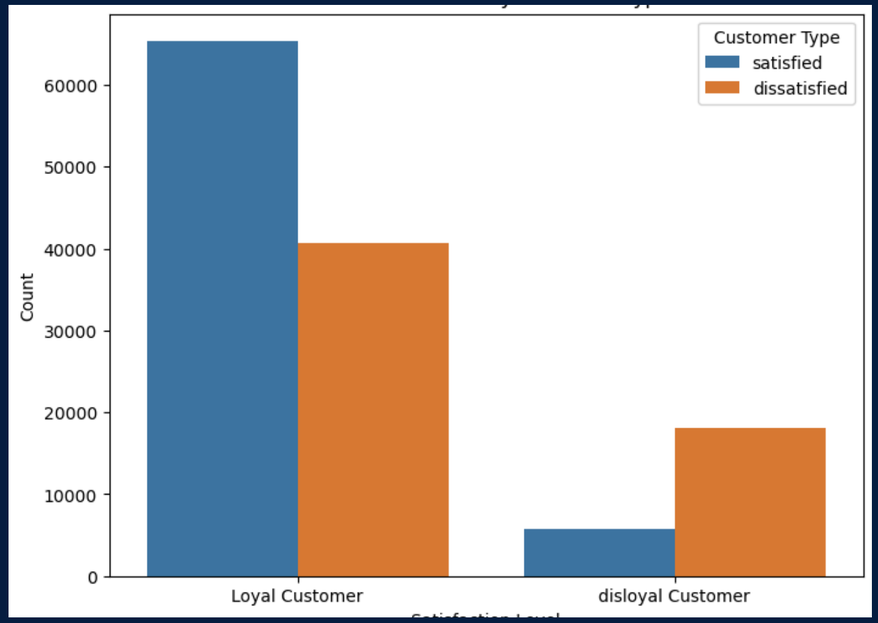
Passenger Demographics

- The vast majority of passengers responding to the survey are classified as Loyal customers

- 82% of respondents are loyal customers compared to 18% disloyal customers

- When we segment the satisfaction by customer type, loyal customers are mostly satisfied and disloyal customers are overwhelmingly dissatisfied



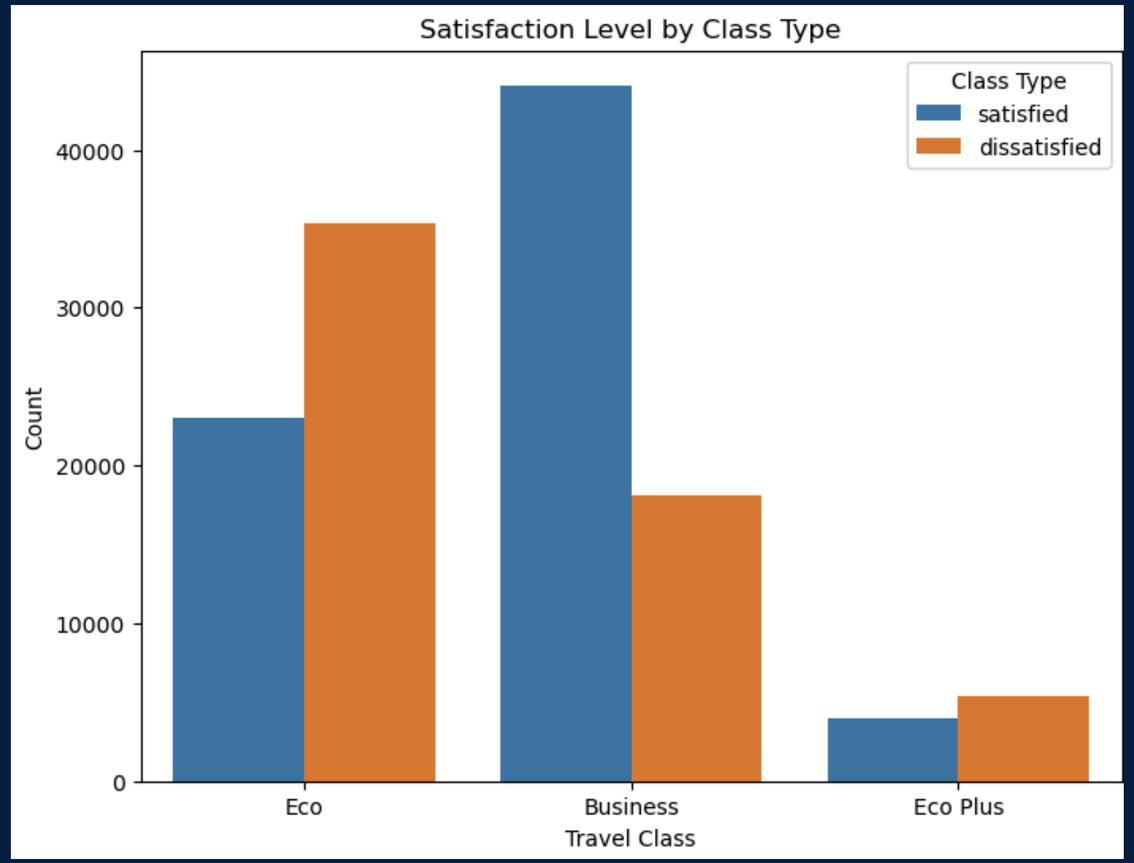


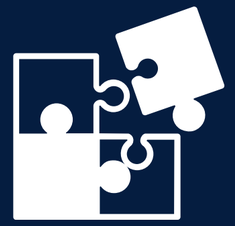
Passenger Demographics

- When we breakdown the class type, we can see that the majority of passengers in Economy class are dissatisfied with their experience

- The majority of business class travelers are satisfied with their experience

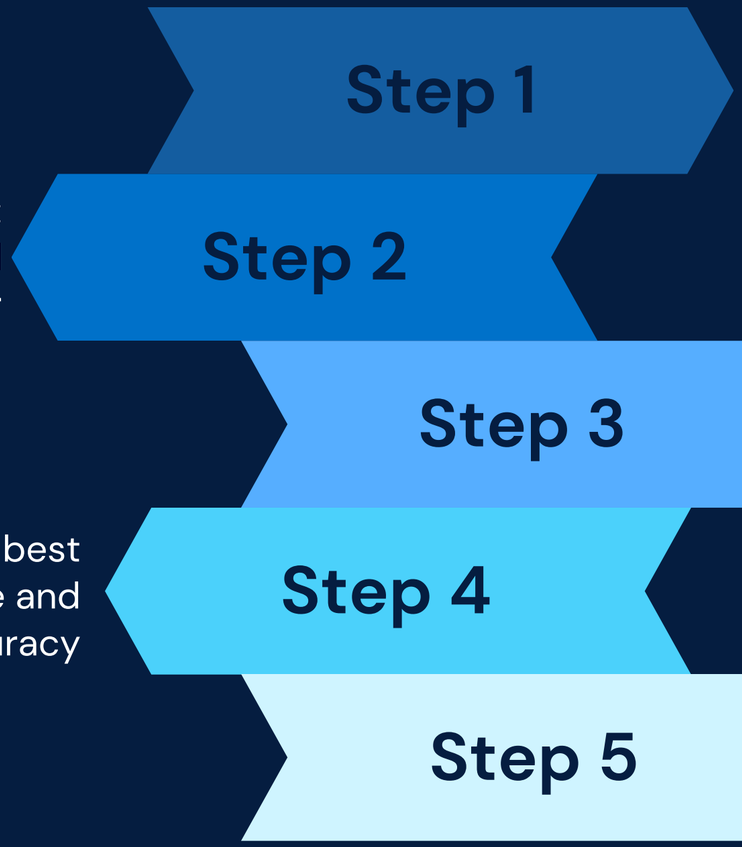
- The experience of Economy Plus passengers is a mixed result, more than half of the passengers are unhappy with their flight experience





METHODOLOGY

Prediction Performance



Run the following models on the dataset: Logistic Classifier, Decision Tree Classifier, Bagging Classifier, Random Forest Classifier, Gradient Classifier and K Nearest Neighbour Classifier

Subset the data based on the following: Class Type, Gender, Age, Type of Travel and Type of Customer

Run the above mentioned models on all the subsets

Identify which model performs best based on Area Under Curve and Accuracy

Use the chosen model to perfrom Business Decision prediction

Business Decision

01 Choose the model with the highest Accuracy and AUC
Train the data of the subset group

02 Perform Recursive Feature Elimination (RFE) on the above mentioned model and train again with the new data

03 Increase satisfaction level of the top 3 features
Train the model with this data

04 Calculate the predictions with the increased satisfaction level and compare with predictions in step 2

DECISION PERFORMANCE

INITIAL ASSUMPTIONS

COSTS

1. Flight Distance: $400
2. Inflight Wifi Service: $80
3. Ease of Online Booking: $60
4. Gate location: $140
5. Food and Drink: $100
6. Online Boarding: $70
7. Seat Comfort: $110
8. Inflight Entertainment: $50
9. On-board Service: $30
10. Leg-room Service: $500 (Bigger plane impractical)
11. Baggage Handling: $20
12. Check-in Service: $20
13. Inflight Service: $40
14. Cleanliness: $20

PROFIT

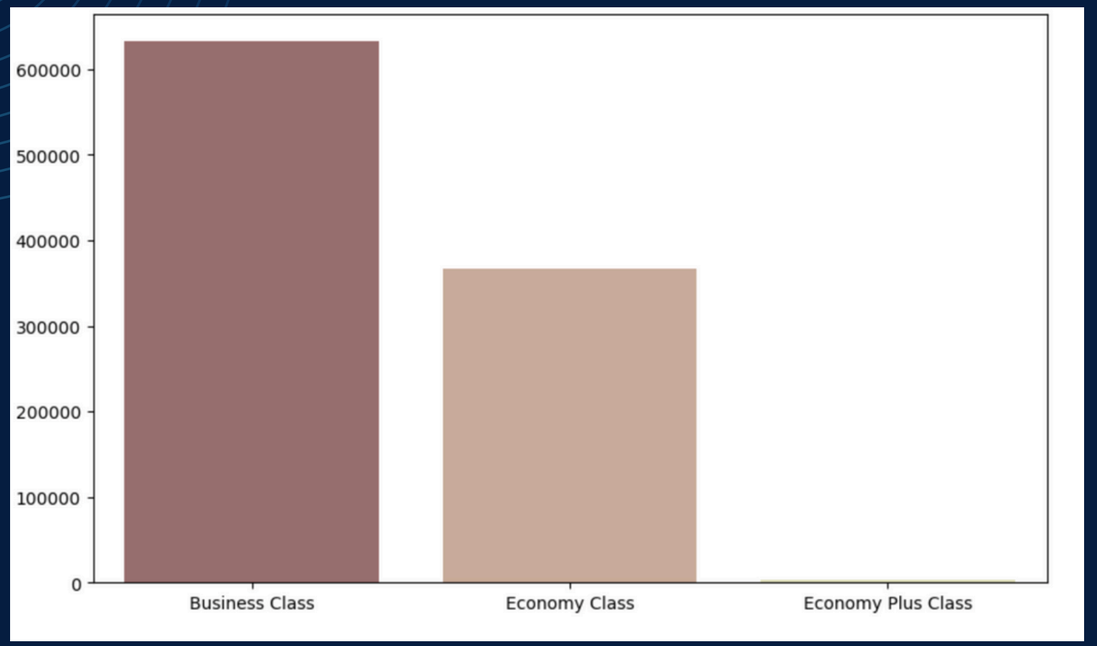
$500 per changed

Changed =
Initial data is dissatisfied
New trained data predicts satisfied

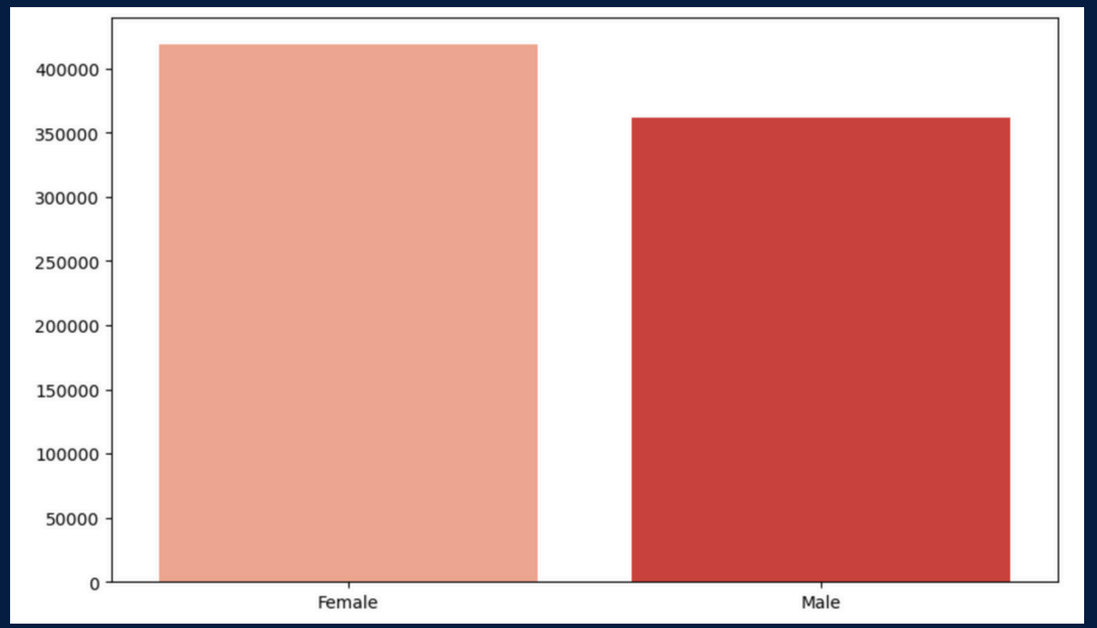
Total Profits

Estimated Profits for:

- Business Class: $632,500
- Economy Class: $367,000
- Economy Plus Class: $3,500



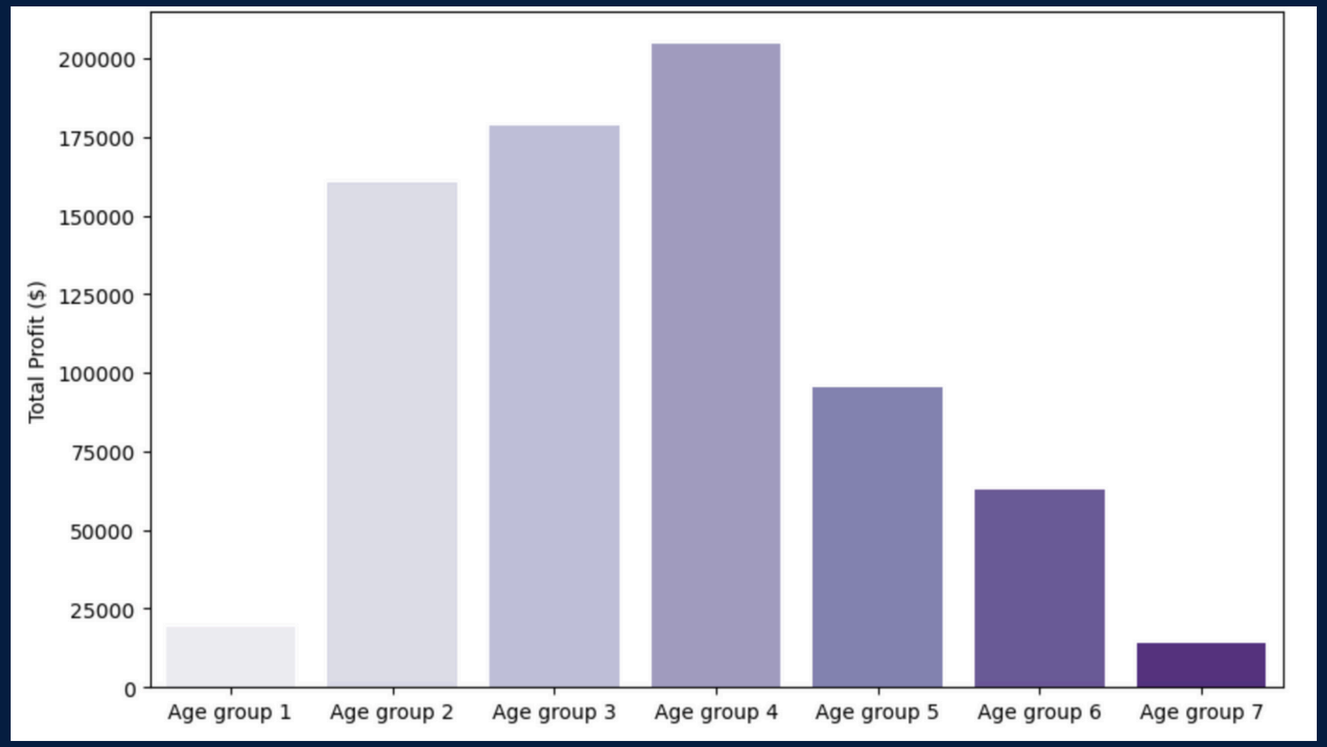
- Female group: $418,500
- Male group: $362,000



Total Profits

Estimated Profits for:

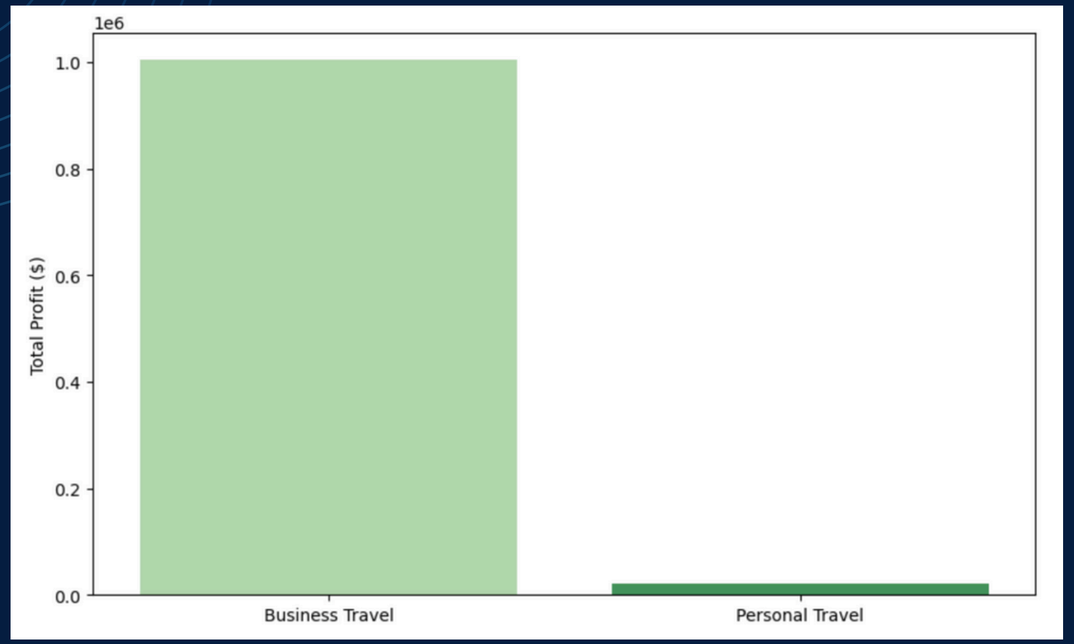
- Age group 1 (6-18): $19,000
- Age group 2 (19-24): $160,500
- Age group 3 (25-34): $178,500
- Age group 4 (35-44): $204,500
- Age group 5 (45-54): $95,500
- Age group 6 (55-64): $63,000
- Age group 7 (> 65): $14,000



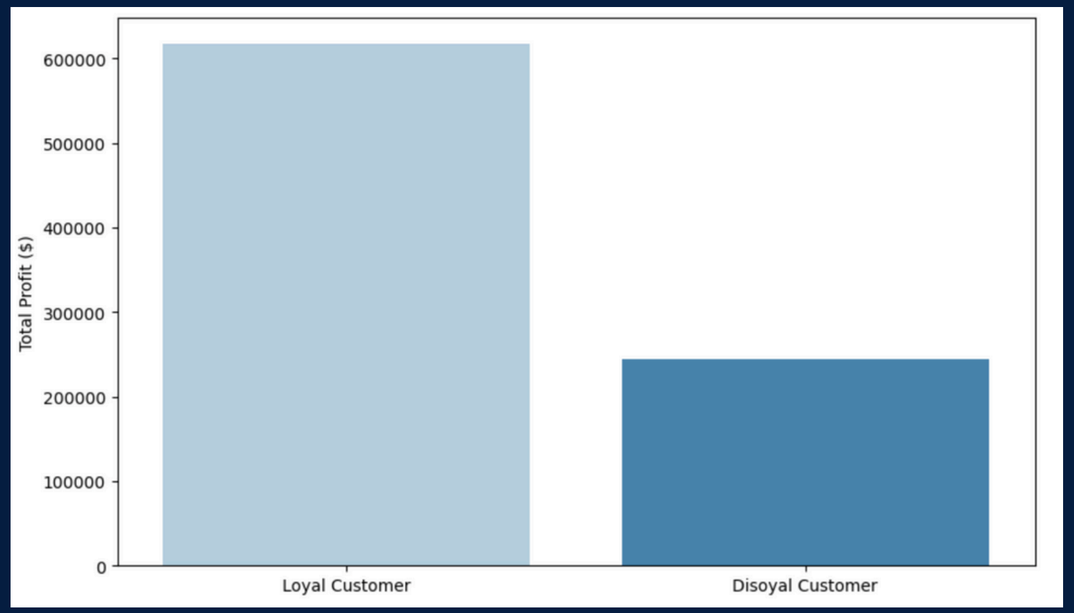
Total Profits

Estimated Profits for:

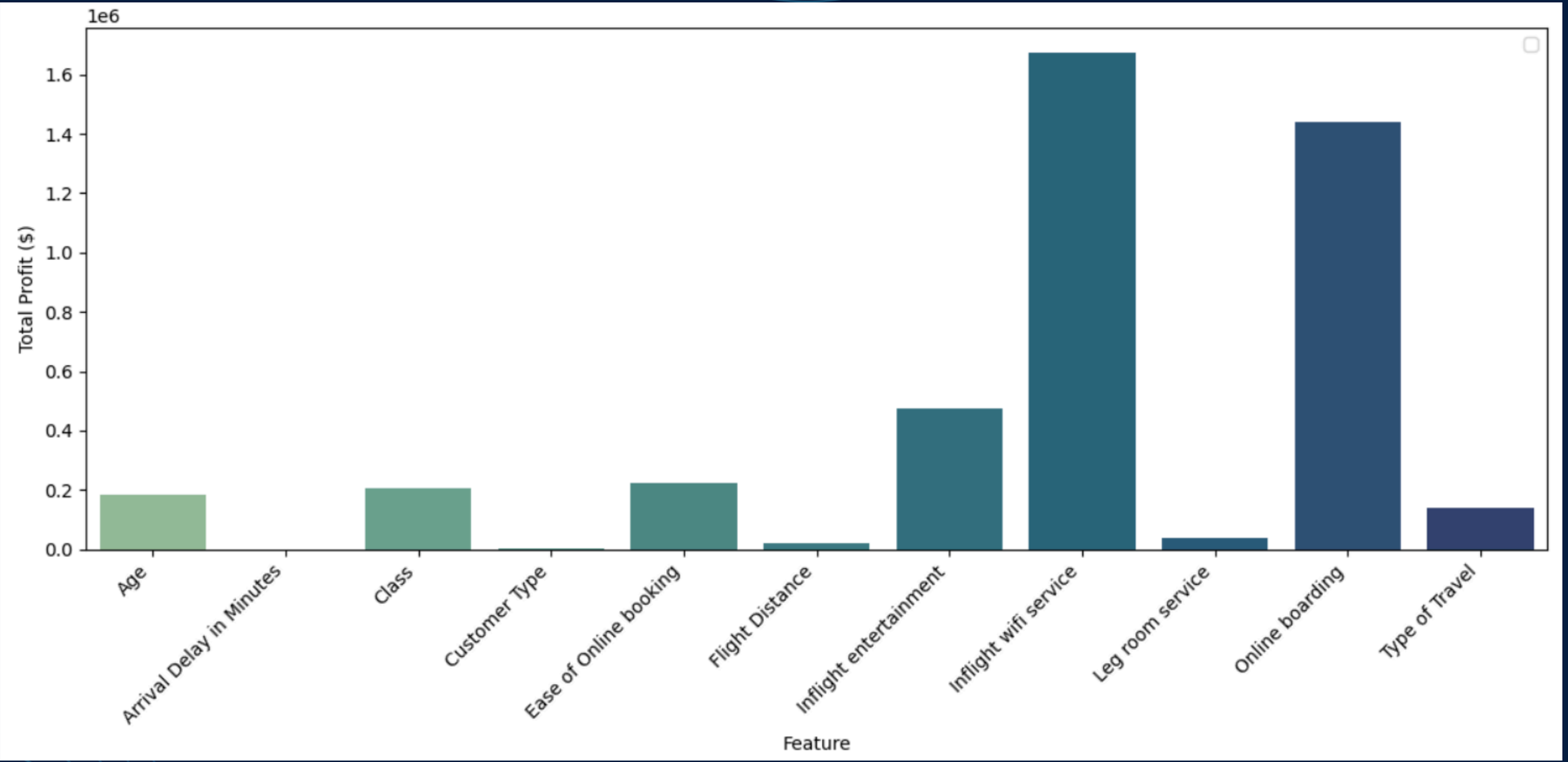
- Business Travel: $1,004,000
- Personal Travel: $21,000



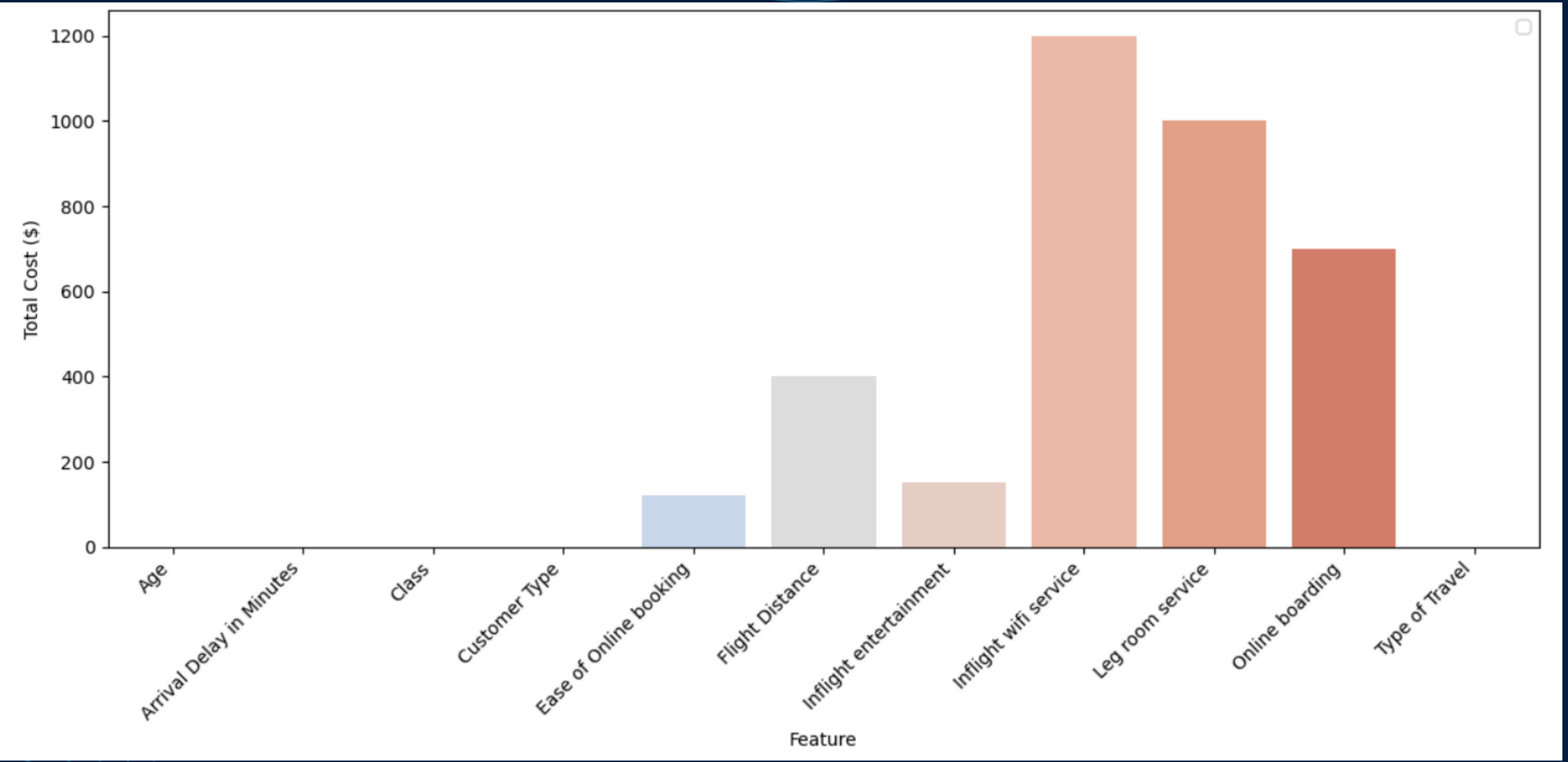
- Loyal Customer: $617,000
- Disloyal Customer: $245,000



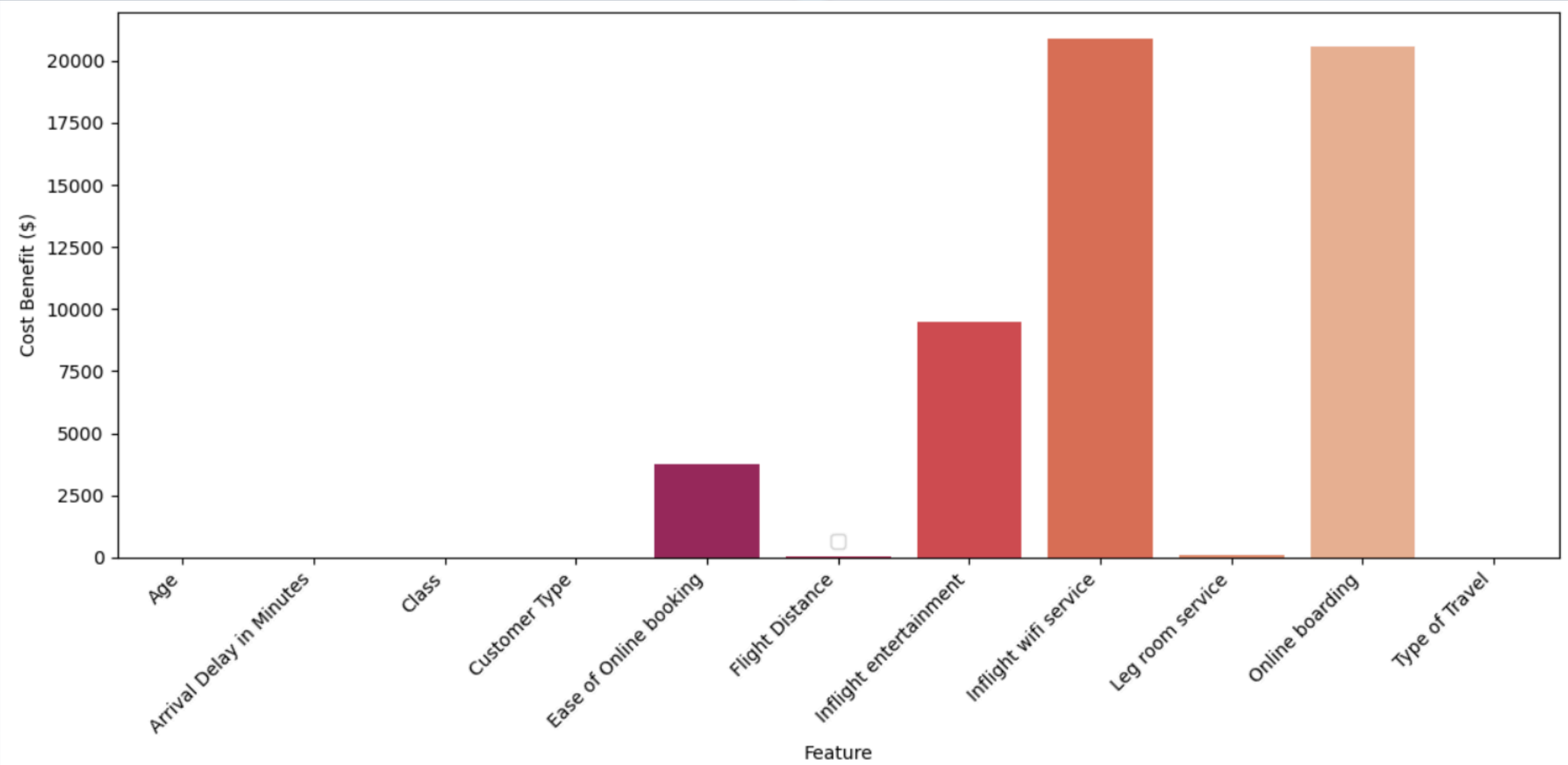
Profits Based on Feature



Costs Based on Feature



Cost-Benefit Based on Feature



CONCLUSION

The Random Forest Classifier and the Gradient Boosting Classifier consistently outperformed other models in Accuracy and AUC for the selected subsets, making them the recommended choices for business decisions based on their performance.

Inflight wifi service and Online Boarding were identified as the most profitable features for cost-benefit improvement, potentially yielding over $20,000 each if increased. Investing in these areas could boost customer satisfaction and future profits.

Inflight entertainment and Ease of Online Booking, also identified as essential features, have the potential to increase profits they could play a crucial role in enhancing customer satisfaction and underscores the need for the airline to allocate budget towards these improvements.

Recommendations

Increase Inflight Wifi/entertainment

Online booking/boarding availability

Target low satisfied subgroups

Retention strategies for disloyal customers

Limitations

More useful data

Satisfaction variable

THANK YOU