Phase 1 Project : Aircraft Risk Analysis

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Figure: Aircraft Maintenance and Inspection

Overview

- ▶ Project goal: Analyze aircraft accident data to identify key patterns and insights.
- ▶ Focus on factors such as injury severity, aircraft damage, and accident causes.
- ▶ Provide actionable recommendations for improving aviation safety.

Business Understanding

- ▶ Understanding business needs:
- ▶ Addressing the need to reduce aircraft accidents and improve safety measures.
- ▶ Providing stakeholders with insights on trends and accident severity.

Data Understanding

- ▶ Dataset includes information on aircraft make, model, injuries, weather conditions, and more.
- ▶ We focus on analyzing injury severity and aircraft damage.
- ▶ Data spans multiple years, providing a comprehensive view of accident trends.
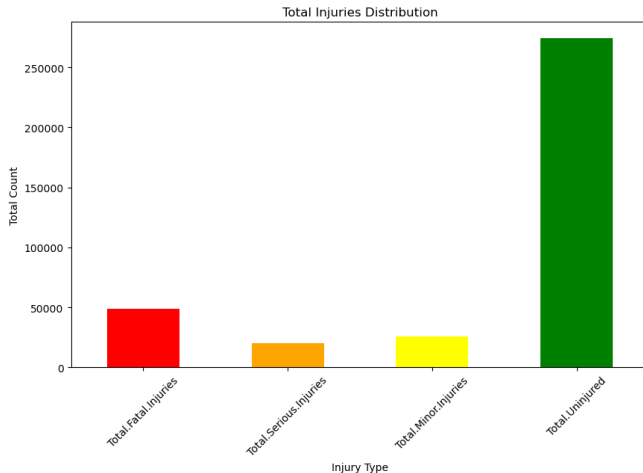
Distribution of Injuries

Figure: Bar plot showing the distribution of injuries: Fatal, Serious, Minor, and Uninjured. The plot illustrates the most frequent injury types from the dataset.

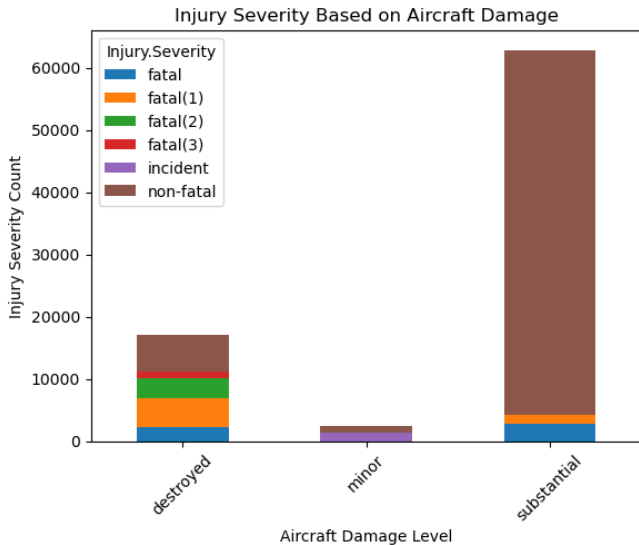# Injury Severity Based on Aircraft Damage

Figure: Injury severity in relation to aircraft damage. The chart shows
that the fatality rate increases with the severity of aircraft damage.

Explanation: From this bar chart, we observe that the fatality rate increases significantly in cases of severe aircraft damage, suggesting a correlation between the extent of damage and the likelihood of fatal injuries.
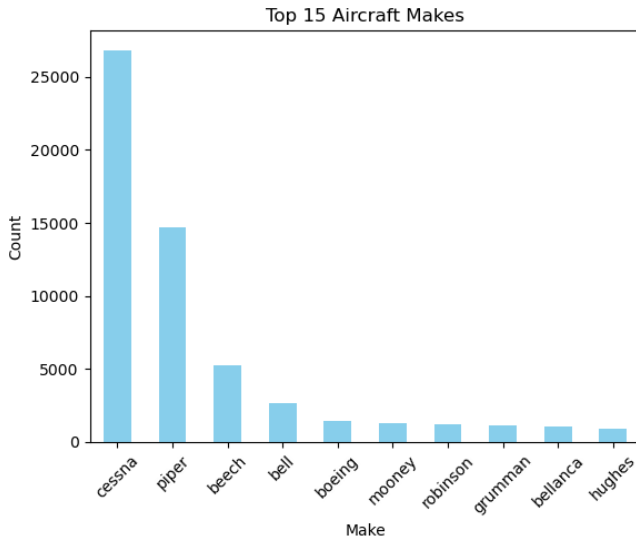
Top 20 Aircraft Makes

Figure: Top 20 aircraft makes with the highest counts in the dataset.

Explanation: This bar plot highlights the most frequently occurring aircraft makes, including Cessna, Piper, Beech, and Bell. These makes have the highest representation in the dataset, which could imply their popularity or higher involvement in accidents.
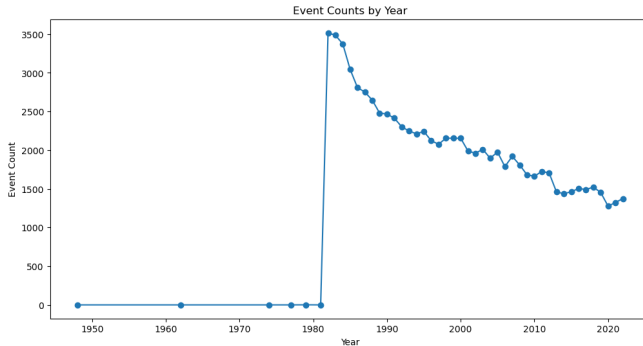
Time-Based Analysis of Accidents

Figure: The number of accidents over time. The plot shows an increase in accident frequency after 1980.

Explanation: This analysis indicates a significant rise in the number of accidents starting from 1980. It may be worthwhile to explore factors such as technological advancements, air traffic volume, or regulatory changes that contributed to this trend.
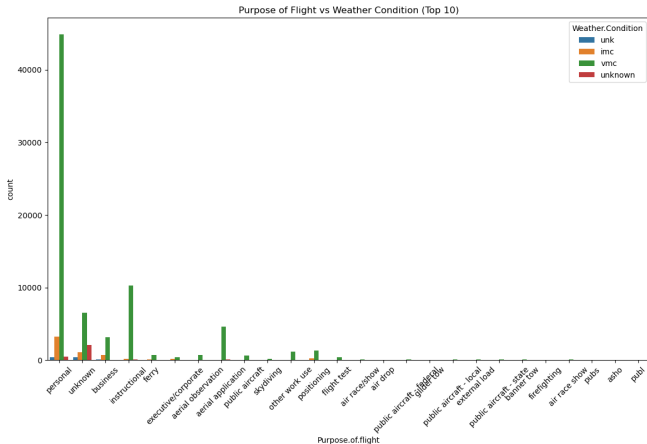
Purpose of Flight vs Weather Condition

Figure: The correlation between the purpose of flight and weather condition. The plot suggests that flights for personal and business purposes are common across all weather conditions.

Explanation: This chart illustrates that the majority of flights, whether for personal, business, or instructional purposes, are not highly dependent on weather conditions. However, flights for ferry purposes seem more likely to occur under favorable weather conditions.

Recommendations

- ▶ Given the high fatality rates in accidents with severe aircraft damage, safety measures should be prioritized during aircraft maintenance and inspections.
- ▶ Further analysis on the correlation between aircraft make and accident severity could help identify specific manufacturers that might need attention in terms of safety features.
- ▶ More stringent weather condition assessments should be implemented for flights, especially for those under business and personal purposes, as these flights appear to happen under varied weather conditions.

Next Steps

▶ Continue investigating other potential factors contributing to the rising trend in accidents after 1980.

▶ Conduct a more detailed analysis on aircraft models and manufacturers to identify safety patterns.

▶ Implement further predictive modeling to foresee potential accidents based on historical data.

Interactive Dashboard

▶ The interaction between various variables has been analyzed using Tableau.

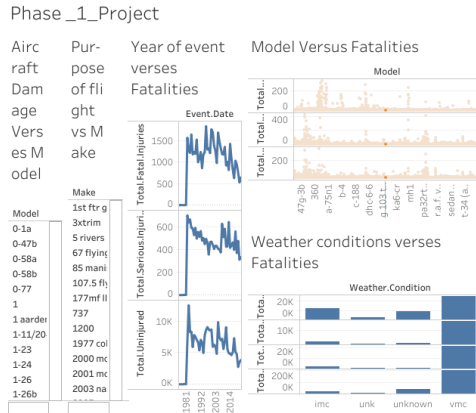▶ The interaction plots of different variables is as in the figure:

Figure: Interactive Dashboard Plots

Interactive Dashboard Explanations

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https://public.tableau.com/app/profile/alice.muia/
viz/Phase1projectTableauAnalysis/Phase_1_Project?
publish=yes
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Thank You

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Questions?