

Aviation Analysis

NON TECHNICAL PRESENTATION

Overview

- ▶ The Purpose of this project is to identify low-risk aircraft suitable for initial investment in both commercial and private aviation operations. Aircraft accident and incident history is used as a proxy for operational, safety and financial risk.

Business Understanding

- ▶ Fleet acquisition decisions in aviation carry high financial and safety risks. Without data-driven evaluation, organizations risk investing in aircraft with poor safety records, higher accident rates, and unreliable operational performance.
- ▶ The final goal is to support the head of Fleet Planning and Management data-driven fleet acquisition decisions that minimize risk while ensuring scalability and reliability.
- ▶ Business questions:
 - Which aircraft types present the lowest safety risk for initial investment
 - How does risk vary by purpose of flight
 - Which aircraft combine high operational usage with low injury severity

Data Understanding

- ▶ The dataset consists of historical aviation accident and incident records collected over several decades. It includes over 90,000 observations covering multiple aircraft types and operational purposes, making it suitable for safety and risk analysis.
- ▶ Each record in the dataset represents a single accident or incident. This means aircraft with high operational usage appear more frequently, which reflects exposure rather than poor safety performance.

Data Understanding

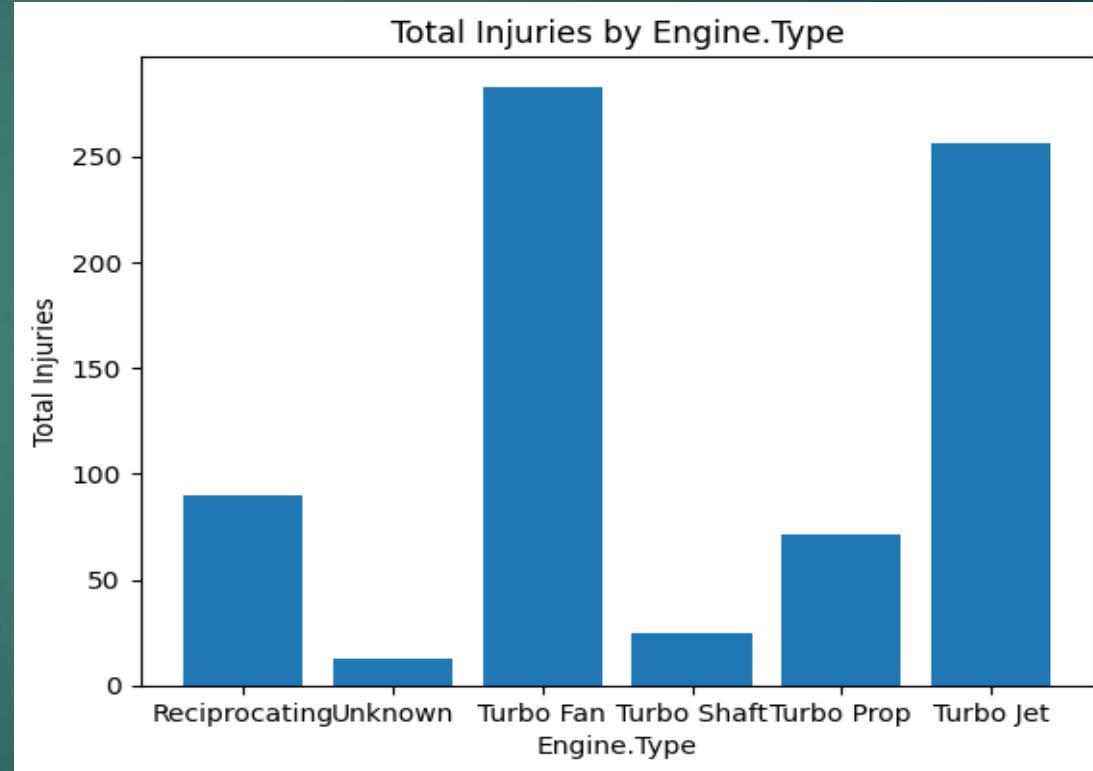
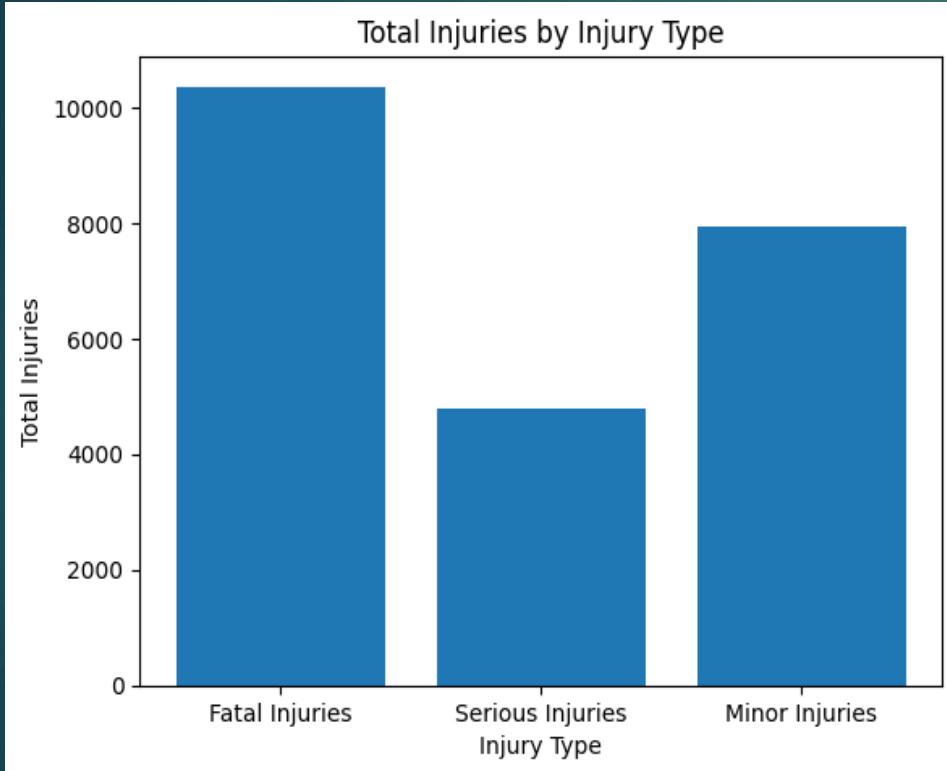
Variable	Description
Make/Model	Aircraft identification
Purpose of Flight	Operational context
Total Fatal Injuries	Catastrophic outcomes
Total Serious/Minor Injuries	Severity and survivability
Number of Engines	Operational redundancy

The above variables were selected because they directly relate to operational safety, severity of outcomes, and financial risk

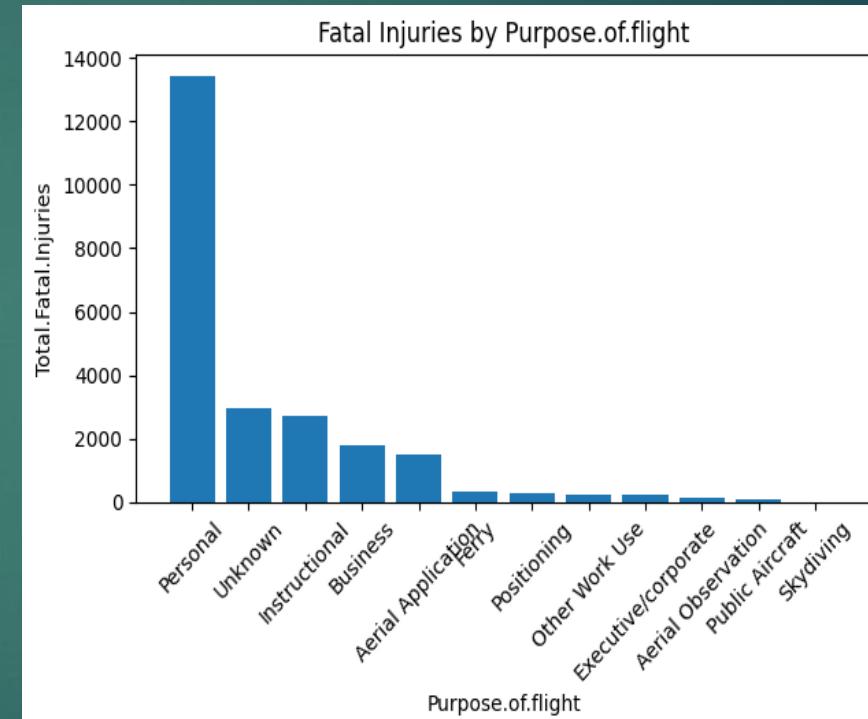
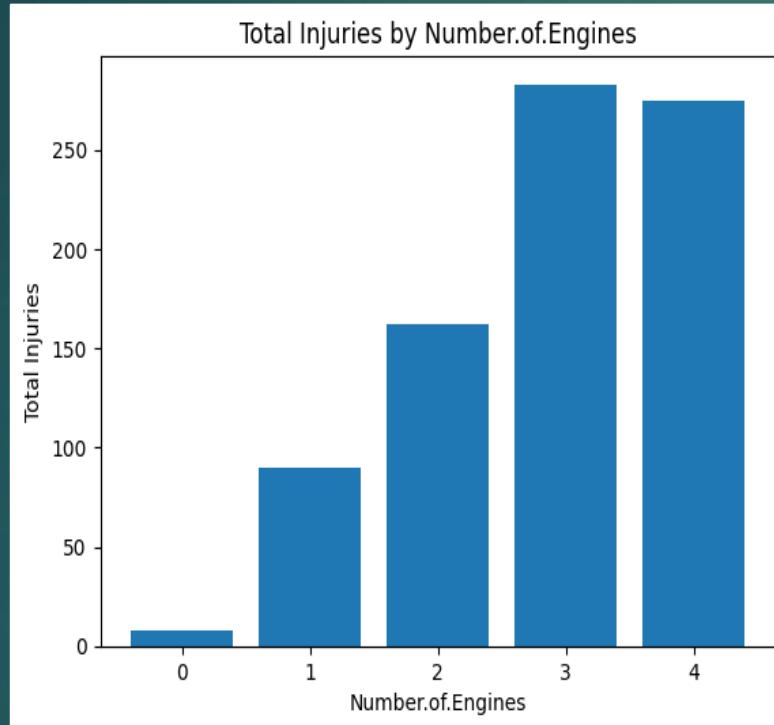
DATA ANALYSIS

- ▶ Before analysis, the data was cleaned to ensure consistency. Missing values were replaced to better capture risk
- ▶ Despite its limitations, the dataset is well-suited for comparative risk analysis across aircraft types and operational categories.

VISUALIZATIONS



VISUALIZATION (Continuation)



Findings

- ▶ Fatal injuries are the most common and highest severity outcome.
- ▶ Turbojet engines are associated with higher total injuries compared to piston engines.
- ▶ More engines correlate with higher total injuries.
- ▶ Personal flights account for the highest number of fatal and total injuries, suggesting elevated risk in private aviation.
- ▶ Certain models (e.g., Cessna 152, 172N, Piper PA-12, PA-18) show consistently low average injuries, making them strong candidates for low-risk classification.

RECOMMENDATIONS

- ▶ For Commercial/Public Aviation: Cessna 152 and 172N the aircrafts present low fatal accident rates, proven reliability, scalable for training and commercial operations.
- ▶ For Private Aviation: Piper PA-12-115 and Piper PA-18 because they present lower fatal accident history and strong private aviation track record.

Next Steps

- ▶ Expand dataset to include maintenance costs, operational efficiency, and insurance claims.
- ▶ Build a fleet acquisition dashboard for ongoing monitoring and decision support.

Questions and Answers

THANK YOU

