PROJECT REPORT

Unlocking the insights into the Global Air Transportation Network

Introduction

1.1 Overview

Unlocking insights into the Global Air Transportation network involves analyzing vast amount of data related to flights, airports, and passenger behavior. Machine learning and data analytics can help identify trends, optimize routes, improve safety and enhance the overall efficiency of the air transportation system.

1.2 Purpose

- Data Analysis: Utilize data sources like flight schedules, passenger statistics, and airline information to analyze trends in air travel, such as popular routes, seasonal variations, and emerging markets.
- Network Visualization: Create network graphs to visualize the connections between airports and airlines. This can help identify hubs, reginal clusters, and key players in the network.
- Passenger Demographics: Explore data on passenger demographics to understand the types of travelers using air transportation and their preferences.
- Environmental Impact: assess the environmental impacts of the global air transportation network, including emissions, fuel efficiency, and sustainability efforts.
- Market Analysis: Conduct market research to identify opportunities for new routes, airlines or services based on demand and competition.
- Technology Trends: Investigate how emerging technologies, such as electric aircraft and autonomous systems, are shaping the future of air transportation.
- Regulatory and Security Factors: Consider the impact of regulations, security measures, and geopolitics factors on the global air transportation network.

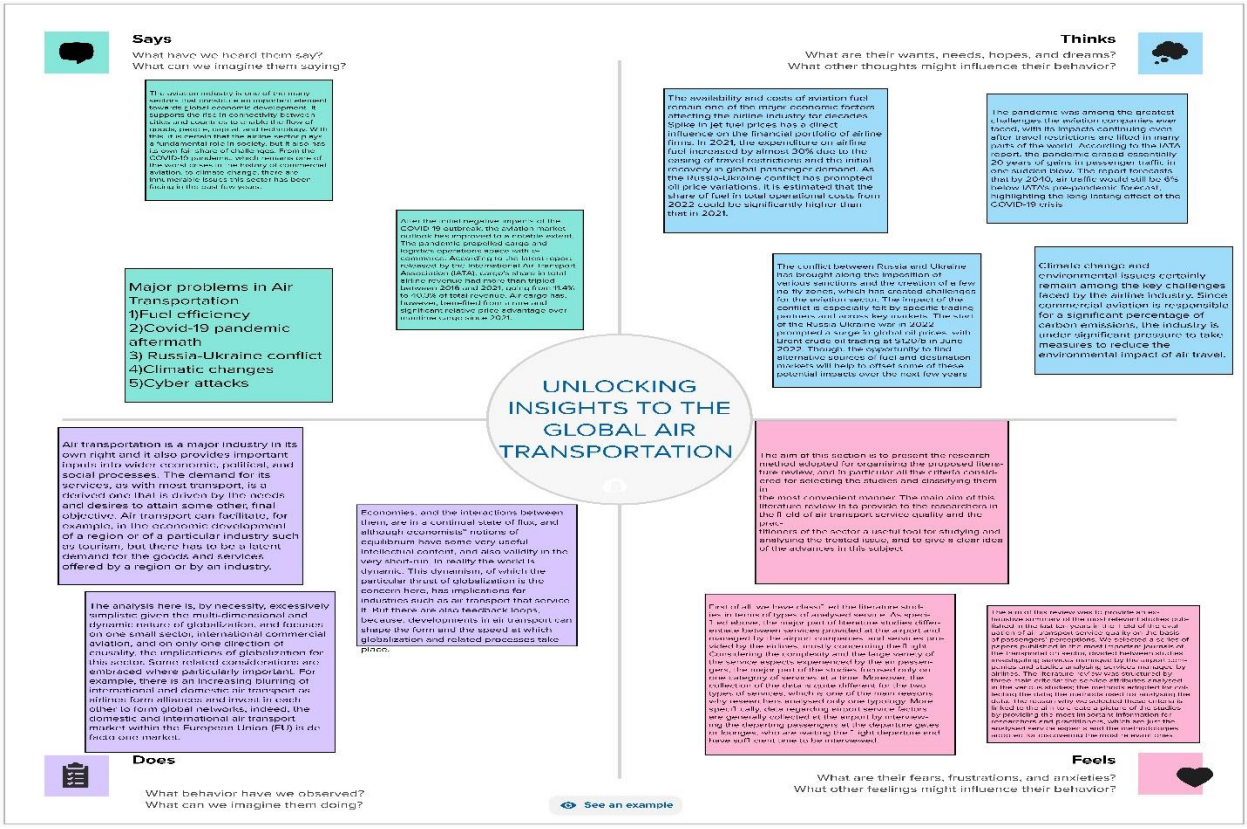
- Economic Implications: Analyze the economic impact of the aviation industry on local and global economics, including job creation, tourism and trade.

- Infrastructure Development: Examine investments in airport infrastructure and expansion projects to anticipate changes in the network's capacity.

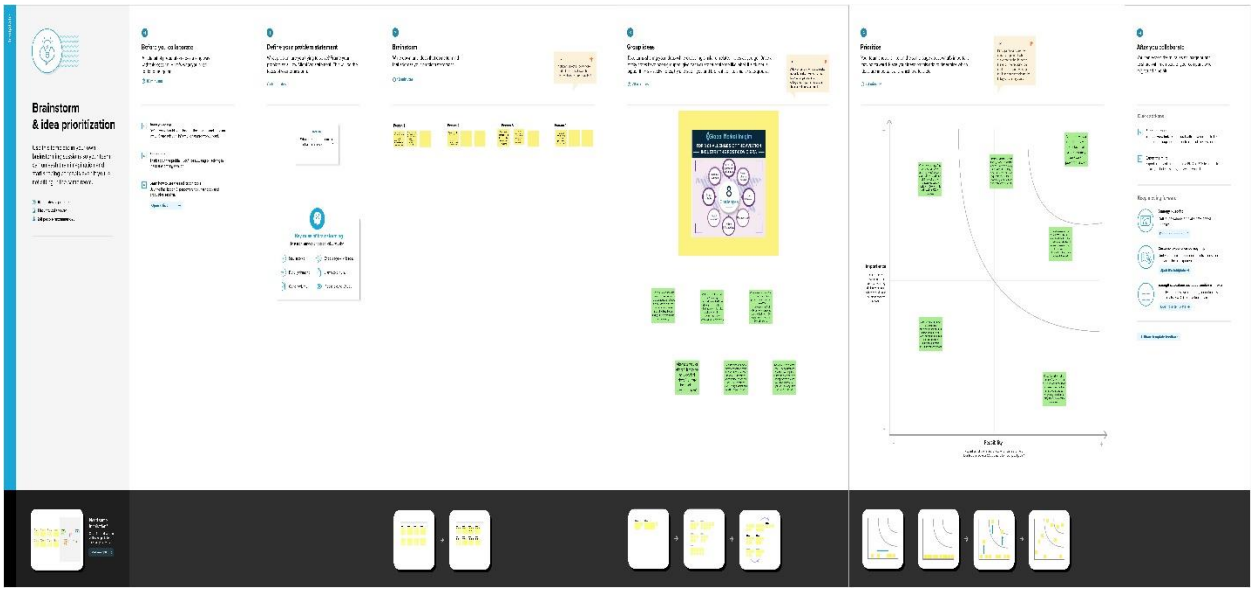
- Pandemic Effects: Assess the long-term effects of events like the COVID-19 pandemics air travels patterns and recovery strategies.

Problem Definition and Design Thinking:

2.1 Empathy map:

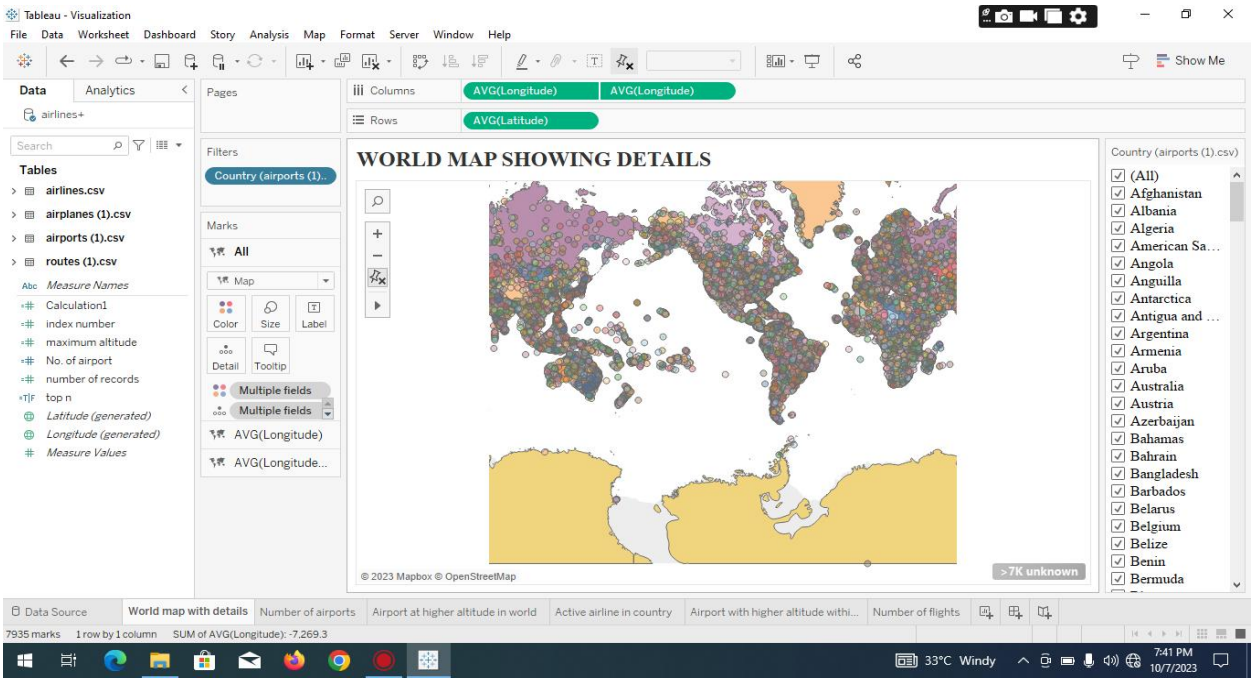


2.2 Ideation and Brainstorming Map:



RESULT:

WORKSHEET



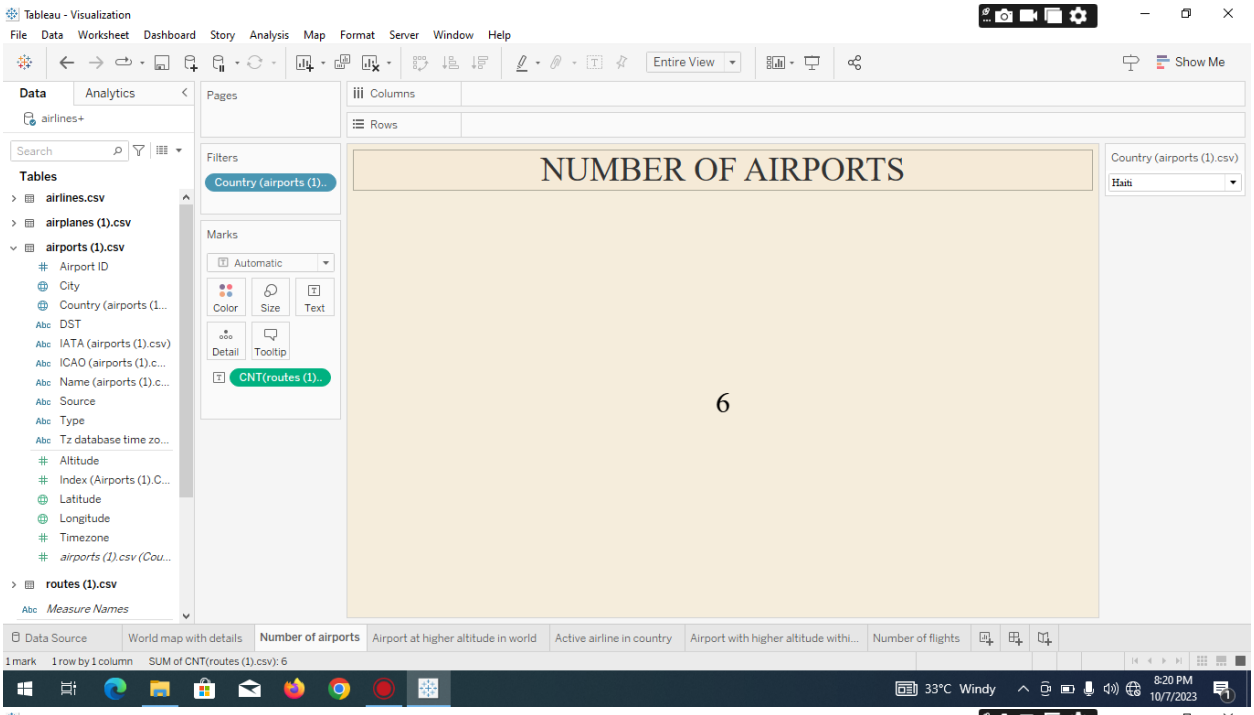


Tableau - Visualization
File Data Worksheet Dashboard Story Analysis Map Format Server Window Help
Entire View
Show Me
Data
Analytics
airlines+
Search
Tables
airlines.csv
airplanes (1).csv
airports (1).csv
Airport ID
City
Country (airports (1...
DST
IATA (airports (1).csv)
ICAO (airports (1).c...
Name (airports (1).c...
Source
Type
Tz database time zo...
Altitude
Index (Airports (1).C...
Latitude
Longitude
Timezone
airports (1).csv (Cou...
routes (1).csv
Measure Names
Pages
Columns
Rows
Filters
Country (airports (1)..
Marks
Automatic
Color
Size
Text
Detail
Tooltip
CNT(routes (1)..
NUMBER OF AIRPORTS
6
Country (airports (1).csv)
Haiti
Data Source
World map with details
Number of airports
Airport at higher altitude in world
Active airline in country
Airport with higher altitude withi...
Number of flights
1 mark
1 row by 1 column
SUM of CNT(routes (1).csv): 6
33°C Windy
8:20 PM
10/7/2023

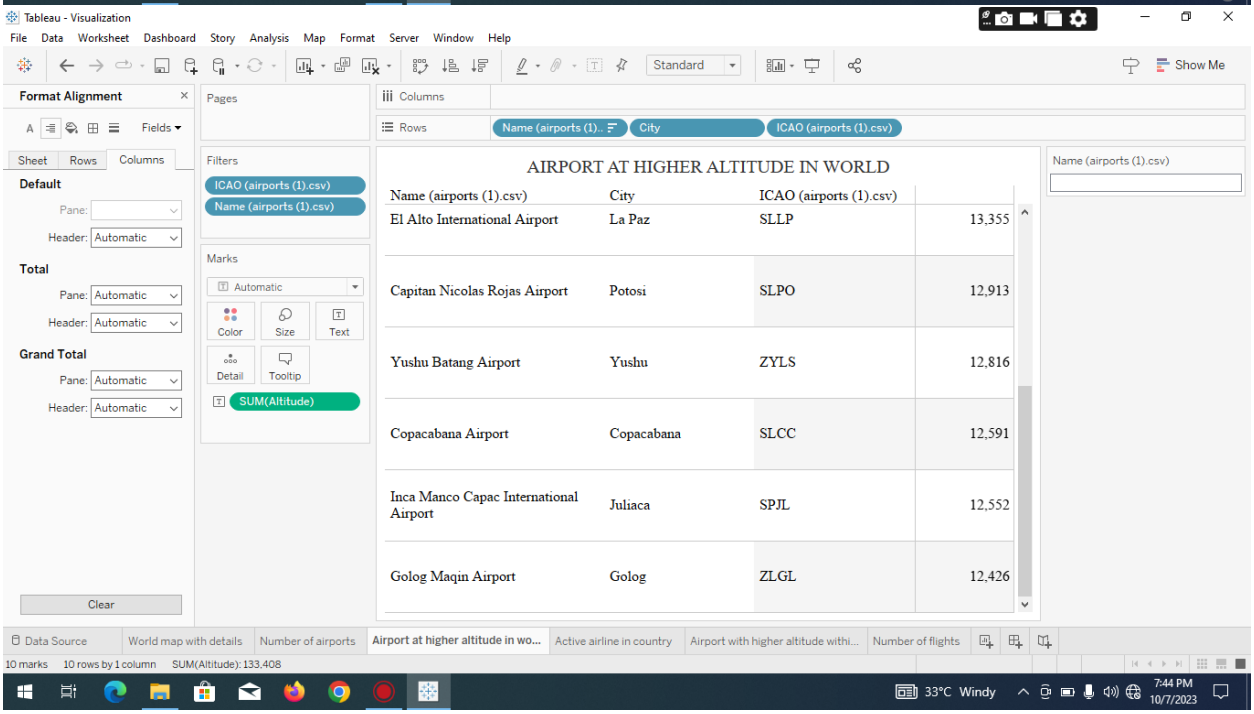


Tableau - Visualization
File Data Worksheet Dashboard Story Analysis Map Format Server Window Help
Standard
Show Me
Format Alignment
Fields
Sheet
Rows
Columns
Default
Pane:
Header: Automatic
Total
Pane: Automatic
Header: Automatic
Grand Total
Pane: Automatic
Header: Automatic
Clear
Pages
Columns
Rows
Name (airports (1).. City ICAO (airports (1).csv)
Filters
ICAO (airports (1).csv)
Name (airports (1).csv)
Marks
Automatic
Color
Size
Text
Detail
Tooltip
SUM(Altitude)
AIRPORT AT HIGHER ALTITUDE IN WORLD
Name (airports (1).csv) City ICAO (airports (1).csv)
El Alto International Airport La Paz SLLP 13,355
Capitan Nicolas Rojas Airport Potosi SLPO 12,913
Yushu Batang Airport Yushu ZYLS 12,816
Copacabana Airport Copacabana SLCC 12,591
Inca Manco Capac International Airport Juliaca SPJL 12,552
Golog Maqin Airport Golog ZLGL 12,426
Name (airports (1).csv)
Data Source
World map with details
Number of airports
Airport at higher altitude in wo...
Active airline in country
Airport with higher altitude withi...
Number of flights
10 marks
10 rows by 1 column
SUM(Altitude): 133,408
33°C Windy
7:44 PM
10/7/2023

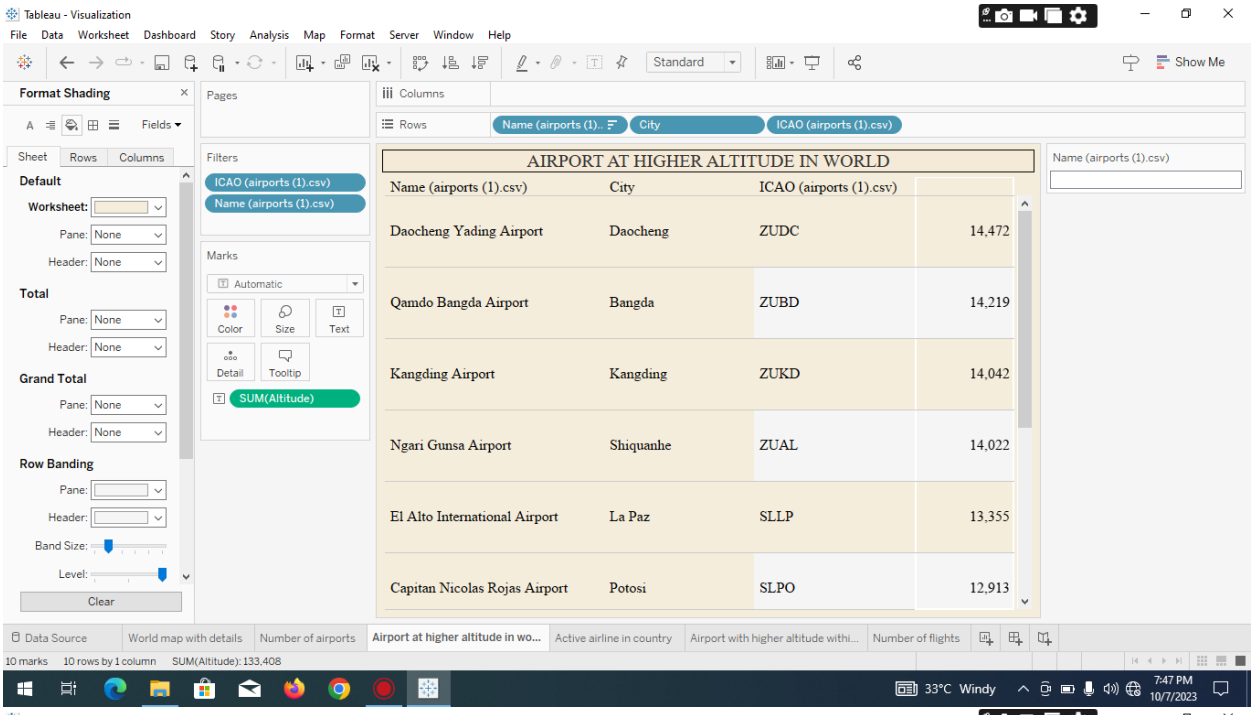


Tableau - Visualization
File Data Worksheet Dashboard Story Analysis Map Format Server Window Help
Format Shading
Pages
Columns
Rows
Name (airports (1)..
City
ICAO (airports (1).csv)
Filters
ICAO (airports (1).csv)
Name (airports (1).csv)
Marks
Automatic
Color
Size
Text
Detail
Tooltip
SUM(Altitude)
AIRPORT AT HIGHER ALTITUDE IN WORLD
Name (airports (1).csv) City ICAO (airports (1).csv)
Daocheng Yading Airport Daocheng ZUDC 14,472
Qamdo Bangda Airport Bangda ZUBD 14,219
Kangding Airport Kangding ZUKD 14,042
Ngari Gunsa Airport Shiquanhe ZUAL 14,022
El Alto International Airport La Paz SLLP 13,355
Capitan Nicolas Rojas Airport Potosi SLPO 12,913
Data Source
World map with details
Number of airports
Airport at higher altitude in wo...
Active airline in country
Airport with higher altitude withi...
Number of flights
10 marks
10 rows by 1 column
SUM(Altitude): 133,408
33°C Windy
7:47 PM
10/7/2023

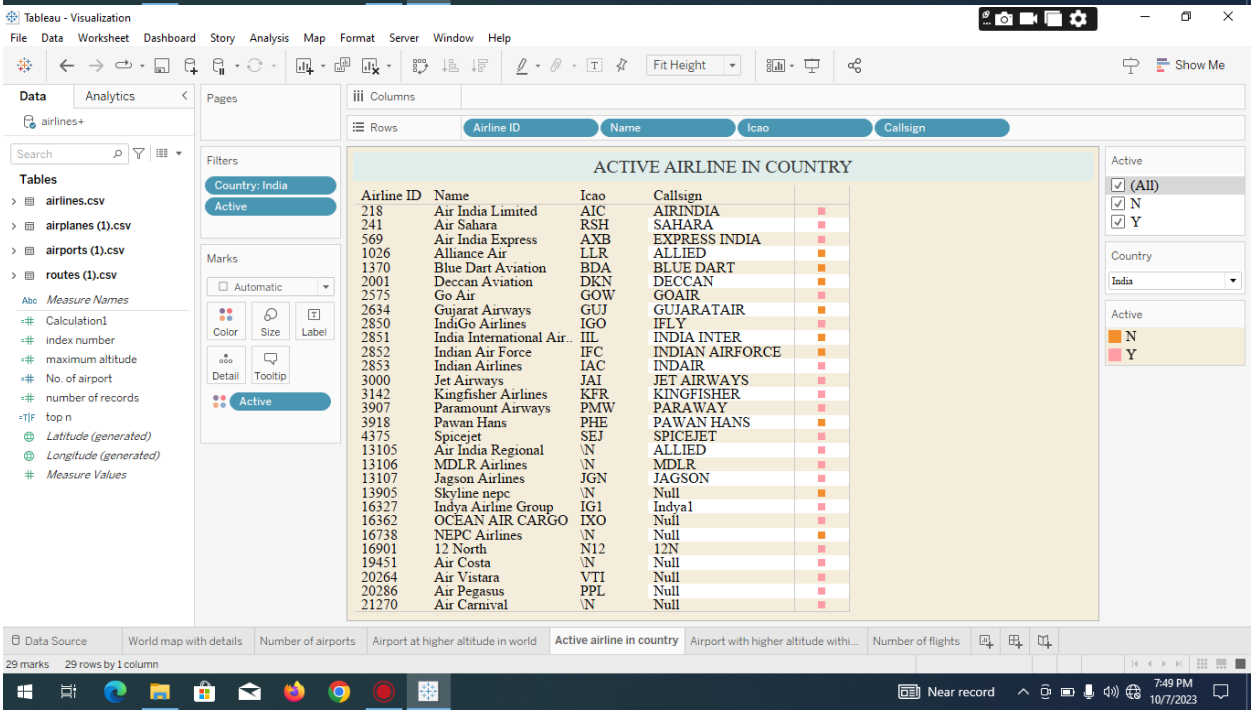


Tableau - Visualization
File Data Worksheet Dashboard Story Analysis Map Format Server Window Help
Data
Analytics
airlines+
Tables
airlines.csv
airplanes (1).csv
airports (1).csv
routes (1).csv
Measure Names
Calculation1
index number
maximum altitude
No. of airport
number of records
top n
Latitude (generated)
Longitude (generated)
Measure Values
Pages
Columns
Rows
Airline ID
Name
Icao
Callsign
Filters
Country: India
Active
Marks
Automatic
Color
Size
Label
Detail
Tooltip
Active
ACTIVE AIRLINE IN COUNTRY
Airline ID Name Icao Callsign
218 Air India Limited AIC AIRINDIA
241 Air Sahara RSH SAHARA
569 Air India Express AXB EXPRESS INDIA
1026 Alliance Air LLR ALLIED
1370 Blue Dart Aviation BDA BLUE DART
2001 Deccan Aviation DKN DECCAN
2575 Go Air GOW GOAIR
2634 Gujarat Airways GUJ GUJARATAIR
2850 IndiGo Airlines IGO IFLY
2851 India International Air.. IIL INDIA INTER
2852 Indian Air Force IFC INDIAN AIRFORCE
2853 Indian Airlines IAC INDAIR
3000 Jet Airways JAI JET AIRWAYS
3142 Kingfisher Airlines KFR KINGFISHER
3907 Paramount Airways PMW PARAWAY
3918 Pawan Hans PHE PAWAN HANS
4375 Spicejet SEJ SPICEJET
13105 Air India Regional \N ALLIED
13106 MDLR Airlines \N MDLR
13107 Jagson Airlines JGN JAGSON
13905 Skyline nepc \N Null
16327 Indya Airline Group IG1 Indya1
16362 OCEAN AIR CARGO IXO Null
16738 NEPC Airlines \N Null
16901 12 North N12 12N
19451 Air Costa \N Null
20264 Air Vistara VTI Null
20286 Air Pegasus PPL Null
21270 Air Carnival \N Null
Active
(All)
N
Y
Country
India
Active
N
Y
Data Source
World map with details
Number of airports
Airport at higher altitude in world
Active airline in country
Airport with higher altitude withi...
Number of flights
29 marks
29 rows by 1 column
Near record
7:49 PM
10/7/2023

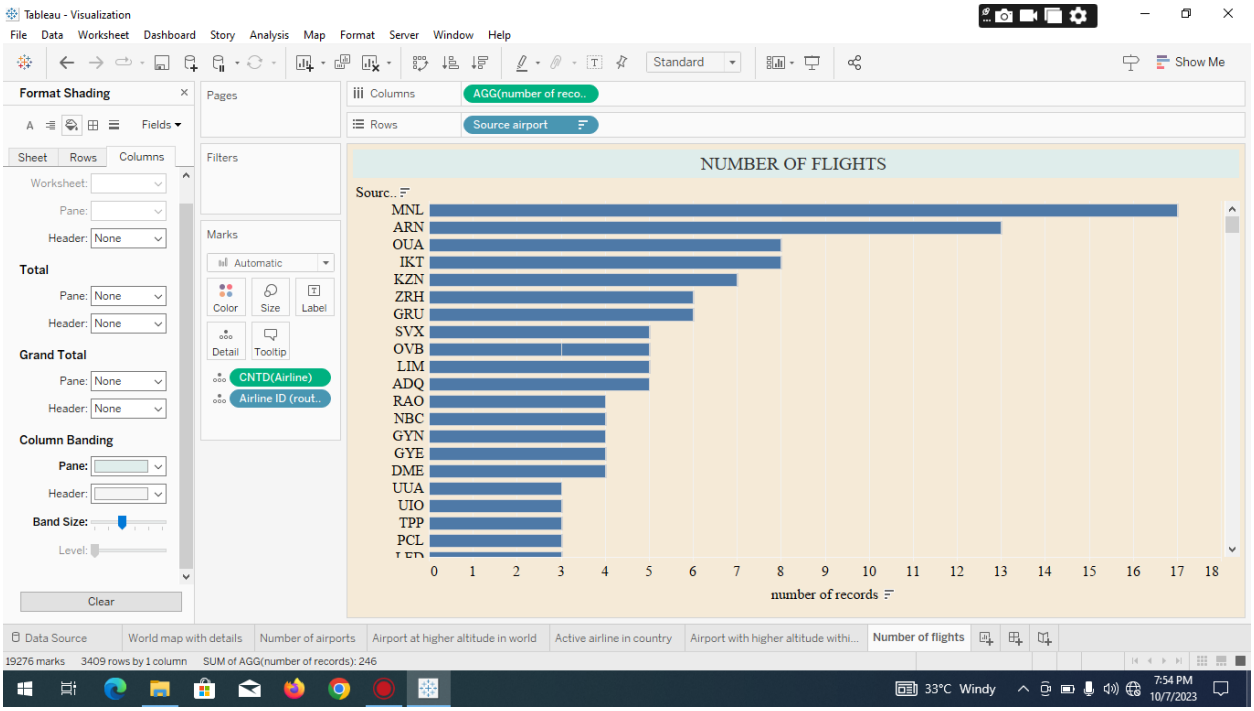


Tableau - Visualization
File Data Worksheet Dashboard Story Analysis Map Format Server Window Help
Format Shading
Pages
Columns AGG(number of reco..
Rows Source airport
Filters
Marks
Automatic
Color Size Label
Detail Tooltip
CNTD(Airline)
Airline ID (rout..
NUMBER OF FLIGHTS
Sourc..
MNL ARN OUA IKT KZN ZRH GRU SVX OVB LIM ADQ RAO NBC GYN GYE DME UUA UIO TPP PCL
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
number of records
Data Source
World map with details
Number of airports
Airport at higher altitude in world
Active airline in country
Airport with higher altitude withi...
Number of flights
19276 marks
3409 rows by 1 column
SUM of AGG(number of records): 246
33°C Windy
7:54 PM
10/7/2023

DASHBOARD

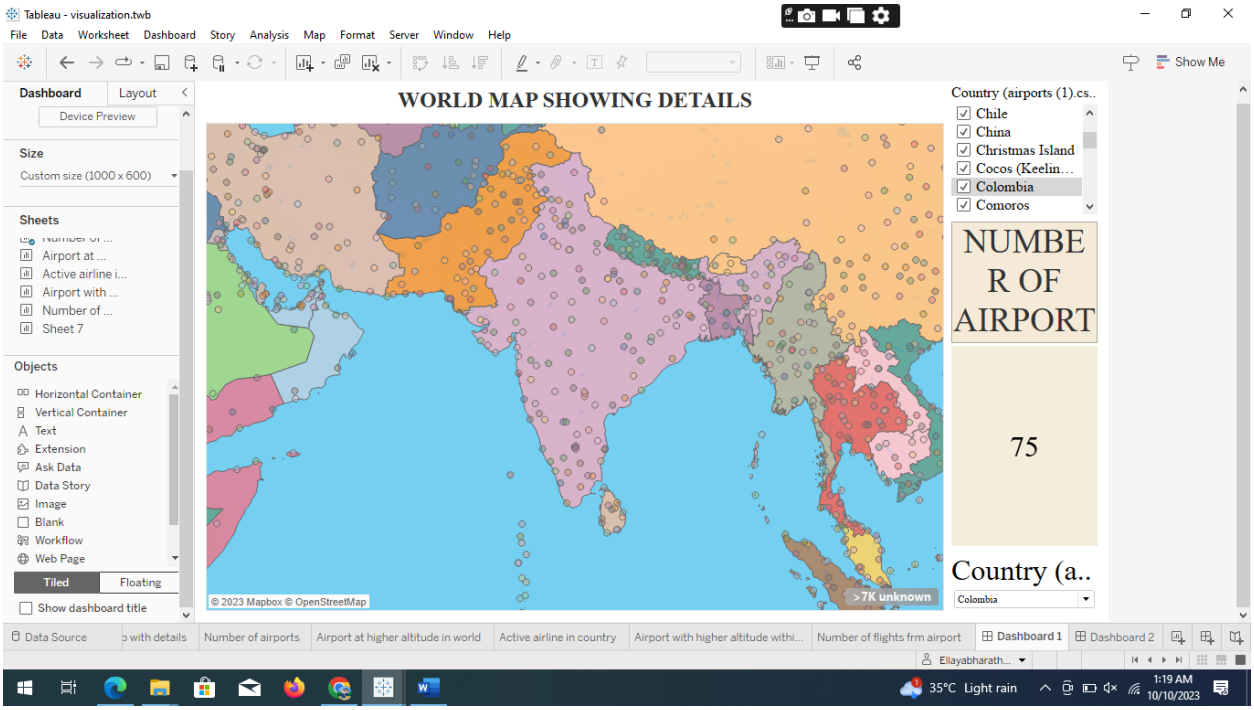


Tableau - visualization.twb
File Data Worksheet Dashboard Story Analysis Map Format Server Window Help
Dashboard
Layout
Device Preview
Size
Custom size (1000 x 600)
Sheets
Airport at ...
Active airline i...
Airport with ...
Number of ...
Sheet 7
Objects
Horizontal Container
Vertical Container
Text
Extension
Ask Data
Data Story
Image
Blank
Workflow
Web Page
Tiled
Floating
Show dashboard title
WORLD MAP SHOWING DETAILS
© 2023 Mapbox © OpenStreetMap
>7K unknown
Country (airports (1).cs..
Chile
China
Christmas Island
Cocos (Keelin...
Colombia
Comoros
NUMBER OF AIRPORT
75
Country (a..
Colombia
Data Source
Number of airports
Airport at higher altitude in world
Active airline in country
Airport with higher altitude withi...
Number of flights frm airport
Dashboard 1
Dashboard 2
35°C Light rain
1:19 AM
10/10/2023

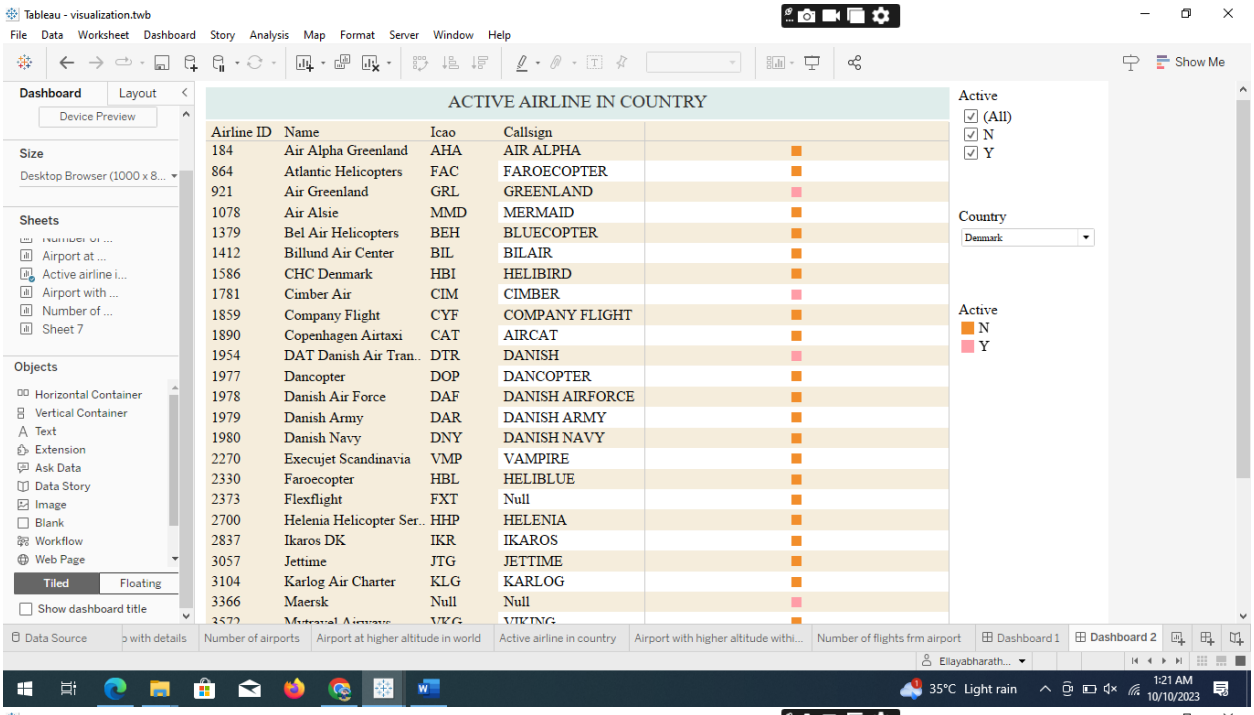


Tableau - visualization.twb
File Data Worksheet Dashboard Story Analysis Map Format Server Window Help
Show Me
Dashboard Layout
Device Preview
Size
Desktop Browser (1000 x 8...
Sheets
Airport at ...
Active airline i...
Airport with ...
Number of ...
Sheet 7
Objects
Horizontal Container
Vertical Container
Text
Extension
Ask Data
Data Story
Image
Blank
Workflow
Web Page
Tiled Floating
Show dashboard title
ACTIVE AIRLINE IN COUNTRY
Airline ID Name Icao Callsign
184 Air Alpha Greenland AHA AIR ALPHA
864 Atlantic Helicopters FAC FAROECOPTER
921 Air Greenland GRL GREENLAND
1078 Air Alsie MMD MERMAID
1379 Bel Air Helicopters BEH BLUECOPTER
1412 Billund Air Center BIL BILAIR
1586 CHC Denmark HBI HELIBIRD
1781 Cimber Air CIM CIMBER
1859 Company Flight CYF COMPANY FLIGHT
1890 Copenhagen Airtaxi CAT AIRCAT
1954 DAT Danish Air Tran.. DTR DANISH
1977 Dancopter DOP DANCOPTER
1978 Danish Air Force DAF DANISH AIRFORCE
1979 Danish Army DAR DANISH ARMY
1980 Danish Navy DNY DANISH NAVY
2270 Execujet Scandinavia VMP VAMPIRE
2330 Faroecopter HBL HELIBLUE
2373 Flexflight FXT Null
2700 Helenia Helicopter Ser.. HHP HELENIA
2837 Ikaros DK IKR IKAROS
3057 Jettime JTG JETTIME
3104 Karlog Air Charter KLG KARLOG
3366 Maersk Null Null
Active
(All)
N
Y
Country
Denmark
Active
N
Y
Data Source
Number of airports
Airport at higher altitude in world
Active airline in country
Airport with higher altitude withi...
Number of flights frm airport
Dashboard 1
Dashboard 2
35°C Light rain
1:21 AM
10/10/2023

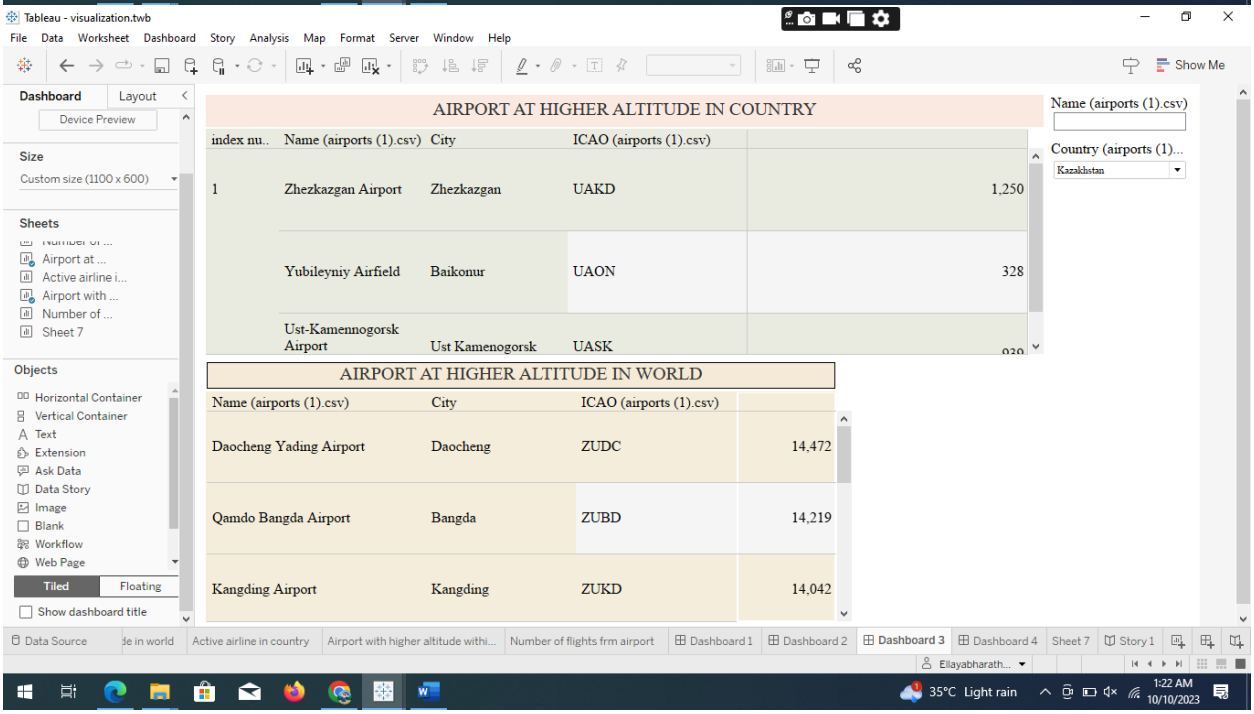
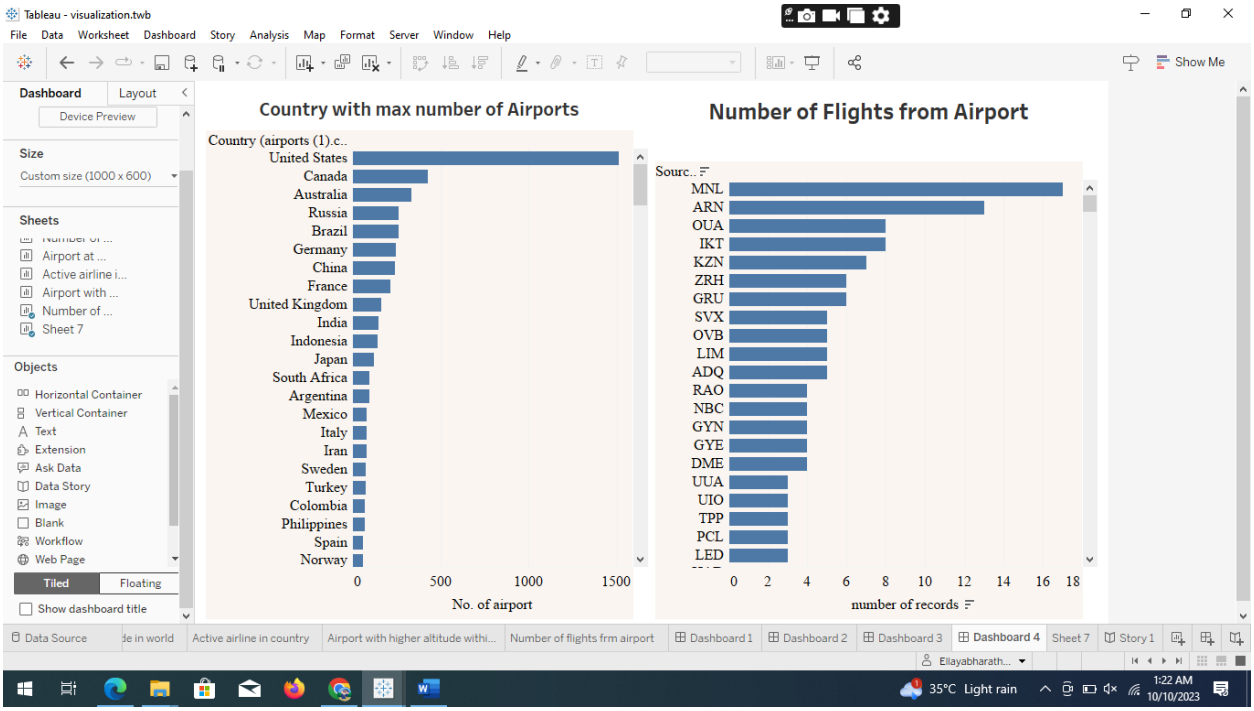
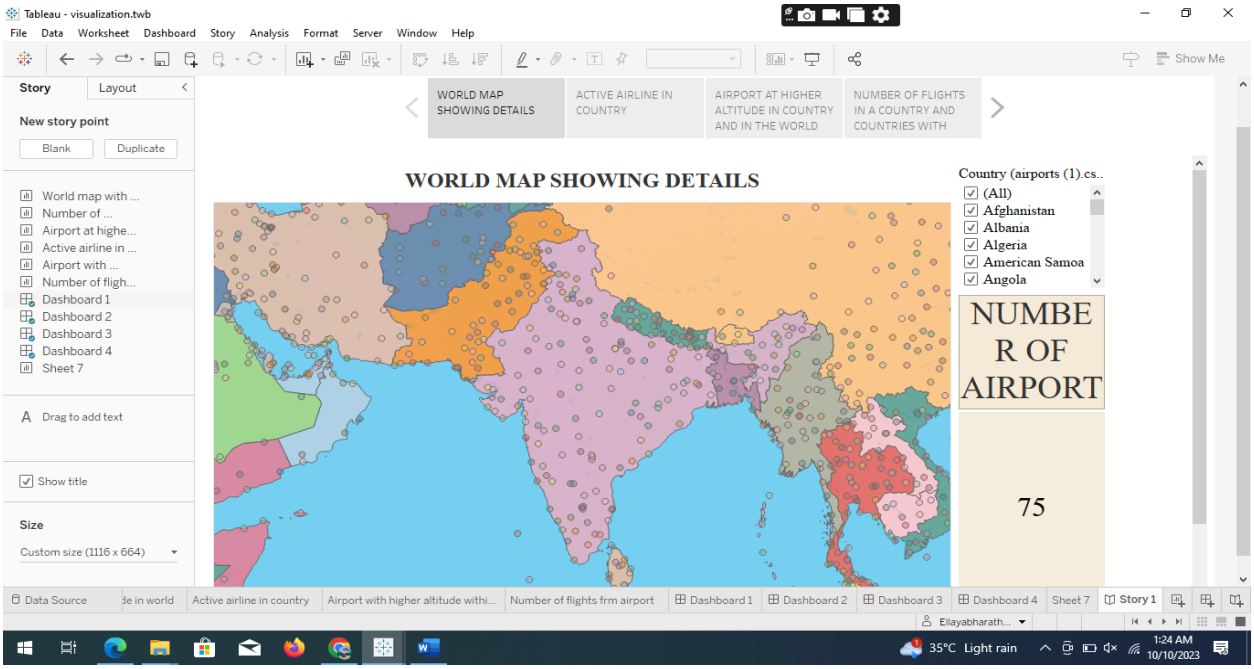


Tableau - visualization.twb
File Data Worksheet Dashboard Story Analysis Map Format Server Window Help
Show Me
Dashboard Layout
Device Preview
Size
Custom size (1100 x 600)
Sheets
Airport at ...
Active airline i...
Airport with ...
Number of ...
Sheet 7
Objects
Horizontal Container
Vertical Container
Text
Extension
Ask Data
Data Story
Image
Blank
Workflow
Web Page
Tiled Floating
Show dashboard title
AIRPORT AT HIGHER ALTITUDE IN COUNTRY
index nu.. Name (airports (1).csv) City ICAO (airports (1).csv)
1 Zhezkazgan Airport Zhezkazgan UAKD 1,250
Yubileyniy Airfield Baikonur UAON 328
Ust-Kamennogorsk Airport Ust Kamenogorsk UASK
AIRPORT AT HIGHER ALTITUDE IN WORLD
Name (airports (1).csv) City ICAO (airports (1).csv)
Daocheng Yading Airport Daocheng ZUDC 14,472
Qamdo Bangda Airport Bangda ZUBD 14,219
Kangding Airport Kangding ZUKD 14,042
Name (airports (1).csv)
Country (airports (1)...
Kazakhstan
Data Source
Active airline in country
Airport with higher altitude withi...
Number of flights frm airport
Dashboard 1
Dashboard 2
Dashboard 3
Dashboard 4
Sheet 7
Story 1
35°C Light rain
1:22 AM
10/10/2023



STORY



ADVANTAGES AND DISADVANTAGES:

- **Speed and Efficiency:** Air travel is the fastest mode of transportation, allowing for quick movement of people and good across the globe.

- **Global Connectivity:** Airports are present in nearly every corner of the world, facilitating global connectivity and trade.

- **Accessibility to Remote areas:** Air travel can reach remote and inaccessible regions, which can e crucial for medical emergencies, humanitarian aid, and economic development.

- **Tourism and Economy:** Air travel boosts tourism by making it easier for people to explore new destinations, thereby stimulating the local economy.

- **Time-saving:** Air travel saves time, especially for long-distance travel, compared to modes like road or sea transport.

- **Environmental Impact:** Aviation contributes significantly to greenhouse gas emissions, which contribute to climate change.

- **Cost:** Air travel can be expensive, limiting accessibility for some individuals and businesses.

- **Security Concerns:** Airports and aircraft are potential targets for terrorism , leading to increased security measures and potential travel disruptions.

- **Congestion:** Major airports and air routes can be become congested, leading to delays and reduced efficiency.

- **Dependency on Oil:** The aviation industry relies heavily on fossil fuels, making it vulnerable to oil price fluctuations and suppl disruptions.

Conclusion:

Unlocking insights into the Global Air Transportation network has revealed crucial findings. Firstly, it evident that air travel plays a pivotal role in connecting the world, fostering economic growth and enabling cultural exchange. The network resilience was tested during unforeseen challenges like COVID-19 pandemic, highlighting the need for adaptability and contingency planning.

FUTURE SCOPE:

- **Technology Advancements:** Continual advancements in aircraft design propulsion and automation will likely lead to more efficient and sustainable air travel.

- **Sustainability:** The industry is expected to focus on reducing its environmental impact through the use of cleaner fuel and more energy-efficient aircraft.

- **Regional Growth:** Emerging markets may experience increased air traffic, necessitating the expansion of airports and infrastructure.

- **Connectivity:** Enhanced connectivity and digitalization could improve passenger experience, with 5G and IoT playing a significant role.

- **Urban Air Mobility:** The rise of electric vertical takeoff and landing (eVTOL) aircraft may revolutionize short-distance urban transportation.

- **Regulation:** Governments and international bodies will play a vital role in shaping the future of air travel, including safety, emissions, and airspace management.

- **Pandemic Resilience:** Air transport may adapt to ensure resilience against future pandemics, possibly through improved sanitation and health protocols.

- **Space Travel:** Advancements in space tourism and transport could create new opportunities within the broader transportation network.