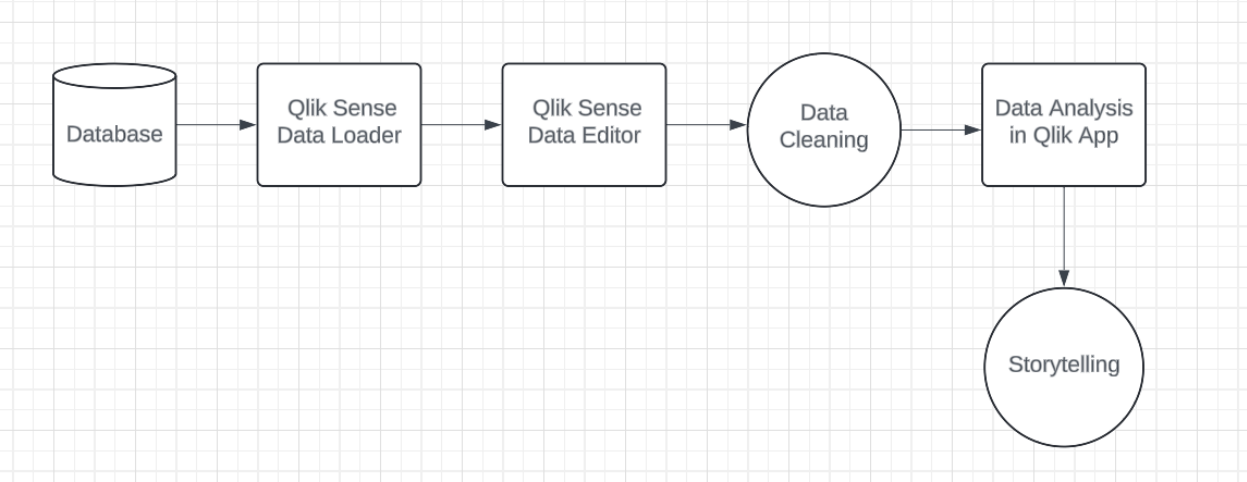
Airline Data Analysis

Introduction

The Airline Analysis Dashboard project involves developing an interactive dashboard using Qlik Sense to visualize and analyze airline operational data. This includes information on flight numbers, departure and arrival times, origin and destination airports, delays, cancellations, and passenger counts. The dashboard will provide comprehensive visualizations and key performance indicators (KPIs) to offer insights into various aspects of airline operations.

The purpose of the Airline Analysis Dashboard is to empower airline management with actionable insights through data visualization, enabling them to make informed decisions. By analyzing flight performance, identifying trends, and highlighting areas for improvement, the dashboard aims to enhance operational efficiency, optimize flight schedules, reduce delays and cancellations, and ultimately improve customer satisfaction.



Problem Understanding

Business Problem

The airline industry faces significant challenges related to operational efficiency, customer satisfaction, and competitive pressures. Key issues include flight delays,

cancellations, and optimizing flight schedules. These challenges result in increased operational costs, reduced customer loyalty, and potential revenue losses. The lack of a comprehensive and interactive analytical tool limits the ability to make data-driven decisions that could address these issues effectively.

Business Requirements

1. Data Integration
    - Integration of diverse data sources including flight schedules, delays, cancellations, passenger counts, and airport information.
    - Ensuring real-time or near-real-time data updates for current insights.
2. Data Visualization
    - Creation of intuitive and interactive visualizations such as bar charts, line charts, heat maps, pie charts, and geo-maps.
    - Visualization of key performance indicators (KPIs) like average delays, total number of flights, and cancellation rates.
3. User Interaction
    - Filters and drill-down capabilities to explore data by various dimensions such as time periods, routes, and airlines.
    - Responsive design for accessibility on desktops, tablets, and smartphones.
4. Analytics and Reporting
    - Advanced analytics capabilities including trend analysis, predictive analytics, and anomaly detection.
    - Automated and customizable reporting for different user roles within the organization.

Literature Survey

Study	**Focus**	**Key Findings**	**Relevance to the Project**
Li, Liu, & Liu (2017)	Predictive Analytics in Airline Operations	Predictive analytics can significantly reduce delays and optimize flight schedules.	Supports the need for predictive analytics in the dashboard.

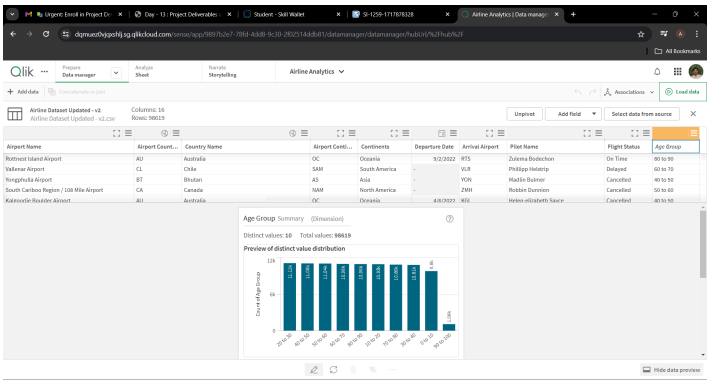
Few (2006)	Information Dashboard Design	Effective data visualization improves comprehension and decision-making in business environments.	Emphasizes the importance of intuitive and interactive visualizations.

Dataset Collection

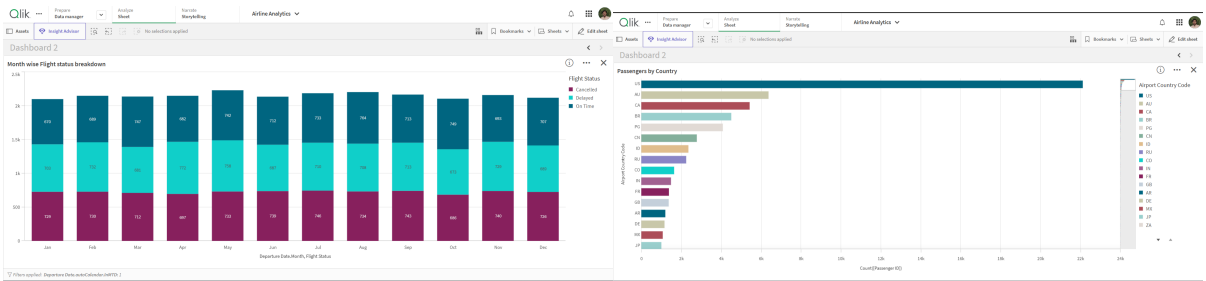
The Airline Operations Dataset, sourced from Kaggle, provides a comprehensive collection of data related to airline operations, including flight schedules, performance metrics, and passenger information. This dataset is valuable for analyzing and understanding various aspects of airline operations, such as on-time performance, flight delays, cancellations, and passenger demographics.

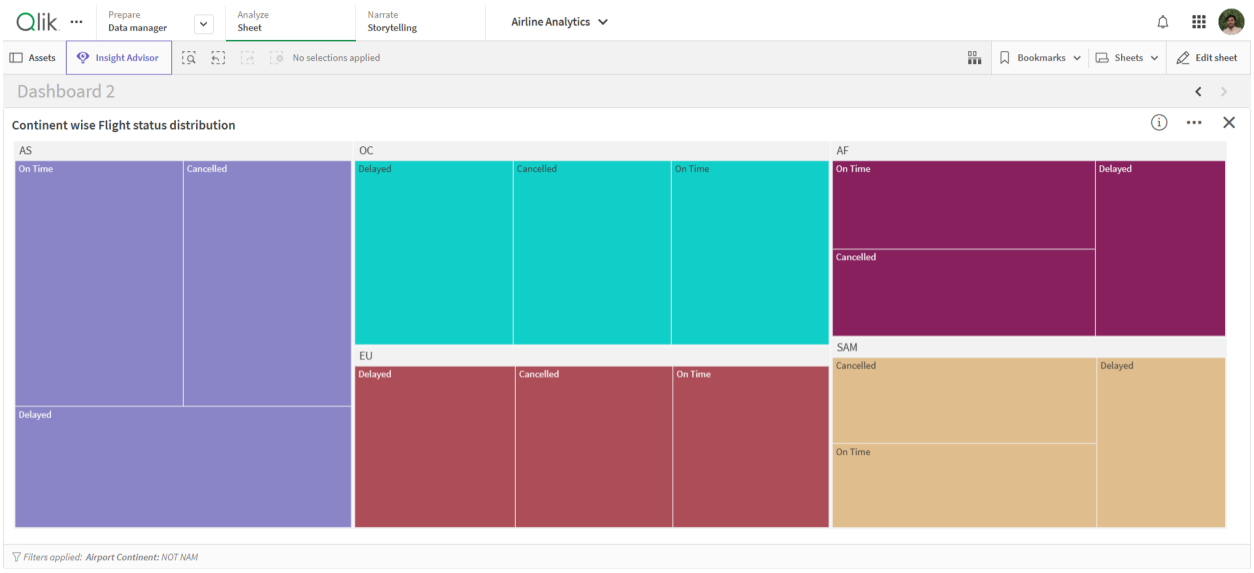
Dataset Link

Data Preparation

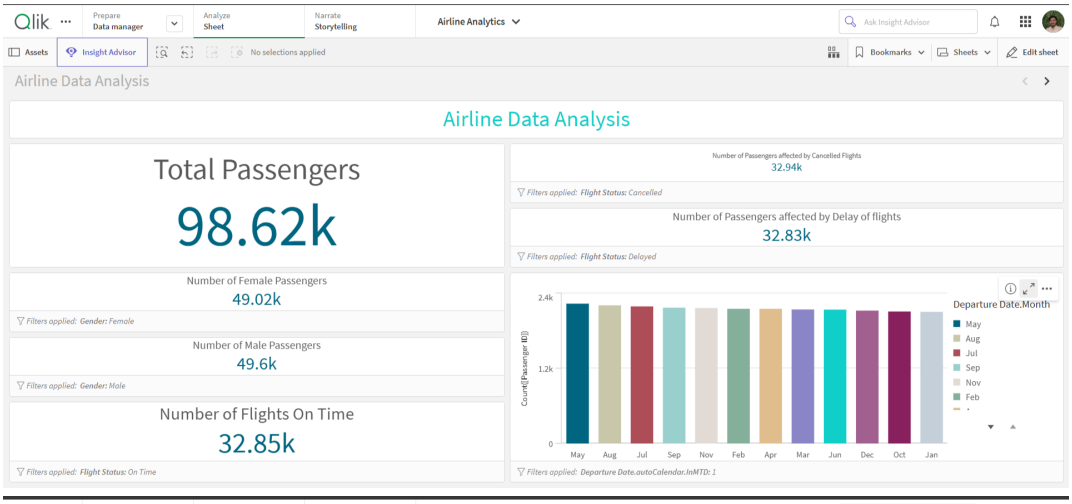


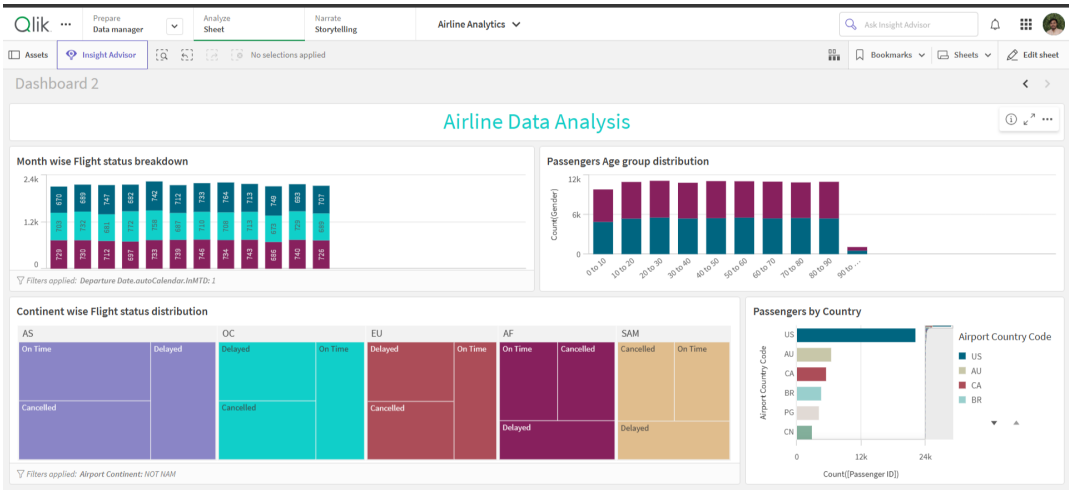
Data Visualizations




Airline Analytics
Assets
Insight Advisor
No selections applied
Bookmarks
Sheets
Edit sheet
Dashboard 2
Continent wise Flight status distribution
AS
On Time
Cancelled
Delayed
OC
Delayed
Cancelled
On Time
EU
Delayed
Cancelled
On Time
AF
On Time
Delayed
Cancelled
SAM
Cancelled
Delayed
On Time
Filters applied: Airport Continent: NOT NAM

Dashboard


Airline Analytics
Assets
Insight Advisor
No selections applied
Bookmarks
Sheets
Edit sheet
Airline Data Analysis
Airline Data Analysis
Total Passengers
98.62k
Number of Passengers affected by Cancelled Flights
32.94k
Filters applied: Flight Status: Cancelled
Number of Passengers affected by Delay of flights
32.83k
Filters applied: Flight Status: Delayed
Number of Female Passengers
49.02k
Filters applied: Gender: Female
Number of Male Passengers
49.6k
Filters applied: Gender: Male
Number of Flights On Time
32.85k
Filters applied: Flight Status: On Time
Departure Date.Month
May
Aug
Jul
Sep
Nov
Feb
Apr
Mar
Jun
Dec
Oct
Jan
Filters applied: Departure Date.autoCalendar.InMTD: 1


Airline Analytics
Assets
Insight Advisor
No selections applied
Bookmarks
Sheets
Edit sheet
Dashboard 2
Airline Data Analysis
Month wise Flight status breakdown
Filters applied: Departure Date.autoCalendar.InMTD: 1
Passengers Age group distribution
Continent wise Flight status distribution
AS
OC
EU
AF
SAM
Filters applied: Airport Continent: NOT NAM
Passengers by Country
Airport Country Code
US
AU
CA
BR
Count([Passenger ID])

Report

Exploring Insights from Synthetic Airline Data Analysis

Total number of Passengers
98.62k

Number of Passengers affected by Delay of flights
32.83k

Number of Passengers affected by Cancelled Flights
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Number of Female Passengers
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Number of Male Passengers
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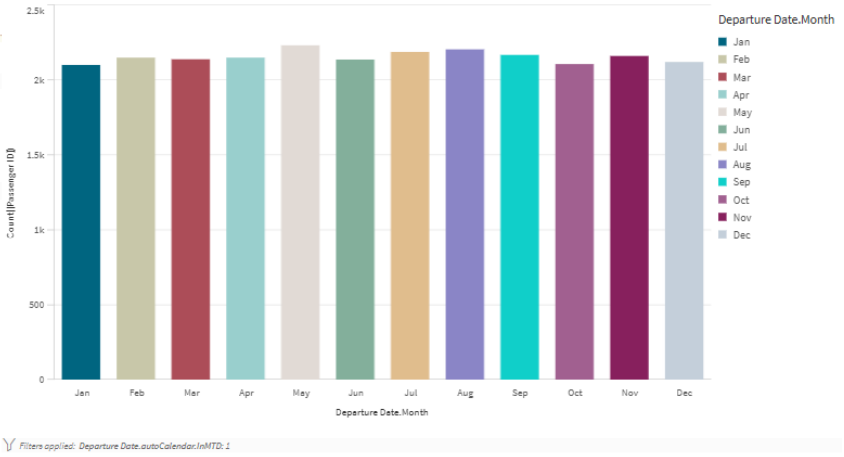
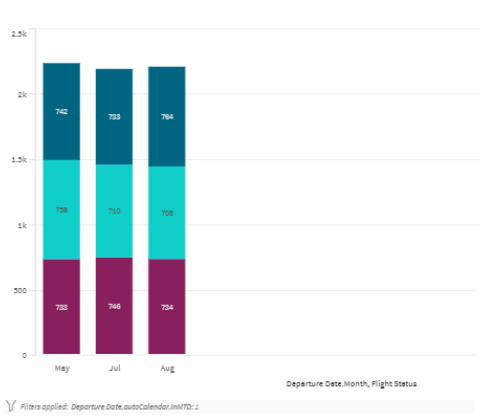
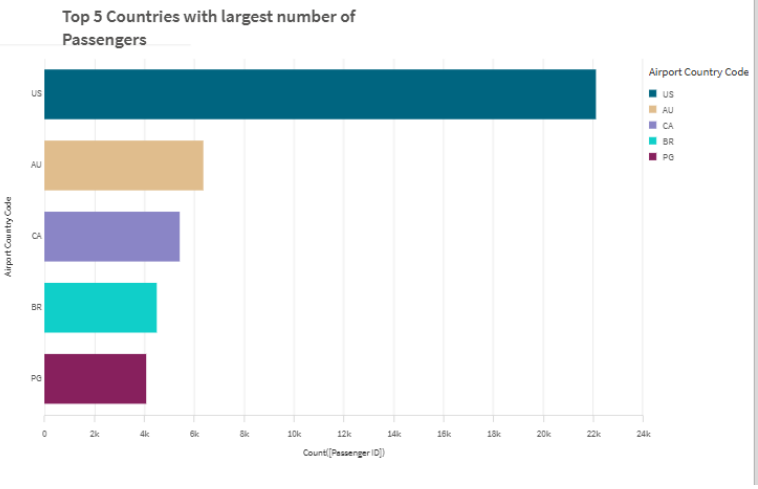




Top 3 Months for Flights



Performance & Testing