1. Define Problem / Problem Understanding

1.1 Specify the business problem

The aviation sector depends significantly on data analysis to optimize operations, improve customer experiences, and maintain safety and compliance. The goal is to construct an interactive dashboard in Qlik Sense that offers information on passenger demographics, flight operations, and pilot performance.

The business challenge centers on the requirement for a comprehensive and dynamic dashboard that may give significant insights into:

- Total number of travelers.
- Flight status performance measures, including delays and cancellations
- The demographic distribution of passengers
- Performance metrics for pilots
- The geographical distribution of passengers
- Monthly trends in passenger travel.

1.2 Business requirements

To solve the business challenge, the following needs were identified:

- A user-friendly, interactive dashboard for business analysts, operations managers, and executives.
- Visualizations that give information on passenger demographics, flight operations, and performance indicators.
- Filters and slicers provide deep analysis and drill-down capabilities.
- Responsive design ensures usability across several devices.
- Performance testing will guarantee that the dashboard can handle massive datasets efficient

1.3 Literature Survey

A literature survey was conducted to understand best practices in dashboard design, data visualization techniques, and performance optimization strategies. Key findings include:

- Effective dashboard design principles emphasize simplicity, clarity, and ease of use.
- Data visualization techniques such as bar charts, pie charts, treemaps, and maps are effective in conveying different types of data insights.
- Performance optimization strategies include efficient data preprocessing, appropriate use of data filters, and minimizing the amount of data rendered at once.

2. Data Collection

2.1 Collect the dataset

The dataset for this project includes various parameters related to airline operations on a global

scale. Key fields include:

- Passenger ID
- First Name
- Last Name
- Gender
- Age
- Nationality
- Airport Name
- Airport Country Code
- Country Name
- Airport Continent
- Continents involved in the flight route
- Departure Date
- Arrival Airport
- Pilot Name
- Flight Status

2.2 Connect Data with Like Sense

The data can be uploaded and analyzed by loading it in the Qlik as an app by following steps:

- Load Data: Import the dataset into Qlik Sense.
- Data Connection: Establish a connection to the data source.
- Data Model: Ensuring the data model is properly set up to facilitate seamless data visualization.

3. Data Preparation

The dataset was clean only one transformation was required to manage the dates as some of them were in the different format which was manged by ysing the data load editor. There were no missing values in the dataset. So, the process followed are explained below:

- Data Cleaning: Remove duplicates, handle missing values, and ensure consistency in data formats.
- Data Transformation: Create date format properly which helped to transform it in different calculated fields and ensuring all data types are correct.
- Data Structuring: Organize data to support visualizations.

4. Prepare the Data for Visualization

Define Dimensions and Measures:

The proper dimensions help to create a good visulization. In this dataset we have certain

dimensions which was required for building the dashboard and was an integral part of the syatem. Some of the dimensions are listed below,
Dimensions: AirportContinent, Age, Gender, PilotName, FlightStatus, CountryName, Continent.

Measures: Count(PassengerID), Count of specific statuses (e.g., Delayed, Cancelled, On-Time).

5. Data Visualizations

5.1 Visualizations

The dataset was analyzed and different form of graphs were taken as a source for making dashboard. Below are the listed chart types along with dimension and measures:

- Total Number of Passengers:

Chart Type: KPI

Measure: Count(PassengerID)

- Number of Passengers Affected by Cancelled Flights:

Chart Type: KPI

Measure: Count(Flight status- cancelled)

- Number of Passengers Affected by Delayed Flights:

Chart Type: KPI

Measure: Count(FlightStatus-Delayed)

- Number of Passengers Affected by On time Flights:

Chart Type: KPI

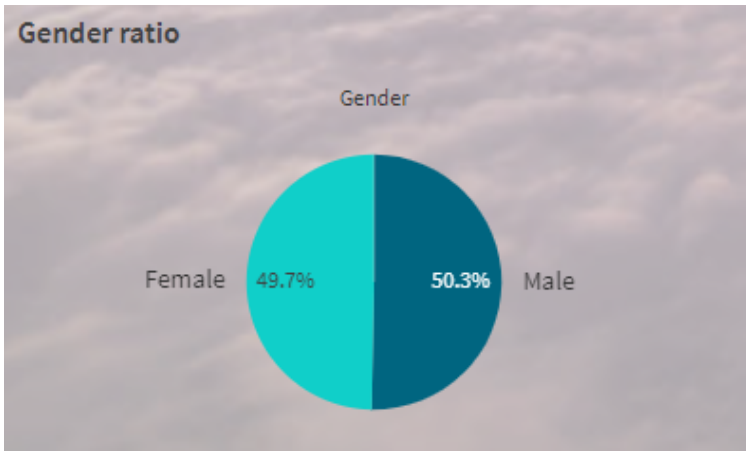
Measure: Count(FlightStatus-On Time)

- Number of Male and Female Passengers:

Chart Type: Pie Chart

Dimensions: Gender

Measure: Count(PassengerID)

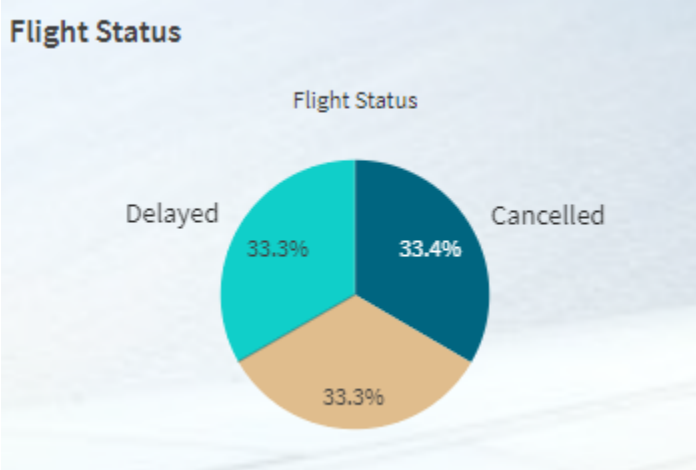


- Flight status:

Chart Type: Pie Chart

Dimension: Flight Status

Measure: Count(PassengerID)

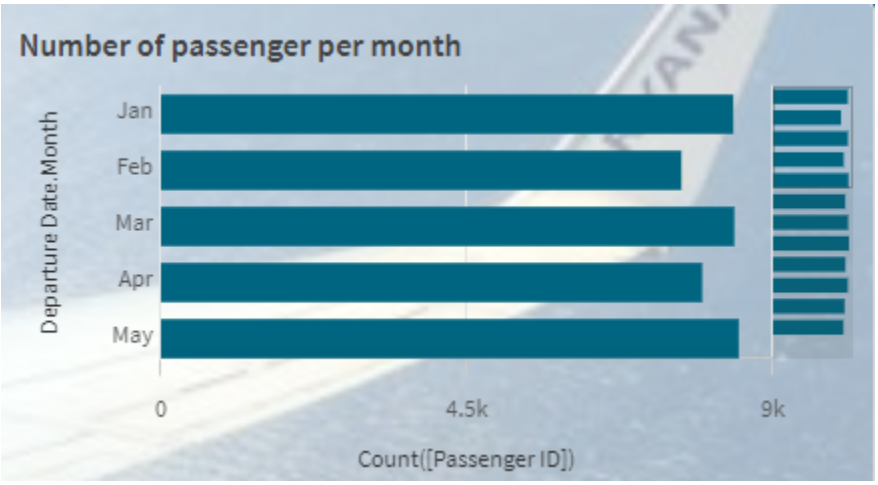


- Number of passenger per month::

Chart Type: Bar Chart

Dimension: Date

Measure: Count(PassengerID)



- Number of passenger per Country:

Chart Type: Bar Chart

Dimension: Nationality

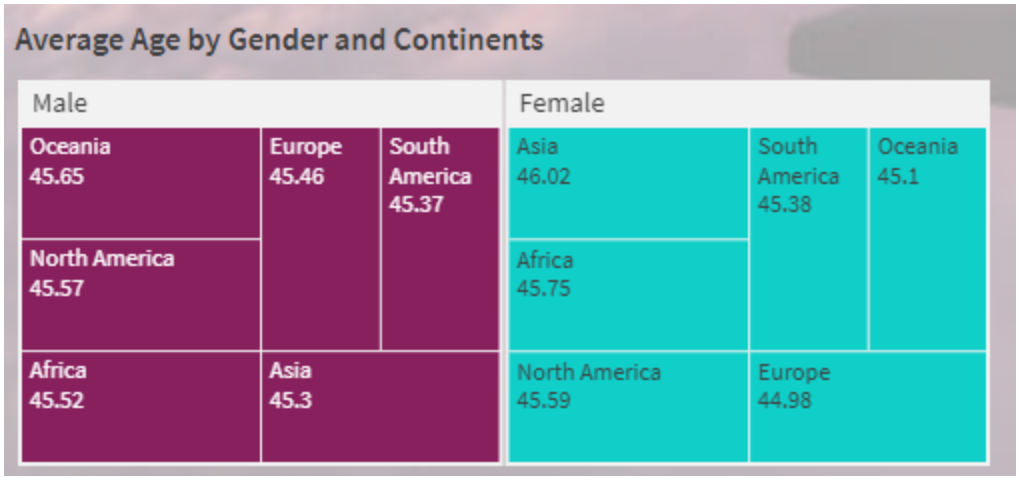
Measure: Count(PassengerID)

- Average of passenger by gender and continent:

Chart Type: TreeMap

Dimension: Gender, Continent

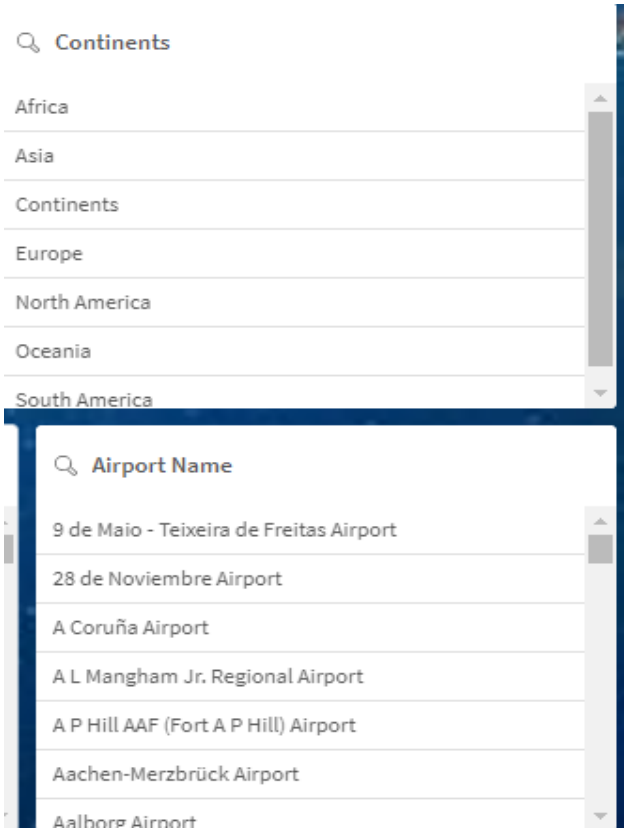
Measure: Count(PassengerID)



- Filter by continent, pilot name and airport name:

Chart Type: Filter pane

Measure: Continent, Pilot name, airport name.

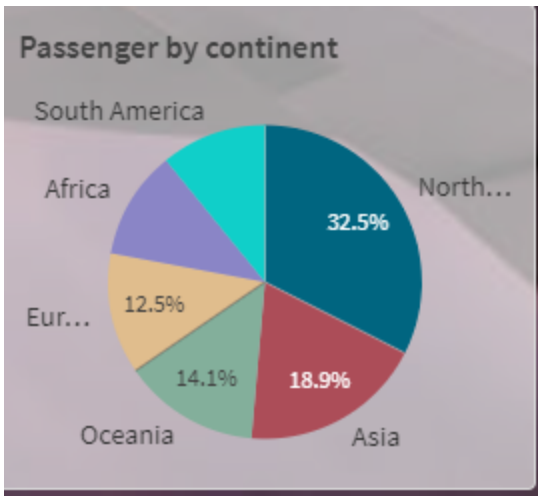


- Number of passenger by continent:

Chart Type: Pie Chart

Dimension: Continent

Measure: Count(PassengerID)

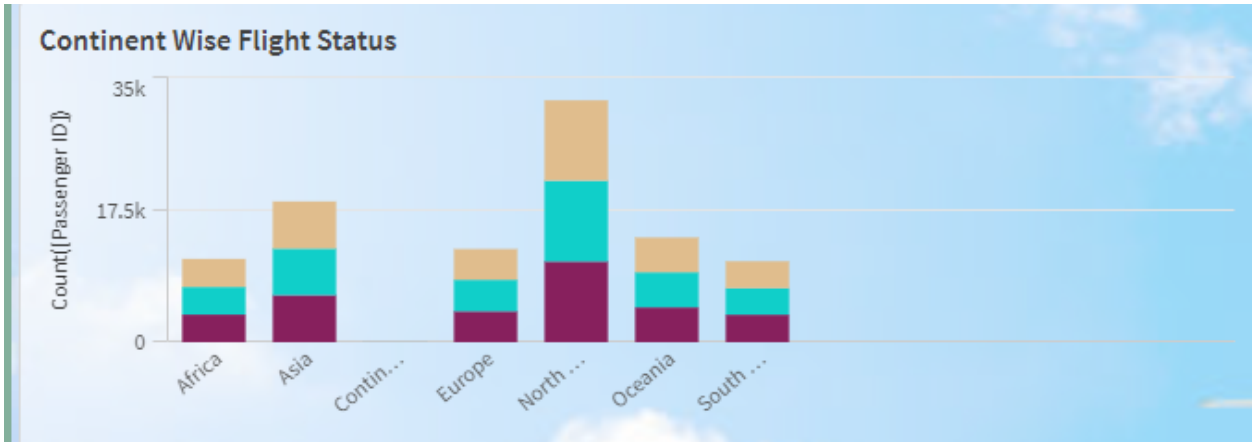


- Continentwise flight status:

Chart Type: Vertical Stacket Bar Chart

Dimension: Continent, Flight Status,Stacked: Gender.

Measure: Count(PassengerID)

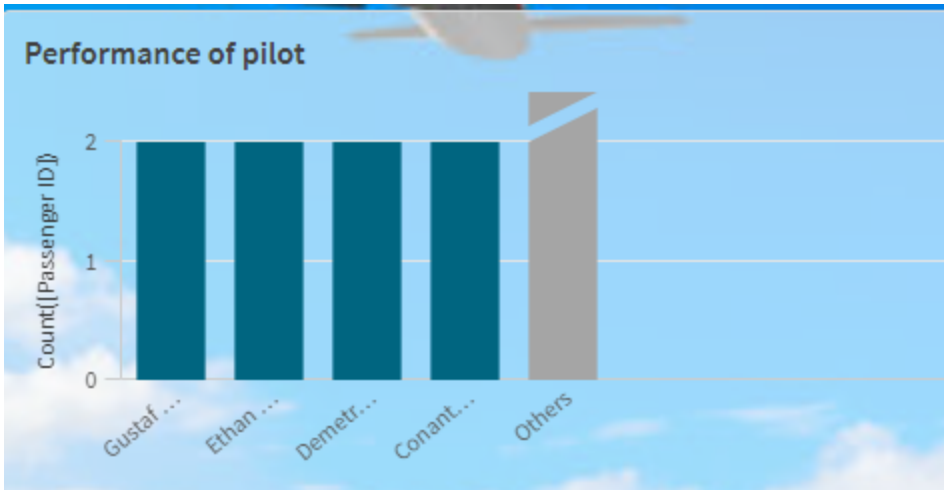


- Top 5 pilot in terms of flight status:

Chart Type: Bar Chart

Dimension: pilot name, flight status.

Measure: Count(PassengerID)

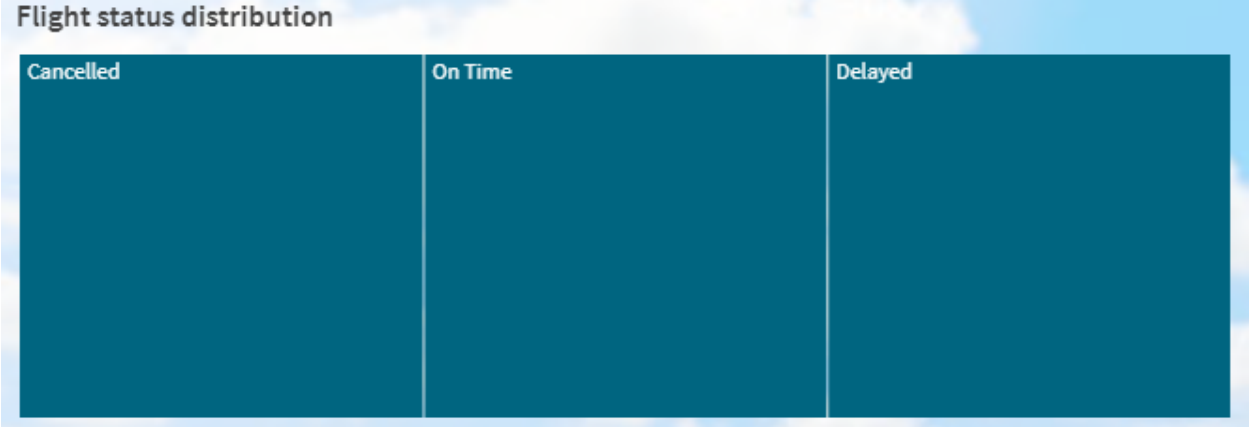


- Flight status distribution:

Chart Type: TreeMap

Dimension: flight status.

Measure: Count(PassengerID)



6. Dashboard

6.1 Responsive and Design of Dashboard

Design Principles: Ensuring the dashboard is responsive, intuitive, and easy to navigate. Use consistent color schemes and fonts.

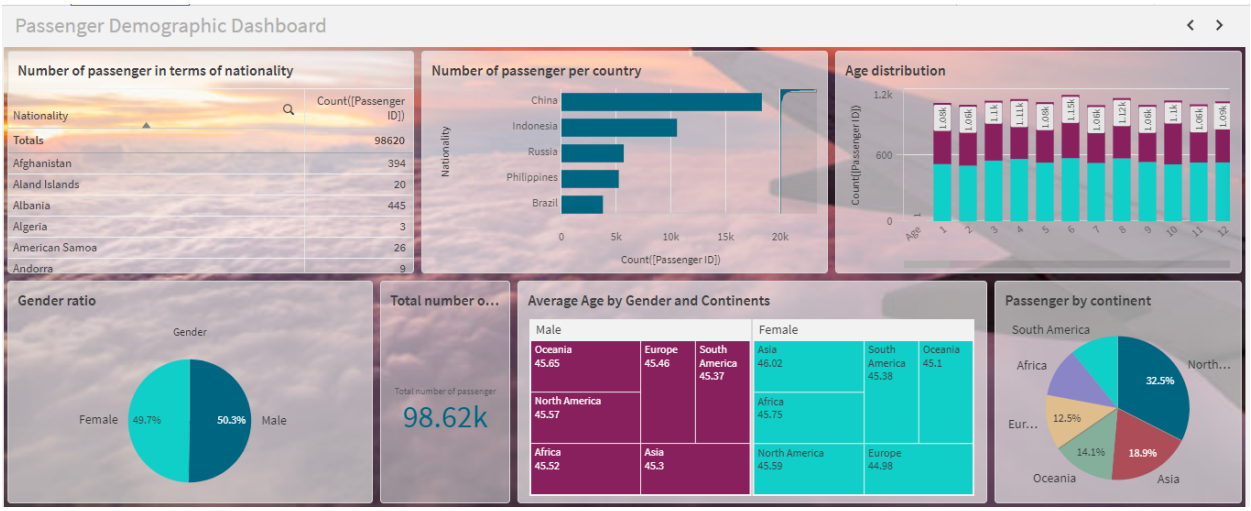
Layout: Organize charts and KPIs logically, grouping related metrics together.

Filters: Add filter panes for Gender, FlightStatus, and other relevant dimensions to allow users to drill down into the data.

There were total three dashboards which are listed below:

- Passenger demographic dashboard:

This dashboard helps to identify the passengers demographically in terms of their nationality, Continent, Country, Gender and age. There difeerent visuals which are interactive and can show the results in terms of any country.

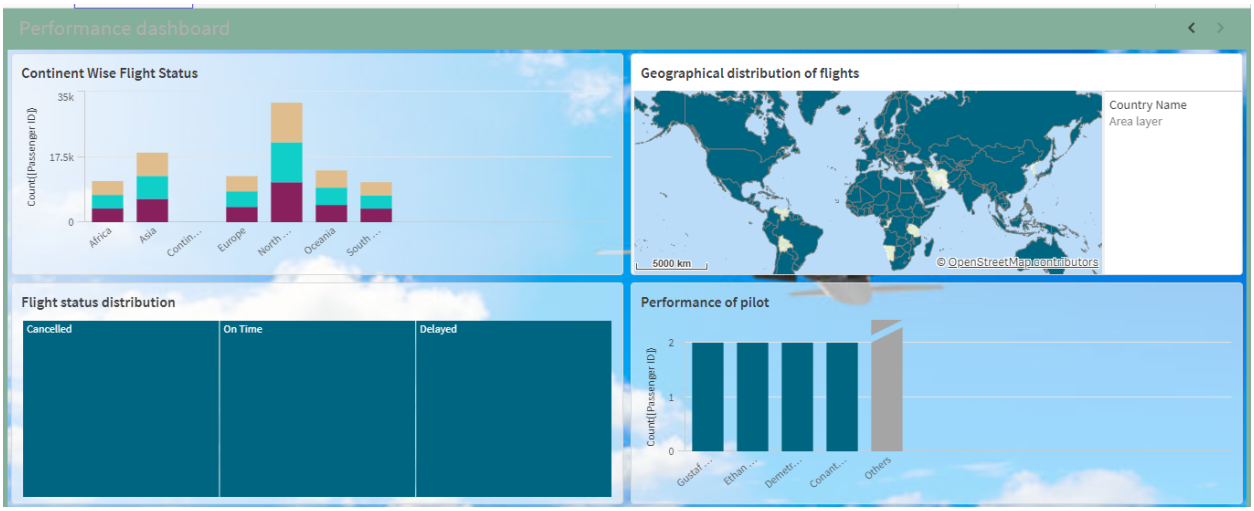


- Flight Operation dashborad:

This dashboard especially deals with the flight operations about metrics like flight delay, on time, cancelled. It also shows the passenger airlines are having per month. All these are responsive connected with the filter pane like continents, pilot name, and airport name whic enhance the result as we play with the dashborad resulting in the very insightful information.

- Performance dashboard:

This dashboard deals with the performance of pilot showing the top 5 pilots in the list who has largest number of on time flights, delayed flights, and cancelled flights. So on, it also have a geo spatical data map whic shows different continents and a vertical stacted bar chart which shows the flight status of respective continent, pilot.

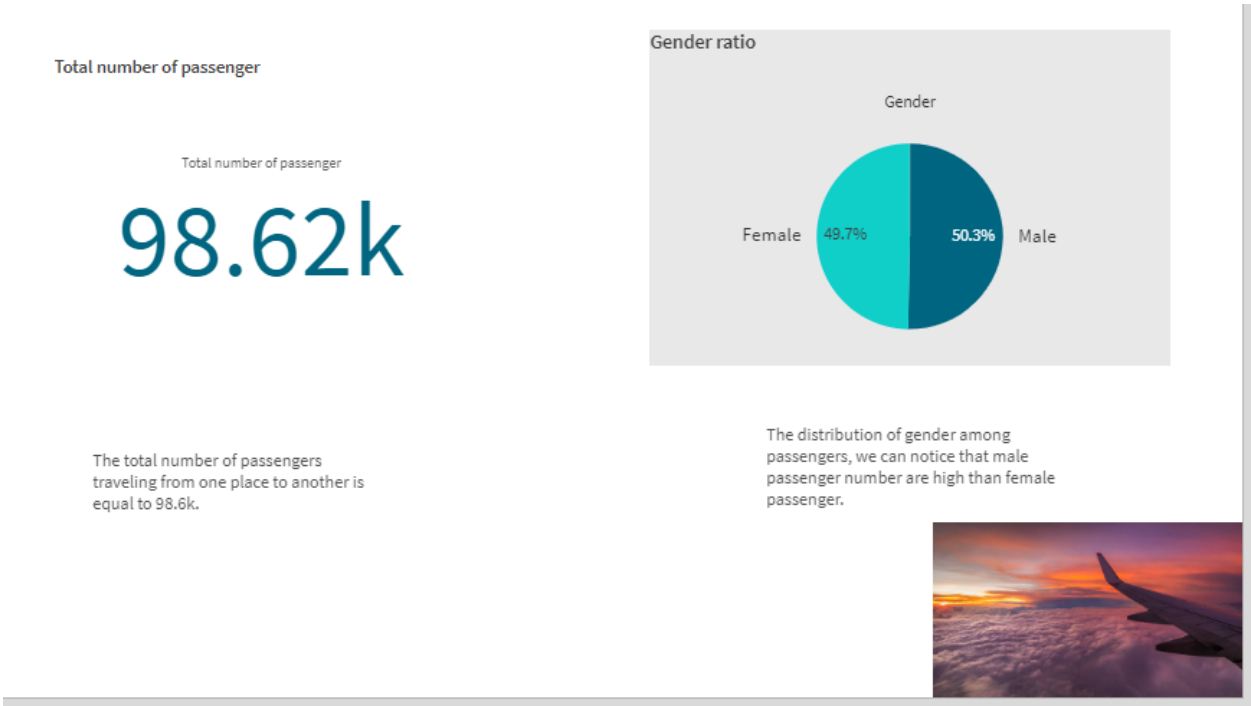


All these dashboards are connected together and are responsive providing good insights resulting in the quick decison-making process.

7. Story

7.1 Story Creation

A story telling pdf was made using the interactive dashboards which provide insightful information below are the important attached storylines:



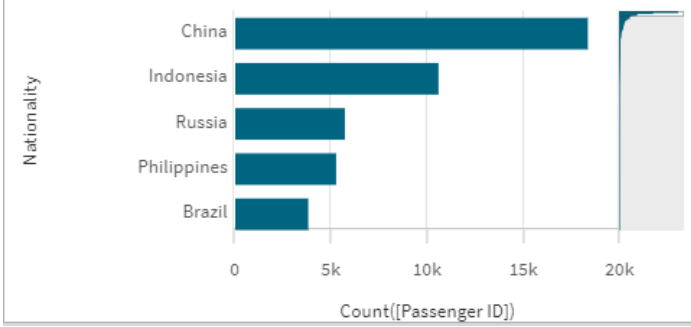
The above slides helps airlines industry to know about the total number passengers and gender distribution among them which will help them to plan for the future in terms of management like operational, food, and age distribution might help them manage the healthcare services for them which will build a customer statisfaction.

Number of passenger in terms of nationality

Nationality	Count([Passenger ID])
Totals	98620
Afghanistan	394
Aland Islands	20
Albania	445
Algeria	3
American Samoa	26
Andorra	9
Angola	81

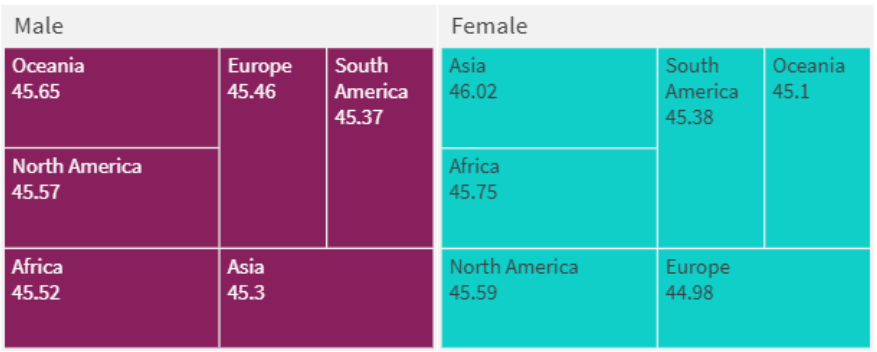
This table shows the number of passengers according to their nationality.
It can be seen that China has the highest number of passengers among all of them.

Number of passenger per country



Here, airlines can mange record of passenger in terms of country and can identify the reasons behind the less passenger in some country can work on them for better growth resulting in the revenue optimization.

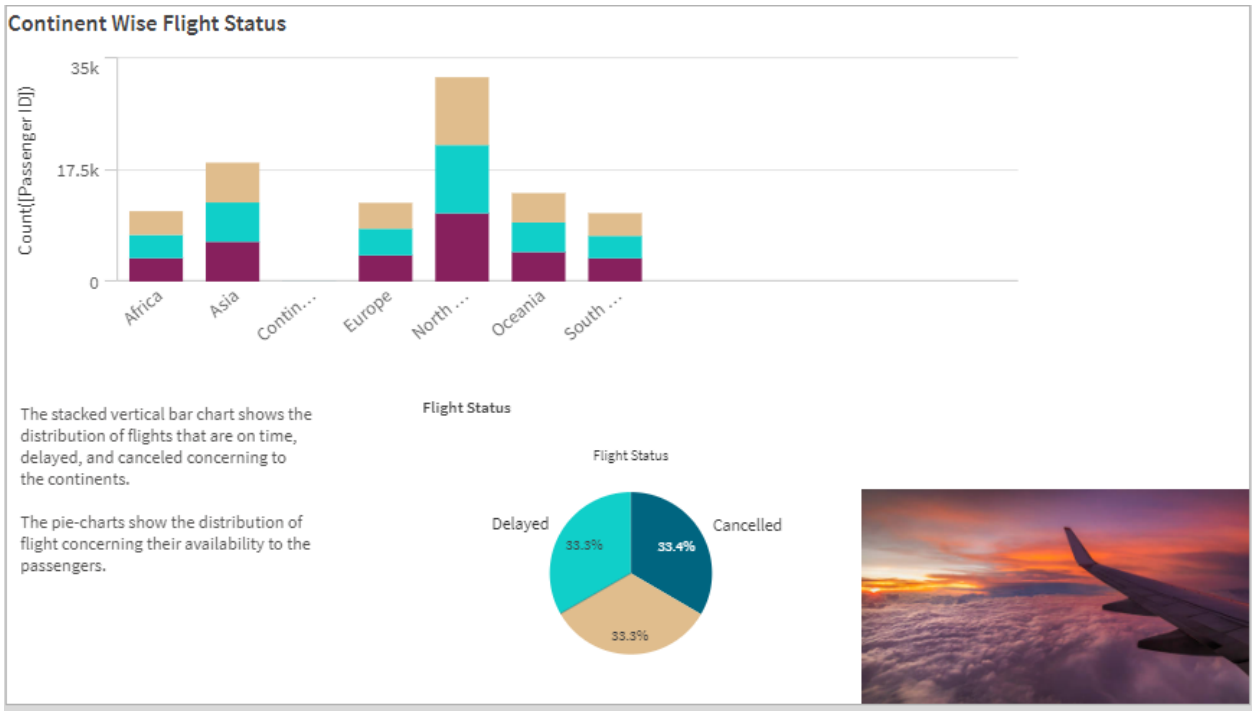
Average Age by Gender and Continents



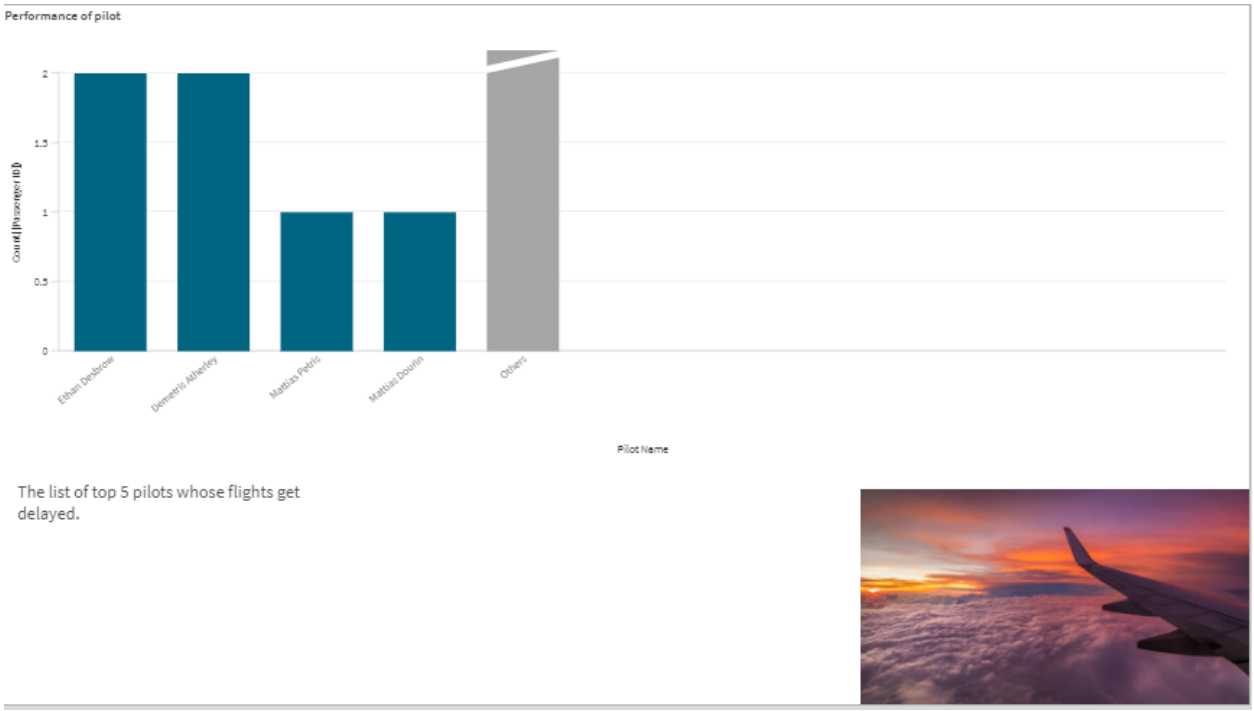
Here, the average age of passengers can be seen concerning the gender and continents.

It will provide a insight about the age distribution in different continents, and when interaced

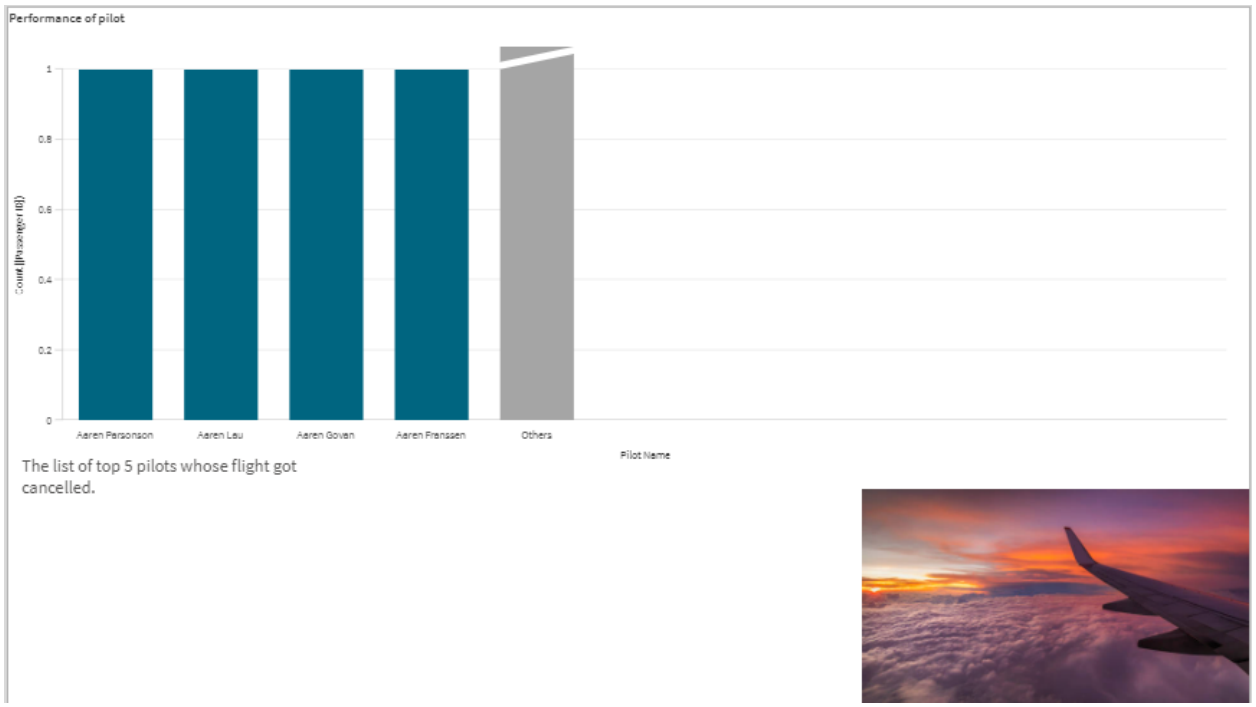
with the filter pane shows the result continent wise distribution of age in continents helping to maintain the stock of the airplanes inventory management.



The above story explains the flight status concering continents which will highlight the problems like delayed, cancelation and airplanes industry and look after it and can maintain the proper customer satisfaction by enchancing their services.

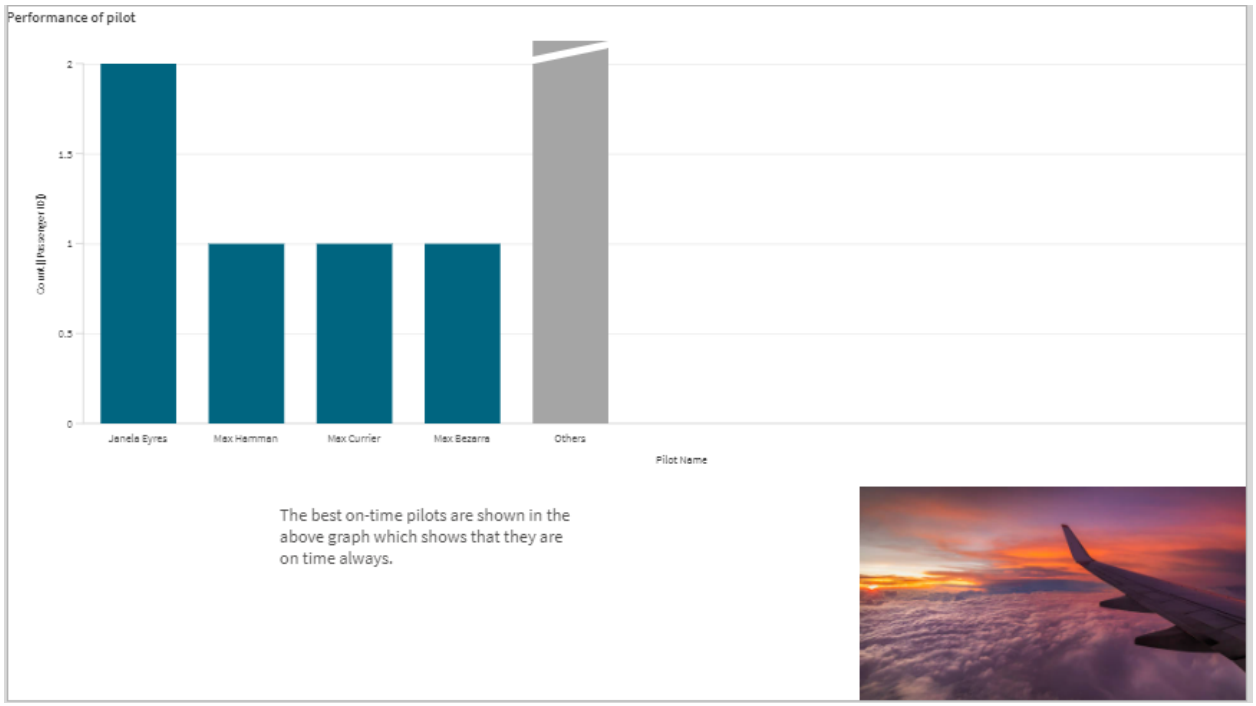


Above story shows the top 5 pilot which has most delayed flights, on going special training the can maintain the up-time. The airline industry and look closely after it resulting better customer engegement.



The list of top 5 pilots whose flight got cancelled.

Above story shows the top 5 pilot which has most canceled flights, on going special training the can maintain the up-time. The airline industry and look closely after it resulting better customer engegement.



The best on-time pilots are shown in the above graph which shows that they are on time always.

Above story shows the top 5 pilot which has most on-time flights, on going special treatment to them can motivates others to do so which will help them to maintain the up-time. The airline industry and look closely after it resulting better customer engegement.

8. Performance Testing

8.1 Amount of Data Rendered to DB

The dataset here consists of 16 fields and 98650 instances providing information like:

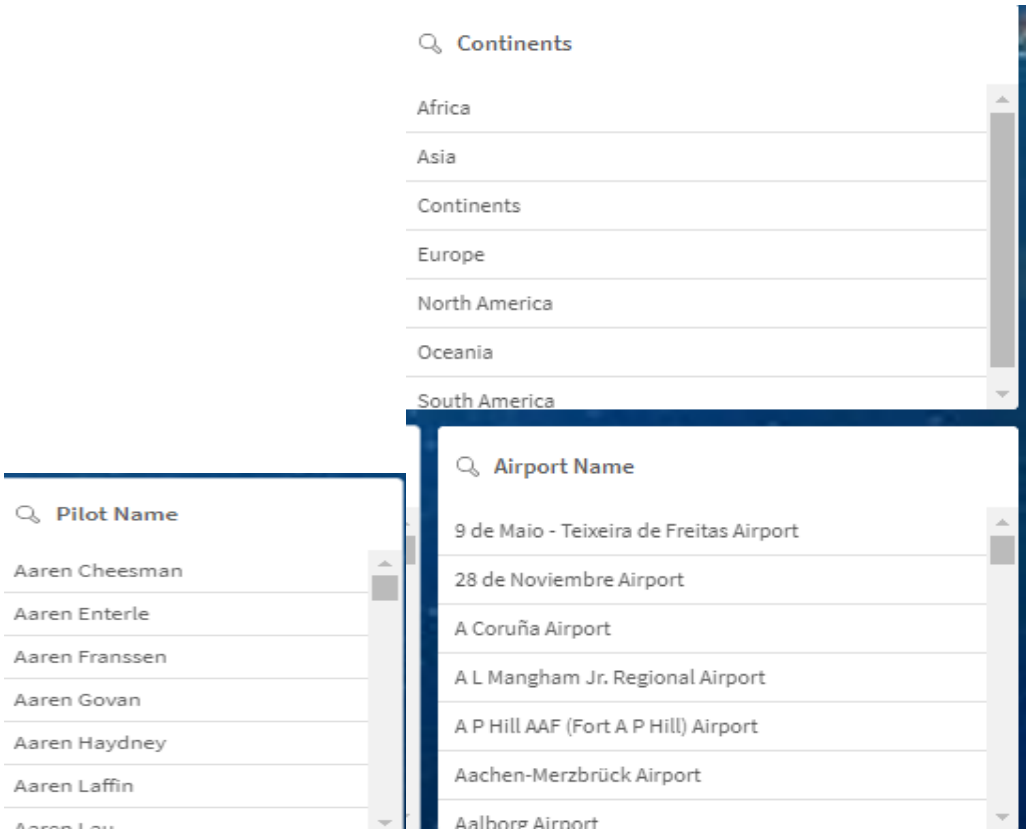
- Passenger ID
- First Name
- Last Name
- Gender
- Age
- Nationality
- Airport Name
- Airport Country Code
- Country Name
- Airport Continent
- Continents involved in the flight route
- Departure Date
- Arrival Airport
- Pilot Name
- Flight Status

Airline Dataset Updated - v2 Airline Dataset Updated - v2.csv Fields: 15

Passenger ID	First Name	Last Name	Gender	Age	Nationality	Airport Name	Airport Country Code
165488	Dionis	Joist	Female	4	Philippines	Bremen Airport	DE
824967	Federica	Peters	Female	16	Portugal	Watson Lake Airport	CA
0a1ws9	Lammond	Sargood	Male	59	Serbia	Karluk Lake Seaplane Base	US
0A1yOa	Arel	Beswick	Male	83	United States	Holy Cross Airport	US
0A2OYl	Jack	Mitrikhin	Male	89	Turkey	Rottnest Island Airport	AU
0a5x5P	Perry	Pretsell	Male	64	Nigeria	Vallenar Airport	CL

8.2 Utilization of Data Filters

The utillization of filter pane helped to build an interactive dasboards and providing more insightful information country wisw, pilot wise, continent wise showing all the distribution like gender distribution, flight status. These helps to build the dashboard interactive and helped airline industry to navigate through different concepts resulting in the insightful discoveries.



8.3 Data Preprocessing – Like Sense Script

The dataset was clean and no null values were present there but the format of date was little bit distributed which result in the problem of handling dataset. A standard MM/DD/YYYY was followed to provide good calculate firlds in terms of date which is used in graphs for the insightful discoveries.

The developed dashboard offers a powerful tool for airline industry stakeholders, enabling them to:

- Optimize Operations: By identifying trends in flight delays, cancellations, and on-time performance, airlines can implement strategies to enhance operational efficiency.
- Enhance Customer Experience: Understanding passenger demographics and preferences allows airlines to tailor their services and improve customer satisfaction.
- Evaluate Pilot Performance: Visualizing pilot performance metrics helps in recognizing top-performing pilots and addressing any performance issues.
- Strategic Decision-Making: The comprehensive data insights support informed decision-making, contributing to overall industry advancement and growth.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SET DecimalSep='.';
SET MoneyThousandSep=',';
SET MoneyDecimalSep='.';
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SET LongDayNames='Monday;Tuesday;Wednesday;Thursday;Friday;Saturday;Sunday';
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Add data
Add from data catalog
Data connections
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Personal
Search
DataFiles
Folder
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Total number of rows: 98620
Gender
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Depa...
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