PROJECT REPORT

RAJAH SERFOJI GOVERNMENT COLLEGE

THANJAVUR

DEPARTMENT OF PHYSICS

NAAN MUDHALVAN

Data analytics with tableau

Project name:

Unlocking insights into the global air transportation network with tableau.

Team details:

NAMES	***NM ID***	***POSITION***

KURINJI VENDAN. R	***0278F4D27DB8516AD1F4E915851F0168***	***Team leader***
KANNAN. V	***41BA270B6861484BF384292937453F87***	***Team member***
MUGESH. S	***9C67DA09BAA13DA88984F6223D1E221A***	***Team member***
KANISH KUMAR. B	***C41AFCDBC4823248D434F22A69EC23DC***	***Team member***
RAGUVARMAN. S	***D971ED8DBD4B71292FA49979C60914B3***	***Team member***

GUIDED BY

DR. P. JAGDISH

Content

1. Source Code

1 INTRODUCTION

Overview :

The project uses a comprehensive dataset that contains information on airports, airlines, and their routes. The dataset includes details such as names, cities, countries, codes (IATA and ICAO), longitudes, latitudes, altitudes of airports across the world with detailed time zone and daylight saving time data. It also covers 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 .

The project aims to create a dashboard and story using Tableau to analyze the Global Air Transportation Network dataset. The

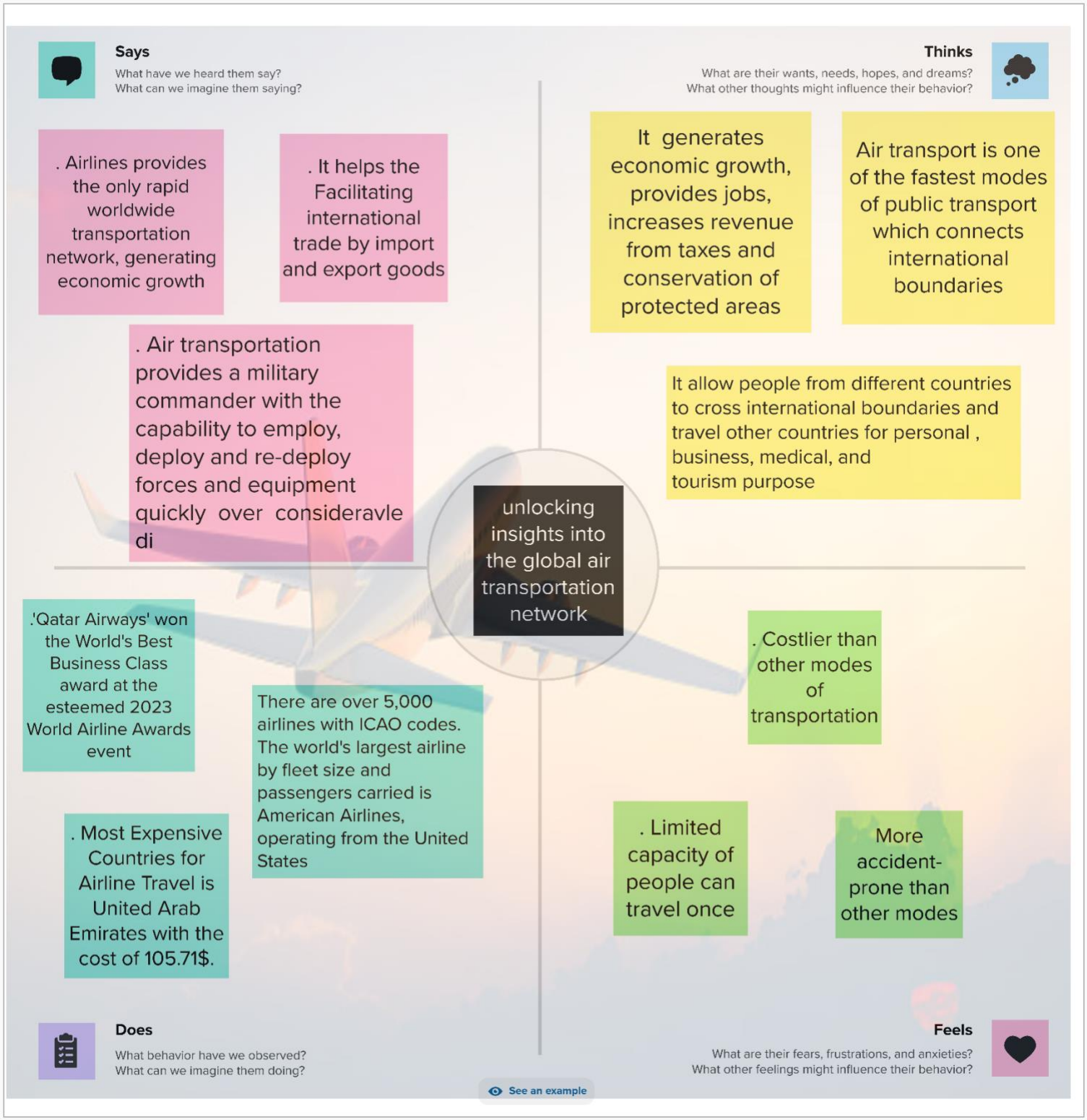
project is guided and provides step-by-step instructions on how to create the dashboard and story .

Purpose:

*The purpose of the **Tableau project** that analyzes the **Global Air Transportation Network** is to create a dashboard and story using Tableau to analyze the Global Air Transportation Network dataset. The project aims to provide insights into the air transportation network from around the globe. The dataset used in this project 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, altitudes of airports across the world with detailed time zone and daylight saving time data. It also covers 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.*

2.Problem definition & Design Thinking:

Empathy map:



Brainstorm idea prioritization:

Template

Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

10 minutes to prepare
1 hour to collaborate
2-8 people recommended

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

10 minutes

Team gathering
Define who should participate in the session and send an invite. Share relevant information or pre-work.

Set the goal
Think about the problem you'll be focusing on solving in the brainstorming session.

Learn how to use the facilitation tools
Use the Facilitation Superpowers to run a happy and productive session.

Open article →

Define your problem statement

What problem are you trying to solve? Frame your problem as a How might we statement. This will be the focus of your session.

5 minutes

How are transportations influence our city life and how it will change our activities, travel pattern in the fast moving world?

Key rules of brainstorming

To run an effective and fun session

- Stay in topic
- Encourage wild ideas
- Defer judgment
- Listen to others
- Go for volume
- If possible, be visual

Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

Person 1
Person 2
Person 3
Person 4

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like name. If a cluster is too big, break it up into two or more smaller sub-groups.

20 minutes

Prioritize

Your team should all see the same key metrics and criteria important moving forward. Place your ideas on this grid to determine which ideas are the most feasible and desirable.

20 minutes

Importance

Feasibility

After you collaborate

You can export the mural as an image or PDF to share with members of your company who might find it helpful.

Quick add-ons

Share the mural
Share a view link so others can view and keep track of the progress of the session mural.

Export the mural
Export a copy of the mural as a PNG or PDF to attach to documents, share in other apps, and more.

Keep moving forward

Strategy blueprint
Define the components of a workshop to craft your strategy.

Open the template →

Customer experience journey map
Understand customer needs, motivations, and obstacles for a seamless experience.

Open the template →

Strengths, weaknesses & opportunities 2 hours
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.

Open the template →

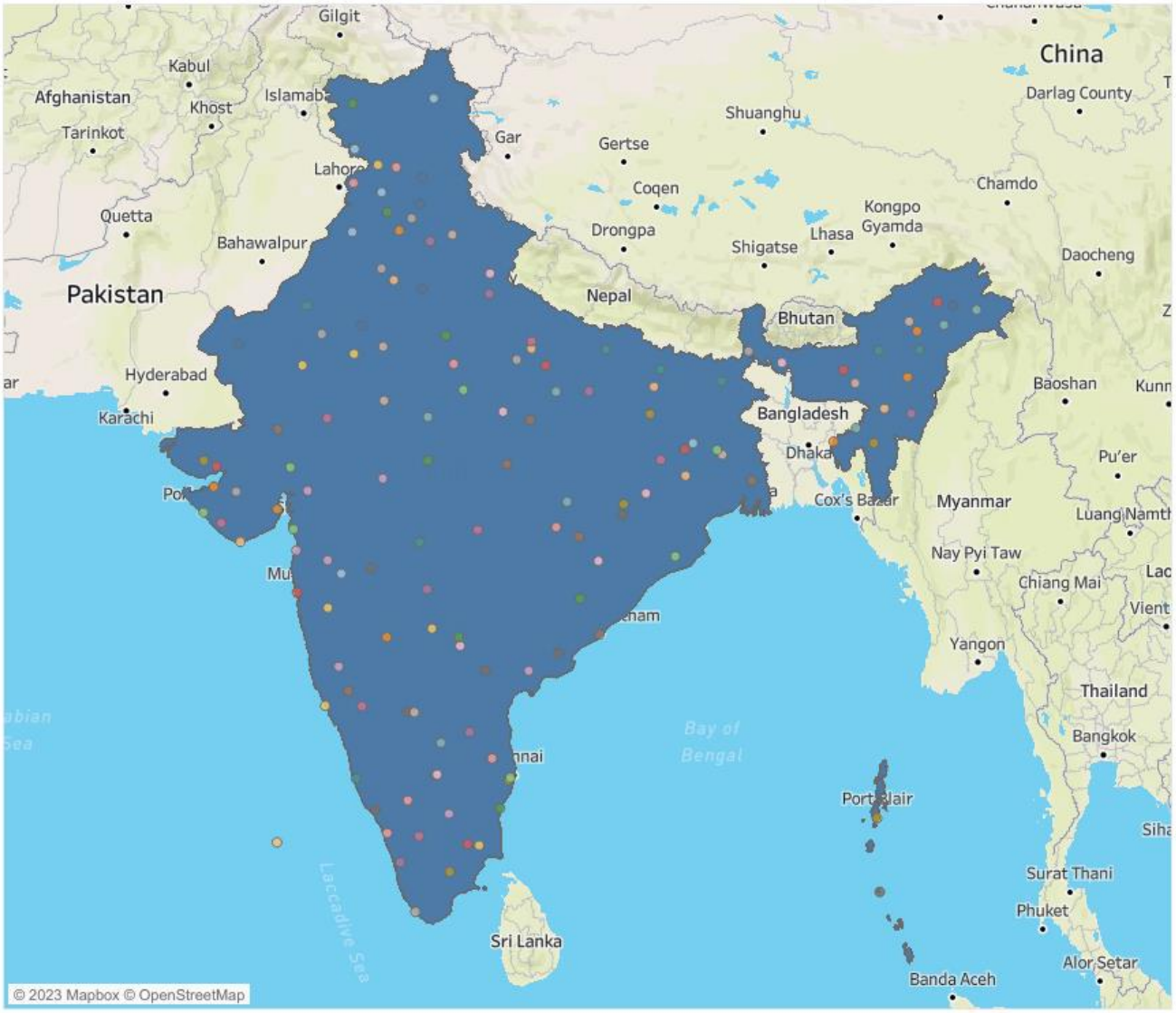
Share template feedback

Need some inspiration?
See how this template was used in real life.
Open example →

3 .RESULT:

DASHBOARD1

GLOBAL AIR TRANSPORTATION SYSTEM



Country (airports...
India

Country (airports...
India

City
Null
Adampur
Agartala
Agatti Island
Agra
Ahmedabad
Aizwal
Ajmer
Akola
Allahabad
Along
Amritsar
Aurangabad
Baghdogra
Bakshi Ka Talab
Bangalore
Bareilly
Baroda
Belgaum
Bellary
Bengaluru
Bhatinda
Bhaunagar
Bhiwani
Bhopal
Bhubaneswar
Bhuj
Bidar
Bikaner
Bilaspur
Bokaro
Calicut
Carnicobar

DASHBOARD2

Country (airports.csv)
Argentina

Airports at higher altitude within a country

Name (airports.csv)	City	ICAO (airports.csv)	
Area De Material Airport	Rio Cuarto	SAOC	1,380
Aviador C. Campos Airport	San Martin Des And..	SAZY	2,569
Brigadier Antonio Parodi ..	Esquel	SAVE	2,621
Brigadier Mayor D Cesar ..	San Luis	SAOU	2,328
Cabo F.A.A. H. R. Bordón ..	Ingeniero Jacobacci	SAVJ	2,925
Capitan V A Almonacid Ai..	La Rioja	SANL	1,437
Catamarca Airport	Catamarca	SANC	1,522
Chamical Airport	Gobernador Gordillo	SACT	1,502
Chilecito Airport	Chilecito	SANO	3,099
Chos Malal Airport	Chosmadal	SAHC	2,788

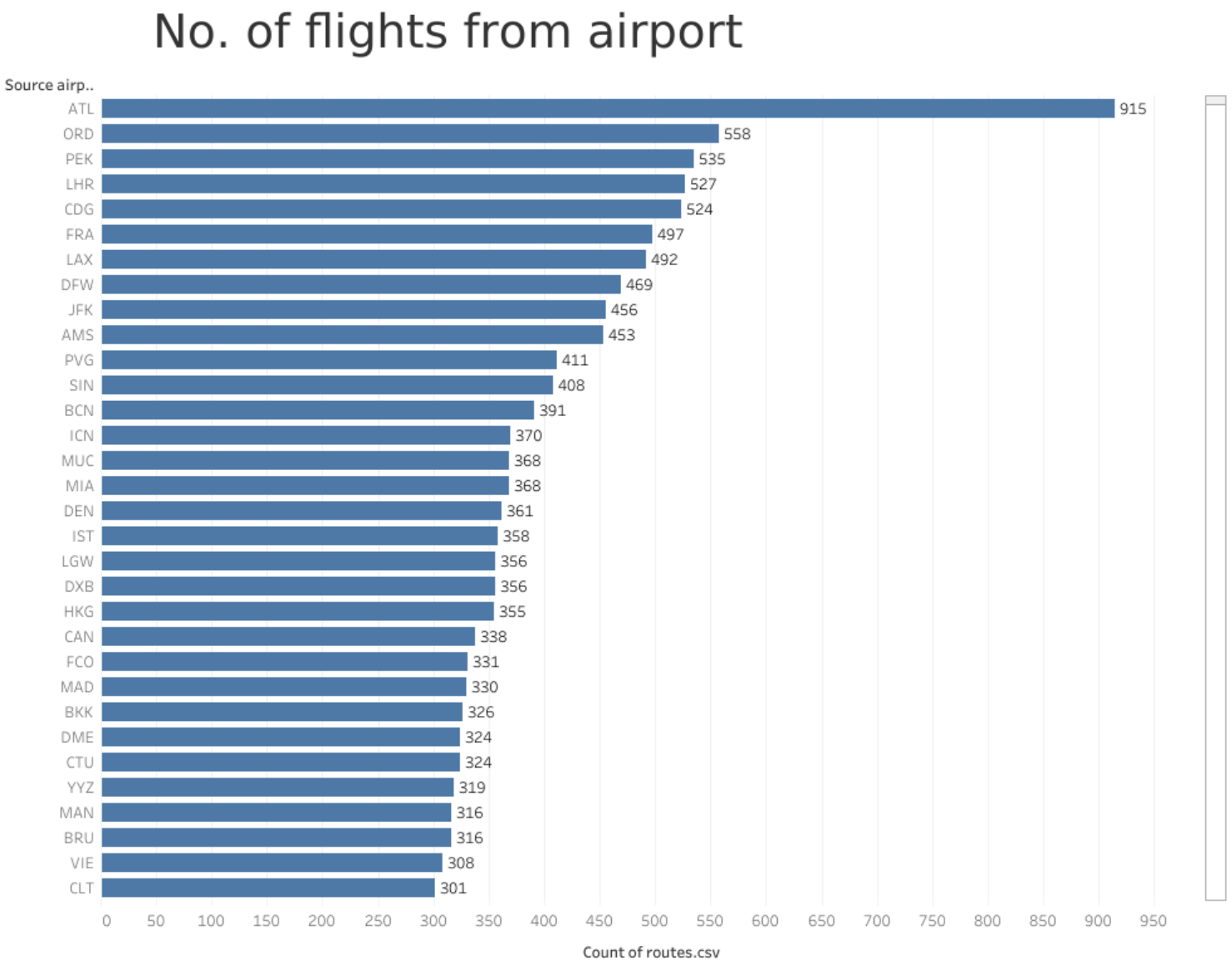
Airports at higher altitude(World)

Name (airports.csv)	City	ICAO (airports.cs..	
Capitan Nicolas Rojas Airport	Potosi	SLPO	12,913
Copacabana Airport	Copacabana	SLCC	12,591
Daocheng Yading Airport	Daocheng	ZUDC	14,472
El Alto International Airport	La Paz	SLLP	13,355
Golog Maqin Airport	Golog	ZLGL	12,426
Inca Manco Capac International ..	Juliaca	SPJL	12,552
Kangding Airport	Kangding	ZUKD	14,042
Ngari Gunsa Airport	Shiquanhe	ZUAL	14,022
Qamdo Bangda Airport	Bangda	ZUBD	14,219
Yushu Batang Airport	Yushu	ZYLS	12,816

DASHBOARD3

Airline ID	Name (airports.csv)	Callsign	ICAO (airpo..	
2838	Sardar Vallabhbhai Patel I..	CIOCCO	VAAH	
2839	Akola Airport	ILAVIA	VAAK	
2840	Aurangabad Airport	ILDEFONSO	VAAU	
2841	Chhatrapati Shivaji Intern..	ILIAMNA AIR	VABB	
2842	Bilaspur Airport	Null	VABI	
2843	Bhuj Airport	ILYICHAVIA	VABJ	
2844	Belgaum Airport	IMAER	VABM	
2845	Vadodara Airport	IMPROTEX	VABO	
2846	Raja Bhoj International Air..	PHOENIX	VABP	
2847	Bhavnagar Airport	IMTREC	VABV	
2848	Daman Airport	INDEPENDENCE AIR	VADN	
2849	Deesa Airport	INDEPENDENT	VADS	
2850	Guna Airport	IFLY	VAGN	
2851	Dabolim Airport	INDIA INTER	VAGO	
2852	Devi Ahilyabai Holkar Airp..	INDIAN AIRFORCE	VAID	
2853	Jabalpur Airport	INDAIR	VAJB	
2854	Jamnagar Airport	INDICATOR	VAJM	
2855	Kandla Airport	INDIGO BLUE	VAKE	
2856	Khajuraho Airport	INTRA	VAKJ	
2857	Kolhapur Airport	WAGON AIR	VAKP	
2858	Keshod Airport	INDO LINES	VAKS	
2859	Dr. Babasaheb Ambedkar I..	NUSANTARA	VANP	
2860	Nashik Airport	TITANLUX	VAOZ	
2861	Pune Airport	INFINIT	VAPO	
2862	Porbandar Airport	Null	VAPR	
2863	Rajkot Airport	INNOTECH	VARK	
2864	Raipur Airport	INSELAIR	VARP	
2865	Solapur Airport	CARTO	VASL	
2866	Surat Airport	INTAIRCO	VASU	
2867	Maharana Pratap Airport	INTAL AVIA	VAUD	
2879	Along Airport	INTER-MOUNTAIN	VEAN	
2880	Agartala Airport	INTER-STATE	VEAT	
2881	Lengpui Airport	INLINE	VELP	
2882	Bagdogra Airport	INTERMEX	VEBD	

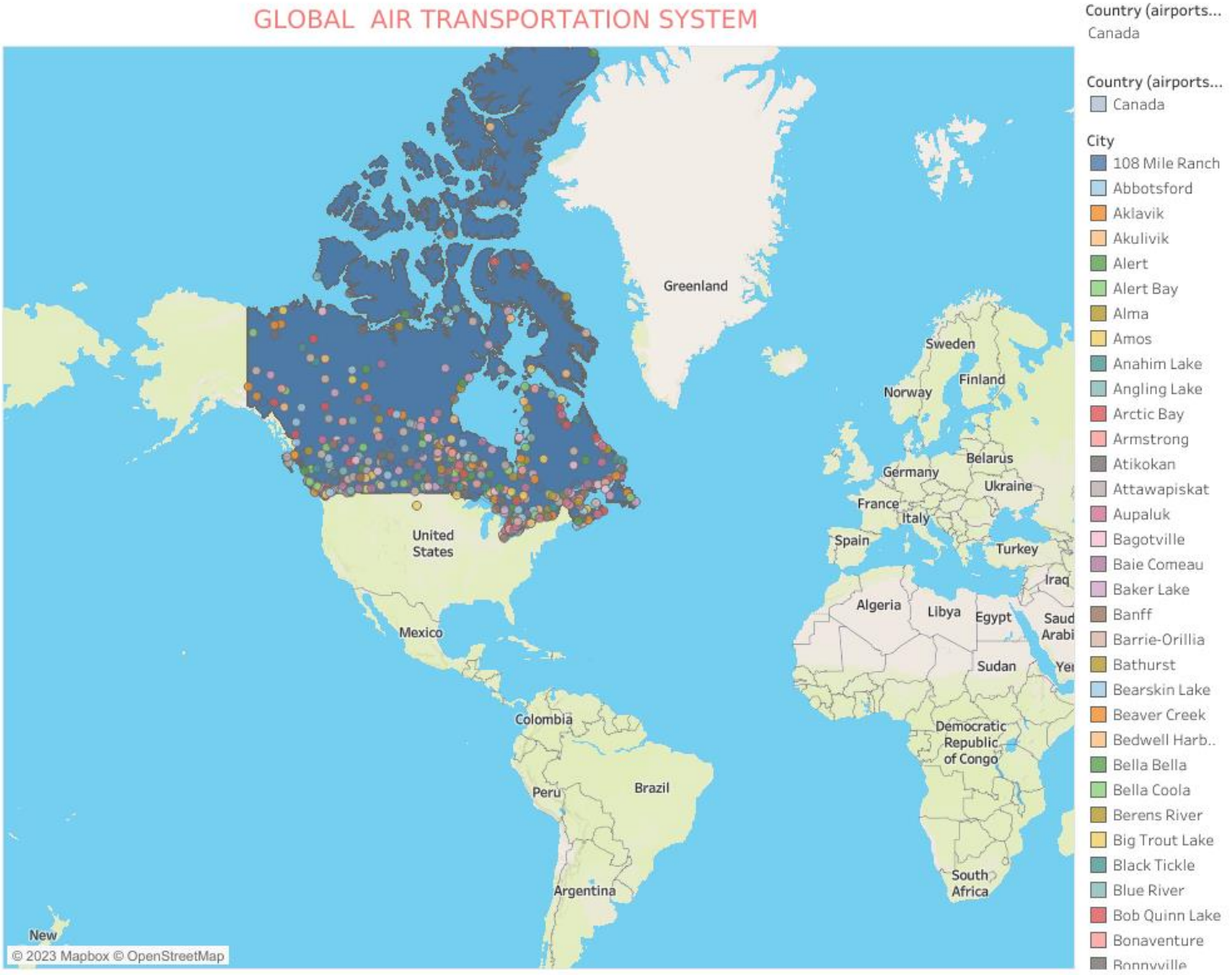
DASHBOARD4:


No. of flights from airport
Source airp..
ATL 915
ORD 558
PEK 535
LHR 527
CDG 524
FRA 497
LAX 492
DFW 469
JFK 456
AMS 453
PVG 411
SIN 408
BCN 391
ICN 370
MUC 368
MIA 368
DEN 361
IST 358
LGW 356
DXB 356
HKG 355
CAN 338
FCO 331
MAD 330
BKK 326
DME 324
CTU 324
YYZ 319
MAN 316
BRU 316
VIE 308
CLT 301
0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950
Count of routes.csv

STORY:

Global Air Transportation Network

World map showing countries with no. of ..	Table showing No.of airports within a cou..	Two tables showing Airports at higher alti..	Table Showing Airlines within a country	Table showing No. of flights from airport



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Global Air Transportation Network

World map showing countries with no. of .. | Table showing No.of airports within a cou.. | Two tables showing Airports at higher alti.. | Table Showing Airlines within a country | Table showing No. of flights from airport

No. of Airports within a country

Country (airports.csv)
India

Active
N
Y

Airline ID	Name (airports.csv)	Callsign	ICAO (airpo..	
2838	Sardar Vallabhbhai Patel I..	CIOCCO	VAAH	
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Global Air Transportation Network

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Global Air Transportation Network

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Airlines within a country

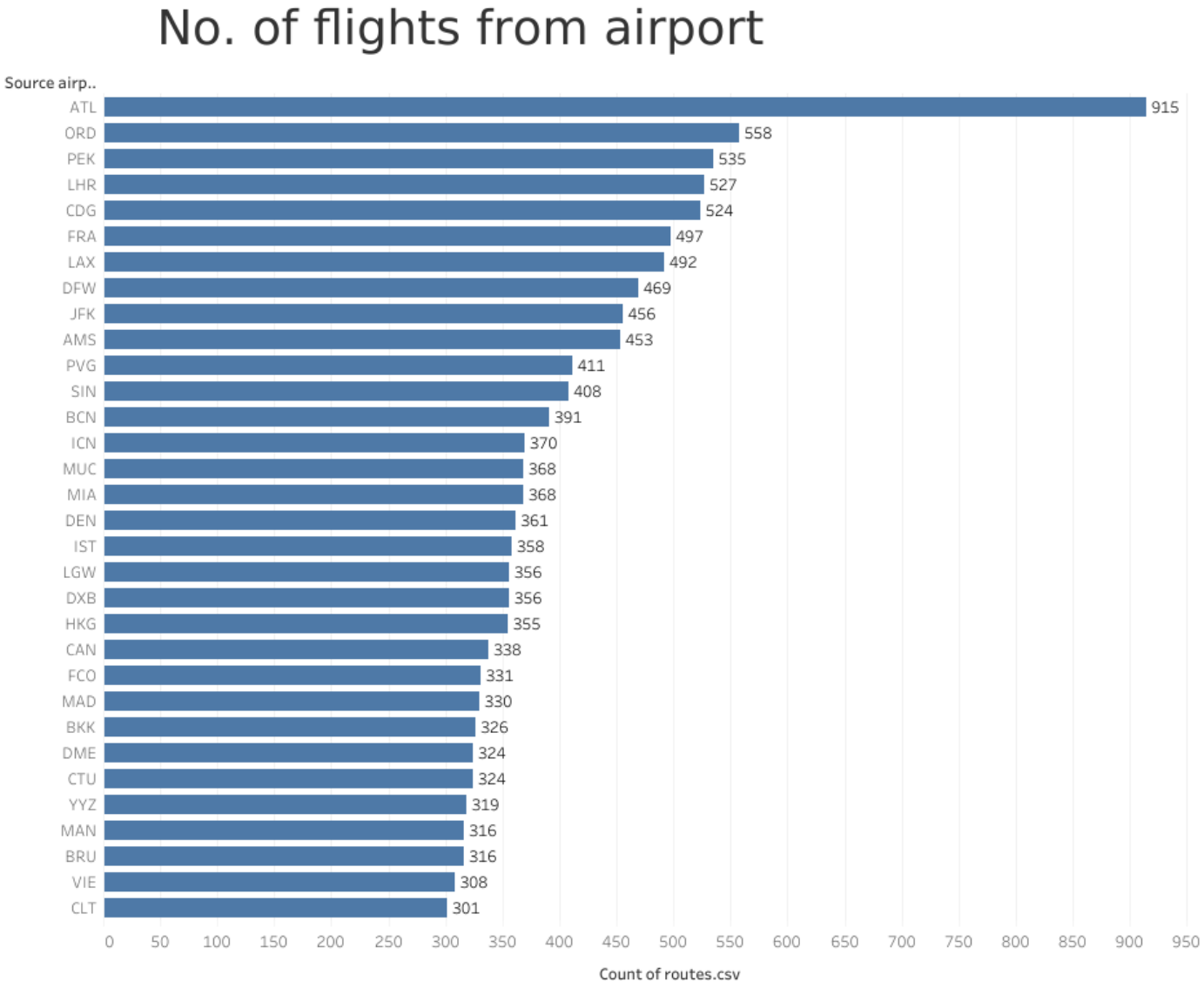
Active
- n
- N
- Y

Active
- N
- n
- Y

Airport ID	Name	Icao	Callsign	
1	Unknown	Null	\N	
2	Private flight	Null	Null	
3	135 Airways	GNL	GENERAL	
4	1Time Airline	RNX	NEXTIME	
5	2 Sqn No 1 Elementary Fly..	WYT	Null	
6	213 Flight Unit	TFU	Null	
7	223 Flight Unit State Airli..	CHD	CHKALOVSK-AVIA	
8	224th Flight Unit	TTF	CARGO UNIT	
9	247 Jet Ltd	TWF	CLOUD RUNNER	
10	3D Aviation	SEC	SECUREX	
11	40-Mile Air	MLA	MILE-AIR	
12	4D Air	QRT	QUARTET	
13	611897 Alberta Limited	THD	DONUT	
14	Ansett Australia	AAA	ANSETT	
15	Abacus International	Null	Null	
16	Abelag Aviation	AAB	ABG	
17	Army Air Corps	AAC	ARMYAIR	
18	Aero Aviation Centre Ltd.	AAD	SUNRISE	
19	Aero Servicios Ejecutivos ..	SII	ASEISA	
20	Aero Biniza	BZS	BINIZA	
21	Aero Albatros	ABM	ALBATROS ESPANA	
22	Aigle Azur	AAF	AIGLE AZUR	
23	Aloha Airlines	AAH	ALOHA	
24	Alaska Island Air	AAK	ALASKA ISLAND	
25	American Airlines	AAL	AMERICAN	
26	Aviation Management Cor..	AAM	AM CORP	
27	Atlantis Airlines (USA)	AAO	ATLANTIS AIR	
28	Aerovista Airlines	AAP	AEROVISTA GROUP	
29	Asiana Airlines	AAR	ASIANA	
30	Askari Aviation	AAS	AL-AAS	
31	Australia Asia Airlines	AAU	AUSTASIA	
32	Astro Air International	AAV	ASTRO-PHIL	
33	Afriqiyah Airways	AAW	AFRIQIYAH	
34	Afrinat International Airli..	AFU	Null	
35	Afric'air Express	AAX	AFREX	

Global Air Transportation Network

World map showing countries with no. of .. | Table showing No.of airports within a cou.. | Two tables showing Airports at higher alti.. | Table Showing Airlines within a country | Table showing No. of flights from airport



4.ADVANTAGES AND DISADVANTAGES:

Advantages of using Tableau for analyzing the global air transportation network:

1. Data Visualization: Tableau is known for its powerful data visualization capabilities. It allows you to create interactive and visually appealing charts, maps, and graphs that can help you explore and understand complex data related to the global air transportation network. This can make it easier to identify patterns, trends, and anomalies.

2. Real-time Analysis: Tableau supports real-time data connections, which means you can analyze and visualize the most up-to-date information about the global air transportation network. This is particularly useful when dealing with dynamic data that changes frequently, such as flight schedules, passenger volumes, and route information.

3. Interactive Dashboards: Tableau allows you to create interactive dashboards that provide a comprehensive view of the global air transportation network. You can customize these

dashboards to display the specific metrics and dimensions that are relevant to your analysis, and users can interact with the data by applying filters, drilling down into details, and exploring different perspectives.

4. Integration with Multiple Data Sources: Tableau can connect to a wide range of data sources, including databases, spreadsheets, cloud services, and web APIs. This flexibility makes it easier to gather data from various sources related to the global air transportation network and combine them into a single analysis. You can also perform data blending and join operations to enrich your analysis with additional information.

5. Collaboration and Sharing: Tableau provides features for collaboration and sharing, allowing you to collaborate with colleagues or stakeholders on your analysis of the global air transportation network. You can share interactive dashboards, reports, and visualizations with others, either by publishing them to Tableau Server or Tableau Public, or by exporting them to different formats such as PDF or image files.

Disadvantages of using Tableau for analyzing the global air transportation network:

1. Steep Learning Curve: Tableau can be complex for beginners, especially if you're not familiar with data visualization concepts or the Tableau interface. Building advanced visualizations and utilizing more advanced features may require a significant learning curve and investment of time.

2. Cost: Tableau is a commercial software, and depending on the version and licensing model you choose, it can be relatively expensive. This may be a disadvantage for individuals or small organizations with limited budgets.

3. Performance Limitations: When dealing with large and complex datasets, Tableau's performance may be impacted. Resource-intensive operations such as data blending, calculations, and rendering may slow down the analysis, especially if the hardware infrastructure is not optimized.

4. Limited Statistical Analysis Capabilities: While Tableau offers basic statistical functions and calculations, it is not as robust as dedicated statistical analysis tools. If your analysis of the global air transportation network requires advanced statistical modeling or hypothesis testing, you may need to supplement Tableau with additional statistical software.

5. Dependency on Data Structure: Tableau relies on well-structured and properly formatted data for optimal analysis and visualization. If the data related to the global air transportation network is messy or inconsistent, you may need to invest additional effort in data preparation and cleaning before it can be effectively used in Tableau.

It's worth noting that the advantages and disadvantages listed above are specific to using Tableau for analyzing the global air transportation network, and may not apply universally to all analysis scenarios. Additionally, advancements in Tableau and changes in the software landscape may have occurred after my knowledge cutoff in September 2021, so it's always a good idea to consult the latest information and user reviews when considering a specific tool for your analysis needs.

APPLICATION:

applications of Tableau for analyzing the global air transportation network:

1. Network Visualization: Tableau allows you to create interactive network visualizations that depict the connections between airports, airlines, and routes. By visualizing the network, you can identify central hubs, major airlines, and high-traffic routes. This can help you understand the overall

structure of the global air transportation network and its key players.

2. Passenger Flow Analysis: Tableau can help you analyze passenger flow through airports and airlines. By visualizing data such as passenger volumes, origins, destinations, and connecting routes, you can gain insights into travel patterns and passenger preferences. This information can be used to optimize operations, improve customer experience, and identify potential market opportunities.

3. Flight Performance Metrics: Tableau enables you to analyze flight performance metrics, such as on-time performance, flight delays, and cancellations. By visualizing these metrics over time, you can identify trends, patterns, and potential causes of disruptions. This analysis can assist airlines and airports in improving operational efficiency, reducing delays, and enhancing the overall travel experience.

4. Revenue Analysis: Tableau can be utilized to analyze revenue data in the air transportation industry. By integrating data on ticket sales, ancillary services, and pricing, you can create visualizations that provide insights into revenue streams, market segments, and pricing strategies. This analysis can help optimize revenue management, identify

revenue growth opportunities, and support strategic decision-making.

5. Market Analysis: Tableau can assist in conducting market analysis for airlines and airports. By combining data on passenger demographics, market demand, and competition, you can create visualizations that identify market trends, customer preferences, and potential market gaps. This analysis can inform route planning, marketing campaigns, and customer targeting strategies.

6. Operational Efficiency: Tableau can help identify opportunities for operational efficiency improvements in the air transportation network. By visualizing data related to aircraft utilization, fuel consumption, maintenance schedules, and crew performance, you can identify areas for optimization and cost reduction. This analysis can lead to better resource allocation, improved scheduling, and enhanced operational performance.

7. Risk Analysis: Tableau can assist in analyzing and visualizing data related to safety and security in the air transportation network. By integrating data on incidents, accidents, and security breaches, you can identify patterns, hotspots, and potential risk factors. This analysis can support risk mitigation strategies, safety protocols, and regulatory compliance.

These are just a few examples of how Tableau can be applied to analyze the global air transportation network. The flexibility and visualization capabilities of Tableau allow for in-depth exploration and insights into various aspects of the industry, supporting data-driven decision-making and strategic planning.

CONCLUSION:

In conclusion, here's a summary of the key points regarding the use of Tableau for analyzing the global air transportation network:

- Tableau's data visualization capabilities enable the creation of interactive and visually appealing charts, maps, and graphs to explore and understand complex data related to the global air transportation network.

- Real-time analysis is supported, allowing for the examination of up-to-date information on flight schedules, passenger volumes, and route data.

- Interactive dashboards can be customized to display relevant metrics and dimensions, enabling users to apply filters, drill down into details, and explore different perspectives.

- Tableau's integration with multiple data sources facilitates gathering and combining data from various sources related to the global air transportation network.

- Collaboration and sharing features enable the sharing of interactive dashboards, reports, and visualizations with colleagues and stakeholders.

- Challenges with Tableau include a steep learning curve, potential cost considerations, performance limitations with large datasets, and limited statistical analysis capabilities.

- Tableau's applications for analyzing the global air transportation network include route analysis, passenger analysis, flight performance monitoring, revenue analysis, network optimization, fuel efficiency analysis, and safety and security analysis.

Overall, Tableau provides a powerful platform for analyzing and visualizing data related to the global air transportation network, offering insights that can inform decision-making, improve operational efficiency, and enhance the travel experience.

7.FUTURE SCOPE:

In conclusion, here's a summary of the key points regarding the use of Tableau for analyzing the global air transportation network:

- Tableau's data visualization capabilities enable the creation of interactive and visually appealing charts, maps, and graphs to explore and understand complex data related to the global air transportation network.

- Real-time analysis is supported, allowing for the examination of up-to-date information on flight schedules, passenger volumes, and route data.

- Interactive dashboards can be customized to display relevant metrics and dimensions, enabling users to apply filters, drill down into details, and explore different perspectives.

- Tableau's integration with multiple data sources facilitates gathering and combining data from various sources related to the global air transportation network.

- Collaboration and sharing features enable the sharing of interactive dashboards, reports, and visualizations with colleagues and stakeholders.

- Challenges with Tableau include a steep learning curve, potential cost considerations, performance limitations with large datasets, and limited statistical analysis capabilities.

- Tableau's applications for analyzing the global air transportation network include route analysis, passenger analysis, flight performance monitoring, revenue analysis, network optimization, fuel efficiency analysis, and safety and security analysis.

Overall, Tableau provides a powerful platform for analyzing and visualizing data related to the global air transportation network, offering insights that can inform decision-making, improve operational efficiency, and enhance the travel experience.

8.APPENDIX:

Source code:

Data Set Link

https://drive.google.com/drive/folders/1RJnbcGxvIVuIM3fkZH1Wz3_IbLDP2RjY?usp=share_link

unlocking insights into global air transportation network analysis with tableau(RSGC)

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