

# Project report

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Branch = Computer science

Title = Virtual internship in Business analytics

Project Name = Exploring Insights from Synthetic Airline Data Analysis with Qlik



# Exploring Insights From Synthetic Airline Data Analysis With Qlik

The project "Exploring Insights from Synthetic Airline Data Analysis with Qlik" involves utilizing synthetic airline data to derive valuable insights using Qlik, a business intelligence and data visualization tool.

In this project, the synthetic airline data simulates various aspects of airline operations, including flight schedules, passenger demographics, ticket sales, and performance metrics. The objective is to leverage Qlik's analytical capabilities to uncover patterns, trends, and correlations within this data, aiding in decision-making processes for airlines, airports, and related stakeholders.

## Scenario 1: Revenue Optimization

An airline wants to optimize its revenue by analyzing historical ticket sales data, identifying peak travel times, popular destinations, and pricing strategies. Using Qlik, they can visualize revenue trends over time, segment customers based on purchasing behavior, and adjust pricing strategies accordingly to maximize profitability.

## Scenario 2: Operational Efficiency

An airport authority aims to enhance operational efficiency by analyzing flight schedules, passenger flows, and luggage handling processes. By integrating Qlik with synthetic airline data, they can identify bottlenecks in airport operations, predict peak traffic periods, and allocate resources effectively to streamline processes and improve overall efficiency.

## Scenario 3: Customer Experience Enhancement

Airlines are keen to enhance the passenger experience by understanding customer preferences, satisfaction levels, and pain points. Through sentiment analysis on customer feedback data integrated with Qlik, airlines can identify areas for improvement, personalize services, and tailor marketing campaigns to better meet customer needs, ultimately fostering loyalty and satisfaction.

# 1.Problem Understanding

## 1.1 Business problem

The aviation industry is a complex and dynamic sector that requires constant analysis and optimization to improve operational efficiency, customer satisfaction, and financial performance. With the advent of big data and advanced analytics tools, there is an unprecedented opportunity to gain deeper insights into airline operations.

This project aims to leverage synthetic airline data to analyze various aspects of airline operations, including flight schedules, passenger demographics, ticket sales, and performance metrics. By utilizing Qlik, a powerful business intelligence and data visualization tool, we can uncover patterns, trends, and correlations within this dataset. The insights derived from this analysis will aid decision-making for airlines, airports, and stakeholders.

The challenge lies in effectively managing and interpreting large volumes of data to extract actionable intelligence. The project will focus on developing robust data visualization and analysis techniques that can handle the complexity of airline data. Additionally, it will explore the use of synthetic keys and dimensions to enhance the data model in Qlik Sense.

Through this project, we aim to demonstrate how synthetic airline data can be used to simulate various operational scenarios and predict outcomes. This will not only help in strategic planning but also in crisis management by providing a virtual environment to test new concepts without the risk associated with real-world trials

## 1.2 Business requirements:

1. **Data Acquisition:** Secure access to comprehensive airline datasets, including flight schedules, passenger information, ticket sales, and operational metrics<sup>1</sup>.
2. **Data Quality:** Ensure the accuracy, completeness, and consistency of the data to support reliable analysis<sup>1</sup>.
3. **Data Privacy:** Comply with data protection regulations and ensure passenger privacy is maintained throughout the analysis process<sup>1</sup>.
4. **Analytical Tools:** Utilize advanced analytics tools like Qlik for data visualization and business intelligence to uncover insights<sup>1</sup>.

5. **Predictive Maintenance:** Implement predictive analytics to forecast maintenance needs and reduce operational costs<sup>1</sup>.
6. **Fuel Management:** Analyze fuel consumption data to optimize routes and reduce expenses<sup>1</sup>.
7. **Customer Experience:** Use data to enhance the customer journey, from booking to post-flight services<sup>2</sup>.
8. **Revenue Optimization:** Identify opportunities for ancillary revenue streams through targeted marketing and personalized offers.

### 1.3 Literature survey

A literature survey on the topic of airline data analysis with Qlik would involve a comprehensive review of existing research, methodologies, and case studies related to the use of Qlik for analyzing synthetic airline data. Here are some key points that such a survey might cover:

1. **Overview of Airline Data Analysis:** Discuss the importance of data analysis in the airline industry and how it can lead to improved operational efficiency, customer satisfaction, and revenue management.
2. **Synthetic Data in Airline Industry:** Explore the concept of synthetic data and its applications in simulating real-world scenarios for airlines without compromising sensitive information.
3. **Qlik as a Business Intelligence Tool:** Examine how Qlik is used as a powerful data visualization and business intelligence tool to uncover actionable insights from complex datasets.
4. **Data Analysis Methodologies:** Review various data analysis methodologies that have been proposed and identified as essential for understanding the inner workings of the airline industry.
5. **Case Studies:** Analyze case studies where Qlik has been successfully implemented for airline data analysis, highlighting the outcomes and benefits achieved.

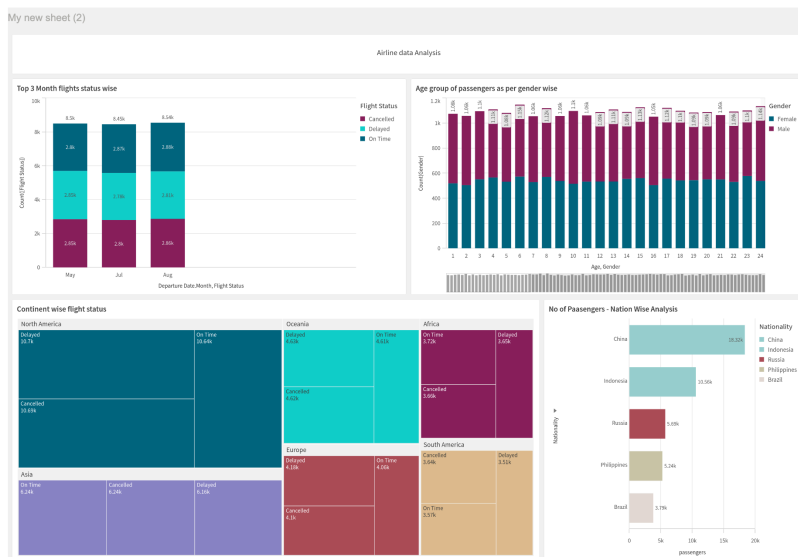
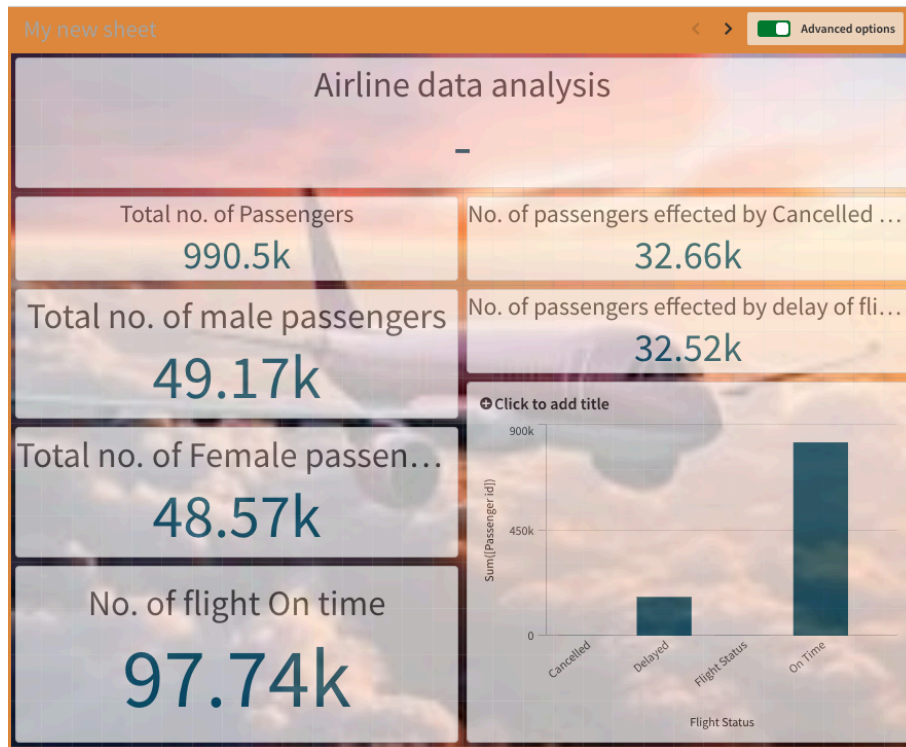
## 2.Data Collection

Data contains all the meta information regarding the columns described in the CSV files  
And It was collected by Kaggle dataset.

Column Description of the Dataset:

- Passenger ID - Unique identifier for each passenger
- First Name - First name of the passenger
- Last Name - Last name of the passenger
- Gender - Gender of the passenger
- Age - Age of the passenger
- Nationality - Nationality of the passenger
- Airport Name - Name of the airport where the passenger boarded
- Airport Country Code - Country code of the airport's location
- Country Name - Name of the country the airport is located in
- Airport Continent - Continent where the airport is situated
- Continents - Continents involved in the flight route
- Departure Date - Date when the flight departed
- Arrival Airport - Destination airport of the flight
- Pilot Name - Name of the pilot operating the flight
- Flight Status - Current status of the flight (e.g., on-time, delayed, canceled)

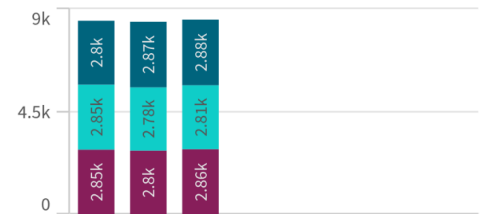
# 1.Data visualization



# 3. Story Visualization

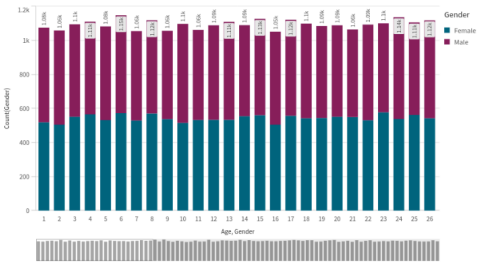
EXPLORING INSIGHTS FROM SYNTHETIC AIRLINE DATA ANALYSIS WITH QLIK

Top 3 Month flights status wise



This Chart shows the Top 3 Months- Flights Status - ( cancelled/Delayed/On - time)

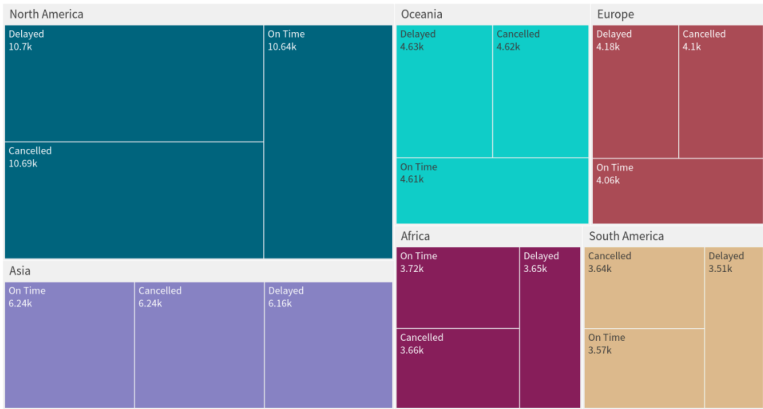
Age group of passengers as per gender wise



This Charts shows Age Group - Gender Wise

This Chart Shows Continent Wise Flight Status

Continent wise flight status



Total No. of Passengers

98.62k

The number of Male & Female Passengers traveled:

Male - [Click Here](#)

Female - [Click Here](#)

Number of Passengers effected by cancelled flights

32.94k

No. of Passengers Effected by delay of flights

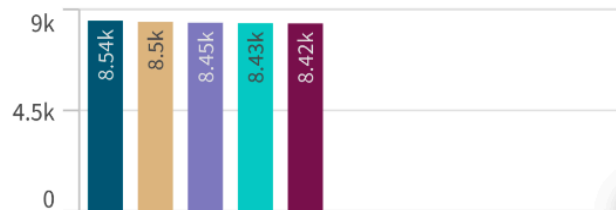
32.83k

No of Flights on Time

32.85k

The Chart displays the Top-5 month Wise-Number of passengers Travelled

Top 5- Number of Male & female Passengers travelled - Month Wise





## 4. Conclusion

The analysis of airline data using tools like Qlik has proven to be an invaluable asset for the aviation industry. It enables airlines to gain deep insights into their operations, customer behavior, and market trends, which are crucial for making informed decisions and staying competitive.

The use of synthetic data allows for safe experimentation and scenario planning without risking real-world consequences. This approach can lead to improved operational efficiency, enhanced customer satisfaction, and increased profitability.

As the industry continues to evolve with advancements in technology and changing consumer expectations, the role of data analytics will only become more significant. Airlines that leverage these insights effectively will be better positioned to adapt to challenges and capitalize on new opportunities.

Ultimately, the goal is to create a seamless and enjoyable travel experience for passengers while ensuring the financial health and sustainability of the airline. By embracing data-driven strategies, airlines can achieve this balance and thrive in the dynamic landscape of air travel. ✈️