PERIYAR UNIVERSITY - SALEM

GOVERNMENT ARTS & SCIENCE COLLEGE

HARUR, DHARMAPURI – 636903

III – B.Sc Mathematics (2023-2024)

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Unlocking Insights into the Global Air Transportation Network with Tableau.

Introduction :

➢ 1.1 Overview

This Global Air Transportation Network dataset is a comprehensive collection of information on airports, airlines and their routes. It contains information such as names, cities, countries, codes (IATA and ICAO) longitudes, latitudes and altitudes of airports across the world with detailed time zone and daylight saving time data. Additionally, this includes information about airlines including their IDs, name aliases, IATA and ICAO codes, callsigns country of origin and active/inactive status. Similarly, it also covers route details such as airline sources to destination airports along with essential details like codeshare stakeholder if any stops required during this journey along with the type of aircraft being used for that particular journey. This dataset has been compiled through meticulous labor by researchers all over the world to give you a comprehensive detail into air transportation networks from around the globe.

➢ 1.2 Purpose

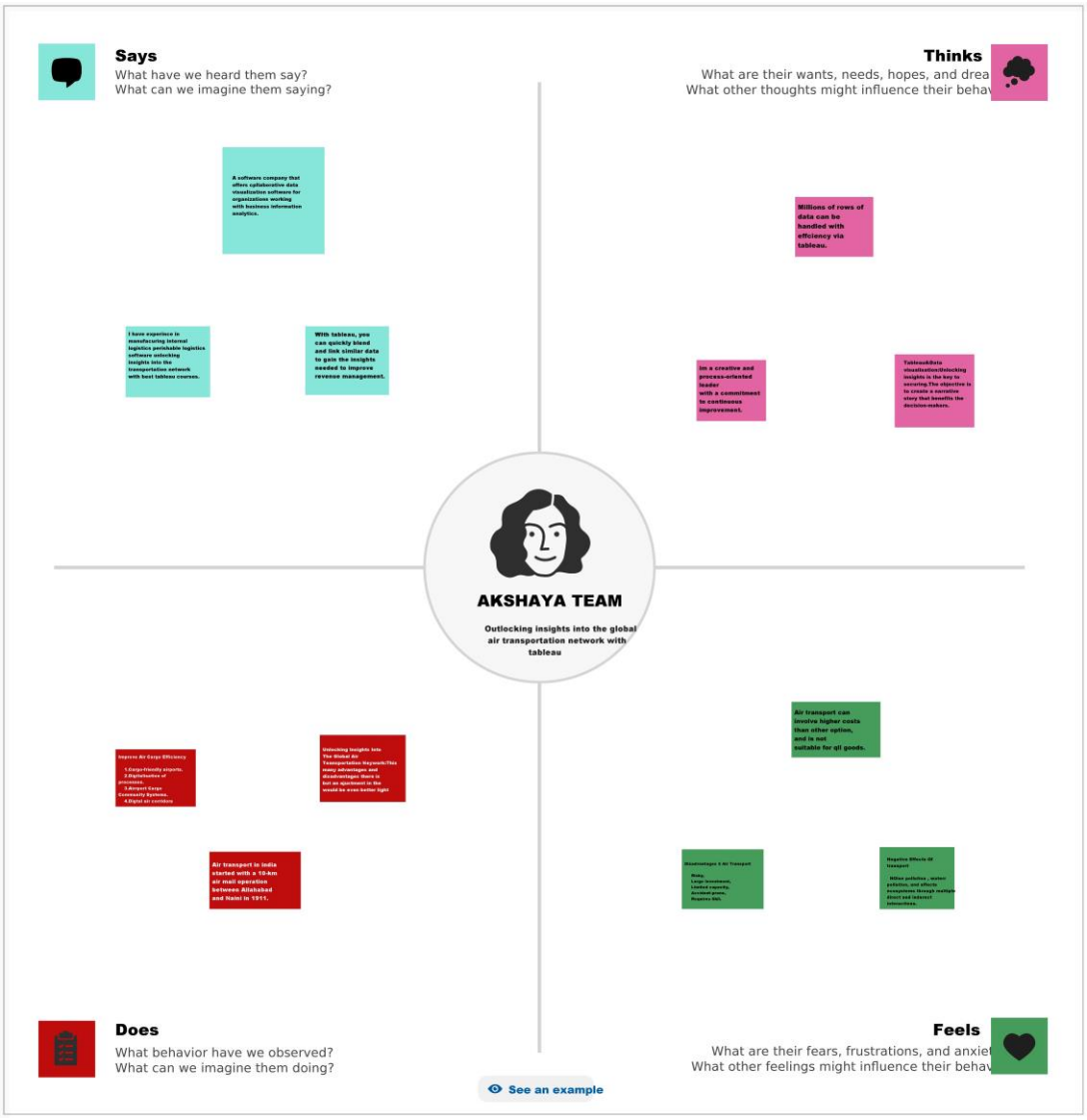
The purpose of the project related to the Global Air Transportation Network dataset is to provide a valuable resource for understanding, analyzing, and researching various aspects of air transportation networks on a global scale. By compiling detailed information on airports, airlines, and their routes, this project aims to support a wide range of applications, including:

- **Air Travel Analysis:** Researchers and analysts can use this data to study patterns in air travel, such as the popularity of routes, airport utilization, and airline performance.
- **Geographic Analysis:** Geospatial professionals can leverage the dataset to explore the geographic distribution of airports and their characteristics.
- Aviation Industry Insights: The dataset can provide insights into the global aviation industry, including the status of airlines, their routes, and the types of aircraft used.
- **Travel Planning and Services**: Travel agencies and online booking platforms can use this data to enhance travel planning services and provide information about airports, routes, and airlines.
- **Policy and Decision-Making**: Government agencies and policymakers may use the dataset to inform decisions related to aviation regulations, infrastructure development, and safety measures.

Overall, the project's purpose is to offer a comprehensive and reliable source of information for a wide range of stakeholders interested in air transportation networks around the world.

Problem Definition & Design Thinking :

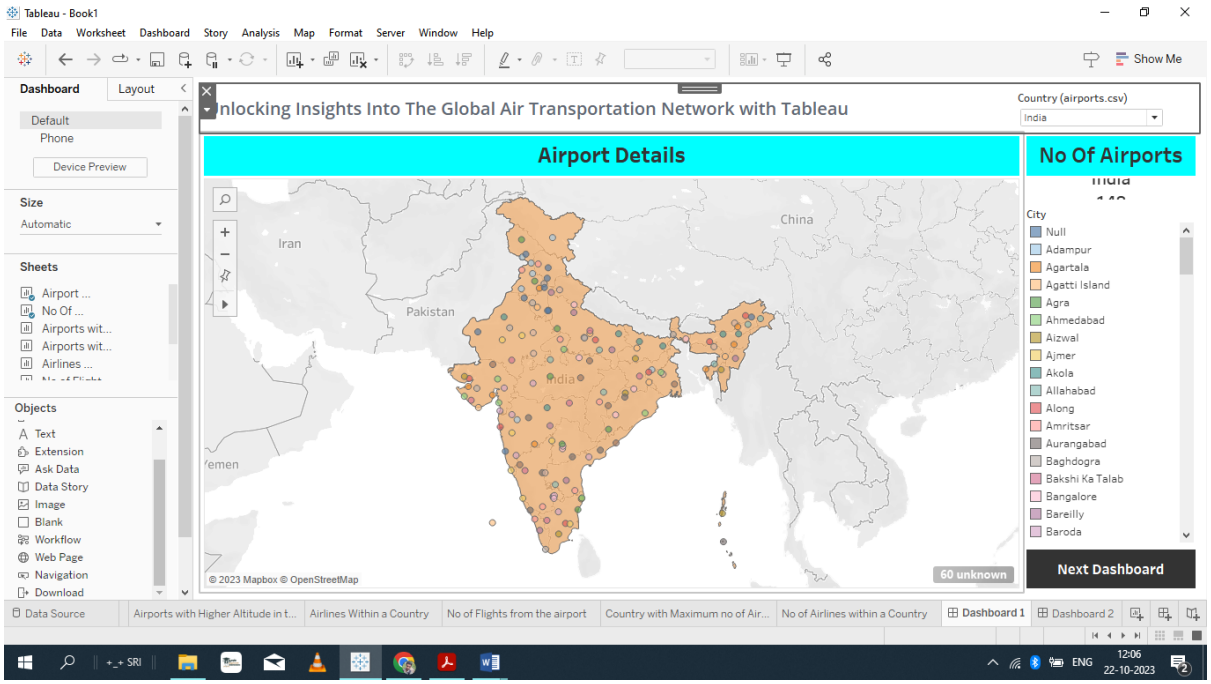
➢ 2.1 Empathy Map



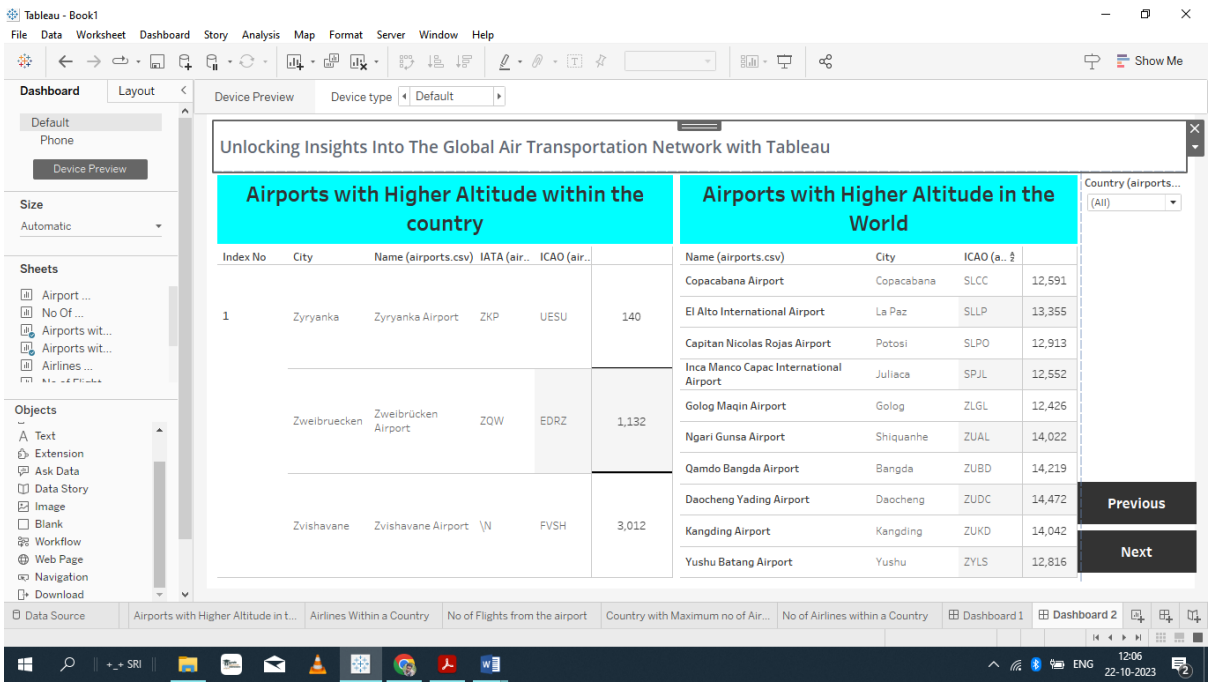
➢ 2.2 Ideation & Brainstorming Map

Result :

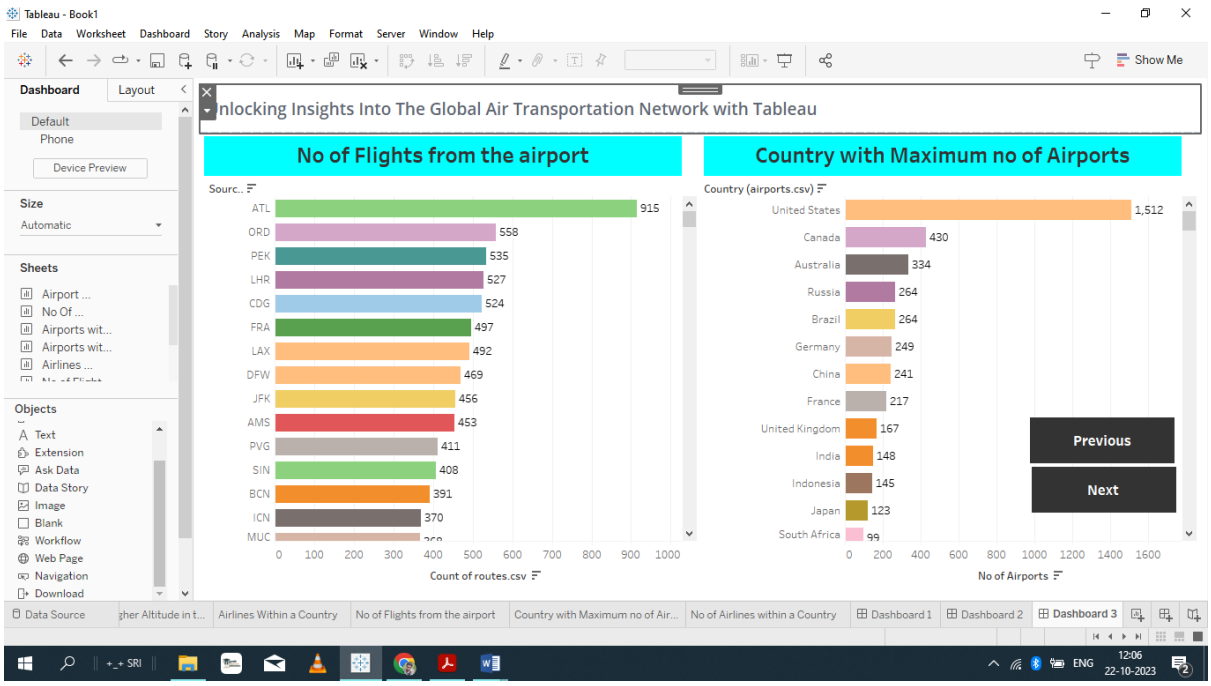
➢ **Dashboard 1**



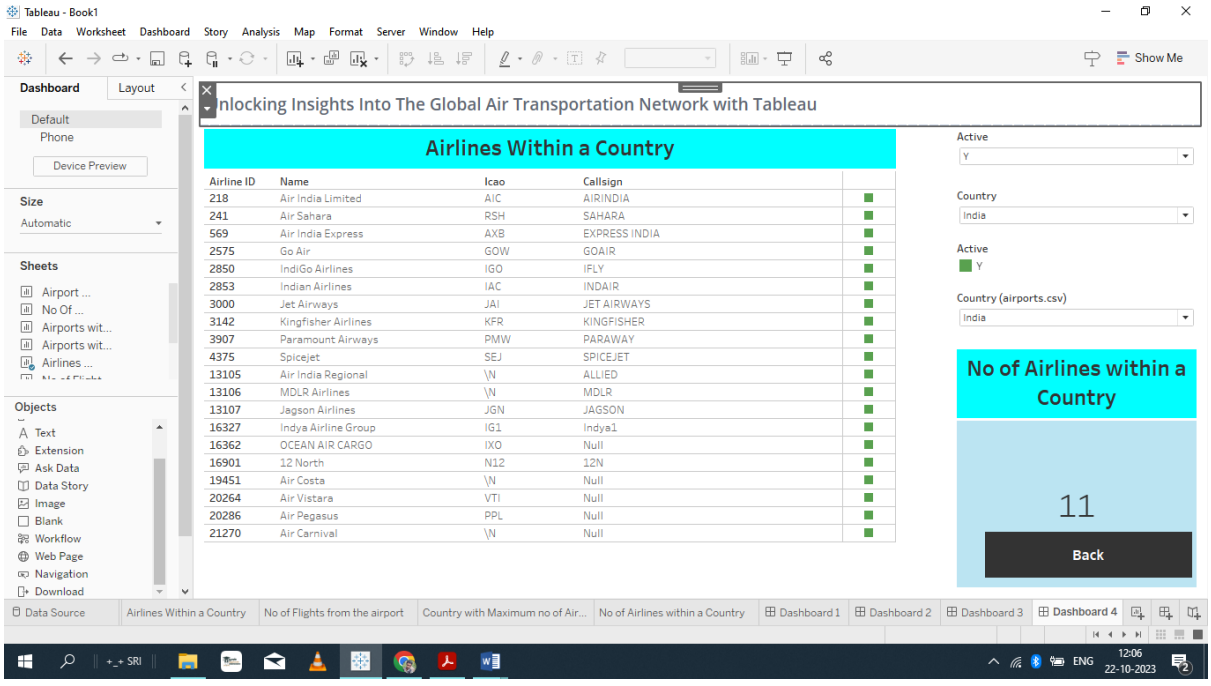
➢ **Dashboard 2**



➢ Dashboard 3



➢ Dashboard 4



➢ Story

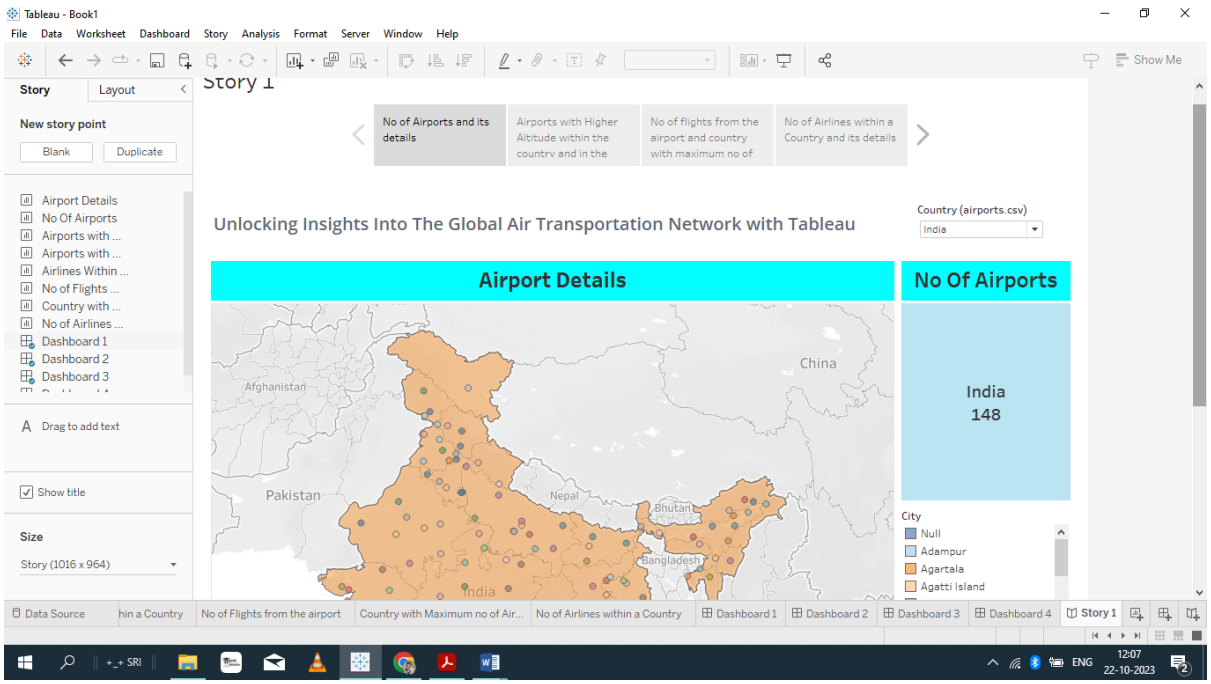
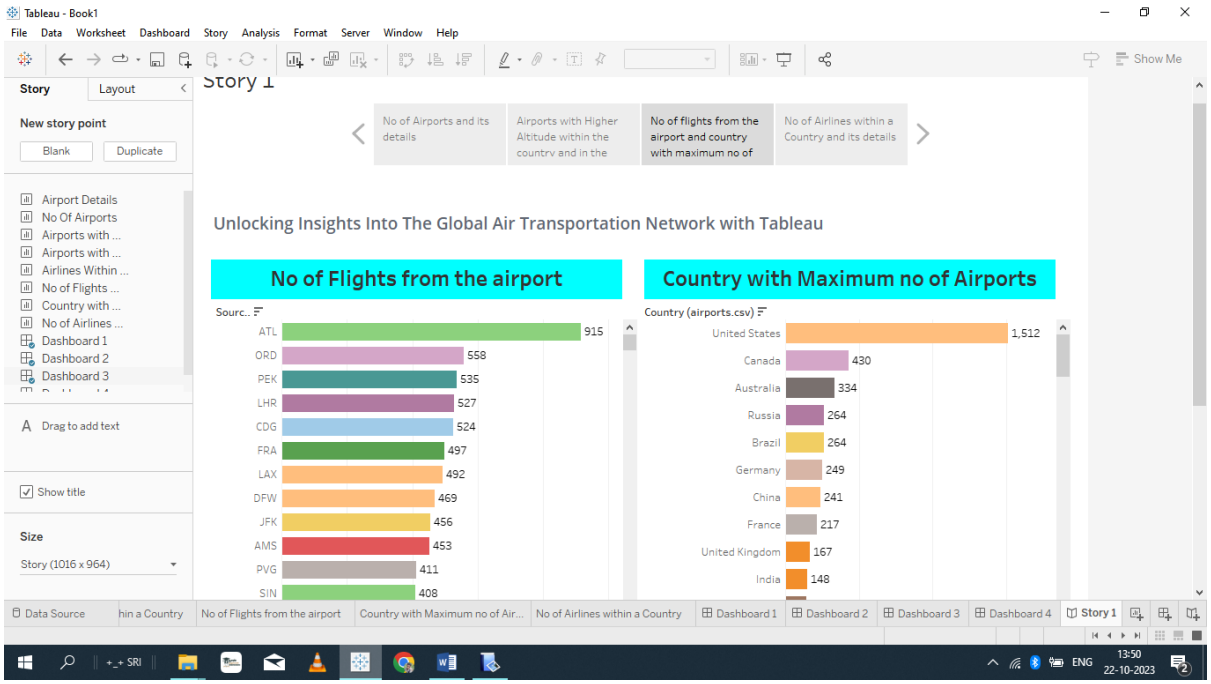


Tableau - Book1
File Data Worksheet Dashboard Story Analysis Format Server Window Help
Story 1
No of Airports and its details
Airports with Higher Altitude within the country and in the
No of flights from the airport and country with maximum no of
No of Airlines within a Country and its details
Unlocking Insights Into The Global Air Transportation Network with Tableau
Country (airports.csv)
India
Airport Details
No Of Airports
India
148
Afghanistan
China
Pakistan
Nepal
Bhutan
Bangladesh
India
City
Null
Adampur
Agartala
Agatti Island
Story
Layout
New story point
Blank
Duplicate
Airport Details
No Of Airports
Airports with ...
Airports with ...
Airlines Within ...
No of Flights ...
Country with ...
No of Airlines ...
Dashboard 1
Dashboard 2
Dashboard 3
Drag to add text
Show title
Size
Story (1016 x 964)
Data Source
Dashboard 1
Dashboard 2
Dashboard 3
Dashboard 4
Story 1
ENG
12:07
22-10-2023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Story 1
No of Airports and its details
Airports with Higher Altitude within the country and in the
No of flights from the airport and country with maximum no of
No of Airlines within a Country and its details
Unlocking Insights Into The Global Air Transportation Network with Tableau
No of Flights from the airport
Sourc...
ATL 915
ORD 558
PEK 535
LHR 527
CDG 524
FRA 497
LAX 492
DFW 469
JFK 456
AMS 453
PVG 411
SIN 408
Country with Maximum no of Airports
Country (airports.csv)
United States 1,512
Canada 430
Australia 334
Russia 264
Brazil 264
Germany 249
China 241
France 217
United Kingdom 167
India 148
Story
Layout
New story point
Blank
Duplicate
Airport Details
No Of Airports
Airports with ...
Airports with ...
Airlines Within ...
No of Flights ...
Country with ...
No of Airlines ...
Dashboard 1
Dashboard 2
Dashboard 3
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Size
Story (1016 x 964)
Data Source
Dashboard 1
Dashboard 2
Dashboard 3
Dashboard 4
Story 1
ENG
13:50
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Advantages & Disadvantages :

Certainly, here are 10 points outlining the advantages and disadvantages of the Global Air Transportation Network dataset:

S.No	Advantages	Disadvantages
1	**Comprehensive Information:** The dataset provides a wealth of information about airports, airlines, and routes globally, making it a valuable resource for researchers and analysts.	**Data Accuracy:** Data accuracy and completeness can vary, leading to potential inaccuracies in analysis.
2	**Geospatial Data:** It includes longitude, latitude, and altitude data for airports, facilitating geographic analysis and mapping.	**Overwhelming Detail:** For some users, the dataset's level of detail may be more information than needed, leading to information overload.
3	**Time Zone and Daylight Saving Data:** Detailed time-related information is essential for scheduling and understanding the impact of time zones on travel.	**Regulatory Compliance**: Handling the dataset may require compliance with aviation data regulations and legal considerations.
4	**Aircraft Details:** It offers insights into the types of aircraft used on specific routes, aiding in aviation research.	**Costs:** Data acquisition, storage, and maintenance can be costly for organizations or researchers.
5	**Global Coverage:** The dataset covers air transportation networks worldwide, providing a holistic view of the industry.	**Resource Intensive:** Requires significant computing resources and storage space for large-scale analysis.
6	**Route Information:** Researchers can analyze specific routes, including stops and codeshare stakeholders, for in-depth route planning.	**Complexity:** Analyzing and interpreting the dataset can be complex, requiring expertise in data analysis and aviation knowledge.
7	**Historical Analysis:** Active/inactive status of airlines allows for historical trend analysis in the aviation sector.	**Limited Use Cases:** Access to and effective utilization of the dataset may be restricted to specific industries or research fields.
8	**Policy Insights:** It can inform aviation policies, safety measures, and infrastructure development decisions.	**Privacy Concerns:** It may contain sensitive information about airport security measures, which could raise privacy concerns.
9	**Travel Planning:** Supports travel agencies and online platforms in offering better travel planning services.	**Data Updates:** Keeping the dataset up to date with the dynamic aviation industry may require continuous effort.
10	**Education and Training:** Valuable for educational purposes, helping students and professionals learn about aviation networks.	**Data Volume:** The dataset can be extensive, making it challenging to manage and process, particularly for smaller research teams.

Applications :

In our **Naan Mudhalvan** program, we introduced Tableau as a mandatory subject. After installing Tableau , we initiated discussions on our designated topic, which was **Unlocking Insights into the Global Air Transportation Network with Tableau.**

This dataset can be leveraged to develop an aviation route optimization and planning application. Such an application would provide numerous benefits to airlines, travelers, and the aviation industry as a whole. Here's how it can work:

- **Route Planning**: The dataset's information on airports, airline routes, and aircraft types can be used to create a user-friendly route planning tool. Travelers can input their departure and destination cities, and the application will suggest the most efficient and cost-effective routes**.**
- **Time Zone and Daylight Saving Time Considerations**: The detailed time zone and daylight saving time data would be crucial for ensuring accurate scheduling and minimizing travel disruptions due to time zone changes.
- **Aircraft Selection:** Travelers can make informed decisions on the type of aircraft used for their journey, taking into account factors like comfort, speed, and seating arrangements.
- **Codeshare Information:** The application can display codeshare arrangements, helping travelers understand if their journey involves multiple airlines and simplifying ticket bookings.
- **Geospatial Features:** The geographical data, including longitudes and latitudes, can be integrated to show interactive maps, aiding travelers in visualizing their route and understanding airport locations**.**
- **Historical Performance**: Access to airline status (active/inactive) information can allow travelers to choose airlines with better track records for reliability and punctuality.
- **Customized Alerts:** The application can provide real-time updates on flight statuses, delays, and gate changes, ensuring travelers are well-informed during their journey.
- **Airline and Route Analysis:** Airlines can use this application to analyze the popularity of certain routes and make data-driven decisions about expanding or reducing services.
- **Educational Resource**: It can serve as an educational tool, helping students and aviation enthusiasts learn about air transportation networks worldwide.
- **Policy and Regulatory Compliance:** Government agencies can utilize this application for regulatory compliance, ensuring aviation policies align with industry trends.

Overall, this application would enhance the travel experience by providing users with the information and tools needed to plan efficient and seamless air travel while assisting the aviation industry in making informed decisions about routes and services.

Conclusion :

In conclusion, the Global Air Transportation Network dataset serves as a valuable and exhaustive resource for anyone interested in the intricate web of global air travel. It provides a comprehensive array of information on airports, airlines, and routes, encompassing a multitude of details, including geographical coordinates, time-related data, and essential airline-specific information.

This dataset's meticulous compilation by researchers worldwide offers numerous advantages, such as supporting detailed analysis of aviation networks, aiding in geographic mapping, and enabling historical trend analysis of airlines. It is of particular value for those involved in the aviation industry, geographic analysis, and policy-making, as it assists in making informed decisions related to aviation regulations, safety measures, and infrastructure development.

However, it is important to acknowledge the potential disadvantages, including the need for data accuracy verification, resource-intensive management, and the challenge of staying up to date with a dynamic industry.

In summary, the Global Air Transportation Network dataset stands as a robust tool for researchers, analysts, and professionals seeking insights into the complex world of global air transportation, with the ability to inform various applications and decisions within the aviation domain.

Future Scope :

The future scope of the Global Air Transportation Network dataset is promising and can lead to several advancements and applications in the field of aviation and related industries. Here are some potential future directions and developments for this topic:

- **Enhanced Route Planning**:
  The dataset can be used to develop more advanced route planning and optimization tools that consider factors like weather conditions, air traffic, and fuel efficiency to make air travel even more efficient.
- **Predictive Analytics: Machine** :
  learning and predictive analytics can utilize this dataset to forecast air travel trends, enabling airlines to better allocate resources and adjust their services accordingly.
- **Sustainability Initiatives:** :
  As the aviation industry focuses on sustainability, this dataset can play a role in analyzing and optimizing flight routes to reduce carbon emissions and promote more eco friendly practices.
- **Emergency Response:** :
  The dataset can be used for emergency response and disaster management, aiding in the coordination of air transportation during crises or natural disasters.
- **Urban Air Mobility:** :
  With the rise of urban air mobility solutions, this dataset can support the planning and management of aerial transportation within cities.

- **Market Research:** :
  Market researchers can use this dataset to understand passenger preferences, travel habits, and market demands for airlines, potentially leading to more tailored services.
- **Safety and Security:** :
  Enhancements in aviation safety and security can be achieved through data analysis, helping in the prevention of accidents and security breaches.
- **Customized Travel Services:** :
  Airlines and travel agencies can develop personalized travel services and offers based on the historical and real-time data available in the dataset.
- **Regulatory Compliance:** :
  Continued advancements in aviation regulations and compliance can utilize this dataset to ensure safe and standardized practices across the industry.
- **Global Connectivity:** :
  As air travel networks expand, the dataset can play a role in maintaining global connectivity, fostering economic growth, and cultural exchange.
- **Aerospace Research:** :
  The dataset can be valuable for research in aerospace engineering, contributing to the development of more efficient and advanced aircraft.
- **Educational Tools:** :
  Educational institutions can create interactive tools and resources for aviation students and enthusiasts to explore and learn about air transportation networks.
- **International Collaboration:** :
  Researchers and organizations from various countries can collaborate to further enrich and standardize the dataset, improving its global utility.

The future of this dataset is dynamic, with opportunities for innovation, efficiency, and improved services in the aviation sector. As technology and data analysis methods continue to evolve, this dataset will likely remain a vital resource for those interested in the global air transportation network.