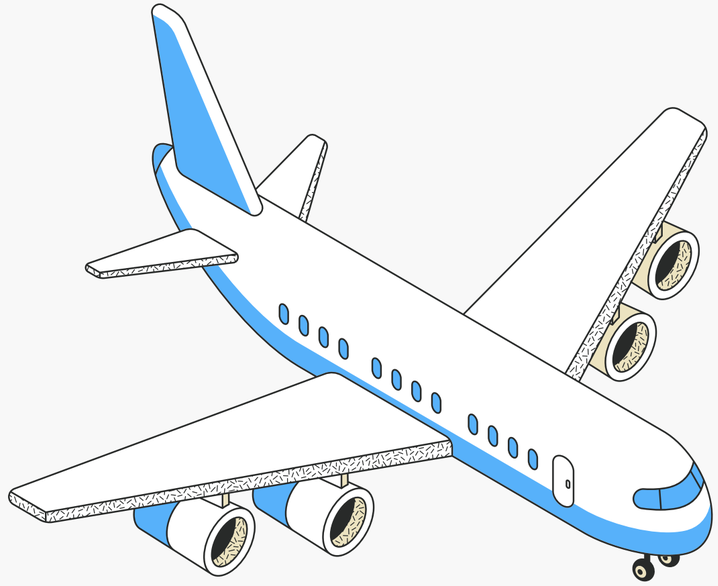
Airline Customer Satisfaction

Tung Dinh, Anji Ni - Team 8



Motivation

Satisfied airline customers are more likely to **recommend an airline** and **repurchase tickets**

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Airline satisfaction and loyalty: Assessing the influence of personality, trust and service quality

Steven Leon [a], Sonoma Dixon [b]

Problem Overview

Determining the most important features that affects customer satisfaction when using airline services

Approach

1. Data Cleaning
2. Model Selection
3. Hyper Parameter Tuning
4. Model Assessment

Data Cleaning

Original Data

- Dataset from Kaggle with 104K entries in train set and 26K entries in test set
- 26 different attributes
- Categorical attributes about customer type, gender, seat class, etc
- Numerical attributes about flight distances, arrival and departure delay time, etc

Preprocessing

- Apply **one-hot encoding** for categorical features
- **Normalized** all numerical features using **StandardScaler**
- Remove N/A
- Convert target label to binary (neutral or dissatisfied - 0, satisfied - 1)

Model Selection

- Decision tree and logistic regression can provide weights for each feature
- They are relatively simple but can be informative
- Results are interpretable

Hyperparameter Tuning

Gridsearch with CV and accuracy

Decision Tree

```
params = {
    'criterion': ['gini', 'entropy'],
    'max_depth': [3, 5, 10, None],
    'min_samples_leaf': [1, 2, 4]
}
```

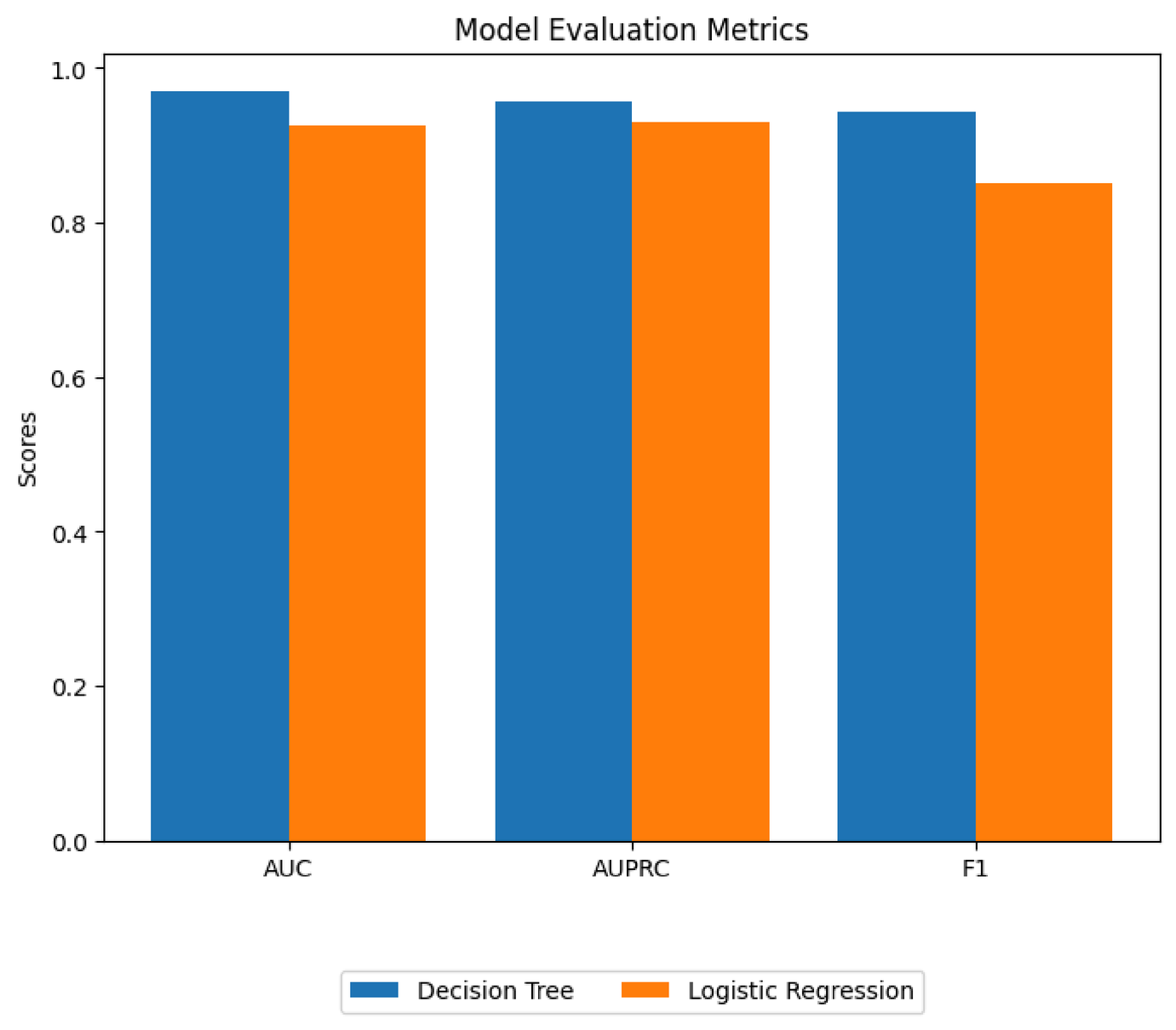
Best params:
{'criterion': 'gini', 'max_depth': None,
'min_samples_leaf': 4}

Logistic Regression

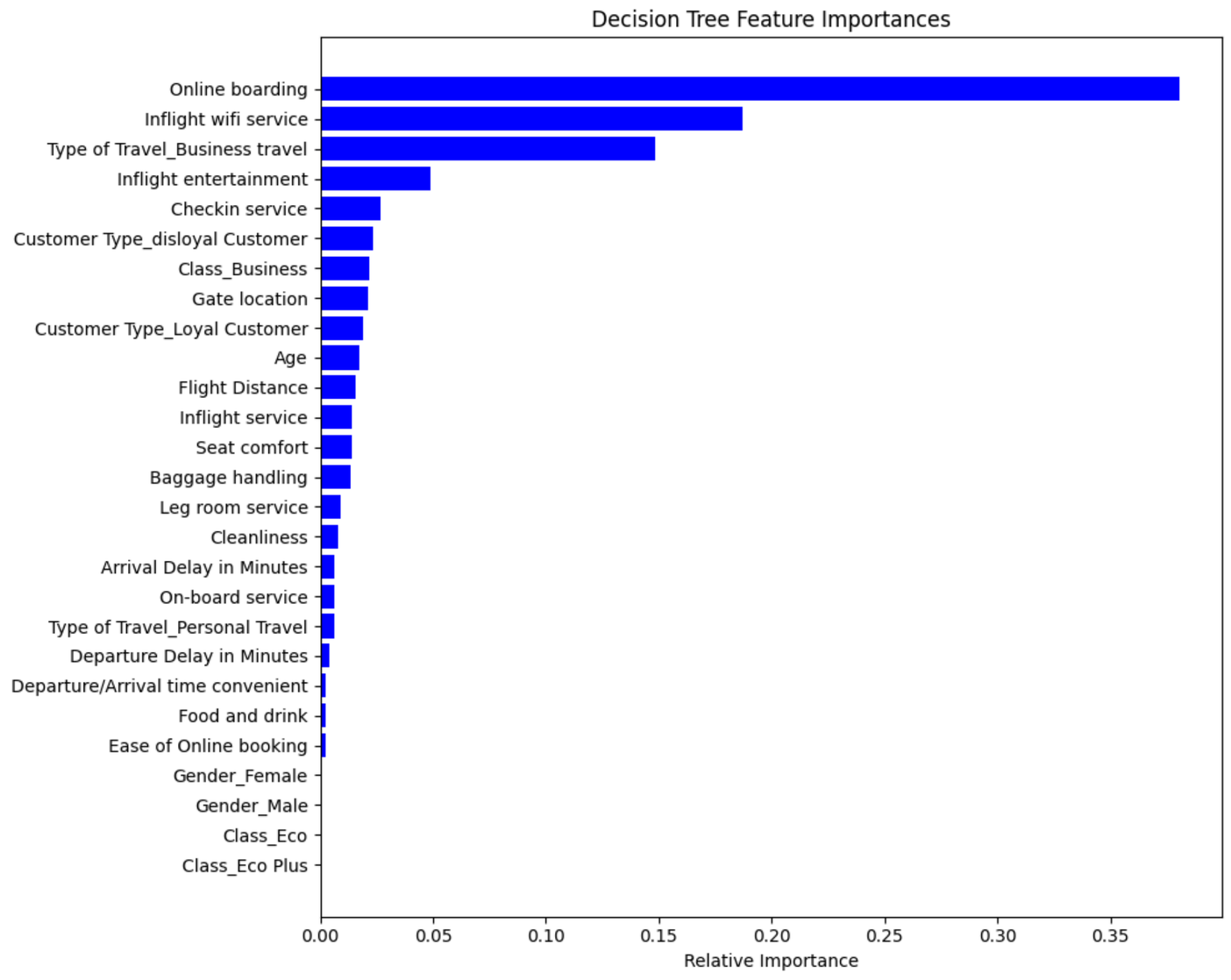
```
params = {
    'C': [0.01, 0.1, 1, 10, 100],
    'solver': ['liblinear', 'lbfgs'],
    'penalty': ['l1', 'l2'],
    'class_weight': [None, 'balanced']
}
```

Best params:
{'C': 0.01, 'class_weight': None,
'penalty': 'l1', 'solver': 'liblinear'}

Model Assessment



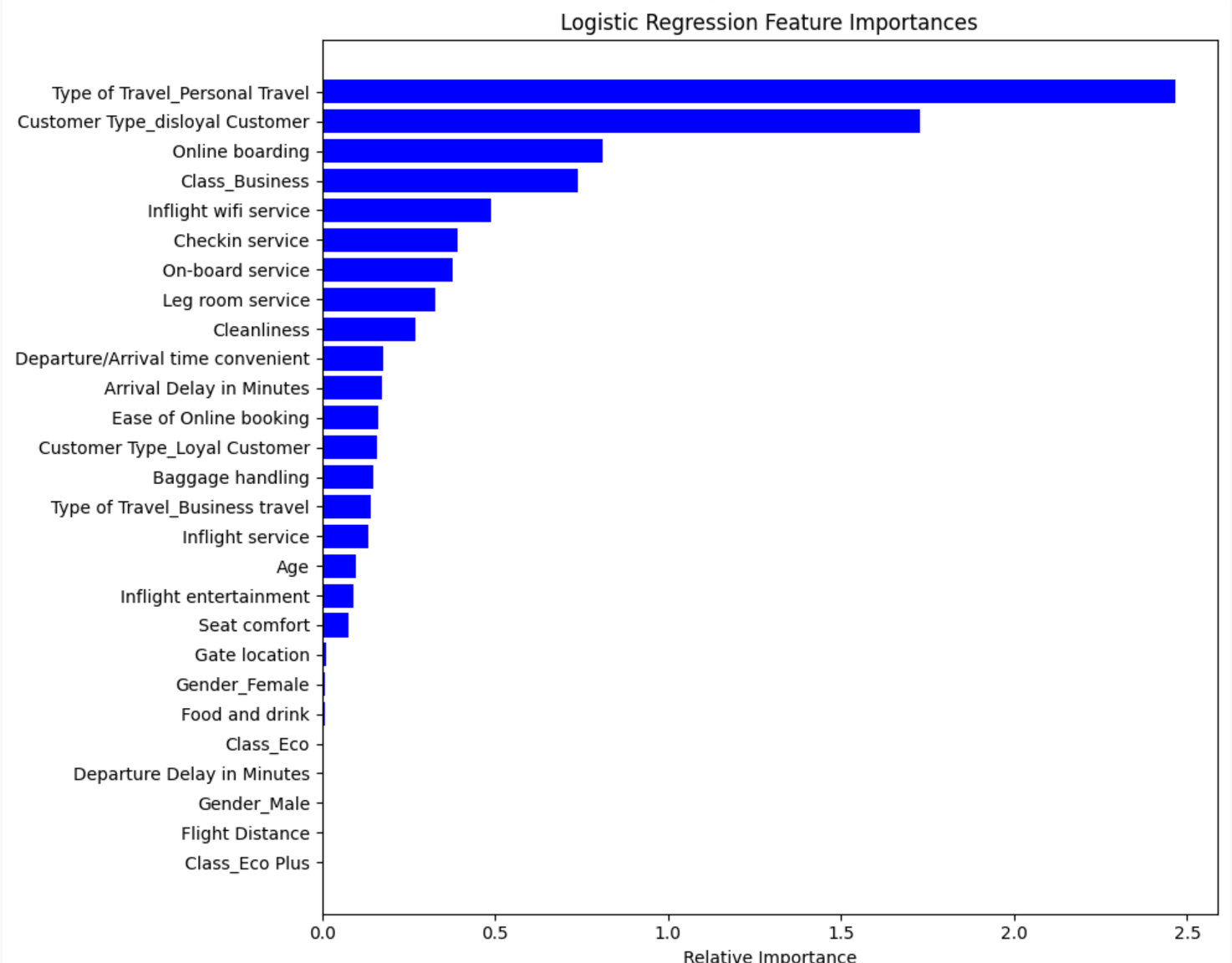
Important Features Decision Tree



Most important features:

- Satisfaction level of online boarding
- Inflight Wifi Service
- Type of Travel: Business vs Personal
- Inflight Entertainment

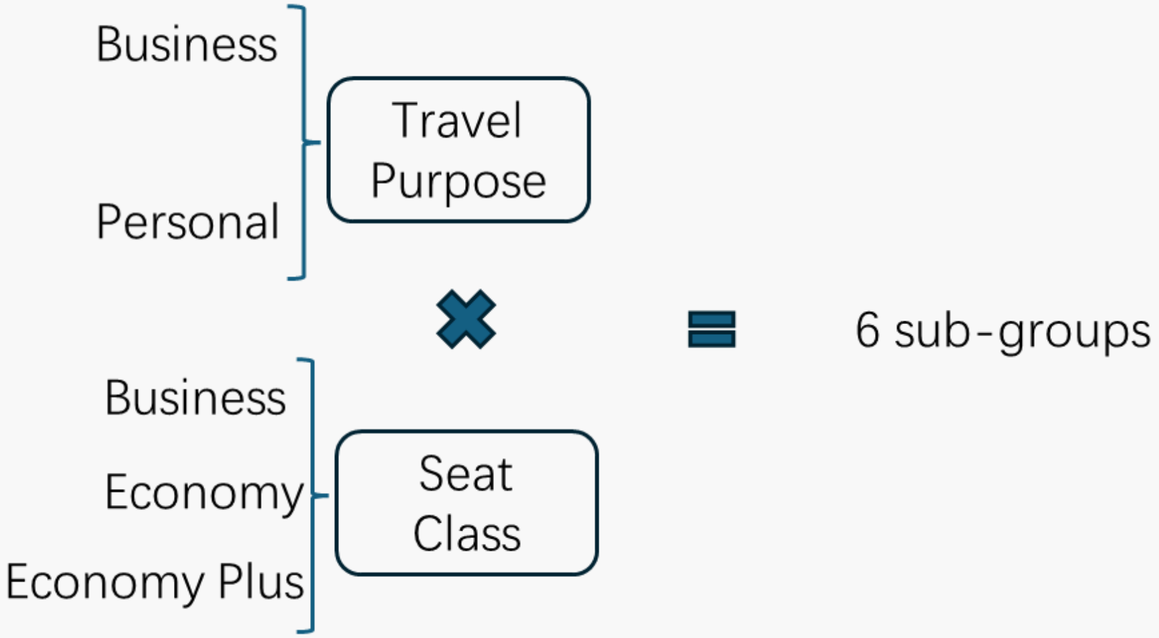
Important Features Logistic Regression

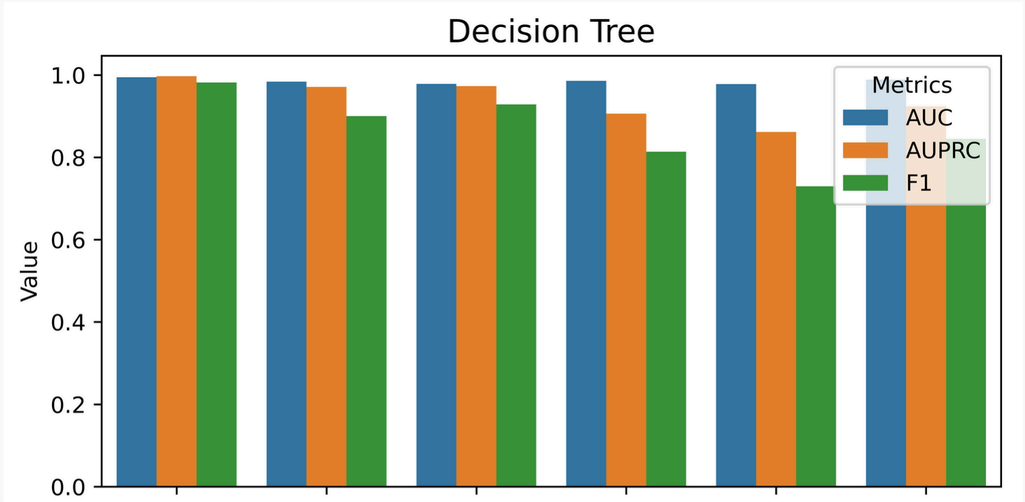


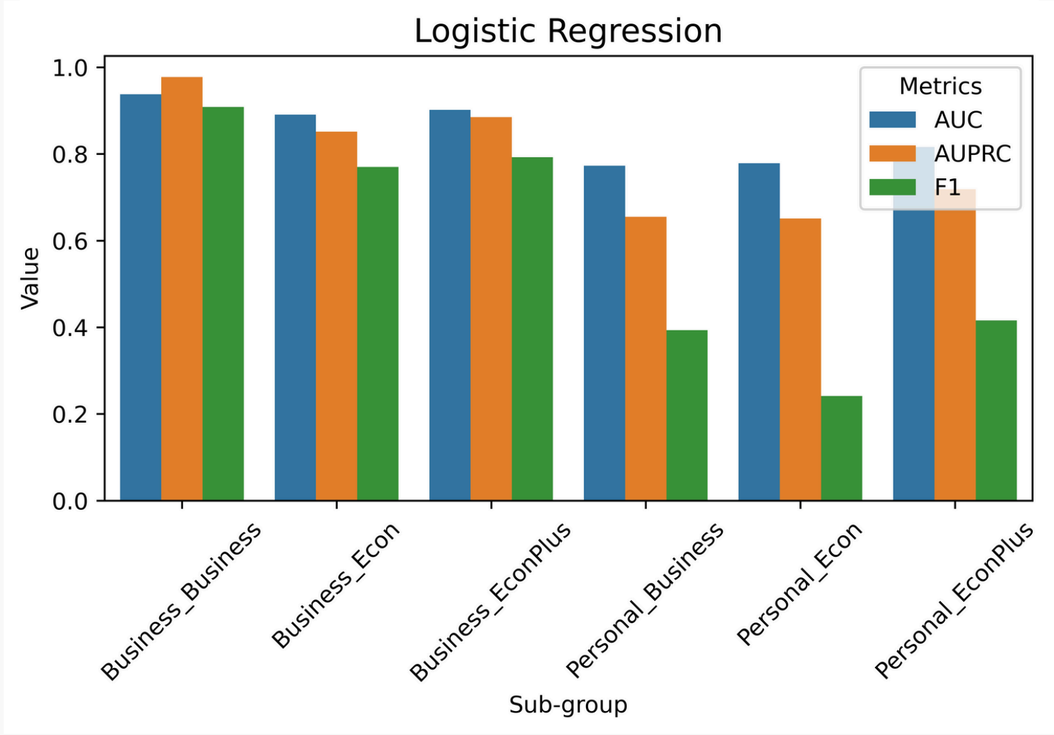
Most important features:

- Type of Travel: Business vs Personal
- Customer Type: Loyal vs Disloyal
- Satisfaction level of online boarding
- Class: Business vs. Economic
- In-flight wifi service

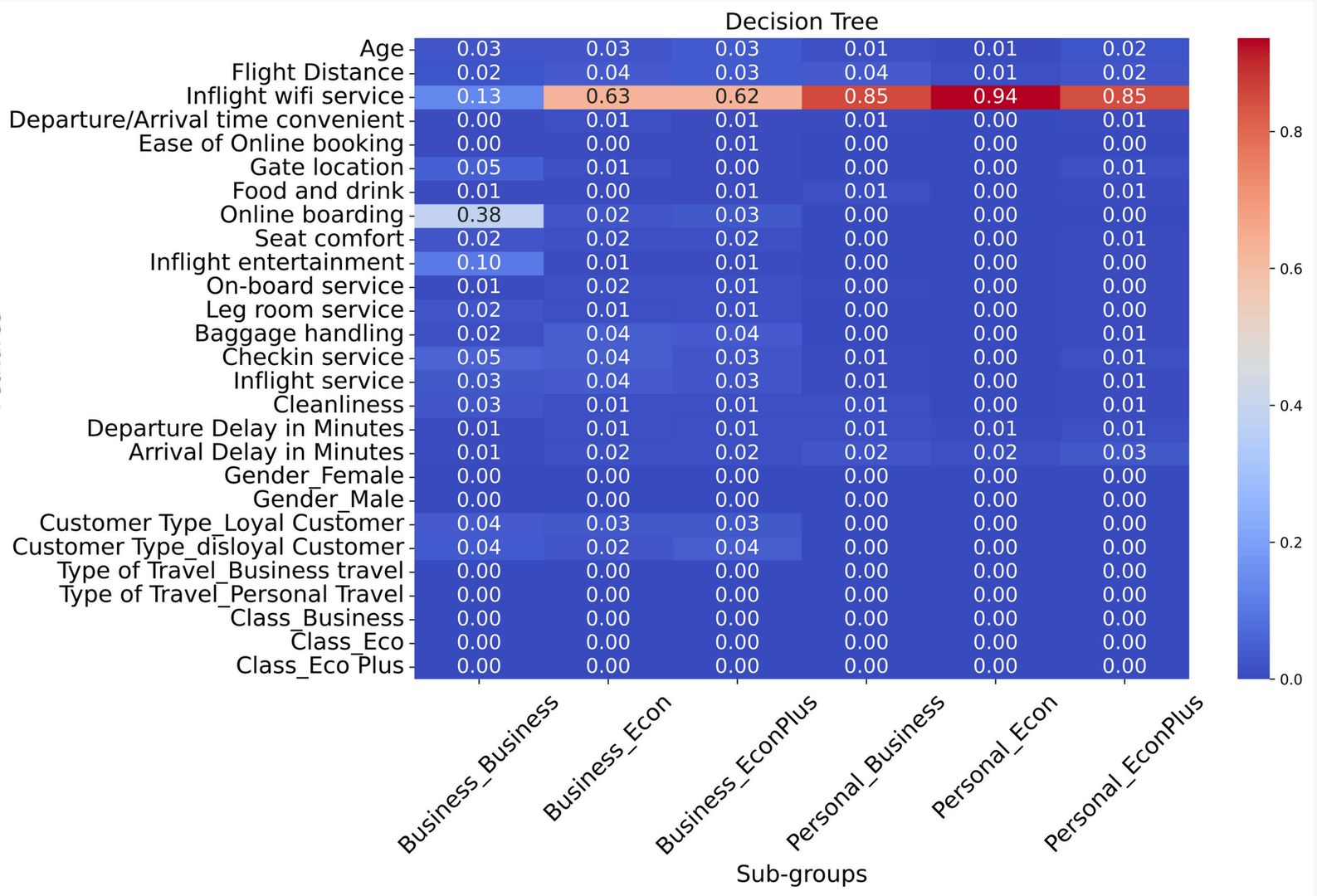
Segmentation Analysis







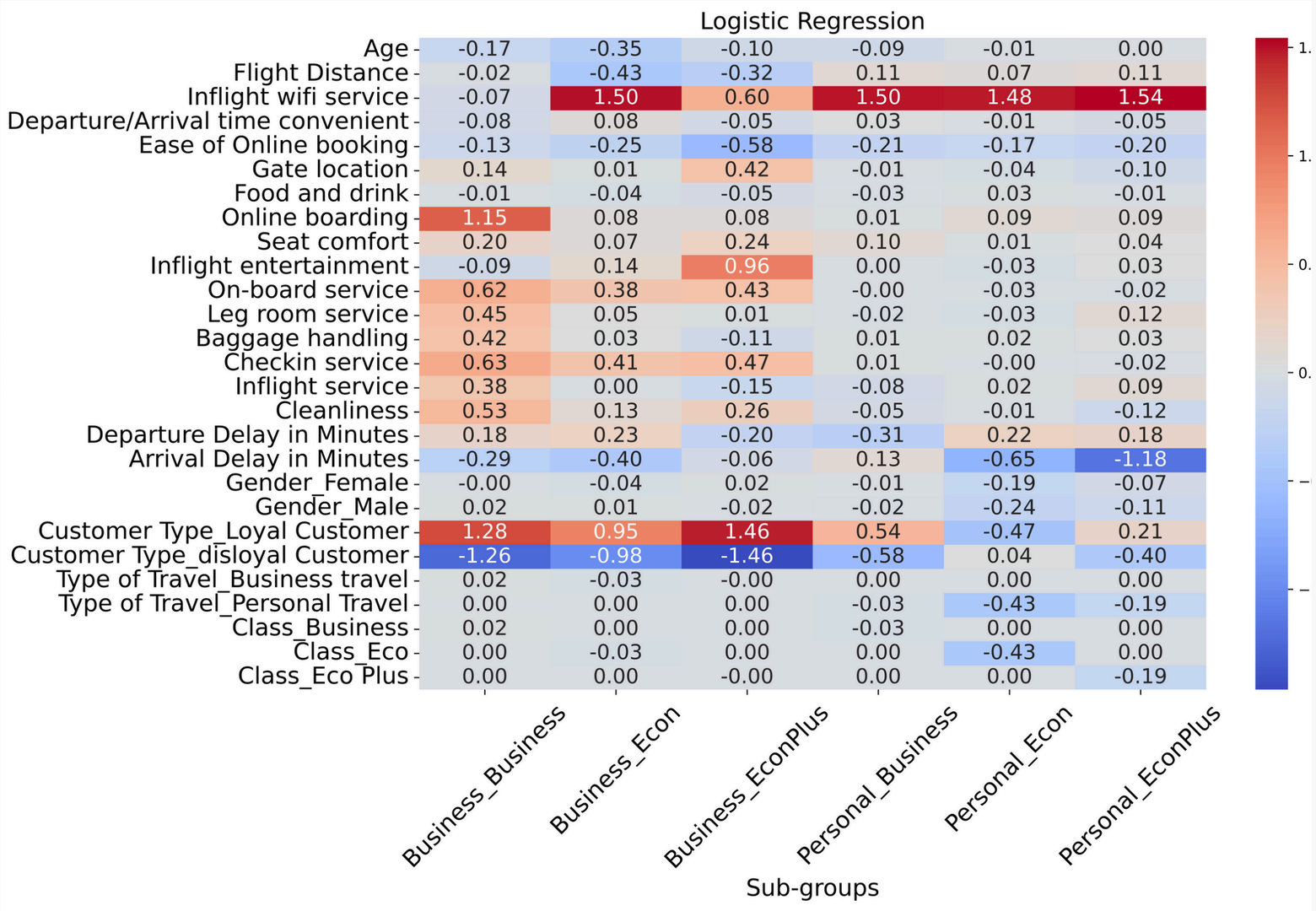
Segmentation Analysis



Some observations

- In-flight wifi is important for flight experiences
- More influencial factors for people traveling for business purpose

Segmentation Analysis



Some observations:

- Agrees with the result from DT that in-flight wifi is important
- More comprehensive service for business class passengers
- Prioritize loyal customers

Thank you!