AIRCRAFT ACCIDENT ANALYSIS

MORINGA SCHOOL

DATA SCIENCE

PHASE 1 PROJECT

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INTRODUCTION

This project provides analysis on the Aviation Accident data as provided by the U.S National Transportation Safety Board(NTSB). The project aims to give recommendation to a client seeking to expand into the aviation Industry with no knowledge of risks involved in aviation.

OBJECTIVES

The project seeks to answer:

- Which aircrafts has the highest and lowest accidents, injuries and fatalities?
- Does number of engines in an aircraft impact accidents?
- Which aircrafts are best used for private and commercial flights?
- How have accident trends changed overtime?

DATA SOURCE

- The project relies of data from the U.S National Transportation Safety Board(NTSB).
- Time span: 1948-2022
- Key columns:
  - Fatalities
  - injuries
  - uninjured
  - event date
  - Aircraft types
  - Make
  - Number of Engines

METHODOLOGY

1. Data Collection from Kaggle and exploration.
2. Data Cleaning.
3. Exploratory Data Analysis and visualisations.
4. Create interactive dashboard on Tableau.

1. Data Collection from Kaggle and exploration

- The aviation dataset contains a mix of numerical and categorical data relating to the aviation accidents.
- The data has no duplicated values but has a lot of missing values in some columns hence it needed some cleaning.

2. Data Cleaning.

Key actions included in this section were:

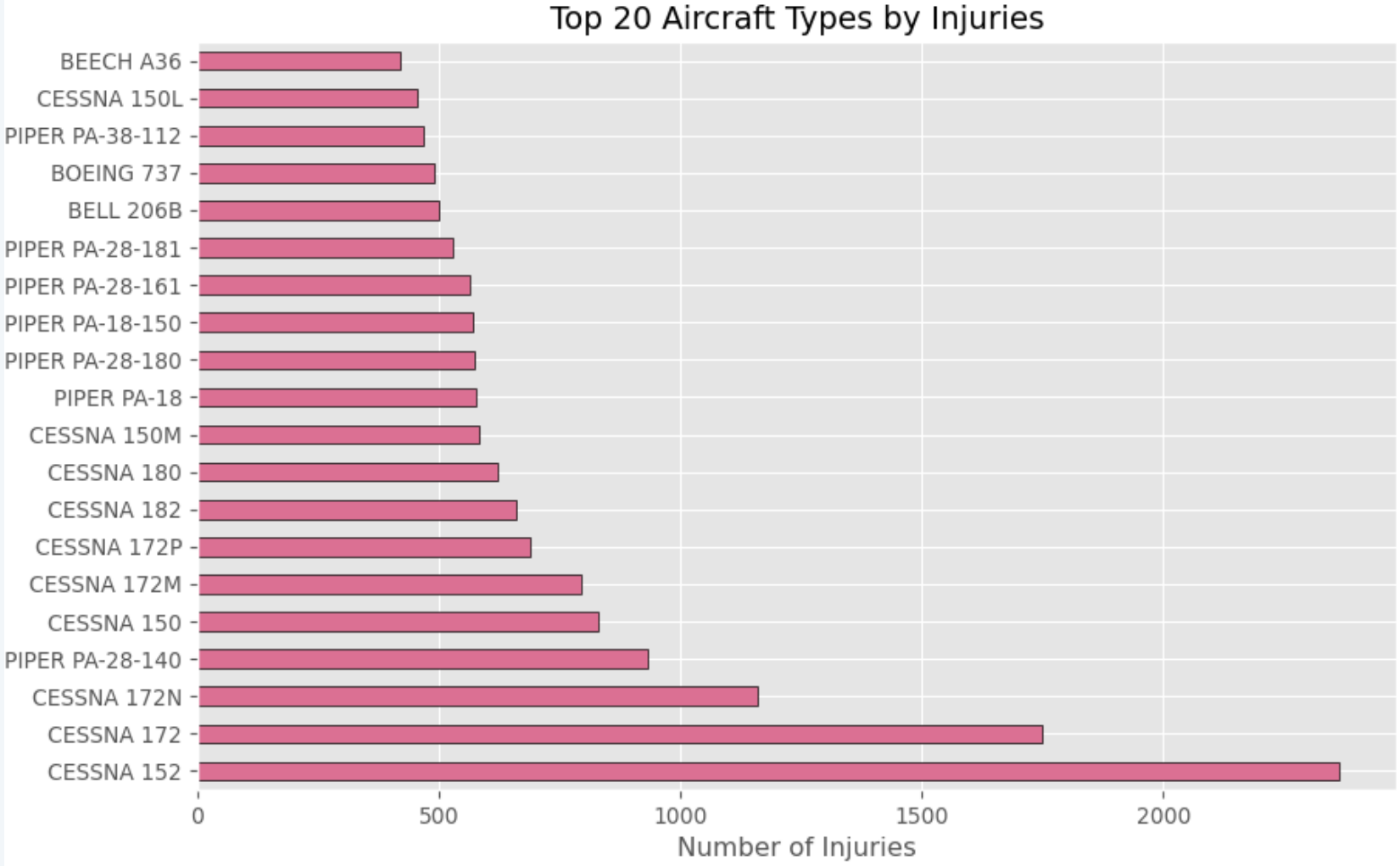
- Standardizing column names
- Dealing with missing values
- Deriving columns needed for further analysis
- Removing irrelevant columns

3. Exploratory Data Analysis and Visualisation.

Focus areas:

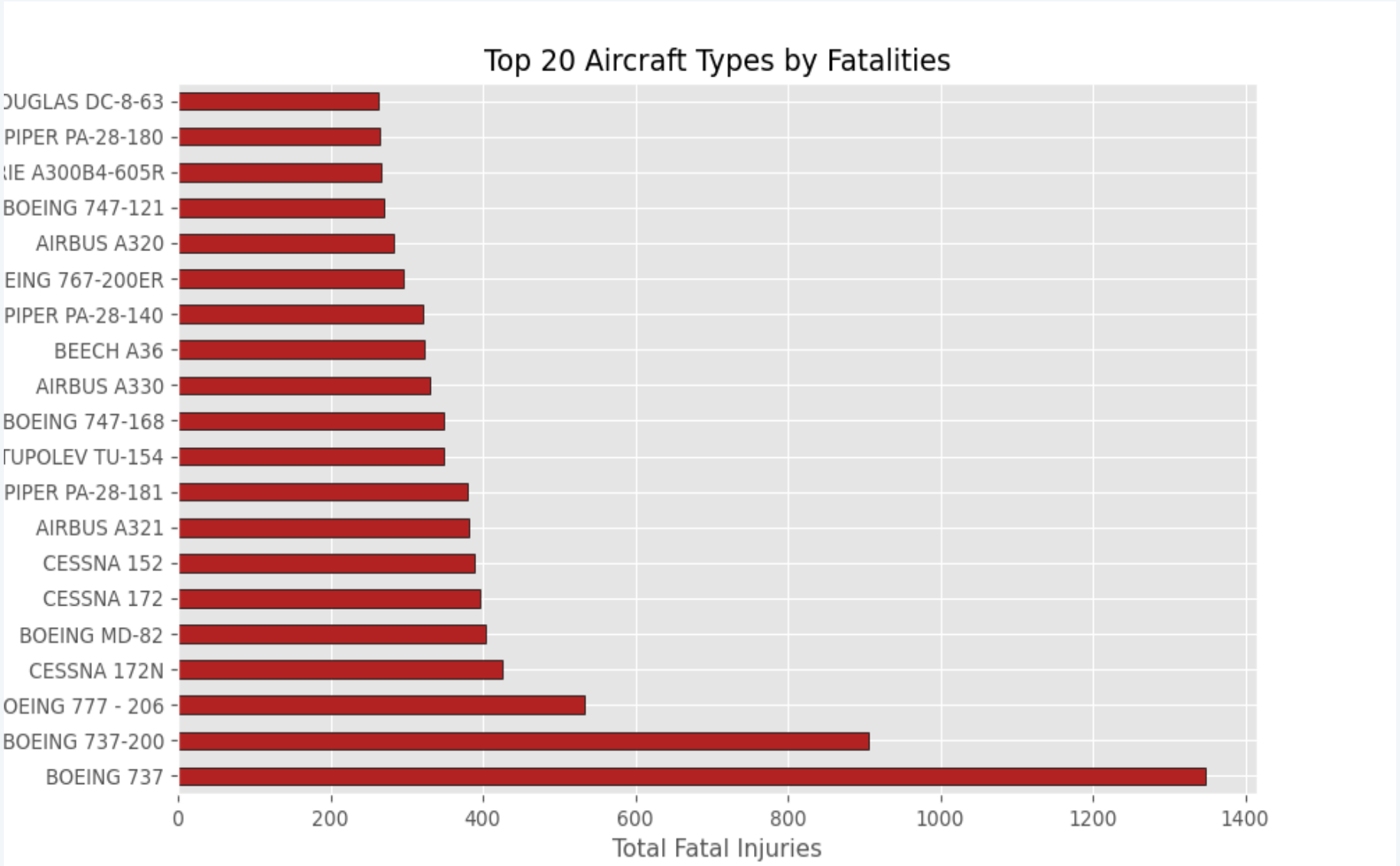
- Aircraft types
- Engine types
- Flight purposes

We explore accident frequencies, counts and impact of type of aircraft, number of engines, purpose of flight to cater for clients's goal to identify aircrafts with the least risks for acquisition.

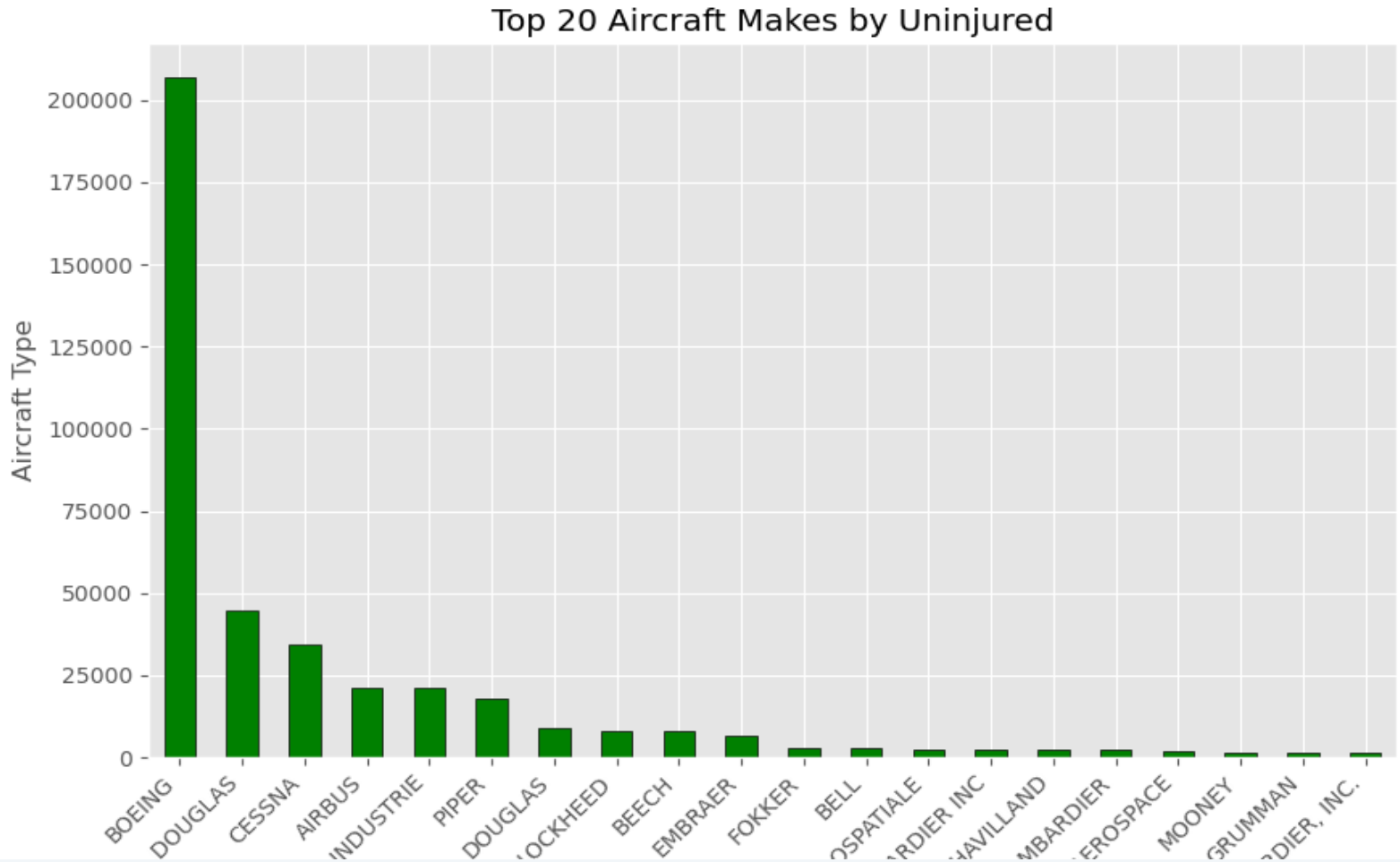


CESSNA 152& 172 tend to have the highest accidents in personal/instructional flights

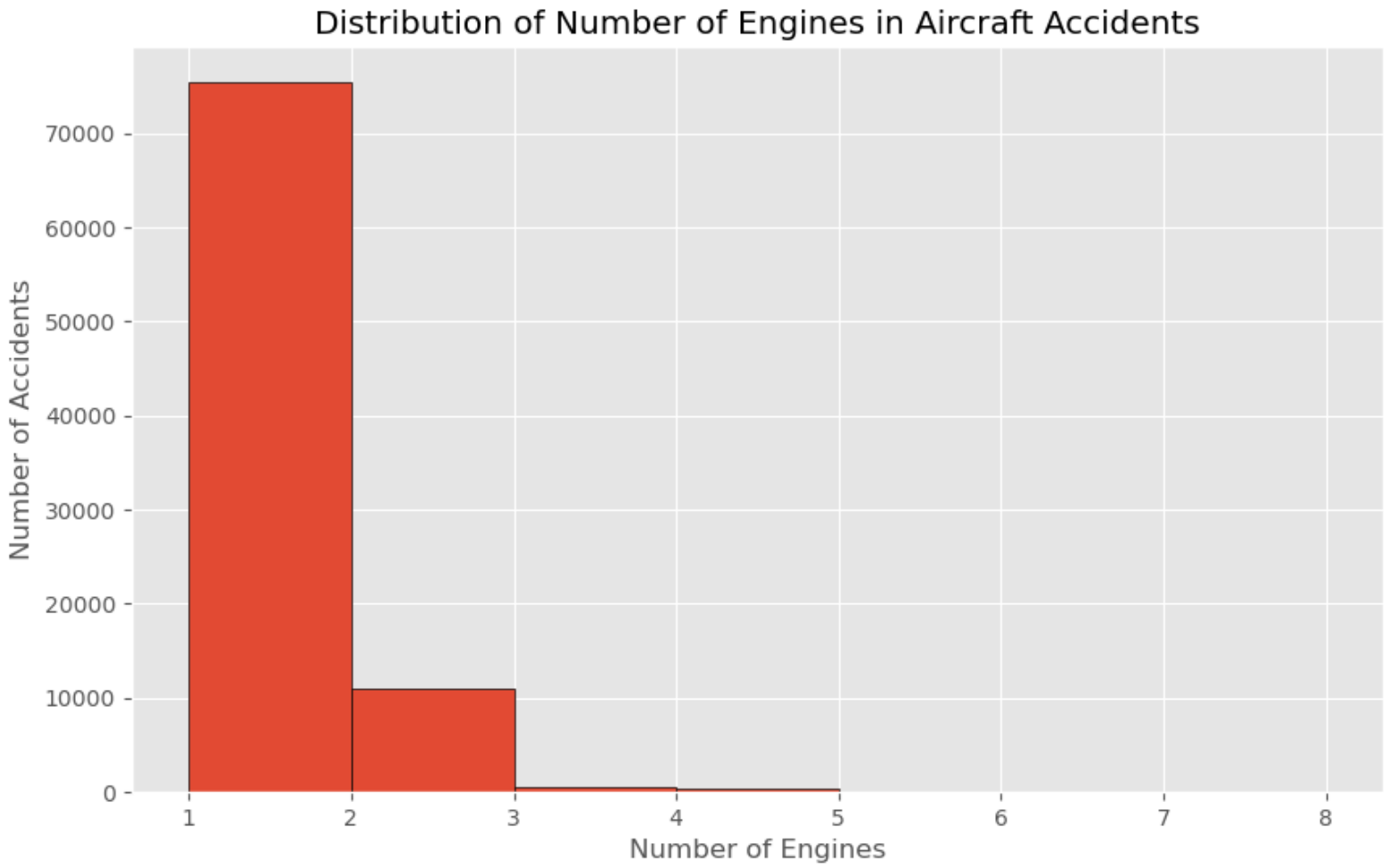
Boeing 737, beech A36 and Piper PA-38-112 has low injury cases



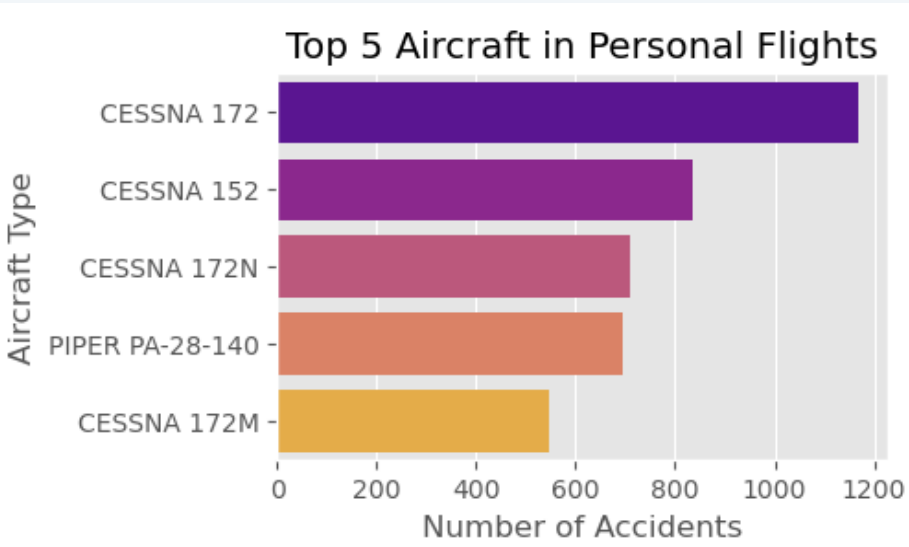
Boeing 737 and Boeing 737-200 accidents resulted in highest number of fatalities with the total exceeding 1300. Douglas DC-8-63 tend to have lower fatalities.

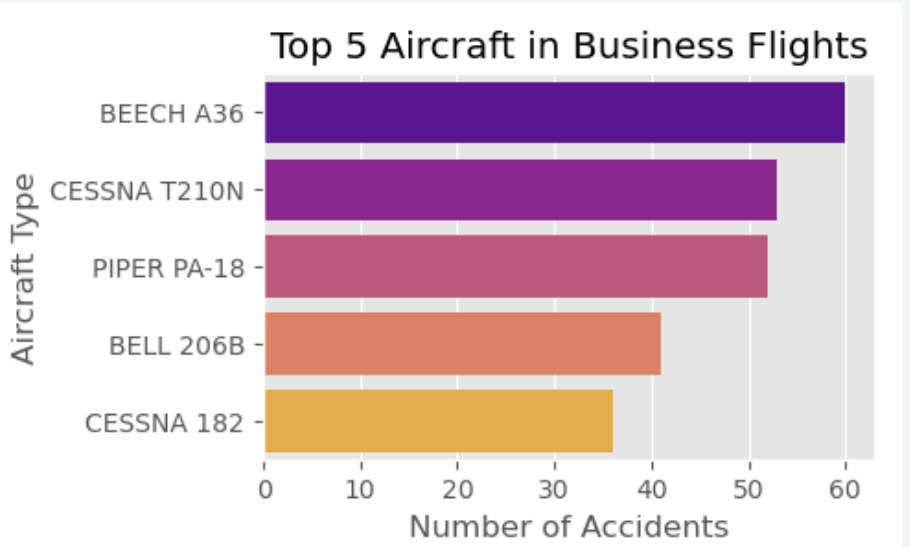


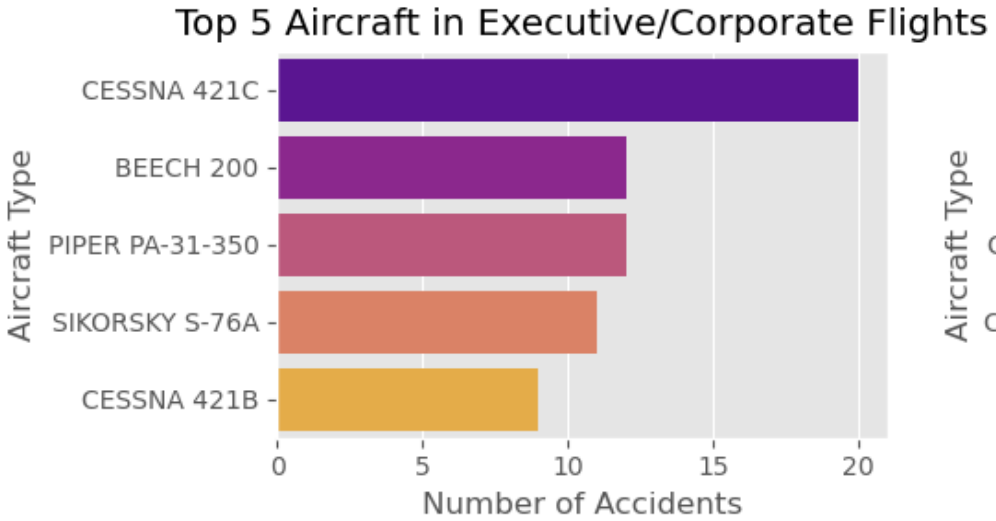
Boieng has largest number of uninjured people followed by Mcdonell Douglas, Cessna, Airbus and PIPER.

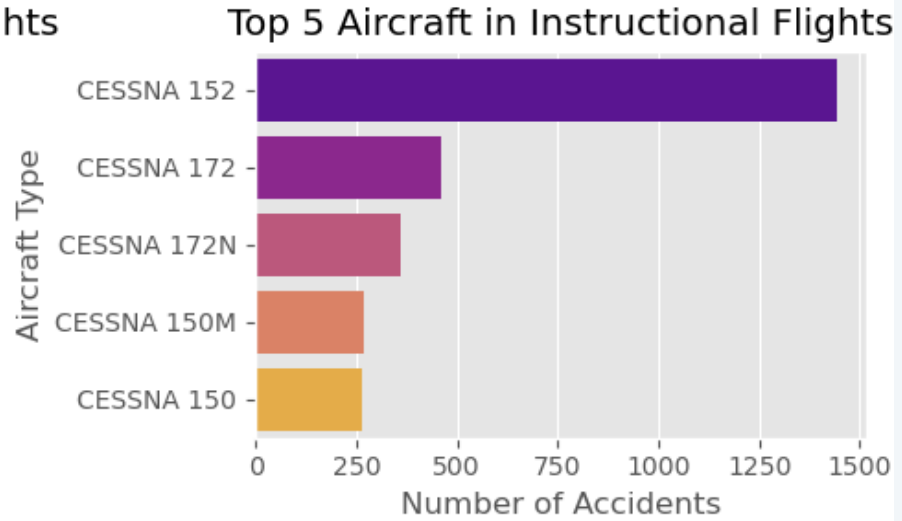


Aircrafts with single engines caused more accidents compared to multiple engines which had significantly fewer accidents especially the ones with more that two engines.





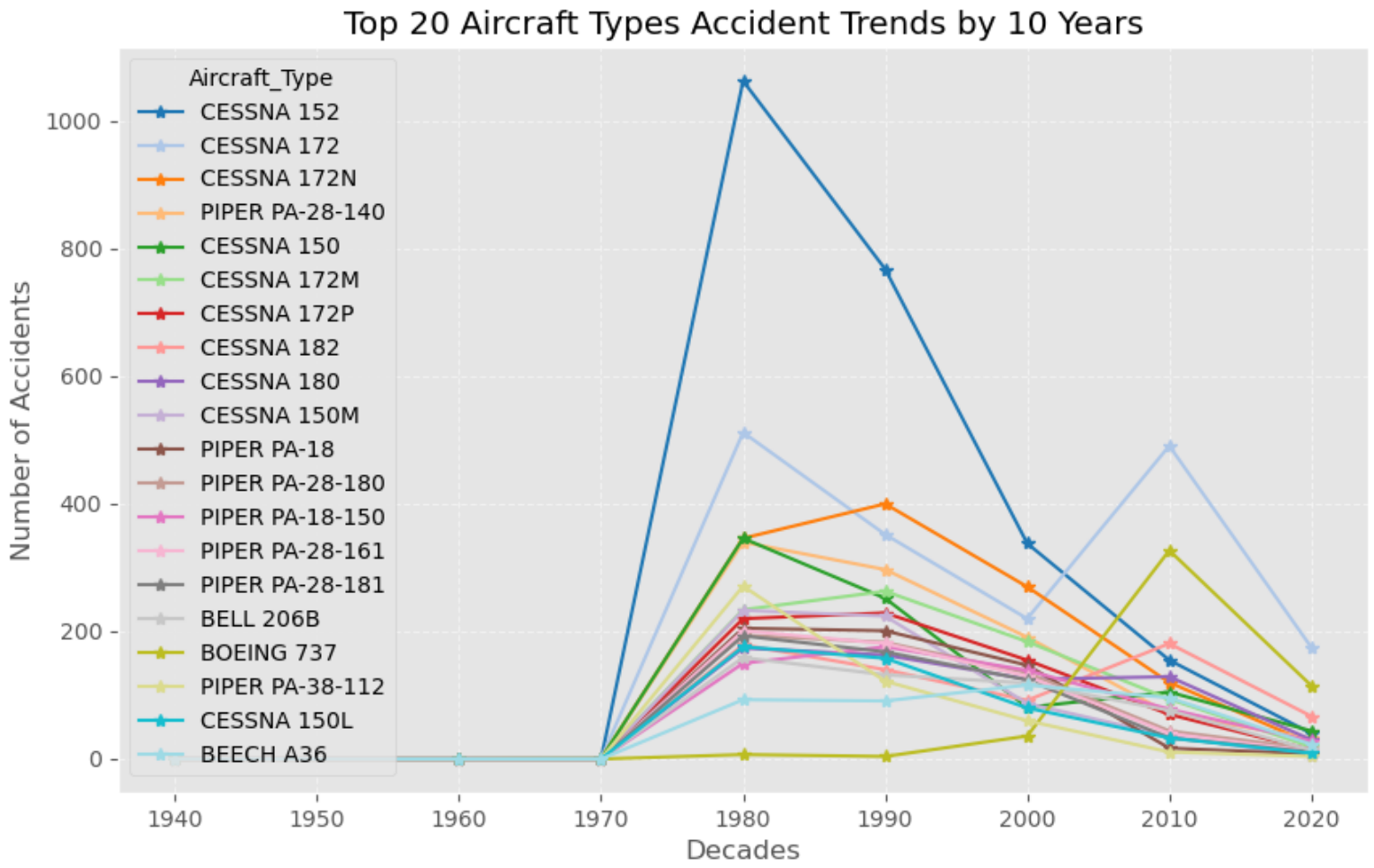




Both major accidents in personal and instructional flights in CESSNA 172.

CESSNA 421C leads in accidents on executive/corporate flights.

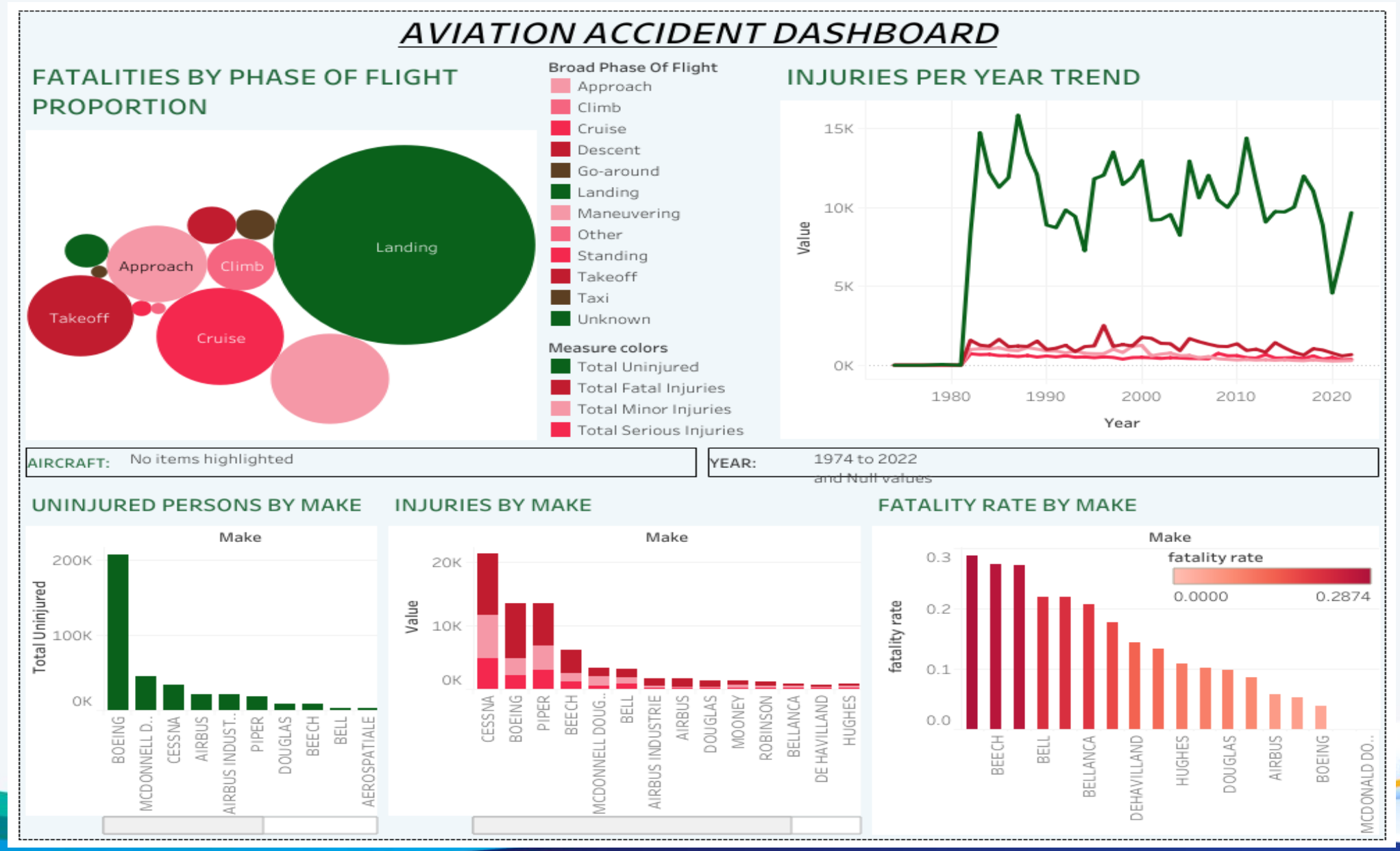
BEECH leads in Business flights



Cessna has highest number of accidents while Robinson, Hughes and Mooney seems to have low accidents over the decades.

Although overtime the accidents have declined for all aircrafts.

4. Interactive dashboard on Tableau.



Conclusion

- Aircraft safety tend to vary by type and purpose, where Cessna 172&152 are top on personal and instructional flights with low risk of accidents. While Beech A36 dominated in accidents for the Business flights and Cessna 421C dominated in accidents for the Executive/corporate flights.
- Multi-engine aircrafts are generally safer and have close to no accidents and single engine aircrafts accounts for most accidents.
- Over the years, accidents have reduced showing much progress. Although focusing on trends overtime accident incidents reported or observed have reduced greatly suggesting safety measures were re-enforced and are working.

Recommendations

- Prioritize aircrafts with multiple engines as they have proven to have lower risks for both private ad commercial operations
- For **Commercial flights**, prioritize larger Boieng Models with strong safety and survival outcomes.
- For **Private Flights**, steer clear from high incident Makes like Cessna & Beech.
- for **Instructional flights**, intensify pilot training and scenario based safety drills before proceeding.
- Continue enhancing **safety regulations and training programs**

Q&A

THANK YOU!

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