



RISK ANALYSIS FOR DIVERSIFICATION IN THE AVIATION DIVISION

*Risk Analysis and Evaluation to sustain
diversification in the Aviation Division for
KOJ And Associates*

20th September, 2024

BUSINESS OBJECTIVE

The objective of this project is to facilitate KOJ And Associates entry into aviation division by identifying aircrafts with minimal risk for both commercial and private operations.

Through analysis of Aviation Data from the year 1948-2022, this projet's deliverables will be useful for recommendations on aircrafts' purchases having the lowest risk for the company to start the new business endeavor.

PRIMARY OBJECTIVES



- *Analyzing and evaluating aircrafts with the lowest risks based on historical accident data to ensure passengers are safe and the company's operations are fluid and not halted. This analysis will be useful for the company's new aviation division that focuses on operating aircrafts for commercial and private enterprise.*

SECONDARY OBJECTIVES



- *Analyzing accident trends and causes for different aircrafts to identify patterns of risk factors such as broad phase of flight and aircraft model to help the company understand key drivers of aircraft accidents.*
- *Evaluating safety performance of aircrafts in commercial and private operations providing recommendations best suited for the enterprise operations.*

METHODOLOGY

DATA CLEANING



- *Removing duplicated records from the Accident dataset(1948-2022) and standardizing the data formats for uniformity.*
- *Data cleaning corrects errors, inconsistencies and inaccuracies in datasets to improve the quality of the data for analysis.*

DATA ANALYSIS AND VISUALIZATION

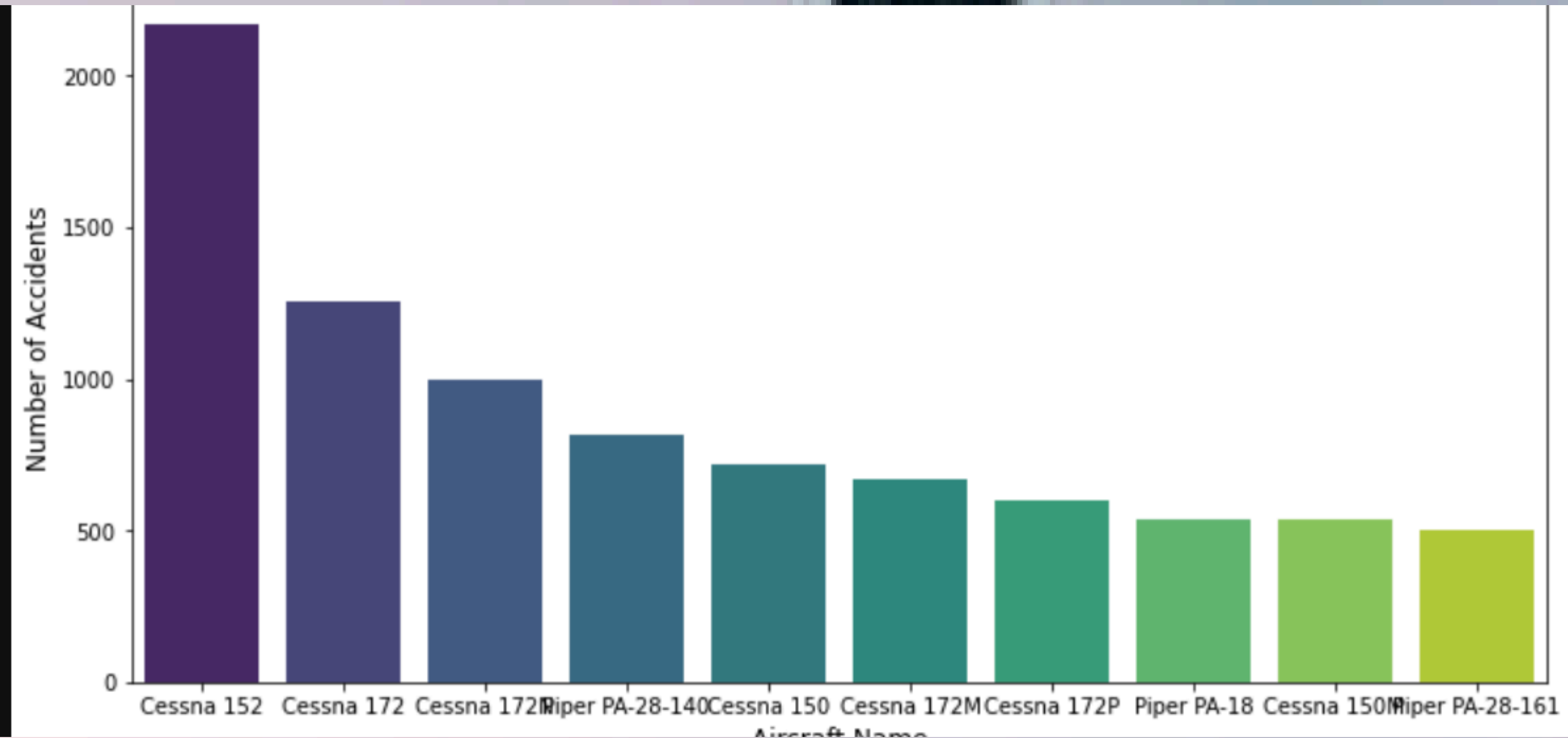
- *Performing Exploratory Data Analysis (EDA) to understand accident distributions.*
- *Using statistical methods to evaluate correlations between aircraft make and model, weather, accident frequency, injury severity, broad phase of flight and purpose of flight.*

EXPLORATORY DATA ANALYSIS(EDA)

• ANALYSING ACCIDENT FREQUENCY BY AIRCRAFT NAME

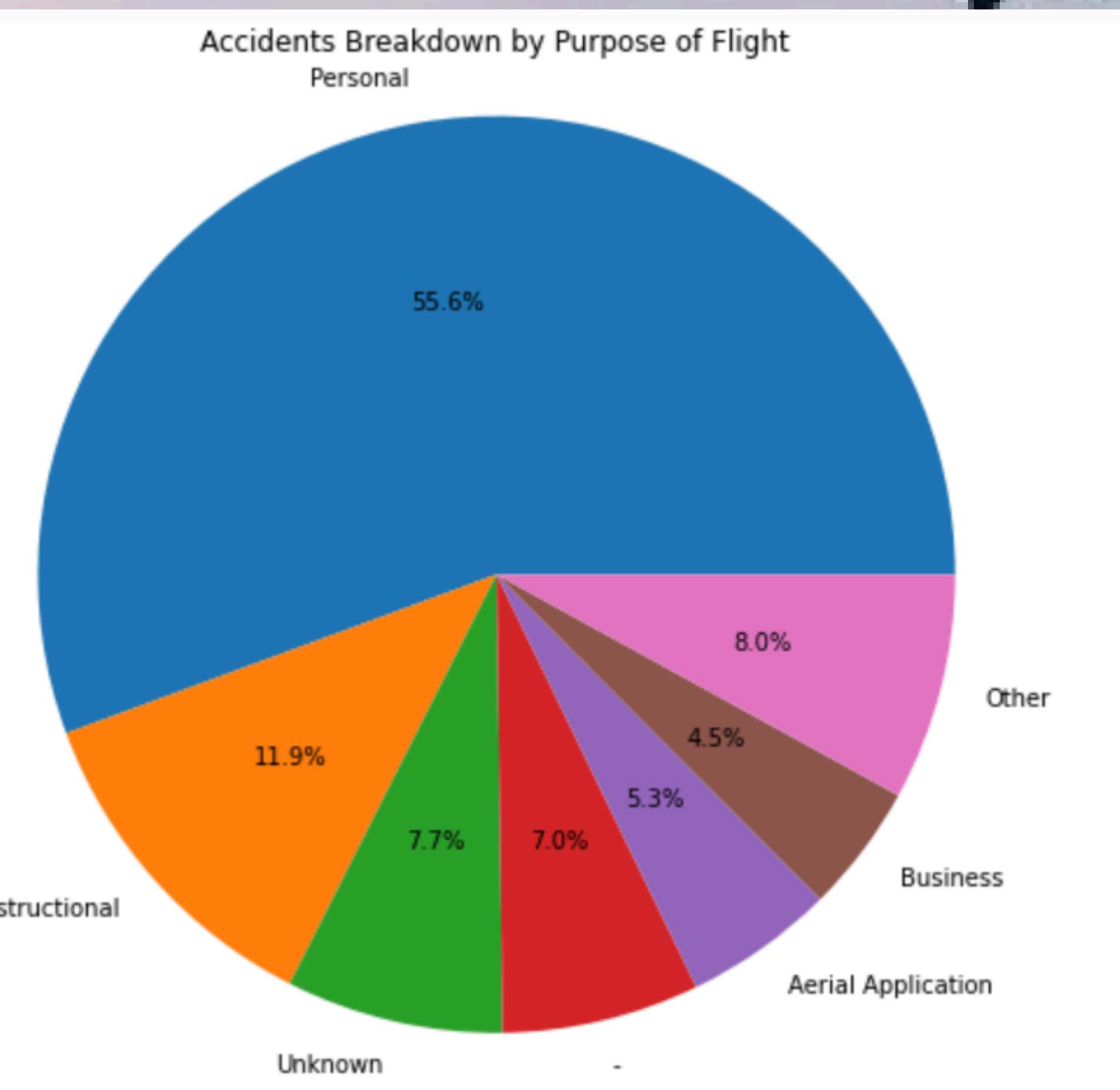
Grouping information from the data frame by make and model is a fundamental step in to understand how different aircraft models and makes are associated with accident occurrences.

TOP 10 AIRCRAFTS BY ACCIDENT FREQUENCY



- Cessna 152 and Cessna 172 from the graph indicates that these models have the highest accident rates compared to Cessna 150M and Piper PA-28-161.
- The difference in accident rates between these models suggests that factors such as model and make play a critical role in deciding on aircrafts to purchase.

• ***ANALYZING HOW PURPOSE OF FLIGHT INFLUENCES AIRCRAFT ACCIDENTS***



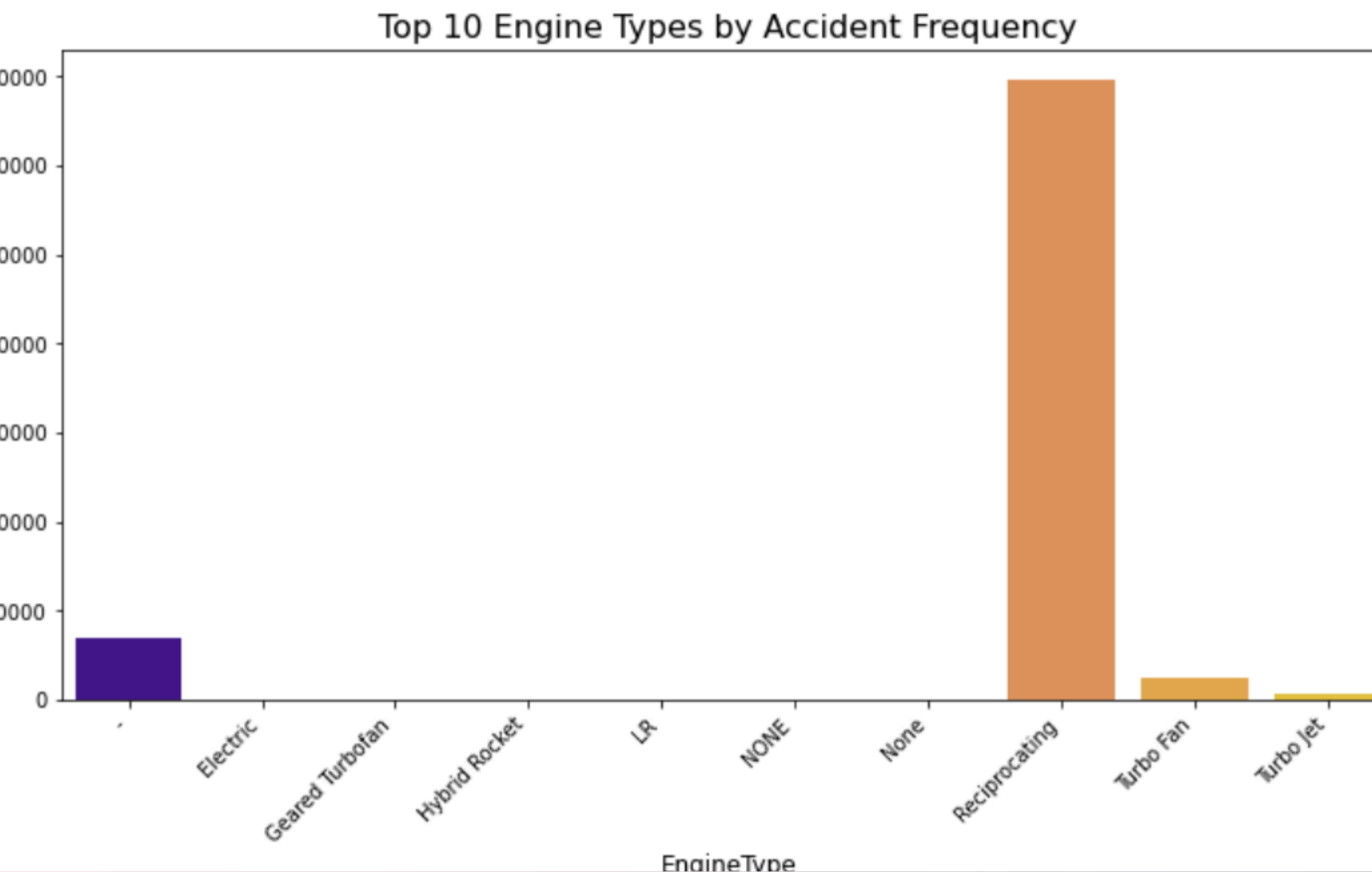
From the pie chart;

- ***Purpose of flight (55.6%)*** represents the primary purpose of flight which accounts for the majority of accidents. It suggests that this category of flights experiences a higher accident rate, either because it has the highest number of flights or because of inherent risks associated with this purpose.
- ***Business/Commercial(4.5%)*** represents minor contributors to the accident count, which could reflect special purposes like military, medical, cargo/freight and chartered flights which have fewer total flights and correspondingly fewer accidents.



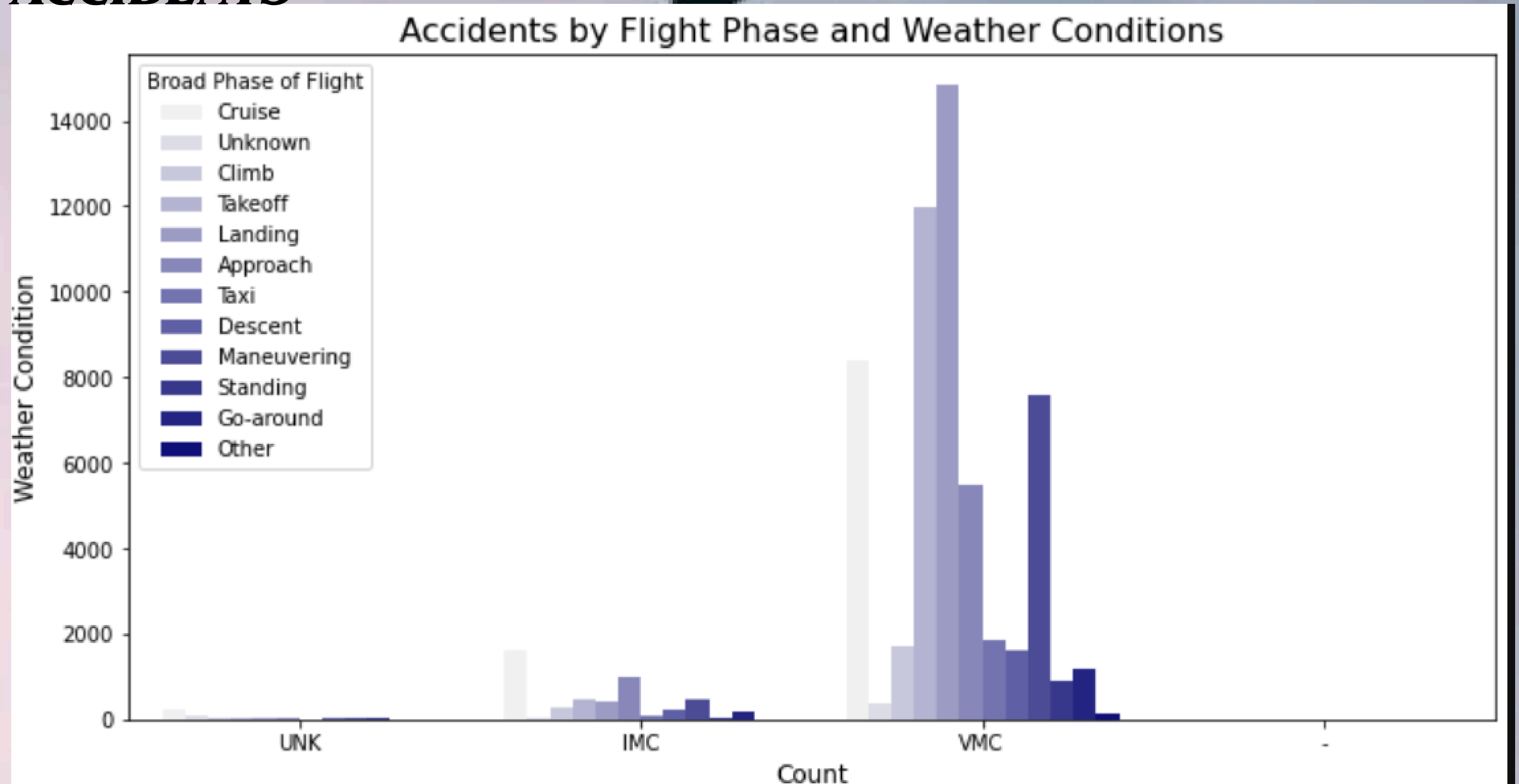
INVESTIGATING THE CORRELATION BETWEEN ENGINE TYPES AND AIRCRAFT ACCIDENTS

- *Exploring the relationship between different engine types and with aircraft accidents. By analyzing data on engine failures and incidents, we aim to uncover patterns that highlight which engines more prone to contributing to accidents. This analysis will help inform aircraft engines to invest in safety measures and improvements design and maintenance.*



- *Geared turbofan engines, which dominate the commercial aviation market show lower accident rates. This can be attributed to enhanced safety protocols, better maintenance practices and the rigorous oversight with commercial operations. Understanding these distinctions is crucial for evaluating the safety landscape in*

EXAMINING HOW THE FLIGHT PHASES, WEATHER CONDITIONS AND AIRCRAFT ACCIDENTS ARE RELATED TO AIRCRAFT ACCIDENTS



- *The above analysis shows a clear relationship between various phases of flight and aircraft accidents. By identifying which phases are more prone to accidents as from the graph, landing and takeoff, the investor in the aviation division can implement targeted safety measures and improve pilot training ultimately enhancing overall aviation safety for both commercial and private operations.*
- *Further analysis could involve exploring additional factors such as weather conditions to gain a more comprehensive understanding of the data. Among the various phases of flight, landing, takeoff and cruise are the most significantly impacted by adverse weather conditions.*

RECOMMENDATIONS



From the above analysis and visulizations;

Prioritizing models with lower accident rates:

- The Cessna 152 and Cessna 172 show higher accident rates compared to the Cessna 150M and Piper PA-28-161. This suggests that when considering aircraft for purchase, it would be prudent to focus on models with lower accident rates such as the Cessna 150M or Piper PA-28-161. These aircraft models from the above analysis have better safety records and align with a strategy focused on minimizing risk.*

Considering Usage Patterns



- *From the indications above, personal purpose of flight category is responsible for 55.6% of accidents, highlighting a greater risk associated with non-commercial operations. In contrast, commercial flights account for only 4.5% of accident occurrences. This suggests that business and commercial operations such as cargo, medical or charter flights will highly provide a safer environment potentially because of tight regulations, improved maintenance practices or a lower overall volume of flights.*
- *Therefore, considering an expansion into business or commercial aviation, particularly in specialized operations represent a more secure investment opportunity.*

Investing in aircraft with safer engine types

- Analysis of engine types has revealed that Geared Turbofan engines, widely used in commercial aviation, have significantly lower accident rates due to superior safety measures and strict regulatory oversight. In contrast, Reciprocating and Turbo Shaft engines are associated with higher accident rates.*
- Therefore, investing in aircraft that utilize geared turbofan engines, known for their reliability is likely to minimize operational risks and promote a safety-first approach.*
- Companies that prioritize and have demonstrated a commitment to enhancing aircraft safety through engine technology advancements, stringent maintenance protocols and comprehensive safety measures should be the primary targets for investment. Focusing on aircraft with lower accident rates and those with better safety records will help ensure the long-term success of the aviation division.*

CONCLUSION



- *These findings outline the importance of a holistic approach to aviation safety, where data-driven insights can inform better decision-making, improve operational protocols, and ultimately reduce the incidence of accidents in the aviation industry.*
- *By implementing targeted strategies based on these analyses, stakeholders can foster a safer flying environment.*



THANK YOU!

Please feel free to ask any questions!

I'm happy to discuss any details or clarify insights further.



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