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Aviation Accident Risk Analysis

Overview

This project analyzes aviation accident data to help stakeholders within a company identify the safest types of aircraft for potential investment. The analysis explores patterns in accident severity, aircraft damage, and flight phases, providing data-driven recommendations for minimizing fatal risk.

Business Understanding

The company is expanding into the aviation industry and needs to understand the risks associated with different types of aircraft and conditions to make informed purchasing decisions.

Stakeholder

The primary stakeholder is the Head of the Aviation Division, who will use this analysis to guide investment decisions.

Key Business Questions

- What types of accidents are most likely to be fatal?
- Which aircraft damage types or flight phases are associated with fatalities?
- How have fatal accidents changed over time?

Data Understanding and Analysis

Source of Data

- **Dataset:** National Transportation Safety Board (NTSB) Aviation Accident Database
- **Files Used:**
 - AviationData.csv
 - USState_Codes.csv

Description of Data

The dataset includes:

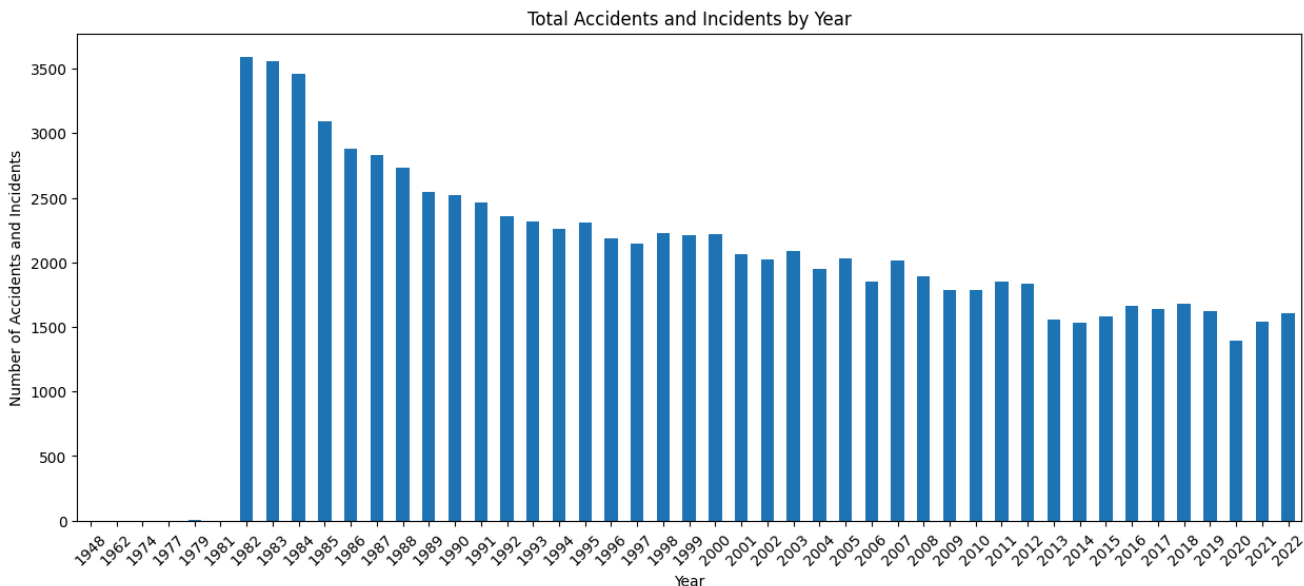
- Event details (date, location, phase of flight)
- Aircraft information (type, damage, engines)
- Injury counts (fatal, serious, minor)
- Environmental conditions (weather)
- ~88,000 accident records spanning from 1962 to 2023

Visualizations

1. Fatal Accidents Over Time

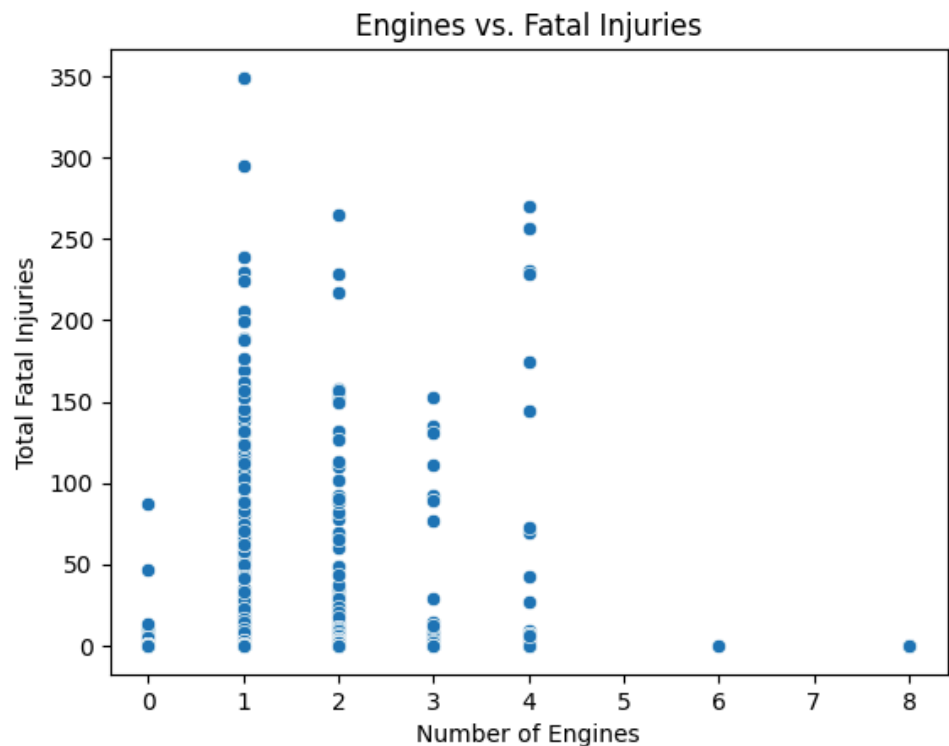
Line chart of number of fatal accidents per year

Fatal accidents have generally decreased over the decades, especially after 2000.



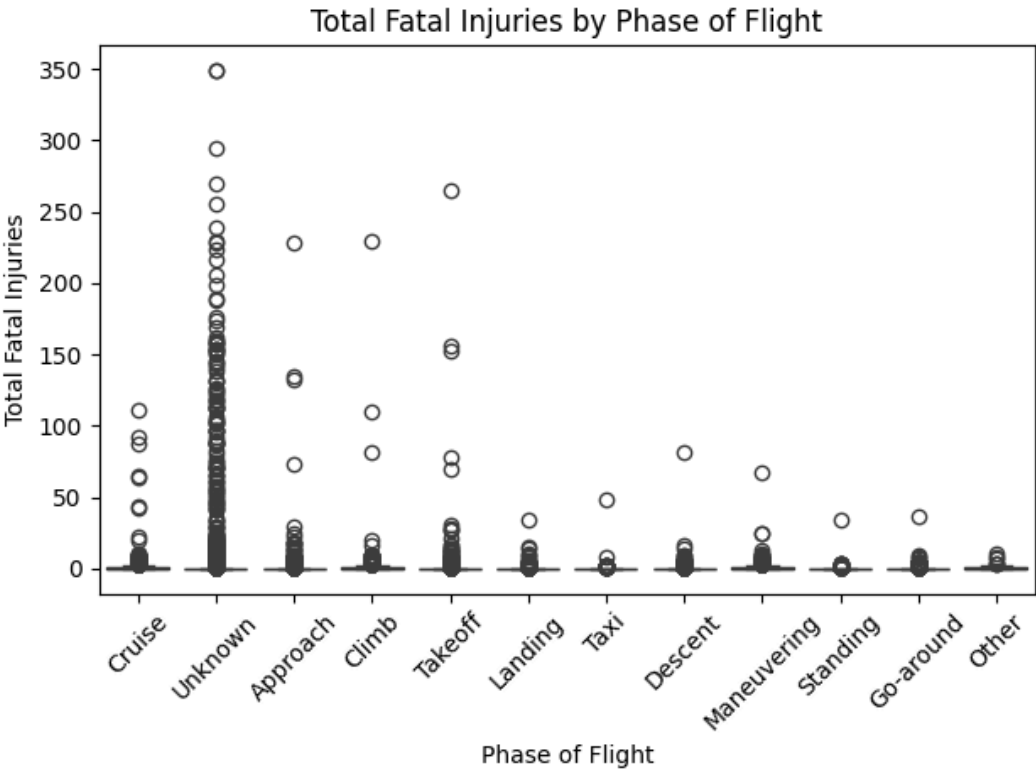
2. Engine types vs. Fatal Accidents

Scatterplot comparing engine types with fatality counts
Substantial and destroyed engine damage are most commonly linked to fatal outcomes.



3. Phase of Flight vs. Fatal Risk

Box plot of flight phases vs. fatal accident ratio
Takeoff and landing phases have the highest proportion of fatal accidents.



Conclusion

Summary of Key Findings

- **Aircraft Damage:** Fatalities are strongly associated with substantial or destroyed damage.
- **Flight Phases:** Takeoff, en-route, and landing are the most critical phases for fatal risks.
- **Trend Over Time:** Overall aviation accidents, especially fatal ones, have declined over the last two

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