

Project Title: Exploring Insights From Airlines with Qlik Sense

1 . INTRODUCTION:

★ Overview

"Exploring Insights From Synthetic Airline Data Analysis With Qlik" is a project focused on leveraging Qlik's data analytics capabilities to derive meaningful insights from synthetic airline data. The project involves creating a comprehensive dashboard using Qlik Sense or QlikView to visualize and analyze various aspects of airline operations, such as flight schedules, passenger demographics, booking patterns, and operational efficiency. By utilizing synthetic data, the project aims to demonstrate the potential of Qlik's tools in uncovering trends, identifying anomalies, and supporting data-driven decision-making in the aviation industry. The goal is to provide a detailed and interactive exploration of airline data, highlighting key performance indicators and facilitating strategic planning and operational improvements.

The "Airlines in Qlik Sense" project offers numerous benefits and potential achievements for stakeholders in the airline industry. Here are some of the key uses and achievements possible with this project:

★ Uses of the Project:

1. Enhanced Decision-Making:

- Provide data-driven insights for strategic and operational decisions.
- Enable management to make informed choices regarding route optimization, pricing strategies, and resource allocation.

2. Operational Efficiency:

- Identify bottlenecks and inefficiencies in airline operations.
- Optimize flight schedules, crew management, and aircraft utilization to reduce costs and improve service delivery.

3. Improved Customer Experience:

- Analyze passenger feedback and travel patterns to enhance customer satisfaction.
- Tailor services and promotions to meet the needs of different passenger segments.

4. Revenue Management:

- Monitor and analyze revenue streams from ticket sales, ancillary services, and cargo.
- Implement dynamic pricing strategies to maximize revenue based on demand and market conditions.

5. Performance Monitoring:

- Track key performance indicators (KPIs) such as on-time performance, load factors, and turnaround times.
- Benchmark performance against industry standards and competitors.

6. Market Analysis:

- Analyze market trends, passenger demographics, and competitive landscape.
- Identify new market opportunities and potential areas for expansion.

7. Compliance and Safety:

- Ensure compliance with aviation regulations and safety standards.
- Monitor safety metrics and incident reports to maintain high safety standards.

★ **Achievements with the Project:**

1. Cost Reduction:

- Identify and implement cost-saving measures across operations.
- Reduce fuel consumption and maintenance costs through optimized scheduling and efficient practices.

2. Revenue Growth:

- Increase ticket sales and ancillary revenue through targeted marketing and pricing strategies.
- Expand into profitable routes and markets based on data insights.

3. Operational Excellence:

- Achieve higher operational efficiency and reliability.
- Minimize delays and disruptions, leading to better on-time performance and customer satisfaction.

4. Customer Loyalty:

- Enhance customer loyalty through personalized services and improved travel experiences.
- Increase repeat business and positive word-of-mouth referrals.

5. Competitive Advantage:

- Gain a competitive edge by leveraging data analytics for superior performance and customer insights.
- Stay ahead of industry trends and adapt quickly to market changes.

6. Regulatory Compliance:

- Maintain compliance with industry regulations and standards.
- Reduce risks associated with regulatory breaches and enhance overall safety.

By utilizing Qlik Sense's advanced data visualization and analytics capabilities, the "Airlines in Qlik Sense" project can transform raw data into actionable insights, driving growth, efficiency, and customer satisfaction in the airline industry.

★ TECHNICAL ARCHITECTURE:



Technical Architecture Overview

1. Data Sources:

- Data is collected from various sources, including databases and external services (e.g., Google Drive).

2. Data Integration and Loading:

- Qlik Sense integrates and processes the data from these sources.

3. Data Visualization:

- The processed data is visualized through interactive dashboards and reports in Qlik Sense.

4. User Interaction:

- Users interact with these dashboards and reports via various devices, allowing for data-driven decision-making.

5. Feedback Loop:

- Users can provide input or take actions based on the insights gained, which can be fed back into the system for continuous improvement.

★ **Simplified Flow**

1. Data Sources → Qlik Sense

- Data from sources is loaded into Qlik Sense.

2. Qlik Sense → Dashboards

- Qlik Sense processes the data and generates visualizations.

3. Dashboards → User Interaction

- Users interact with the visualizations on various devices.

4. User Interaction → Qlik Sense

- Users' interactions provide feedback to refine and enhance data insights.

This architecture supports seamless data integration, powerful visual analytics, and interactive user engagement to drive effective decision-making.

2.PROBLEM UNDERSTANDING

★ **Business Problem**

The airline industry is highly competitive and complex, requiring effective management of various operational aspects to maintain profitability and customer satisfaction.

Airlines face several business challenges, including:

1. Operational Efficiency:

- Managing flight schedules, crew assignments, and aircraft maintenance to minimize delays and disruptions.
- Ensuring optimal fuel consumption and efficient use of resources.

2. Revenue Management:

- Maximizing revenue through effective pricing strategies and managing ticket sales across different channels.
- Identifying and leveraging ancillary revenue opportunities such as baggage fees, in-flight services, and upgrades.

3. Customer Satisfaction:

- Understanding and enhancing the passenger experience to increase customer loyalty and retention.
- Addressing customer feedback and reducing negative experiences related to delays, cancellations, and service quality.

4. Market Competitiveness:

- Analyzing market trends and competitor strategies to identify growth opportunities and stay ahead in the market.
- Expanding into profitable routes and adjusting services based on demand patterns.

5. Regulatory Compliance and Safety:

- Ensuring compliance with aviation regulations and maintaining high safety standards.
- Managing incident reports and improving safety protocols.

★ **Addressing the Business Problem with Qlik Sense**

The "Airlines in Qlik Sense" project aims to tackle these business problems by providing a comprehensive data analytics solution. Here's how:

1. Enhanced Operational Efficiency:

- Interactive dashboards track key operational metrics such as flight punctuality, turnaround times, and resource utilization.
- Insights help identify bottlenecks and inefficiencies, leading to more streamlined operations.

2. Optimized Revenue Management:

- Analysis of sales data and pricing trends allows for dynamic pricing strategies that maximize revenue.
- Identification of high-value customer segments and ancillary revenue opportunities.

3. Improved Customer Satisfaction:

- Detailed analysis of passenger feedback and travel patterns helps tailor services to meet customer needs.
- Real-time monitoring of service issues enables prompt responses and improvements.

4. Market Competitiveness:

- Market and competitor analysis provide insights into new opportunities and strategic adjustments.
- Data-driven decisions support market expansion and service optimization.

5. Regulatory Compliance and Safety:

- Continuous monitoring of compliance metrics and safety standards ensures adherence to regulations.
- Data-driven safety improvements enhance overall operational safety.

By leveraging Qlik Sense's data integration, visualization, and analytics capabilities, the project empowers airline stakeholders to make informed decisions, improve operational efficiency, enhance customer satisfaction, and maintain a competitive edge in the market.

★ **BUSINESS REQUIREMENTS:**

- Data Integration and Preparation
- Performance Analysis
- Operational Efficiency
- Customer Experience
- Interactive Dashboards and Reports
- Predictive Analysis

By focusing on these requirements, the project aims to provide comprehensive insights into airline operation, performance, and customer experience.

★ **LITERATURE SURVEY:**

The use of synthetic airline data for analysis offers a versatile and powerful tool for exploring various aspects of airline operations, passenger behavior, and financial

performance. Continued advancements in data generation and analysis techniques will further enhance the ability to derive actionable insights from synthetic data, benefiting both researchers and industry practitioners.

3.DATA COLLECTION

★ COLLECT THE DATASET:

Source Data: Obtain a synthetic airline dataset. Ensure it includes relevant fields such as Date, Airline, PassengerCount, FlightDelay, Destination, etc. Format: The dataset can be in formats like CSV, Excel, or a database table.

★ STRUCTURE OF THE DATASET:

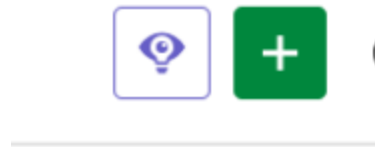
Passenger ID	First Name	Last Name	Gender	Age	Nationality	Airport Name	Airport Country Code	Country Name	Airport Continent	Continents	Departure Date	Arrival Airport	Pilot Name	Flight Status
fs4OZI	Allan	Prime	Male	49	Philippines	Mid-Carolina Regional Airport	US	United States	NAM	North America	6/23/2022	SRW	Ulrick Tutchings	Cancelled
urqtZB	Conrad	Vaun	Male	15	China	Alcides Fernández Airport	CO	Colombia	SAM	South America	02-02-2022	ACD	Giulietta Harler	On Time
Ym0iup	Carmela	Bridal	Female	36	Australia	Cataratas Del Iguazú International Airport	AR	Argentina	SAM	South America	2/14/2022	IGR	Pennie Rizzotto	Cancelled
uTCmlG	Welbie	Shorrocks	Male	41	Cameroon	Vatulele Airport	FJ	Fiji	OC	Oceania	9/26/2022	VTF	Griffin Cowey	On Time
HVmtQs	Waldon	Deverale	Male	80	Vietnam	Coen Airport	AU	Australia	OC	Oceania	05-09-2022	CUQ	Oralie Reisenberg	Delayed

The dataset prominently incorporates fields such as Passenger ID, First Name, Last Name, Gender, Age, Nationality, Airport Name, Airport Country Code, Country Name, Airport Continent, Continents, Departure Date, Arrival Airport, Pilot Name, and Flight Status.

★ CONNECT DATA WITH QLIK SENSE:

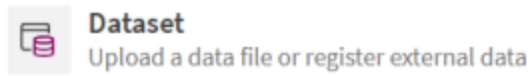
- After collecting the dataset ,Open Qlik Sense and create a new app.
- Click + symbol on the top right corner.
- Click "add dataset".
- Click "Upload data file".
- click on "Browse" and add the required dataset from your device.
- Then click on "upload and analyze".
- Then the new app will be created to create your visualisations.

step 1:



step 2:

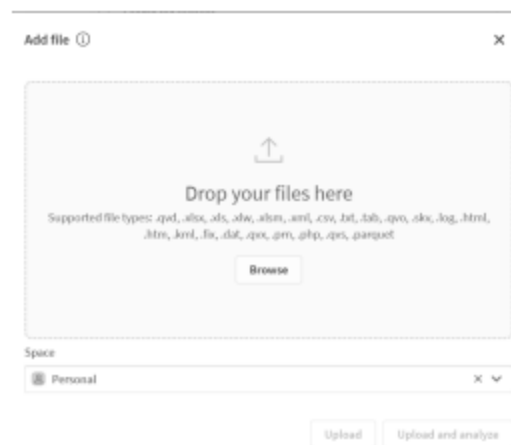
Add new data



step 3:



step 4:



4.DATA PREPARATION:

★ PREPARING DATA FOR VISUALIZATION:

Preparing the data for visualization involves cleaning the data to remove irrelevant or missing data, transforming the data into a format that can be easily visualized, exploring the data to identify patterns and trends, filtering the data to focus on specific subsets of data, preparing the data for visualization software, and ensuring the data is accurate and complete. This process helps to make the data easily understandable and ready for creating visualizations to gain insights into performance and efficiency. In the app, go to data manager and then select data load editor and embed the code required to create new columns in the dataset (or) go to the edit option in data manager and select "Add field" and add "calculated field" and select the name for the column and give the expression on which you want to calculate the data of the column. From the dataset, I created "age group" column with the expression :

```
if(Age<4,'toddler',  
if(Age<12,'child',  
if(Age<19,'teen',  
if(Age<30,'adults',  
if(Age<=59,'middle age adults',  
if(Age>60,'senioradults'))))))
```

This created a new column in the dataset.

	<i>age group</i>	
	child	
	teen	
	middle age adults	
	senioradults	
	senioradults	
	senioradults	
	middle age adults	
	middle age adults	
	middle age adults	
	middle age adults	
	middle age adults	
	middle age adults	
	teen	

fig : Creation of age group column for data preparation

5.DATA VISUALISATIONS

★ VISUALISATIONS:

Data visualization refers to the representation of data in graphical formats such as charts, graphs, dashboards, or infographics. This makes it easier for you to see trends, recognize relationships, and uncover data-driven insights from large, complex data sets. These insights can increase efficiency, revenue, and profits for your organization.

ACTIVITY 1: TOTAL NO.OF PASSENGERS USING KPI

Total no.of passengers

98.62k

ACTIVITY 2: NUMBER OF PASSENGERS EFFECTED BY CANCELLED FLIGHTS USING KPI

Cancelled flight passengers

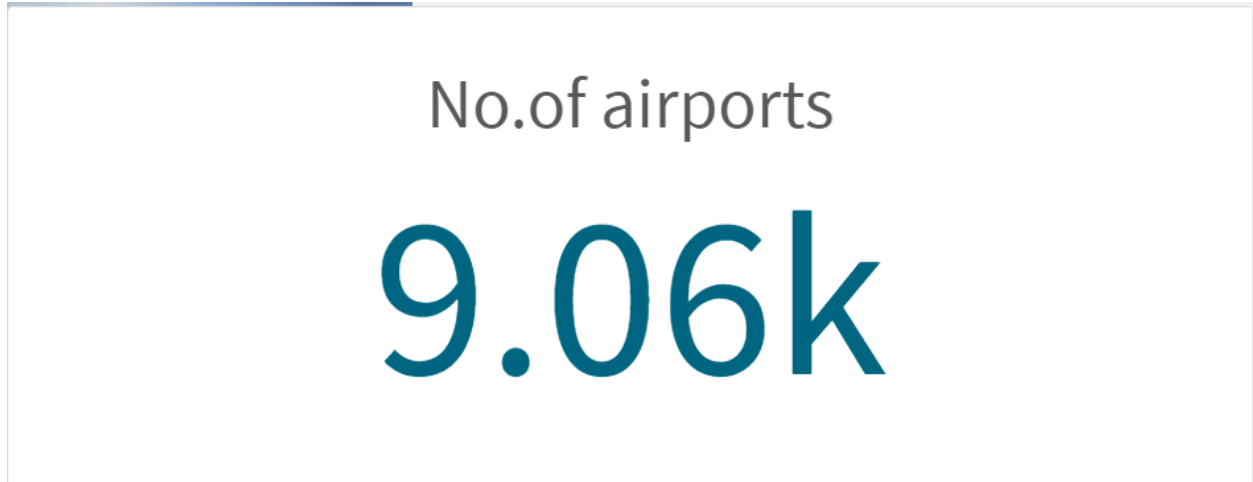
32.94k

ACTIVITY 3: NUMBER OF PASSENGERS EFFECTED BY DELAYED FLIGHTS USING KPI

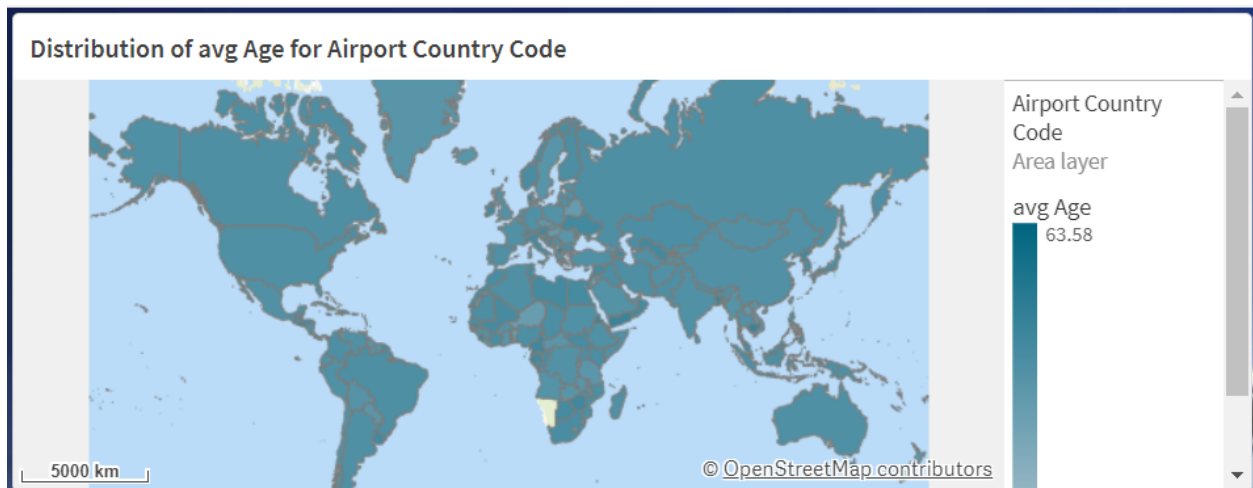
Delayed flight passengers

32.83k

ACTIVITY 4: NUMBER OF AIRPORTS USING KPI



ACTIVITY 5: DISTRIBUTION OF AVERAGE AGE FOR AIRPORT COUNTRY CODE USING MAP



ACTIVITY 6 :COUNTING AVERAGE AGE BY GENDER AND CONTINENTS

avg Age by Gender and Continents

Male			Female		
Oceania 45.65	Africa 45.52	South America 45.37	Asia 46.02	North America 45.59	Oceania 45.1
North America 45.57	Europe 45.46	Asia 45.3	Africa 45.75	South America 45.38	Europe 44.98

ACTIVITY 7: SEARCHING BY COUNTRY NAME

Country Name

South Sudan

Spain

Sri Lanka

Sudan

Suriname

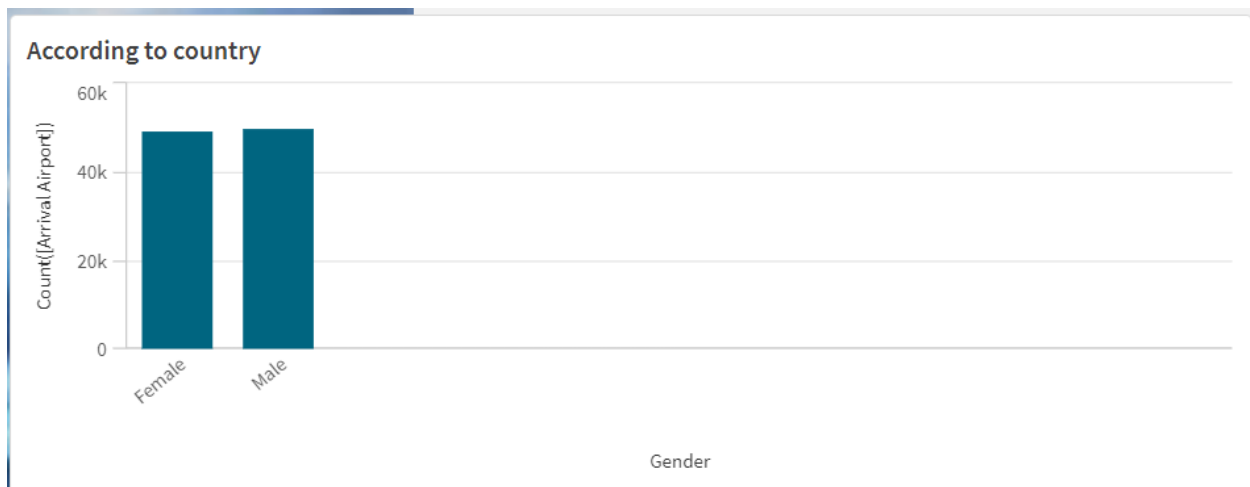
Sweden

Switzerland

Syrian Arab Republic

Taiwan, Province of China

ACTIVITY 8: COUNT OF MALE AND FEMALE WHO ARE ARRIVING TO AIRPORT ACCORDING TO COUNTRY



6.DASHBOARD:

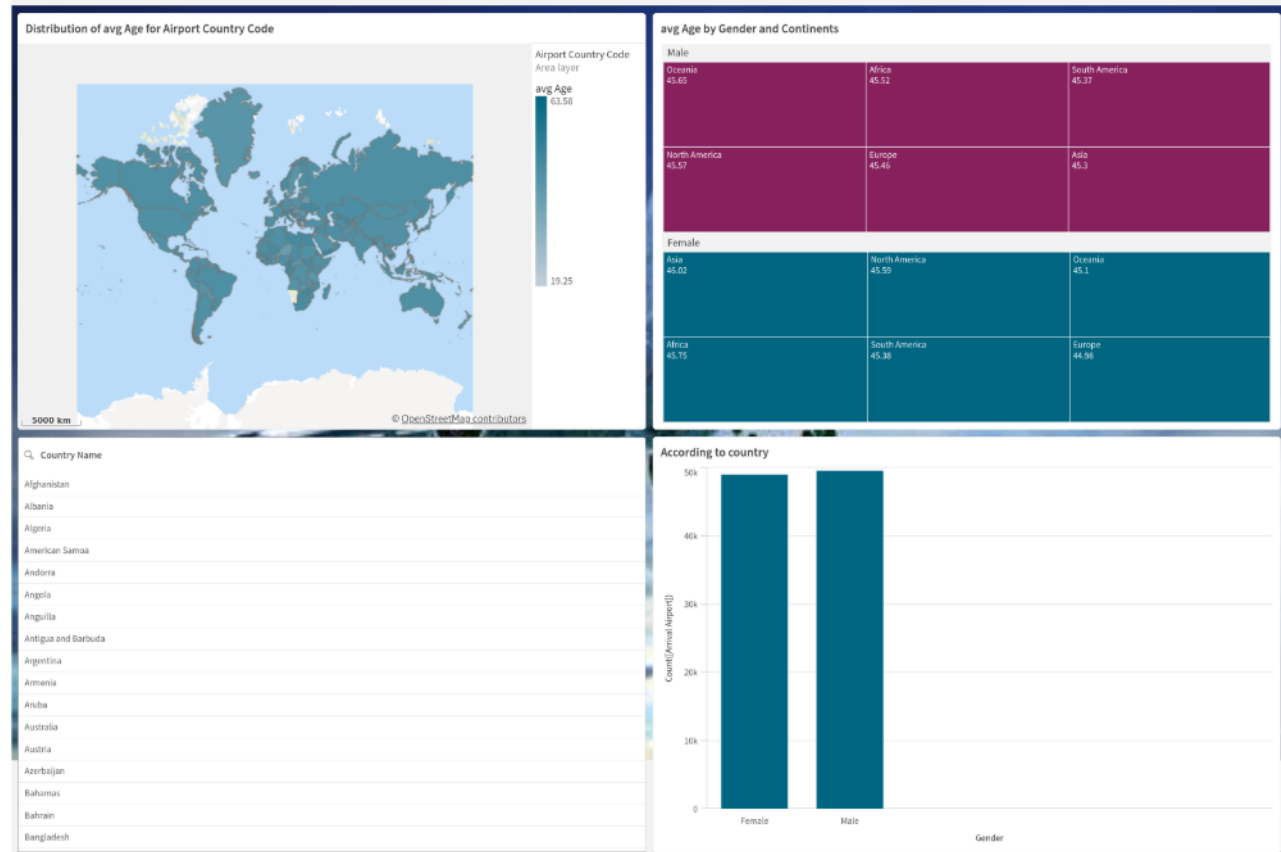
A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key performance indicators (KPIs), monitor performance metrics, and display data in the form of charts, graphs, and tables.

★ RESPONSIVE AND DESIGN OF DASHBOARD:

DASHBOARD 1



DASHBOARD 2



7.STORY TELLING:

★ STORY CREATION:

A data story is a way of presenting data and analysis in a narrative format, with the goal of making the information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and analysis in a logical and systematic way, and a conclusion that summarizes the key findings and highlights their implications. Data stories can be told using a variety of mediums, such as reports, presentations, interactive visualizations, and videos.



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Total no.of passengers

98.62k

Delayed flight passengers

32.83k

Cancelled flight passengers

32.94k

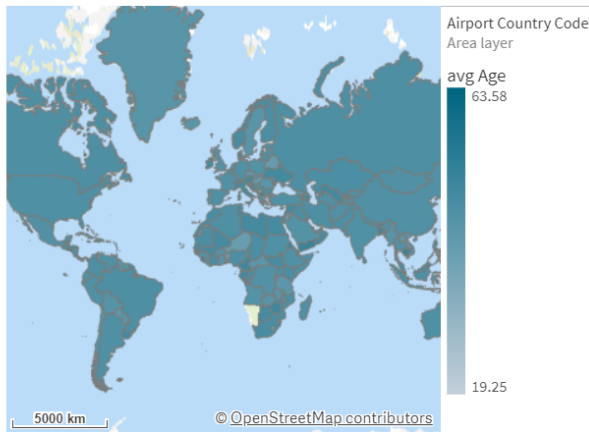
No.of airports

9.06k

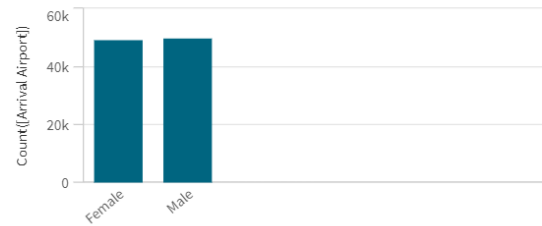
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Distribution of avg Age for Airport Country Code



According to country



avg Age by Gender and Continents

Male			Female		
Oceania 45.65	Europe 45.46	South America 45.37	Asia 46.02	South America 45.38	Oceania 45.1
North America 45.57			Africa 45.75		
Africa 45.52	Asia 45.3		North America 45.59	Europe 44.98	

8. PERFORMANCE TESTING:

Performance testing is a crucial step to ensure that the Qlik Sense application can handle the expected load and provide timely insights to users.

★ UTILIZATION OF DATA FILTERS

Data filters in Qlik Sense are essential for manipulating and refining the data displayed in your visualizations. Here are some key utilities and advantages of data filters in Qlik Sense:

1. Data Reduction: Filters allow users to reduce the scope of data displayed in charts and tables. This is particularly useful when dealing with large datasets, as it enables users to focus on specific subsets of data relevant to their analysis.

2. Interactive Exploration: Qlik Sense offers interactive filtering capabilities, allowing

users to explore data dynamically. Users can apply, remove, and adjust filters on the fly, facilitating iterative data analysis and exploration.

3. Drill-Down Analysis: Filters enable drill-down analysis by allowing users to progressively filter data based on different dimensions or hierarchies. This helps users uncover insights by navigating through various levels of detail within the data.

4. Customization: Qlik Sense provides various types of filters, including list boxes, drop-downs, sliders, and search boxes, offering flexibility in how users interact with and apply filters to their data.

5. Expression-Based Filtering: Users can create custom expressions to define complex filtering conditions based on specific criteria. This allows for advanced filtering logic tailored to the unique requirements of the analysis.

6. Set Analysis: Qlik Sense supports set analysis, a powerful feature that enables users to define and manipulate sets of data independently of the current selections. Set analysis expressions can be used in conjunction with filters to perform complex comparative analysis and calculations.

7. Integration with Visualizations: Filters seamlessly integrate with Qlik Sense visualizations, allowing users to apply filters directly within charts and graphs. This enables users to interactively refine the data displayed in visualizations based on their analysis requirements.

8. Collaboration: Qlik Sense supports collaborative filtering, allowing multiple users to apply and share filters within shared applications. This fosters collaboration and enables teams to collectively analyze and interpret data.

Overall, data filters in Qlik Sense play a crucial role in empowering users to interactively explore, analyze, and derive insights from their data in a flexible and intuitive manner.