AVIATION ACCIDENTS ANALYSIS

An analysis on Aviation Accidents that occurred between 1919-2023

Overview

This project aims to effectively identify the risks associated with different aircraft by analyzing historical aviation accident data. By identifying the patterns, trends, and risk factors that influence aircraft safety, it will facilitate the determination of the lowest risk venture aircraft for purchase by the company and the viable operation of the aircrafts for commercial and private enterprises.

The dataset covers approximately 24,000 aviation accidents worldwide that occurred between 1919 and 2023. Since the company is exploring entry into the aviation sector, it is crucial to understand the historical safety records of different aircraft types, operators, and regions in order to make well-informed decisions.

Business Understanding

The company's goal is not just to diversify its portfolio but also to efficiently identify the risk associated with each aircraft type in order to make well-informed investment decisions for their business endeavor. This lack of clarity on the potential risks involved with an aircraft venture calls for a need to have data-driven insights that would positively lead to optimized decision-making in the critical areas.

To achieve this, the following business questions have been developed:

1. Which of the aircraft types contribute the least to aircraft accidents?
2. Which locations are performing well, which ones are subject to the most aircraft accidents and what could be the cause?
3. Which are the most profitable aircrafts types regardless of the accident frequency and based on accident frequency?
4. How are the accidents trending over time e.g. (monthly, quarterly, yearly) and do they have any influx at certain time periods?

Data Understanding

The dataset used for this analysis provides a comprehensive record of aircraft accidents that occurred between the years 1919 and 2023. This dataset captures crucial details of each accident, including the date of the incident, registration number of the aircraft involved, the country where the accident occurred, the specific location, the category of the accident, and the number of fatalities.

The dataset involves the following 9 columns:

- **Date of Accident**: This column contains the dates of each aviation accident, ranging from 1919 to 2023.
- **Type**: This column indicates the model of the aircraft that was involved in the accident.
- **Registration:** This column contains the unique identification code that is usually assigned to each aircraft. It helps identify and track specific aircraft involved in incidents.
- **Operator**: This column shows the airline that commands that specific aircraft that was involved in the accident.
- **Fatalities**: This column records the count of fatalities associated with each aviation accident. It provides information on the number of fatalities both ground fatality and aircraft fatality.

- **Location**: This column shows the specific region within the country where each accident occurred.
- **Country**: This column indicates the country where each aviation accident took place. This column has no missing values.
- **Cat**: This is short for Category whereby each accident is classified into different categories based on factors such as the cause, nature, or severity of the incident. The categories in the daaset are:
    i. A = Accident
    ii. I = Incident
    iii. H = Hijacking
    iv. C = Criminal occurrence (sabotage, shoot down) O= other occurrence (ground fire, sabotage)
    v. U = type of occurrence unknown
    vi. 1 = hull-loss
    vii. 2 = repairable damage
    E.g. the A1 category means an Accident resulting in a total loss of the plane.

- **Year**: This is a column that includes the extracted year-data from the date column. It has no missing values but has them labelled as 'Unknown'.

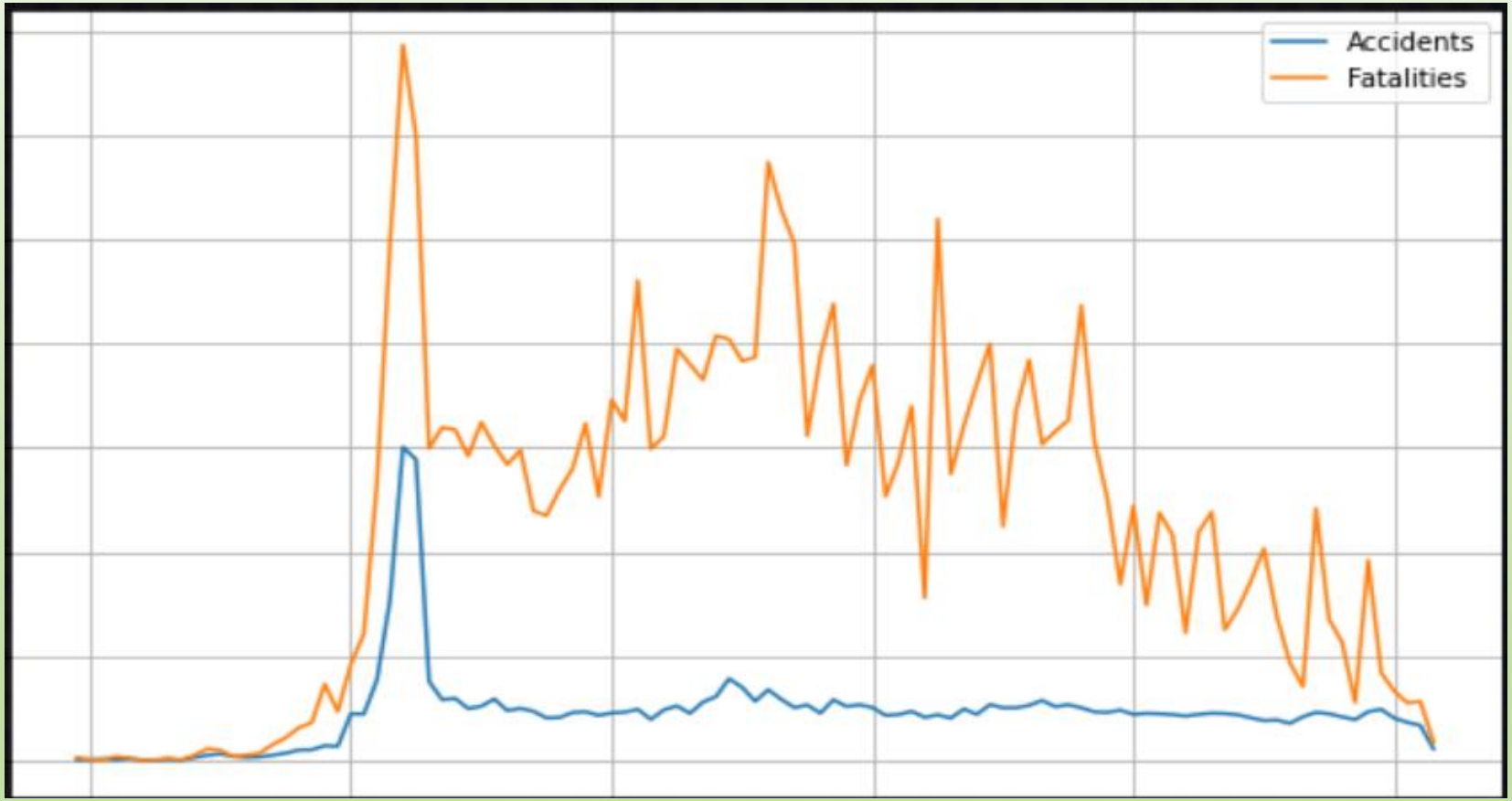
Data Analysis

Examining through the tabular structure would prove tiresome hence the nees for visualizations to summarize the key facts and figures.

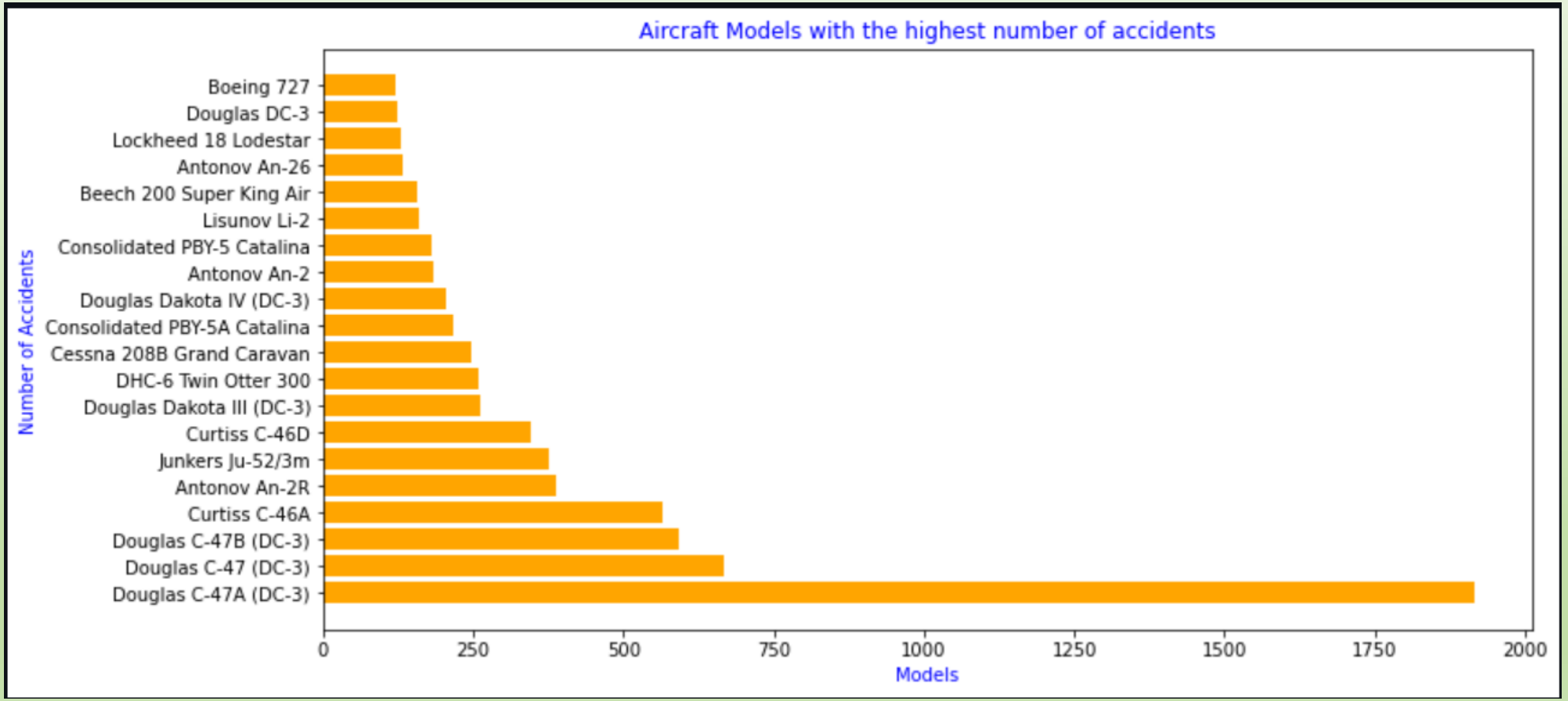
The visuals would not only highlight trends, comparisons and outliers, but also provide an intuitive understanding of the data that might be overlooked in tabular form.

This makes it easier to communicate findings on accident frequency, severity and impact across years, aircraft types, and other key dimensions.

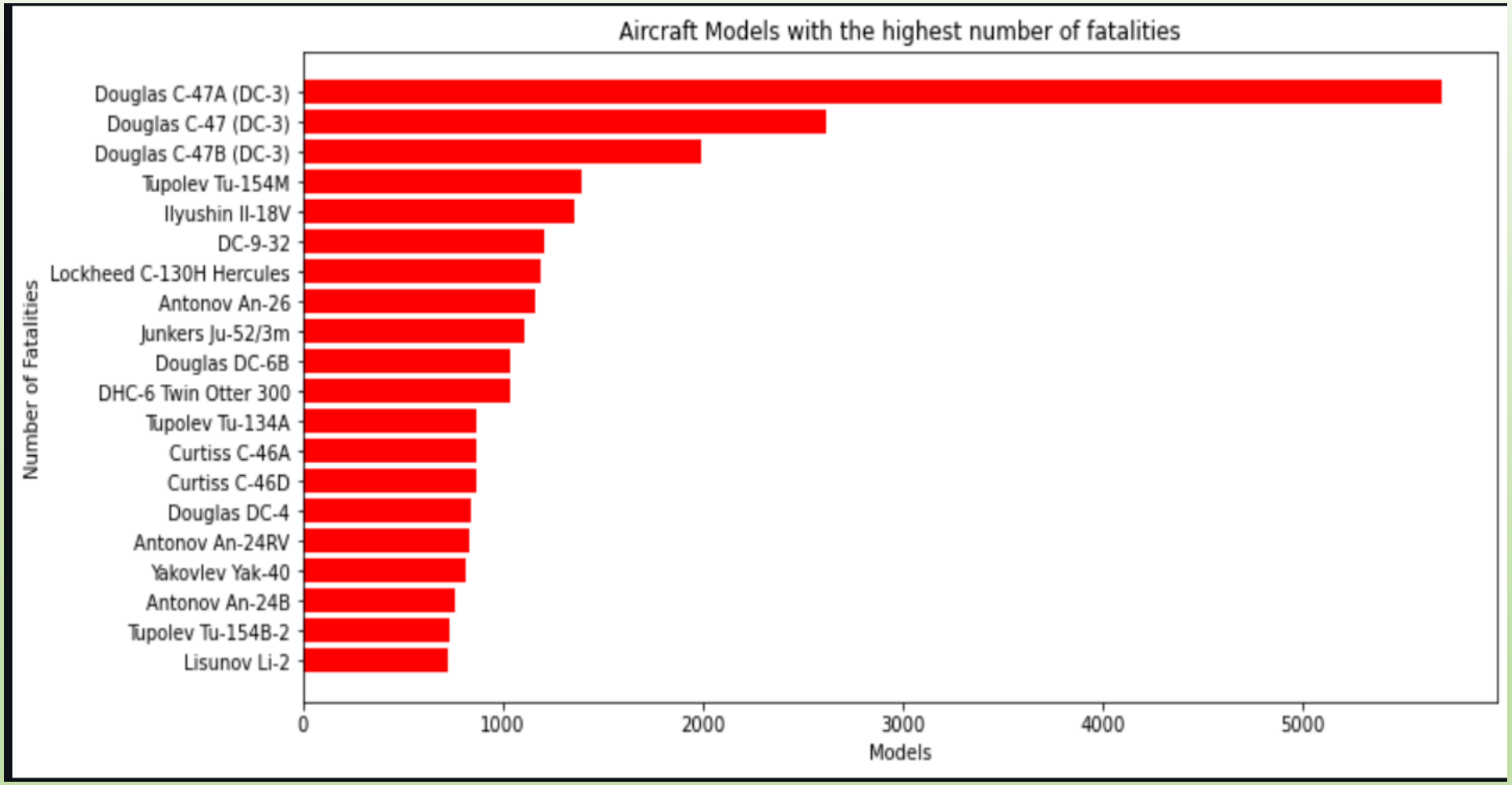
Accidents and fatalities trends over time



Accident Prone Models



Models with the highest Fatalities



Recommendations

- The decrease in the number of accidents over time has led to a decrease in the number of fatalities. This could be attributed to high technological advancement and improved safety standards in the aviation sector hence less accidents happening. The company can thus consider it as a wise decision to venture into this industry since it is less prone to accidents hence higher chances of being profitable basing on possibility of accidents occurring.

- Since the company wants the least-risk aircraft, they should consider not going for a Douglas Model. This is because historically, this model has been the most accident-prone aircrafts hence this doesn't not sit well with the company's goals. This does not mean the other models are safe, but based on historical data, the Douglas are a very risky investment. Worth noting is that the Douglas was initially a military plane but later used commercially after world war II.

The Douglas model also has the highest fatality rates but this is because it is a commercial plane hence it ferries many passengers. Thus, it is evident that commercial planes have higher fatalities and carry higher risk compared to private airliners.

Also worth noting is that since the company will be a private operator of the aircraft, the chances of accidents happening are low hence it is a viable business venture.

Geographically, it would not be feasible to generalize that certain regions like the USA and Russia have higher risk than other countries. While this being true, other factors like that the war occurred in these two countries skews the results. The company should consider the operating location geographically on this metric but they should consider other factors such as profitability before choosing a low-risk aircraft based on this factor.

I appreciate your time and attention.
Your insights and feedback are highly valued.

Any questions or clarifications?
I'd be glad to discuss further.

Thank you for your attention.

I welcome any questions or comments you may have and look forward to continuing the discussion.

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