Airline passenger satisfaction analysis

Szabó Ákos

2024

The problem

An airline company aims to **identify the most dissatisfied customers** and develop strategies to **improve their satisfaction** levels.

Data overview

The dataset contains information about previous airline passengers, including their satisfaction levels with the various services.

The variables include:

- **Demographics:** e.g. age, gender

- **Travel details:** e.g. type of travel, class, flight distance, delay time

- **Satisfaction ratings for the various services:** e.g. inflight Wi-Fi, seat comfort, food and drink, online boarding, baggage handling

- **Overall satisfaction:** binary feature about the overall

Data preprocessing and correlation analysis

Preprocessing steps include:

- Removing rows with missing values

- Dropping irrelevant ID-like columns

- One-hot encoding categorical variables for the analysis

Correlation analysis:

- Visualize a correlation matrix to identify relationships between variables

- Focus on features that have the strongest correlation with overall airline satisfaction

Correlation Matrix of Airline Passenger Satisfaction
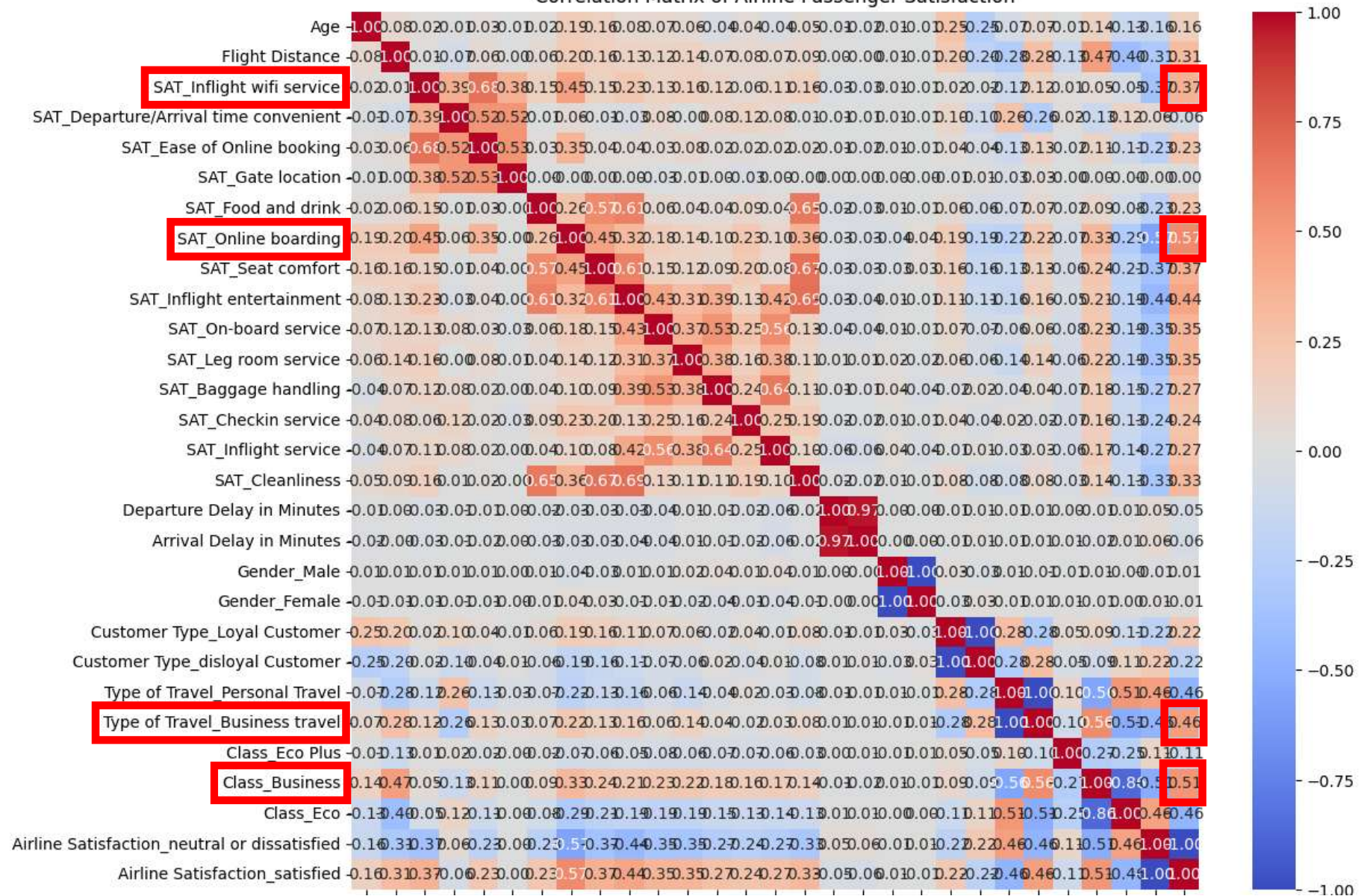
...more correlations

The features' correlation with the Eco class and the Personal travels

Class_Eco	1.000000
Type of Travel_Personal Travel	0.511373
Airline Satisfaction_neutral or dissatisfied	0.455029
SAT_Departure/Arrival time convenient	0.116428
Customer Type_disloyal Customer	0.114699
Arrival Delay in Minutes	0.014174
Departure Delay in Minutes	0.010902
Gender_Female	0.004853
SAT_Gate location	-0.003641
Gender_Male	-0.004853
SAT_Inflight wifi service	-0.052284
SAT_Food and drink	-0.081828
SAT_Ease of Online booking	-0.106023
Customer Type_Loyal Customer	-0.114699
SAT_Cleanliness	-0.126392
SAT_Checkin service	-0.131016
Age	-0.133400
SAT_Inflight service	-0.142324
SAT_Baggage handling	-0.147994
SAT_Inflight entertainment	-0.188088
SAT_Leg room service	-0.192107
SAT_On-board service	-0.194037
SAT_Seat comfort	-0.212461
Class_Eco Plus	-0.249608
SAT_Online boarding	-0.290978
Flight Distance	-0.403255
Airline Satisfaction_satisfied	-0.455029
Type of Travel_Business travel	-0.511373
Class_Business	-0.863468

Type of Travel_Personal Travel	1.000000
Class_Eco	0.511373
Airline Satisfaction_neutral or dissatisfied	0.462451
Customer Type_Loyal Customer	0.283738
SAT_Departure/Arrival time convenient	0.263053
Class_Eco Plus	0.100680
SAT_Checkin service	0.019691
Gender_Male	0.006364
Gender_Female	-0.006364
Arrival Delay in Minutes	-0.007110
Departure Delay in Minutes	-0.007478
SAT_Inflight service	-0.028704
SAT_Gate location	-0.032942
SAT_Baggage handling	-0.039696
SAT_On-board service	-0.061688
SAT_Food and drink	-0.066600
Age	-0.066909
SAT_Cleanliness	-0.083679
SAT_Inflight wifi service	-0.123779
SAT_Ease of Online booking	-0.129364
SAT_Seat comfort	-0.133203
SAT_Leg room service	-0.139753
SAT_Inflight entertainment	-0.160435
SAT_Online boarding	-0.222466
Flight Distance	-0.276187
Customer Type_disloyal Customer	-0.283738
Airline Satisfaction_satisfied	-0.462451
Class_Business	-0.560486
Type of Travel_Business travel	-1.000000

Key findings

Based on the data analysis, passengers traveling in Eco class and those on Personal travel tend to be more dissatisfied.

Specific areas of dissatisfaction within these groups include:

- Seat comfort

- Departure delays

- Inflight Wi-Fi

- Inflight entertainment

- Food and drink

Improvement strategies

For Eco class:

- Enhance seat comfort (e.g., increased legroom, better cushioning)
- Improve inflight entertainment options
- Upgrade food and drink quality and variety
- Reduce departure delays

For Personal travel:

- Prioritize online booking experience
- Offer reliable and fast inflight Wi-Fi
- Focus on convenient gate locations

Prioritizing strategies and implementation considerations

High-impact changes to prioritize:

- **Punctuality:** Minimizing delays is crucial for all travelers

- **Reliable Wi-Fi:** Essential for business travelers and increasingly important for leisure travelers

- **Seamless Online Booking:** A user-friendly experience is key to satisfaction

For the implementation:

- Define specific steps, allocate resources, and delegate tasks for each improvement initiative.

- Track progress and measure the impact of changes on passenger satisfaction.

Artificial Intelligence in planning and decision making

Thank you!

Business Informatics MSc

University of Debrecen

2024

A special thanks to Gemini for helping me in this course and assignment!