GROUP ASSIGNMENT PROPOSAL

AICT009-4-2-IDA

INTRODUCTION TO DATA ANALYTICS

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The Commercial Passenger Airline Industry

Customer satisfaction in the competitive airline market today is not only a service metric, but also a strategic key performance indicator (KPI) that plays significant weight in customer loyalty, operating performance, and long-term profitability .Those airlines that monitor and enhance customer satisfaction can differentiate themselves through the provision of improved passenger experiences in an era where customer feedback is in high visibility and high influence (Tahanisaz & Shokuhyar, 2020).

The information in this project, "Airline Passenger Satisfaction", contains complete records on passenger demographics, travel details, service quality scores, and overall satisfaction levels. It enables analysis of drivers of satisfaction such as Wi-Fi on flights, beverages and meals, luggage, and comfort levels in seating (Dike et al., 2023). Such data can be used by management to identify trends and issues in the service process, culminating ultimately in strategic decision-making and improvement actions.

Today's customer service is provided through the end-to-end passenger experience, from pre-flight engagement, in-out service, to post-flight service, all of them essential to providing great satisfaction and fostering loyalty. With customers becoming increasingly familiar with simple digital interactions, airlines are focusing on improving in-flight interaction and offering connected experience worthy of today's customer expectations (Shiwakoti et al., 2022).

This strategic focus on satisfaction KPIs is harmonious with higher-level goals like customer retention, brand differentiation, and market competitiveness, which are all critical elements of good strategic management.

Business Goal

To enhance passenger satisfaction in order to enhance customer loyalty, brand reputation, repeat business generation and ultimately enhance overall airline profitability and competitiveness. This will be fuelled by identifying the main driver of satisfaction and dissatisfaction through data analysis and implementing service improvements targeted at these.

Problem Statement

The airline industry is a highly competitive, service-based sector that heavily relies on repeat passengers, customer loyalty, and a strong brand reputation to maintain profitability and market share (Batarlienė, 2023). However, challenges arise in the operational and service aspects can lead to passenger dissatisfaction. Without proactive measures to address these issues, customer retention will suffer due to damaged reputation, resulting in financial losses (Ali, 2022). This project aims to mitigate this problem by utilizing data analytics to identify passengers likely to be dissatisfied through a predictive model, thereby enabling airlines to proactively intervene and enhance the customer flight experience.

Aim

- To identify passengers likely to be dissatisfied and address potential issues by developing a predictive model, enabling airline improve customer flight experience.

Objectives

1. To preprocess and explore the dataset to understand the variables and overall satisfaction distribution.
2. To analyse the relationships between various attributes to identify key features that will accurately predict satisfaction.
3. To build and evaluate a classification model that predicts whether a passenger will be satisfied or dissatisfied based on their journey attributes.
4. To determine the most influential features that contribute to dissatisfaction from the classification model.
5. To propose strategies and improvements to the identified area of weaknesses.

Hypotheses

1. If the rating of inflight amenities and comfort (such as Seat Comfort, Leg Room Service, Cleanliness, Food and Drink, In-flight service, In-flight Wifi Service, and In-flight Entertainment) are higher, then the overall passenger satisfaction will be higher.
2. Passenger demographics will have a negligible relationship with overall passenger satisfaction.
3. Passengers travelling in Economy class will demonstrate lower overall satisfaction compared to those in Business or Economy Plus classes.
4. Flight delays (departure and arrival) will show a weak negative correlation with the overall passenger satisfaction.
5. If the passenger is returning passenger, then their overall satisfaction will be higher.

Scope of the Solution

Inclusions:

- The provided `airline_passenger_satisfaction.csv` and `data_dictionary.csv` datasets will be exclusively used for all analysis and training of the data mining model.
- CRISP-DM methodology will be applied for structured data mining and reporting.
- A comprehensive report about the process of analysis, findings, and actionable recommendations will be delivered, along with an interactive dashboard built with Streamlit designed to visualize key insights and accepting input data for prediction.
- Python libraries such as Pandas, Scikit-learn, Matplotlib, and Seaborn will be utilized for the entire data analysis and modelling process.

Exclusions:

- Real-time operational data from any airline will not be incorporated into this analysis.
- The developed model does not support live deployment or integration into an airline's existing system, it is intended as a hypothetical solution for academic purposes only.
- Detailed feasibility studies are not included for the recommendations proposed.
- The analysis is solely focused on passenger experience and will not encompass a full audit on the airline operational departments.

Data Sets Used

This project will utilize the following dataset:

- **Dataset Name:** Airline Passenger Satisfaction
- **Source:** Publicly available (via Maven Analytics https://mavenanalytics.io/data-playground?page=9&pageSize=5)
- **Content Description:**
    - **Demographics:** Gender, Age, Customer Type (Loyal vs. Disloyal)
    - **Travel Details:** Type of Travel (Business/Personal), Class (Business, Economy, Economy Plus), Flight Distance
    - **Flight Performance:** Departure Delay, Arrival Delay
    - **Service Ratings:** Passenger ratings (0-5) for various categories including Departure and Arrival Time Convenience, Ease of Online Booking, Check-in Service, Online Boarding, Gate Location, On-board Service, Seat Comfort, Leg Room Service, Cleanliness, Food and Drink, In-flight Service, In-flight Wifi Service, In-flight Entertainment, Baggage Handling
    - **Target Variable:** Satisfaction (Satisfied/Neutral or Dissatisfied)
- **Size:** 129880 rows and 24 columns
- **Relevance:** The dataset provides comprehensive attributes of passengers' flight journey, which are directly relevant for understanding the drivers of passenger satisfaction and achieve the project's aim.

References

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