Flight Delay Data Analysis Project ReadMe

Project Overview:

This project involves the analysis of flight delay data for U.S. airports and carriers from August 2013 to August 2023. The goal is to examine trends, identify causes of delays, and provide insights and strategic recommendations for operational improvements in the aviation industry.

Dataset Description:

The dataset includes detailed information on flight arrivals, delays, cancellations, and diversions, categorized by carriers and U.S. airports. Key metrics include the number of arriving flights, delays over 15 minutes, and breakdowns of delays attributed to carriers, weather, NAS, security, and late aircraft arrivals.

Files in the Repository:

- **Airline_Delay_Cause.csv**: Main dataset file containing flight delay data.
- **flight_delay_analysis.ipynb**: Jupyter notebook containing the data analysis.
- **Visuals Folder**: Contains all generated visualizations.
    - yearly_trends_flight_delays_cancellations_diversions.png
    - monthly_trends_flight_delays.png
    - year_on_year_changes_flight_delays_cancellations_diversions.png
    - breakdown_of_delay_causes_by_year.png

Key Analyses Conducted:

Trend Analysis: Investigating temporal trends in delays, cancellations, and diversions.
Root Cause Analysis: Identifying the main causes of delays.
Carrier and Airport-Specific Analysis: Assessing how different factors contribute to delays across various carriers and airports.

Visualizations:

Several visualizations are created to represent the data comprehensively:

- Yearly trends in delays, cancellations, and diversions.
- Monthly trends in flight delays.
- Year-on-year percentage changes in delays, cancellations, and diversions.
- Breakdown of delay causes by year.

Strategic Recommendations:

Based on the findings, strategic recommendations are provided to improve operational efficiency and customer experience in the aviation sector.

Usage Instructions:

- Ensure you have a Python environment with necessary libraries (Pandas, Matplotlib, Seaborn) for running the Jupyter notebook.
- The dataset can be explored and analyzed using the provided notebook, which contains detailed instructions and comments.

Contributors:

- Mohamad Chokr

Acknowledgements:

- Analysis and visualizations created using Python and associated data science libraries