README: Tableau Dashboards for Aircraft Purchase Decision

Project Overview

This project involves analyzing aviation data to create Tableau dashboards that assist in making informed decisions about purchasing aircraft. The dashboards are designed to provide insights into safety, performance, cost-effectiveness, and regional trends. The analysis is based on a dataset containing information about aviation incidents, including aircraft make and model, injury severity, weather conditions, and more.

Dataset Description

The dataset used for this project includes 79,906 rows and 26 columns. Key fields are:

- **Event Details**: Event.Id, Event.Date, Location, Country
- **Aircraft Specifications**: Make, Model, Number.of.Engines, Engine.Type
- **Incident Details**: Injury.Severity, Aircraft.damage, Weather.Condition, Broad.phase.of.flight
- **Operational Context**: Purpose.of.flight, Year

Dashboard Descriptions

1. Safety Dashboard

- **Objective**: Identify the safest aircraft models and environmental conditions for operations.
- **Plots**:
    1. **Incident Trends by Make and Model**:
        - X-axis: Year, Make, Model
        - Y-axis: Count of Event.Id
    2. **Severity Distribution**:
        - X-axis: Make, Model
        - Y-axis: Count of Event.Id (split by Injury.Severity)
    3. **Weather and Phase of Flight Analysis**:

        - X-axis: Weather.Condition
        - Y-axis: Count of Event.Id (split by Broad.phase.of.flight)

2. Performance Dashboard

- **Objective**: Evaluate the reliability of aircraft based on engine type and design.
- **Plots**:
    1. **Engine Type vs. Incidents**:
        - X-axis: Engine.Type
        - Y-axis: Count of Event.Id
    2. **Number of Engines and Incident Rates**:
        - X-axis: Number.of.Engines
        - Y-axis: Count of Event.Id
    3. **Reliable Models**:
        - X-axis: Make, Model
        - Y-axis: Percentage of incidents categorized by Injury.Severity

3. Cost-effectiveness Dashboard

- **Objective**: Identify aircraft that minimize operational risks and costs.
- **Plots**:
    1. **Damage Levels by Purpose of Flight**:
        - X-axis: Purpose.of.flight
        - Y-axis: Count of Event.Id (split by Aircraft.damage)
    2. **Aircraft Damage Correlation**:
        - X-axis: Aircraft.damage
        - Y-axis: Count of Event.Id (grouped by Make and Model)
    3. **Incident Types by Flight Purpose**:
        - X-axis: Purpose.of.flight
        - Y-axis: Count of Event.Id (split by Injury.Severity)

4. Regional Insights Dashboard

- **Objective**: Explore incident trends by geography.
- **Plots**:
    1. **Country-Level Incidents**:
        - X-axis: Country
        - Y-axis: Count of Event.Id
    2. **Top Locations with Most Incidents**:
        - X-axis: Location
        - Y-axis: Count of Event.Id (top 10 by frequency)
    3. **Yearly Incident Trends by Region**:
        - X-axis: Year
        - Y-axis: Count of Event.Id (split by Country)

Usage Instructions

1. **Prepare the Data**:
    - Import the CSV file (Cleaned_AviationData.csv) into Tableau.
    - Verify field types, especially for dates and numerical columns.
2. **Build Dashboards**:
    - Use the columns and rows outlined for each plot to create visualizations.
    - Add filters for Make, Model, Year, and Country to enhance interactivity.
3. **Interpret Results**:
    - Use the dashboards to identify trends, evaluate aircraft reliability, and assess geographical risks.

Key Insights

- Identify models with lower accident rates and damage levels.
- Understand environmental conditions linked to incidents.
- Compare regional trends to focus on safer operational areas.

CONCLUSION

The analysis of aviation event data reveals key trends that are essential for guiding the sales and marketing strategies of aircraft manufacturers. The following conclusions can be drawn:

1. Safety is a Top Priority: Manufactures should prioritize on aircraft with few accidents.
2. Technological Advancements Drive Sales: Modern aircraft equipped with advanced weather navigation and safety systems are better positioned in the market, especially under challenging conditions.
3. Customization for Purpose: Aircraft sales are heavily influenced by their purpose
4. Impact of Historical Trends: Certain manufacturers consistently exhibit strong performance and safety records, making them market leaders in specific segments.

RECOMMENDATIONS

1. Safety Enhancements:

Manufacturers should prioritize safety features for aircraft models associated with higher injury severity rates or damage.

Enhanced weather navigation systems could reduce incidents under Instrument Meteorological Conditions (IMC), which are linked to a higher number of accidents.

2. Data-Driven Design:

Aircraft manufacturers should use accident data to refine designs, focusing on reducing damage during critical phases of flight (e.g., cruise and approach).

Invest in technology that addresses recurring issues found in older models or designs with higher accident rates.

3. Targeted Marketing:

Focus on promoting models with excellent safety records for specific purposes of flight, such as commercial, recreational, or training purposes.

Emphasize models with proven durability and resilience in diverse weather conditions.

4. Regulatory Collaboration:

Collaborate with aviation authorities to establish stricter safety regulations for amateur-built aircraft, as these may exhibit a higher accident rate.

5. Customer Education:

Provide comprehensive training and support for operators of high-performance models to ensure optimal handling and maintenance.