AIRLINE REPORT

Problem Statement

The primary goal of this project was to design an interactive dashboard that enables the analysis of passenger profiles, flight delays, and satisfaction levels.
Airlines today face challenges in retaining customers, especially when delays occur. The problem we aimed to address was:

- **How do different types of delays (departure and arrival) impact customer satisfaction?**
- **What passenger characteristics (such as age, gender, customer type, and class) influence satisfaction?**
- **Which features of the service are most important to passengers?**
- **How can these insights help in identifying key areas for operational improvement and customer service enhancement?**

Tool Used

This analysis was performed using:

- **Microsoft Power BI Desktop**
    - For **data import**, **transformation**, and **modelling** (using Power Query and relationship's view).
    - For creating **calculated columns and measures** using DAX to compute KPIs such as:
        - Average satisfaction by different categories.
        - Satisfaction ratio (percentage of passengers who were satisfied).
        - Average delay minutes (departure and arrival).
    - For building **interactive visualizations** using cards, pie charts, bar charts, line charts, and donut charts.
    - Slicers were used for dynamic filtering (e.g., by age range, gender).

Project Execution Summary

1. **Data Collection & Understanding**

- Imported airline passenger data, including demographics, satisfaction scores, travel class, flight range, and delay details.
- Explored the dataset to understand key columns and relationships.

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2. **Data Cleaning & Preparation**

- Handled missing values and cleaned inconsistencies in delay and satisfaction fields.
- Created new columns for analysis (e.g., delay categories, satisfaction levels).
- Ensured data types were correct for numerical and categorical fields.

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3. **Data Modelling**

- Built relationships between tables (if applicable).
- Created calculated columns and measures using DAX (e.g., average satisfaction, count of distinct passengers, average delay).

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4. **Dashboard Design & Visualization**

- Designed clear, interactive dashboard pages:
    - Passenger profile (demographics, customer type, travel class).
    - Delay analysis (departure & arrival delay metrics, delay categories).
    - Satisfaction analysis (by age, class, customer type, flight range).
- Applied consistent colours, slicers, and formatting for readability.

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5. **Insights & Conclusion**

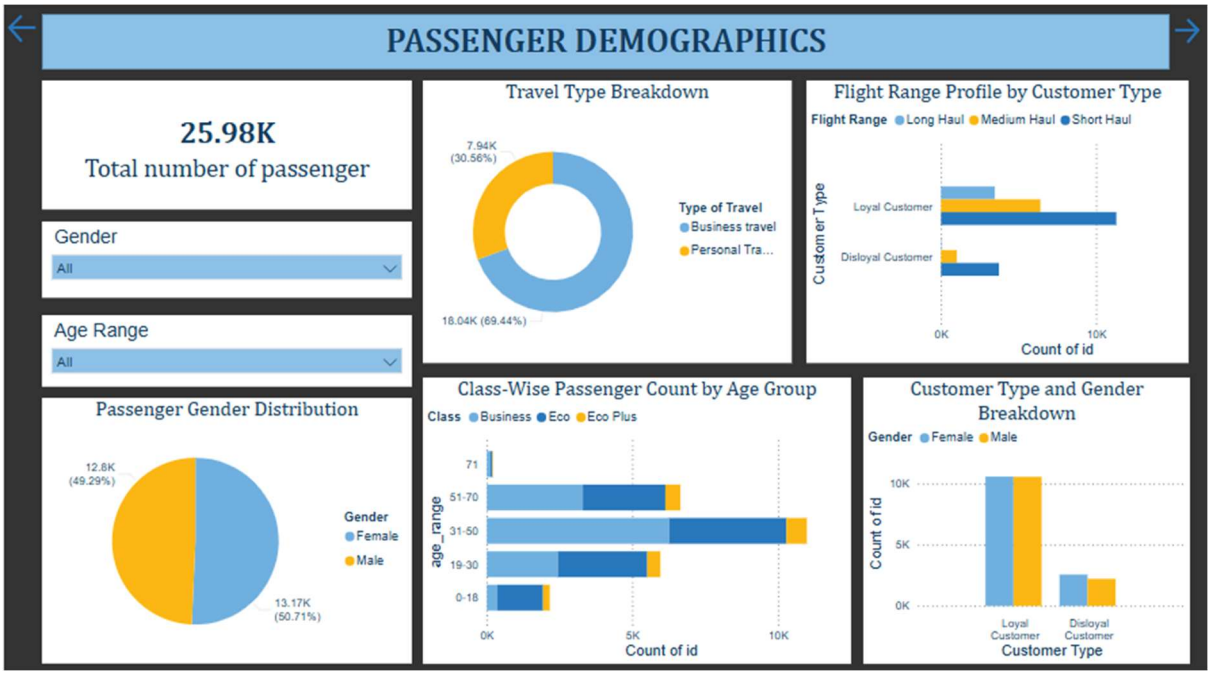
- Interpreted visuals to identify patterns (e.g., loyal customers had higher satisfaction; delays reduced satisfaction).
- Prepared the dashboard for stakeholder use to support data-driven decision making.

Passenger Profile Dashboard

Focus: Demographics, Travel Class, and Customer Type Insights

Key Highlights:

- **Total Passengers:** *~10,000 (based on data provided)*
- **Gender Split:**
  - Male: ~50%
  - Female: ~50%
- **Customer Type:**
  - Loyal Customers: Majority of passengers
  - Disloyal Customers: Minority
- **Type of Travel:**
  - Business: Larger share
  - Personal: Smaller share
- **Class Distribution:**
  - Business Class: Highest satisfaction segment
  - Eco Plus & Eco: Mixed satisfaction levels
- **Flight Range:**
  - Long haul: Significant proportion
  - Medium & Short haul: Balance of remainder

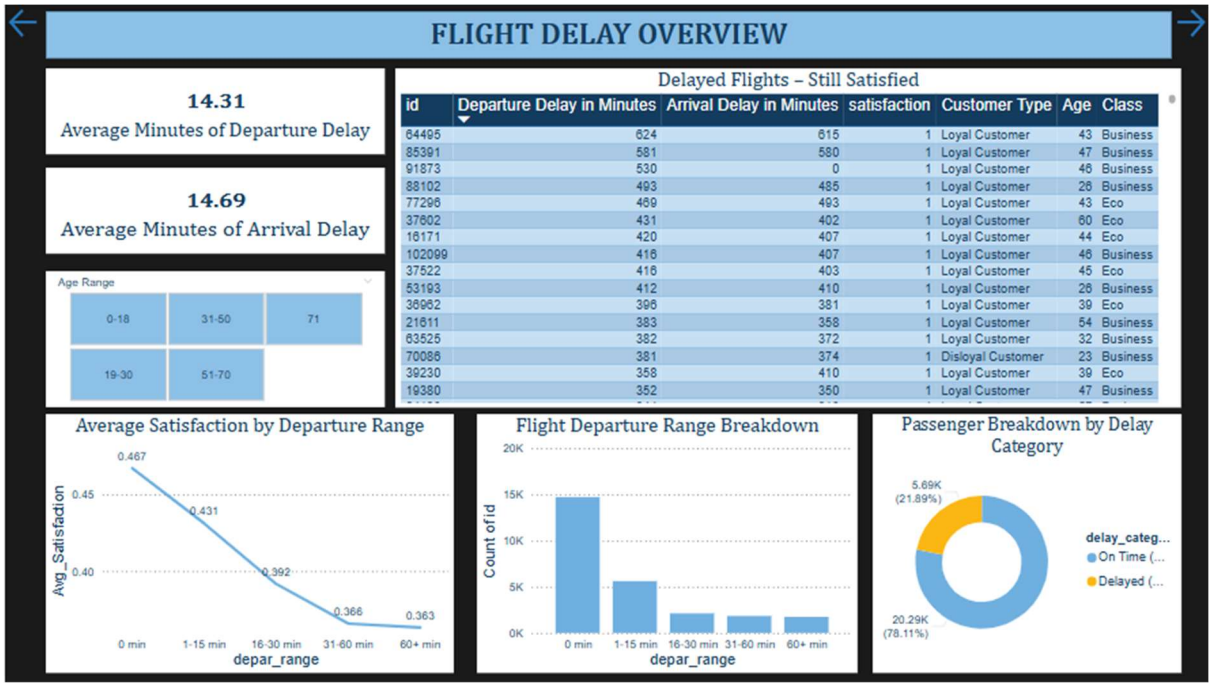


Flight Delay Analysis Dashboard

Focus: Departure & Arrival Delay Patterns

Key Highlights:

- **Average Departure Delay:** *Measured in minutes — delays increase dissatisfaction*
- **Average Arrival Delay:** Similar trend to departure delay
- **Delay Categories:**
    - No Delay: Largest group
    - Minor Delay: Noticeable impact on satisfaction
    - Major Delay: Associated with sharp satisfaction drop
- **Passenger Count by Delay Category:**
    - Majority experience no or minor delays
    - Small proportion affected by major delays
- **Delay Trends:**
    - Longer delays linked to lower average satisfaction

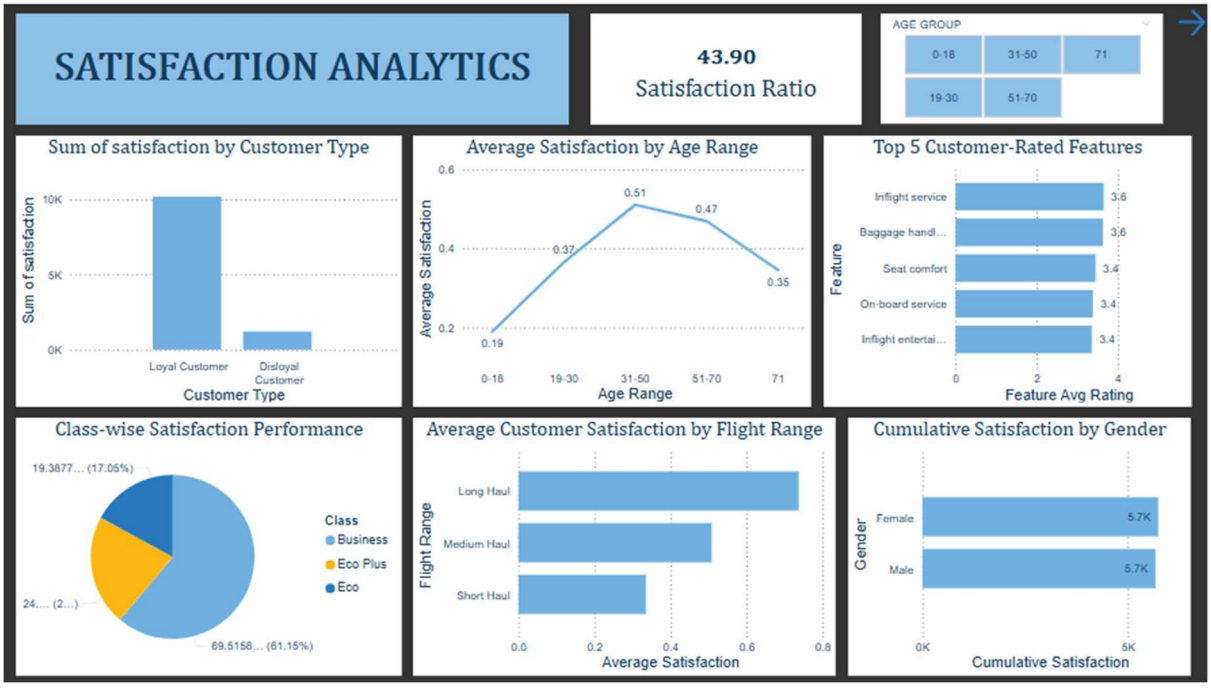


Passenger Satisfaction Dashboard

Focus: Satisfaction Levels Across Passenger Segments

Key Highlights:

- **Satisfaction by Customer Type:**
  - Loyal customers report higher satisfaction
- **Satisfaction by Class:**
  - Business class passengers most satisfied
  - Eco and Eco Plus lower in comparison
- **Satisfaction by Flight Range:**
  - Long haul flights show higher satisfaction
- **Satisfaction by Age Group:**
  - Older age groups report slightly higher satisfaction
- **Top-Rated Features:**
  - Inflight service
  - Baggage handling
  - Seat comfort



Project Outcome

The outcome of this project was the successful development of an **interactive Power BI dashboard** that provides deep insights into **passenger profiles, flight delay patterns, and satisfaction drivers**.

Key Outcomes

- **Comprehensive Dashboard:**
  Three well-organized dashboard pages were created — *Passenger Demographics*, *Flight Delay Overview*, and *Satisfaction Analytics*. These allow users to explore data across multiple dimensions (e.g., age, gender, customer type, travel class, delay categories).
- **Insights into Satisfaction Drivers:** The dashboard clearly identifies factors that contribute to higher satisfaction levels:
  - Loyal customers and business class passengers report higher satisfaction.
  - Inflight service and baggage handling are the top-rated features.
  - Long-haul flights are associated with higher satisfaction compared to short or medium haul.
- **Impact of Delays on Satisfaction:**
  The analysis showed that as delays (both departure and arrival) increase, the average satisfaction score decreases. This provides a clear data-backed case for focusing on operational improvements to minimize delays.
- **Actionable Intelligence for Airlines:**
  The dashboard provides airline management with data-driven recommendations:
  - Prioritize efforts to reduce delays in specific segments (e.g., short-haul or medium-haul flights).
  - Focus loyalty programs and premium services on the passenger segments that contribute most to satisfaction.
  - Improve customer-rated features further, especially inflight services, to enhance satisfaction.
- **User-Friendly, Interactive Tool:**
  The dashboard allows users to:
  - Filter data dynamically (by age, gender, customer type, etc.).
  - Drill down into specific segments and categories.
  - Compare performance across different groups easily.
- **Reusable Framework:**
  The Power BI model can be refreshed with updated data, making it a reusable and scalable solution for ongoing analysis.

Problems Faced

During this project, several challenges arose:

- **Data Quality:**
  The dataset contained missing and inconsistent values in key columns such as Departure Delay, Arrival Delay, and Satisfaction. It required cleaning and creating new calculated fields like delay categories (e.g., no delay, minor delay, major delay).
- **Colour Consistency:**
  Initially, charts had random colour assignments which made it harder to track categories across pages (e.g., customer types, flight ranges). Consistent colour schemes were applied to ensure clarity and avoid confusion.
- **Visual Overload:**
  When combining multiple breakdowns (e.g., class + age + satisfaction), the charts became cluttered. The design had to be refined by:
  - Removing unnecessary legends.
  - Limiting the number of categories per chart.
  - Using tooltips or separate pages to show deeper details.
- **Maintaining Performance:**
  With large datasets and multiple visuals, dashboard responsiveness became an issue. Optimizing DAX calculations and reducing the use of heavy visuals like large tables helped improve performance.

Key Learnings

- The **importance of slicers** and interactivity in dashboards — users can explore the data dynamically, focusing on specific age groups, genders, or customer types.
- The value of **clear, consistent colour schemes** across the dashboard, which improves user comprehension.
- **Effective use of DAX** measures and calculated columns helped in deriving meaningful metrics like average satisfaction or satisfaction ratios for different passenger segments.
- **Visual simplicity** is key. It is better to have separate, focused visuals than trying to combine too much information into a single chart.
- Gained experience in building dashboards that balance both **high-level summaries** and the ability for users to **drill down into details**.