Aircraft Risk Analysis

INTRODUCTION

In this project, we aim to evaluate the risk associated with different aircraft based on historical crash and incident data.

The goal is to create a **Risk Score** for each aircraft, allowing us to identify the **Top 100 Most Dangerous** and **Top 100 Safest** aircraft.

Aircraft safety is critical for operational, insurance, and maintenance decisions. However, raw incident data alone is difficult to interpret.

We need a **clear, data-driven method** to quantify and compare risk across aircraft models.

Business Context

Why this matters:

- **Safety Management**: Airlines and operators need to prioritize maintenance and training efforts based on aircraft risk.
- **Financial Impact**: Riskier aircraft could lead to higher insurance costs, operational restrictions, or reputation damage.
- **Fleet Decisions**: Helps guide purchase or retirement decisions for aircraft fleets.

Data Overview

Data was sourced from a Historical aircraft crash and incident dataset.

Key Fields:

- Identifier (Aircraft Name/Model)
- Flag (Data sufficiency indicator)
- Risk Score (Severity and Frequency based)

Ensured data quality through preprocessing and filtering.

Process Steps

Data Cleaning: Dropped missing and irrelevant rows.

Filtering: Focused on aircraft with a sufficient number events in the dataset(Flag).

Risk Scoring: Calculated based on event severity and frequency of injuries associated with each aircraft.

Selection: Top 100 Highest and Lowest Risk Scores.

Visualization: Built in Tableau (Separate sheets + dashboard).

Findings and Recommendations

Identified aircraft with consistently high risk.

Safest aircraft create operational benchmarks.

Recommendations:

- Put aircrafts with low sample data under review
- Prioritize audits for highest-risk models.
- Use risk data to negotiate better insurance terms.
- Monitor and benchmark safest models for best practices.

Limitations and Next Steps

Limitations:

- Small sample sizes for some models.
- Risk Score based only on historical data.

Future Improvements:

- Time-based risk trends.
- Predictive modeling (machine learning).
- Add maintenance and operational data sources.

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