Project Documentation: Airport Traffic Analysis

The main objective of this project is to analyze historical airport traffic data to identify the busiest airports worldwide and understand traffic distribution across different countries. This analysis can help governments, aviation authorities, and airlines make informed decisions about infrastructure, resource allocation, and forecasting.

Dataset

- Source: Public datasets from Kaggle or Bureau of Transportation Statistics.
- Data Fields (examples):
    - Airport – Name of the airport
    - Country – Country where the airport is located
    - Total passengers – Number of passengers handled in a year

4. Methodology

1. Data Loading & Inspection
    - Used pandas to load and explore the dataset.
    - Checked basic statistics, missing values, and dataset structure.
2. Top Airports Analysis
    - Sorted airports by Total passengers.

    - Extracted the Top 10 busiest airports.
    - Visualized using a bar chart.
3. Country-wise Traffic Analysis
    - Grouped data by Country.
    - Aggregated passenger counts to find top traffic-contributing countries.
    - Visualized using a bar chart.

Challenges

Challenge 1: Missing Data

- Some columns had missing/null values.
- *Resolution*: Used df.isnull().sum() to detect and ensure analysis only used complete records.

Challenge 2: Large Range of Passenger Data

- Some airports had disproportionately high passenger counts, skewing results.
- *Resolution*: Focused only on Top 10 airports and countries for balanced visualization.

Challenge 3: Visualization Readability

- With the help of visualizations it becomes easy to analyse the data and retrieve meaningful insights from it.

Visualizations Used

1. Bar Chart – Top 10 Busiest Airports by Passenger Traffic
    - A bar chart was used to display the top 10 busiest airports based on the number of total passengers.
    - X-axis: Airport names
    - Y-axis: Total number of passengers
    - Purpose: To easily compare which airports handle the highest passenger traffic.

2. Bar Chart – Top 10 Countries by Total Airport Traffic
    - Another bar chart was used to show the top 10 countries with the highest total passengers (aggregated across all their airports).
    - X-axis: Country names
    - Y-axis: Total passengers
    - Purpose: To highlight the leading countries in terms of overall passenger traffic and compare their dominance globally.

3.Pie Chart – Share of Top 5 Countries

- Show percentage share of passenger traffic by top 5 countries.

4.Passenger Distribution (Histogram)

- Plot histogram of "Total passengers" to see how airports are distributed (are most small, or only few very large?).

7. Conclusion

This project successfully identified the busiest airports and top countries by passenger traffic.