Airline Customer Satisfaction Analysis

Overview

This report analyzes a dataset containing customer feedback on an airline's services. Multi-faceted approach to gain insights from this data:

- **Data Cleaning and Analysis:** Leveraged Python libraries (Pandas, NumPy, Matplotlib) to clean, organize, and analyze the data.

- **Database Management:** Utilized the cleaned data to import in Microsoft SQL Server for query execution.

- **Data Visualization:** Employed Power BI to create interactive visualizations and reports to communicate findings .

AGENDA

- **Problem Statement**

- **Research Objectives**

- **Hypothesis**

- **Data Overview**

- **Analysis & Findings**

- **Dashboard using Power BI**

- **Recommendations**

Problem Statement

Following the pandemic, the airline industry suffered a massive setback as a result, in order to revitalize the industry in the face of the current recession, it is absolutely necessary to understand the customer pain points and improve their satisfaction with the services provided. Hence, how can the airline leverage customer feedback data to optimize its services in the post-pandemic era where customer expectations and preferences may have shifted?

Research Objectives

Overall Sentiment Analysis
Calculate the average sentiment score and identify the distribution of positive, negative, and neutral feedback.

Correlation Analysis

Examine the relationships between different customer satisfaction ratings and identify factors influencing overall satisfaction.

Impact of Delays

Assess the impact of departure and arrival delays on customer satisfaction.

Age and Satisfaction

Determine if age significantly impacts satisfaction with specific aspects of the flight experience.

Segment-Specific Analysis

Compare satisfaction levels between business and personal travelers.

Flight Distance and Satisfaction

Analyze how flight distance affects customer satisfaction

Hypothesis

- There is a significant correlation between specific aspects of the flight experience (e.g., inflight services, seat comfort).

- Arrival Delay and Departure delay might have an adverse impact on the customer satisfaction.

- Customer satisfaction levels vary across different passenger classes (Economy, Economy Plus, Business).

- Customer satisfaction levels vary across different age groups (Children, Young Adults, Adults, Seniors).

About Dataset

- The dataset is rich in information, containing 22 columns and 25,977 rows and includes information on customer demographics(e.g. age, gender, class) flight experience(Inflight Wi-Fi service, On-board service) and overall satisfaction.

- Dataset Source: Kaggle

- By analyzing this dataset, airlines can gain valuable insights into the factors and can tailor their services accordingly to enhance customer experience.

Analysis & Findings

• The dataset was categorized into three main aspects of the customer journey:

✓ Pre-flight

```
Index(['Gender', 'Customer Type', 'Age', 'Type of Travel', 'Class',
       'Ease of Online booking', 'Checkin service', 'Online boarding',
       'Arrival Delay in Minutes', 'Departure/Arrival time convenient',
       'Departure Delay in Minutes', 'Gate location', 'satisfaction'],
      dtype='object')
```

✓ In-flight

```
Index(['Gender', 'Customer Type', 'Age', 'Type of Travel', 'Class',
       'Inflight wifi service', 'Food and drink', 'Seat comfort',
       'Inflight entertainment', 'Leg room service', 'On-board service',
       'Inflight service', 'Cleanliness', 'satisfaction'],
      dtype='object')
```

✓ Post-flight

```
Index(['Gender', 'Customer Type', 'Age', 'Class', 'Type of Travel',
       'Baggage handling', 'Arrival Delay in Minutes', 'satisfaction',
       'Rating'],
      dtype='object')
```

- The **overall percentage** of positive, negative or neutral ratings.

  Satisfied customers: 43.89%

  Dissatisfied customers: **56.10%**

- The **loyal** customers : 21,111 (**81.27%**)

  The **disloyal** customers: 4782 (18.41%)

- The **loyal** customers which are **dissatisfied**: 10,950 (75.14%)

  The **loyal** customers which are **satisfied**: 10,161 (**89.11%**)

- **There are more business travellers than personal travellers and business travellers are more satisfied than personal travellers.**

```
Business Travellers: 18038
Personal Travellers: 7938
Business Travellers Satisfaction: 40.83%
Personal Travellers Satisfaction: 3.06%
```

- **Satisfaction based on <u>class</u>:**

	Class	Satisfied Count	Dissatisfied Count	Total Count	% Satisfied	% Dissatisfied
0	Business	8660	3797	12457	69.519146	30.480854
1	Eco Plus	474	1438	1912	24.790795	75.209205
2	Eco	2231	9293	11524	19.359597	80.640403

Economy class passengers are the most **dissatisfied.**

•**Satisfaction based on <u>loyalty</u>:**

Loyal customers who are **dissatisfied** are: **economy >economy plus>business.**

|	Class	Neutral/Dissatisfied Count	Total Loyal Count	% Neutral/Dissatisfied
0	Business	2680	10589	25.309283
1	Eco Plus	1256	1713	73.321658
2	Eco	7014	8809	79.623113

Passengers are more loyal in Economy Plus and then in business class 85%,89%,76%.

•Average arrival delay is **15 minutes** and average departure delay is **14 minutes.**

	Arrival Delay in Minutes	Departure Delay in Minutes
count	25893.000000	25976.00000
mean	14.740857	14.30609
std	37.517539	37.42316

PRE-FLIGHT

- People who find online booking easy will also be satisfied with the online boarding process.

- Strong Positive Correlation Between Online Booking and Gate Location.

- Customers that are Overall satisfied are unhappy with the **Departure/Arrival time.**

- Customers that are Overall Dissatisfied are unhappy with the **Online Booking service.**

Correlation Heatmap
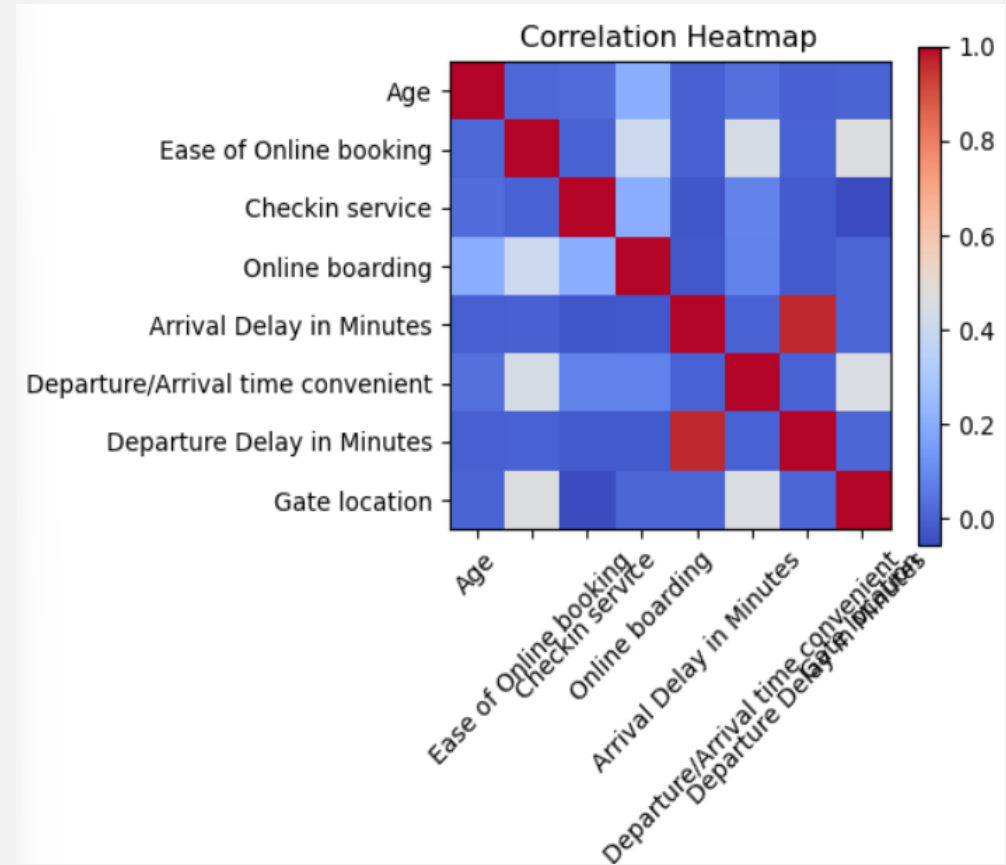
```
personal.describe()
```

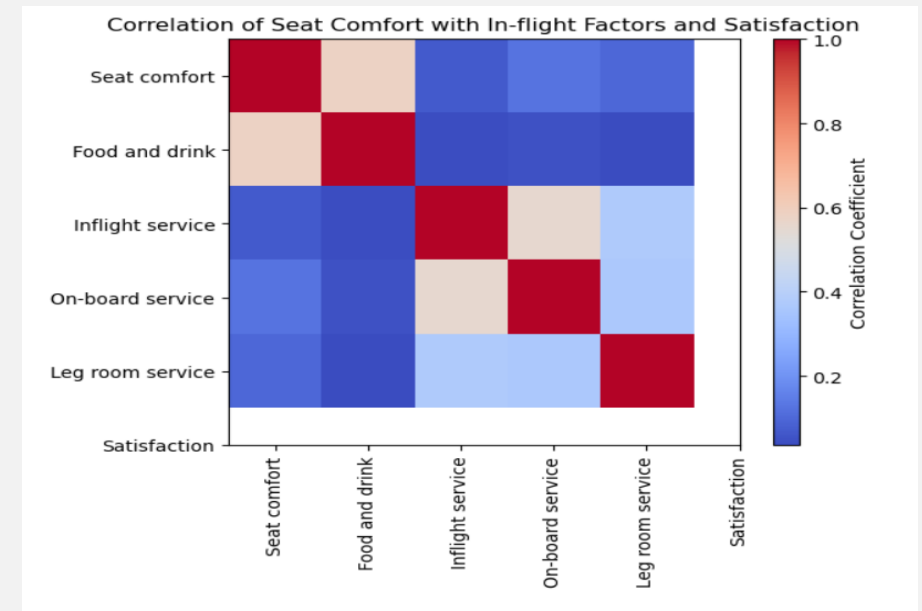|	Age	Ease of Online booking
count	7938.000000	7938.000000
mean	38.941673	2.466364
std	18.560153	1.262335
min	7.000000	0.000000
25%	23.000000	2.000000
50%	39.000000	2.000000
75%	55.000000	3.000000
max	70.000000	5.000000

A significant portion of personal travelers express

dissatisfaction with the ease of online booking.

75% of respondents rated it a 3,

a neutral sentiment. However, a concerning

number of customers, particularly in the 20th and
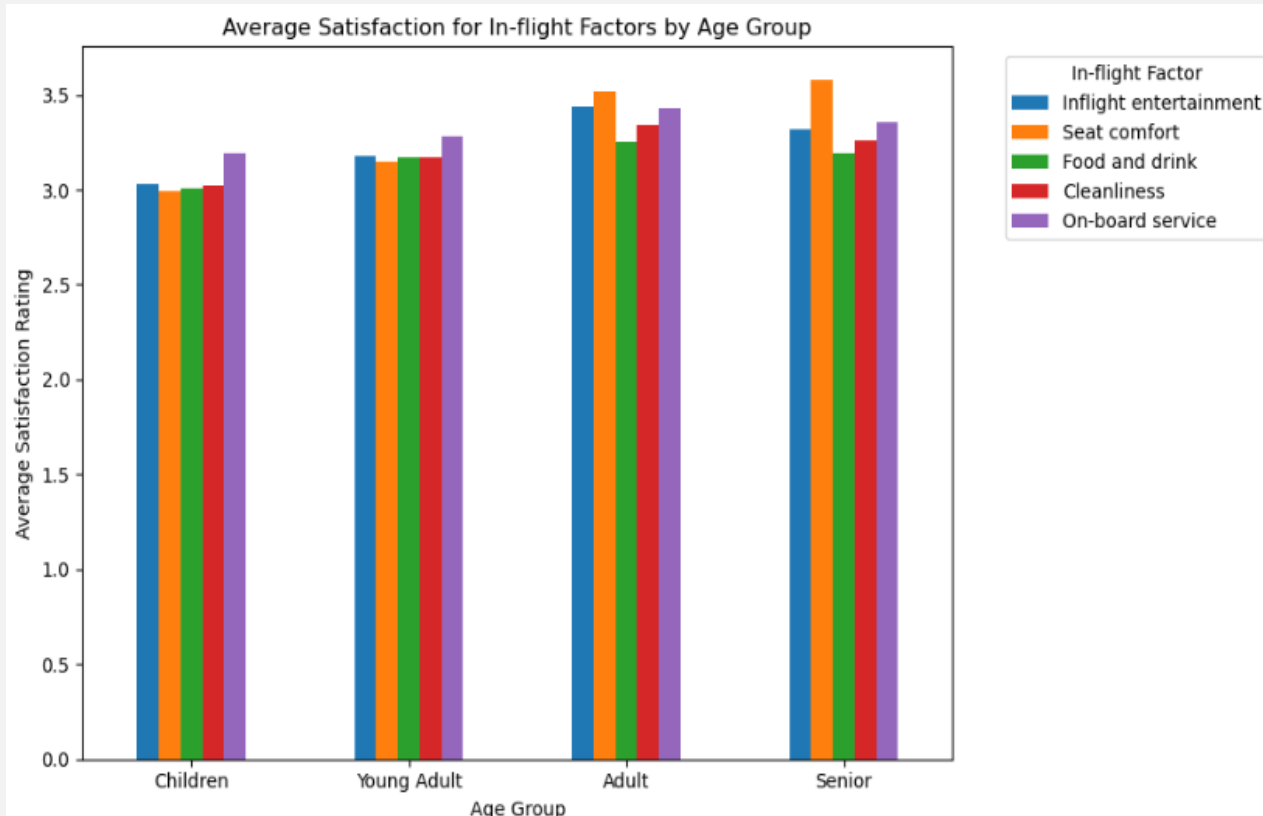
50th percentiles, rated it a 2.

IN-FLIGHT

	Age	Inflight wifi service	Food and drink	Seat comfort	Inflight entertainment
Age	1.000000	0.009242	0.023841	0.154507	0.068998
Inflight wifi service	0.009242	1.000000	0.122306	0.116991	0.201782
Food and drink	0.023841	0.122306	1.000000	0.580970	0.627265
Seat comfort	0.154507	0.116991	0.580970	1.000000	0.616817
Inflight entertainment	0.068998	0.201782	0.627265	0.616817	1.000000
Leg room service	0.033299	0.159699	0.035870	0.099150	0.303203
On-board service	0.054977	0.113658	0.050688	0.124805	0.412266
Inflight service	-0.059083	0.108419	0.039992	0.067306	0.411018
Cleanliness	0.048418	0.125768	0.659253	0.683924	0.695269

<u>Inflight Entertainment, Seat Comfort, Food and Drink, and Cleanliness</u> These factors are highly correlated, indicating that passengers who are satisfied with one of these factors are likely to be satisfied with the others as well.

This suggests that focusing on improving these aspects can have a significant impact on overall passenger satisfaction.

Correlation of Seat Comfort with In-flight Factors and Satisfaction

Average Satisfaction for In-flight Factors by Age Group

Children(7-17) and

Young Adults(18-24)

Show a higher level of satisfaction with in-flight entertainment compared to Adults and Seniors.

Adults(25-54) and Seniors(55-85)

lean towards more seat comfort and cleanliness.

POST-FLIGHT

- Customers rated **Baggage Handling** service as:
  Good(4 & above) : 61.86%
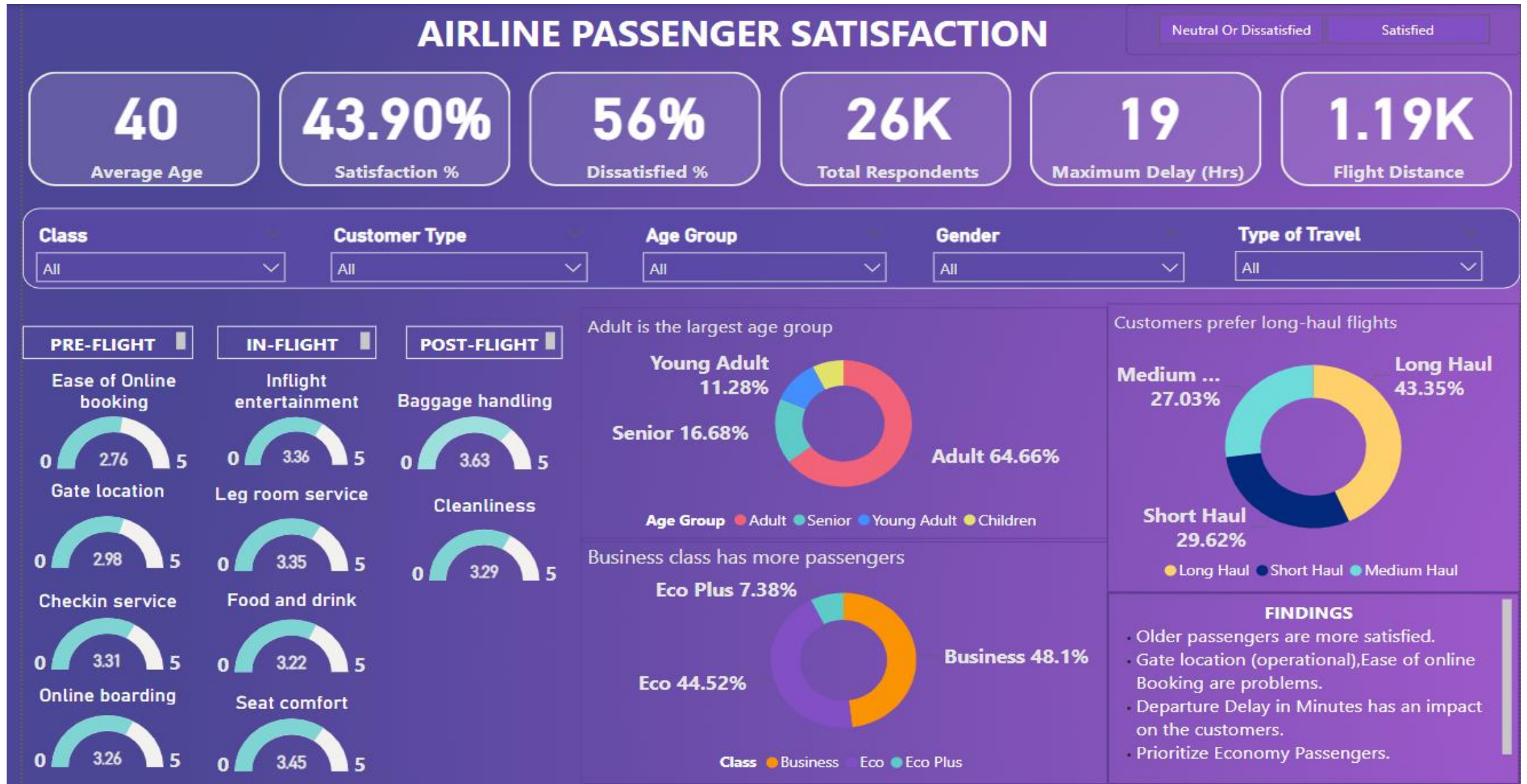 **Average(3) :** 20.03%
  Bad(2 and below) : 17.77%

Class type with customers who have rated "Baggage Handling" less than 3

- Economy class passengers has the highest count percentage of low satisfaction score.

Class	Total Bad Count	% of each class
Eco	2424	52.331606
Business	1749	37.759067
Eco Plus	459	9.909326

DASHBOARD USING POWER BI

RECOMMENDATIONS

- Address the specific needs and pain points of economy class passengers.
- Streamline the online booking process to improve user experience and reduce friction.
- Focus on improving operational services to increase efficiency to reduce delay during arrival and departure time both.
- Invest in in-flight entertainment, seat comfort, food and beverage quality, and cabin cleanliness.
- **Prioritize Younger Passengers** given their lower satisfaction levels in comparison to Adults and seniors.