Aircraft Risk Analysis & Business Recommendations

Low-Risk Aircraft for Strategic Investment

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Business Understanding

Objective:

The company is expanding into the aviation industry and needs data-driven insights to reduce risks in aircraft acquisition

Goal:

Determine the lowest-risk aircraft models for commercial and private operations.

Business Impact:

Informed decision-making to avoid costly aircraft with high incident rates.

Data Understanding

Data Sources:

National Transportation Safety Board -accident data from 1962 to 2023 about civil aviation accidents and incidents in the United States and international waters.

Key Features:

- Aircraft specifications (category,Make , Model)
- Incident and accident reports
- Operator information

- Aircraft type, manufacturer, date, capacity, usage type
- Number and severity of incidents
- Operational detail

Data Challenges

Missing values

Inconsistent formats

Need for merging multiple datasets

Data Challenges

Steps Taken:

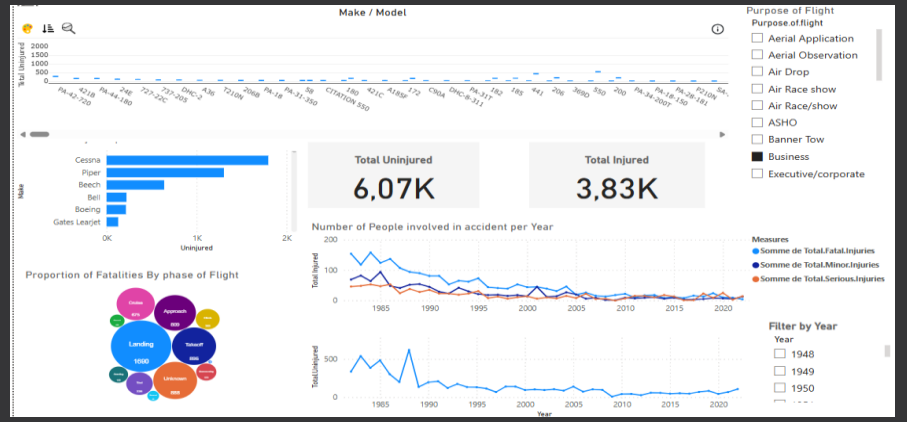
- Removed duplicates
- Handled missing values with mean/mode or domain-specific logic
- Standardized manufacturer names Severity, model numbers

Imputation Techniques:

- imputation for numerical features (Number of injuries ,uninjuries, engine)
- flagging for categorical fields
- Unknow string feacture

Outcome:

- Clean, unified dataset ready for analysis



Data Analysis

•**Risk Scoring Methodology**:

- Calculated incident rate per 1,000 flight hours
- Adjusted for aircraft age and usage intensity

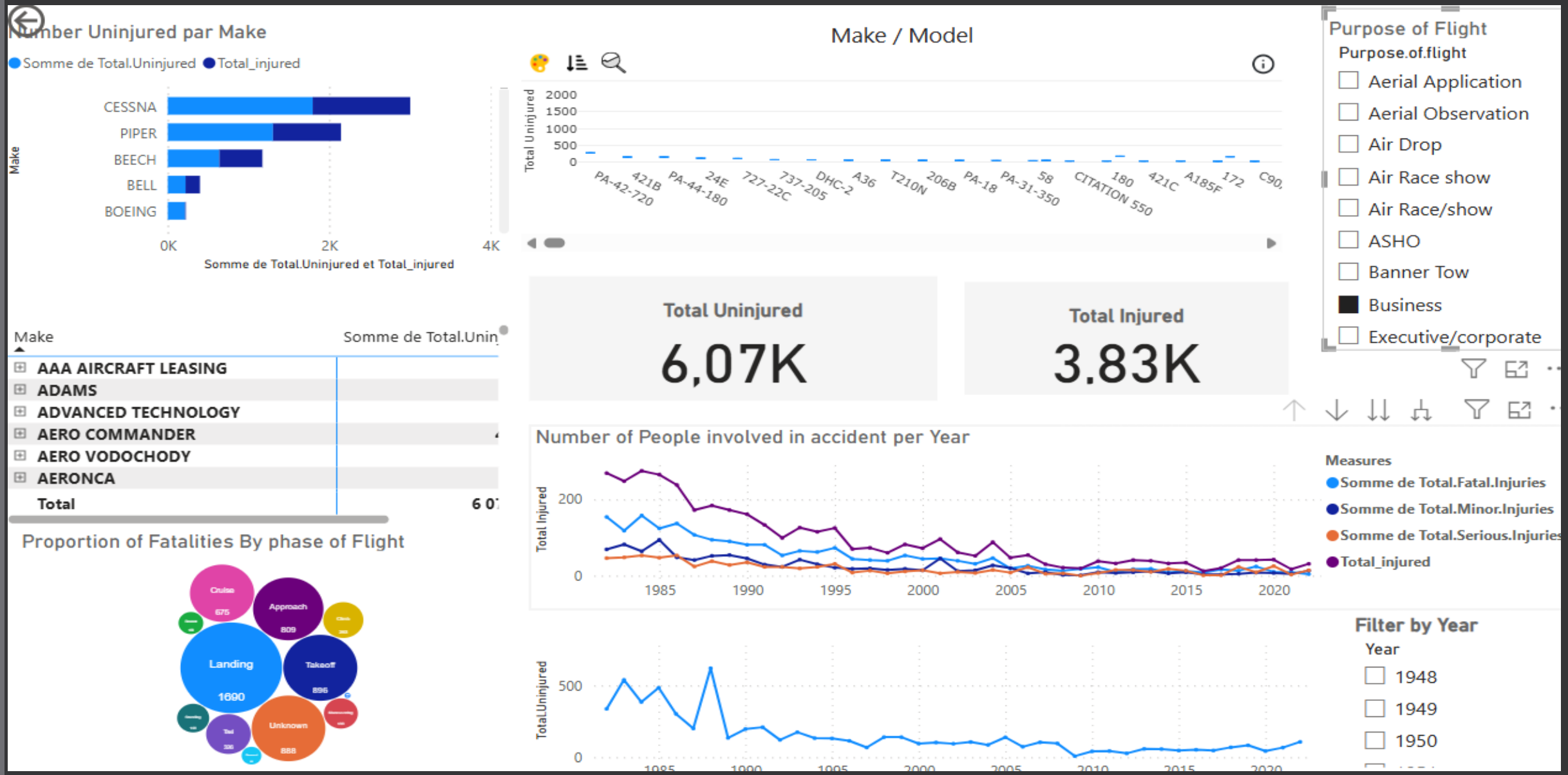
Insights:

- Certain manufacturers had consistently lower incident rates
- Newer aircraft models showed improved safety records

Visualization Preview:

- Bar chart: Incident rate by aircraft model
- Heatmap: Correlation between age and incident frequency

Data Analysis



Recommendations

Aircraft Models to the Company

Risk score for each aircraft model based on:

- Number of incidents or accidents (normalized per flight pupose and Event year
- Severity of incidents (Injured and Uninjured)
- Usage purpose of flight
- When calculated a normalized incident rate per Business purpose flight, adjusted for Event year. Aircraft in recent years were considered low-risk.”

Business Aircraft Risk Summary

Safest Models

- BOEING
- PIPER
- BELL
- BOEING

Higher Risk Models

- newer models proven safety records

Based on the frequency and severity of incidents, we recommend considering aircraft such as the Aircraft below which show low incident rates and minimal injury severity.

Next Steps

We recommend starting with 1–2 of the safest aircraft for a pilot program. This allows the company to enter the market with minimal operational risk, while gathering real-world data on costs and performance.

Thank You

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