Aviation Incidents Data

Enhancing Safety Through Data Insights

Jeremiah Rubin

Overview

The Aviation Incidents Analysis project aims to provide a comprehensive examination of recent aviation incidents to enhance safety and operational efficiency. This analysis will help the Safety Director at Global Airways understand the factors contributing to incidents and develop strategies to mitigate risks, ultimately improving overall flight safety and regulatory compliance.

Outline

- Overview
- Business Understanding
- Data Understanding
- Data Analysis
- Recommendations
- Limitations
- Next Step

Business Understanding

- Improve Safety Measures
- Optimize Operational Efficiency
- Enhance Compliance and Risk Management
- Strengthen Stakeholder Confidence

Data Understanding

The dataset comprises **90,348** entries related to aviation accidents.

Key attributes include:

- **Make**(aircraft manufacturers)
- **Aircraft Category**(focus on **"Airplanes"**)
- **Number of Engines**(engine counts)
- **Injury Severity**(injury reports)

Data Understanding

Aircraft Category Count: **Total Airplanes**: **27,617**(out of **90,348**)

Number of Engines:

1 Engine: 21,176

2 Engines: 3,515

4 Engines: 103

Top Engine Types:

Reciprocating: 20,715

Turbo Prop: 1,366

Turbo Fan: 970

Turbo Jet: 158

Data Understanding

Injury Severity Breakdown:

- **Non-Fatal: 21,063**
- **Fatal: 4,238**
- **Minor: 165**
- **Serious: 127**

Popular Aircraft Makes:

- **Cessna: 3,608 incidents**
- **Piper: 1,910 incidents**
- **Beech: 674 incidents**
- **Boeing: 287 incidents**

Data Understanding

```
# Narrowing down the dataset to 4 columns
aviation_data = aviation_data[['Make', 'Aircraft.Category', 'Number.of.Engines', 'Engine.Type','Injury.Severity']]
```

```
aviation_data.head()
```

	Make	Aircraft.Category	Number.of.Engines	Engine.Type	Injury.Severity
5	Mcdonnell Douglas	Airplane	2.0	Turbo Fan	Non-Fatal
7	Cessna	Airplane	1.0	Reciprocating	Non-Fatal
8	Cessna	Airplane	2.0	Reciprocating	Non-Fatal
12	Bellanca	Airplane	1.0	Reciprocating	Non-Fatal
13	Cessna	Airplane	1.0	Reciprocating	Fatal(1)

Data Preparation

Data Cleaning:

- Dropped NaN and duplicates
- Selected Columns: Make, Aircraft Category, Number of Engines, Engine Type, Injury Severity.

Data Preparation

```
# Narrowing down the dataset to 4 columns
aviation_data = aviation_data[['Make', 'Aircraft.Category', 'Number.of.Engines', 'Engine.Type','Injury.Severity']]
```

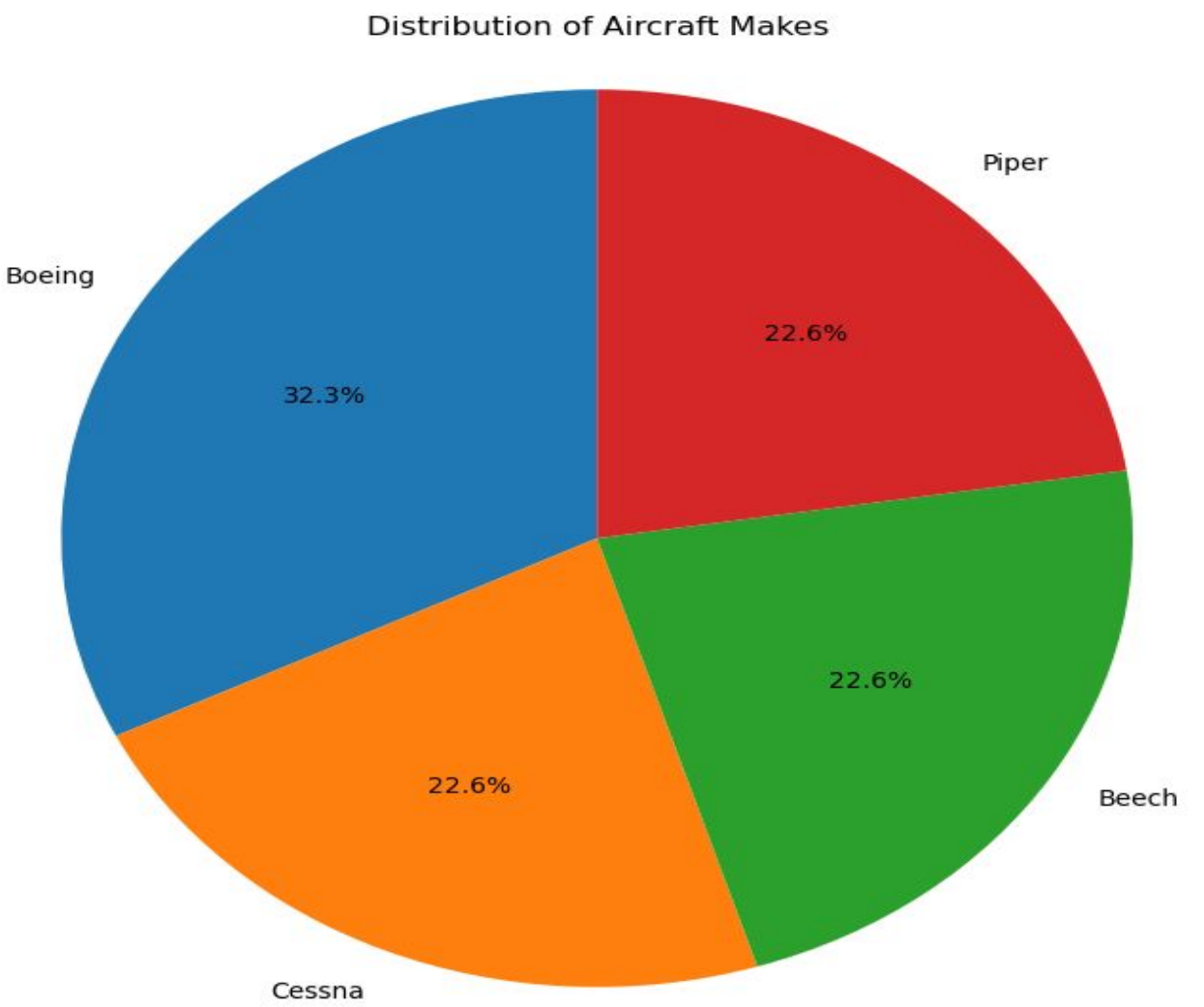
```
aviation_data.head()
```

	Make	Aircraft.Category	Number.of.Engines	Engine.Type	Injury.Severity
5	Mcdonnell Douglas	Airplane	2.0	Turbo Fan	Non-Fatal
7	Cessna	Airplane	1.0	Reciprocating	Non-Fatal
8	Cessna	Airplane	2.0	Reciprocating	Non-Fatal
12	Bellanca	Airplane	1.0	Reciprocating	Non-Fatal
13	Cessna	Airplane	1.0	Reciprocating	Fatal(1)

Exploratory Data

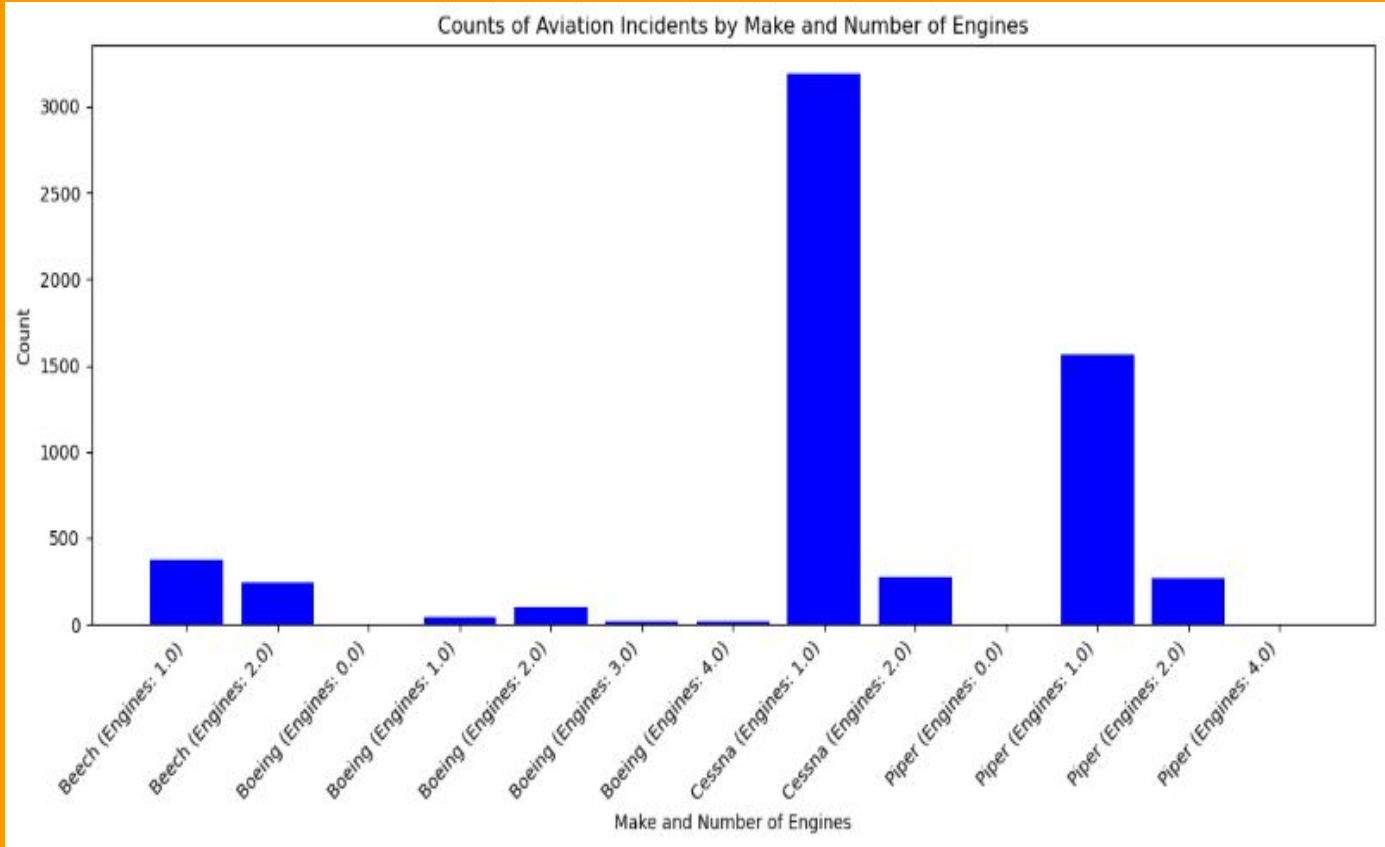
The Distribution

Of Aircraft Makes



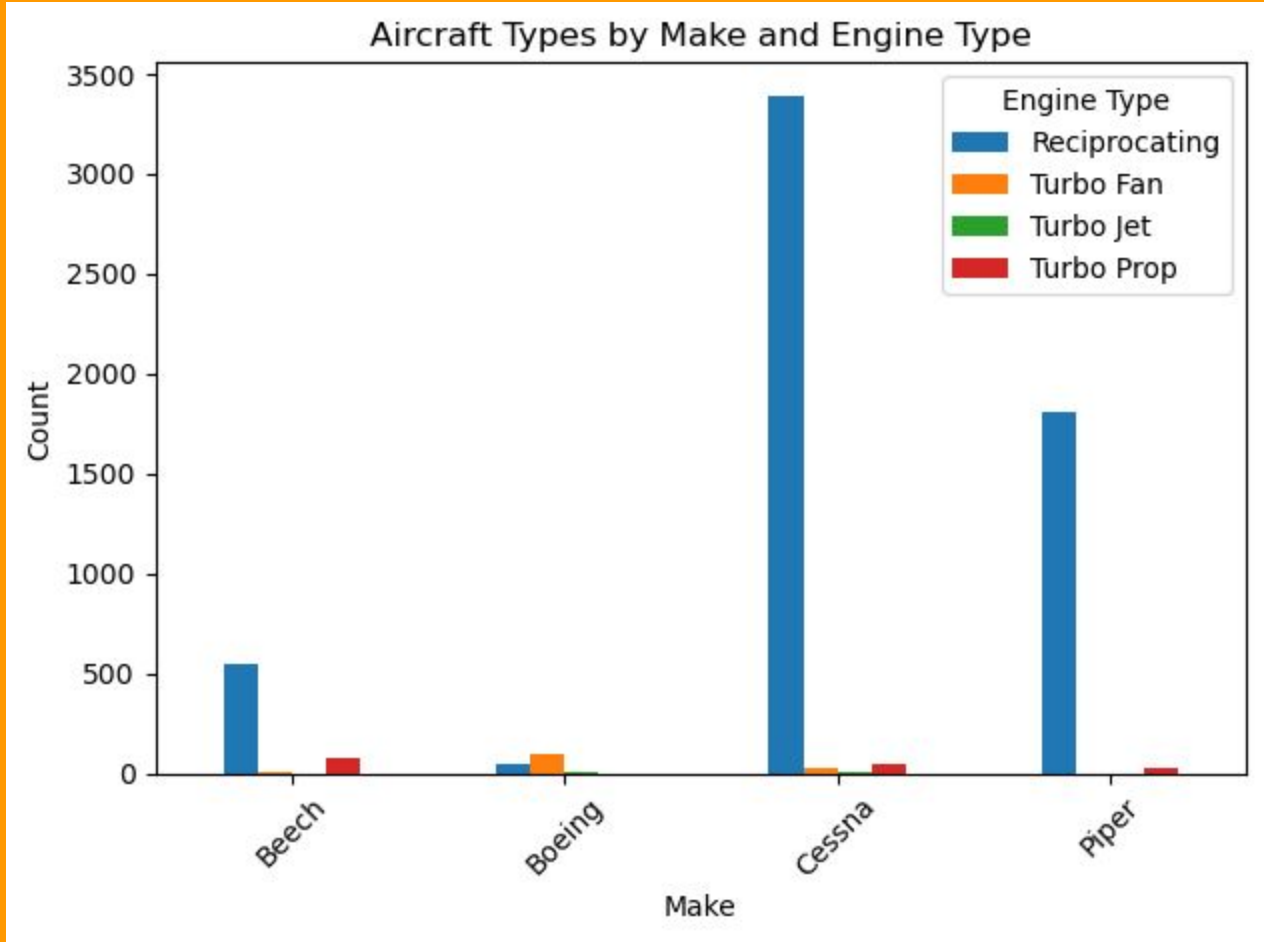
Exploratory Data

Incident counts by Make and Number of Engines



Exploratory Data

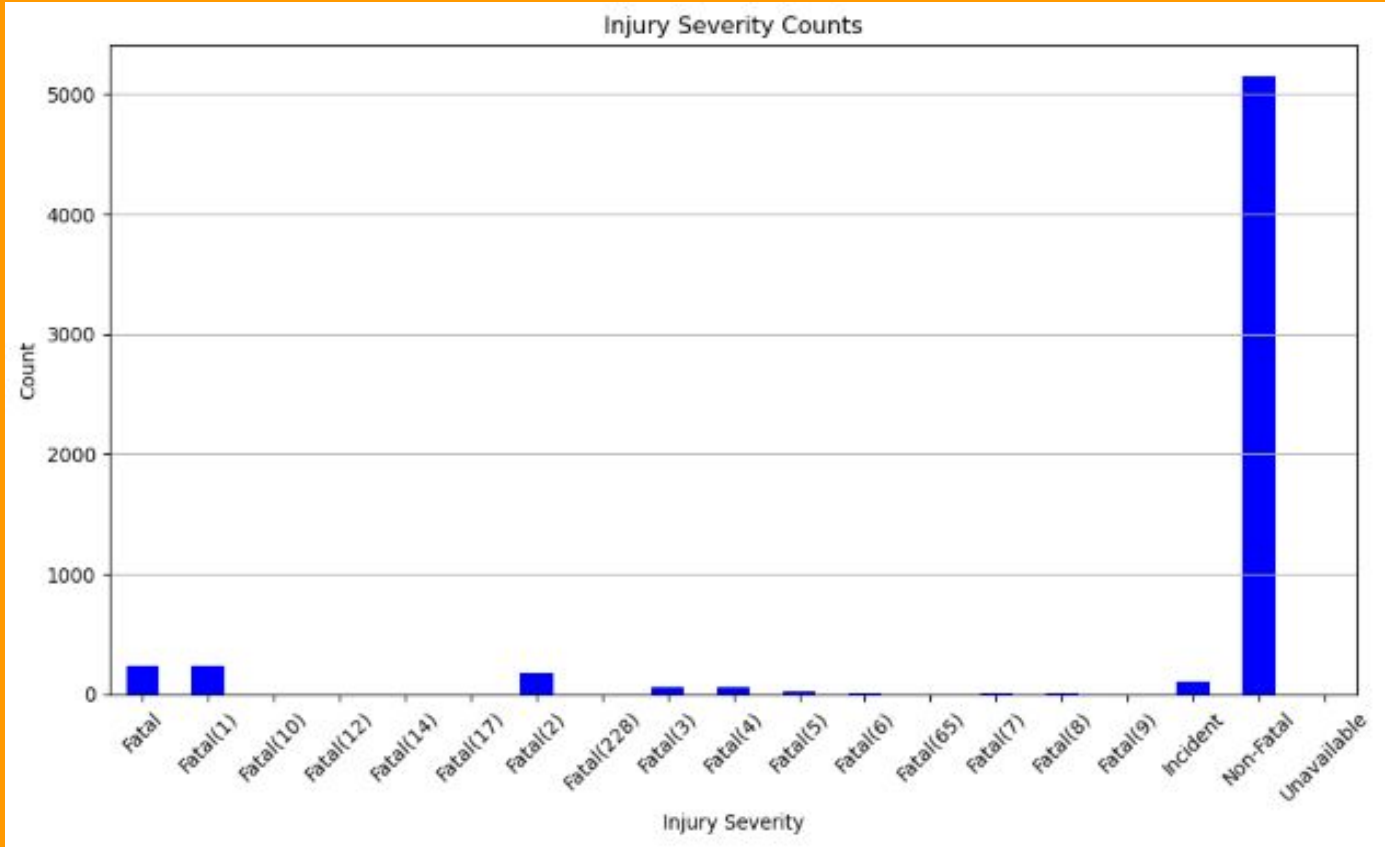
Breakdown of aircraft types by make and engine type



Exploratory Data

Counts of

Injury Severity



Conclusions

- The analysis of aviation incidents provides valuable insights into the trends and patterns within the dataset. Visualizations highlight how different aircraft categories and engine types correlate with incident frequency, enabling stakeholders to identify potential risk factors.

Limitation

- **Data Completeness:** The analysis relies on the accuracy and completeness of the dataset.
- **External Factors:** The analysis does not account for external factors such as weather conditions or pilot experience.
- **Generalization:** Findings may not be universally applicable across all regions or types of aviation operations.

Recommendation

- **Targeted Safety Initiatives:** Develop initiatives focusing on aircraft categories and engine types with higher incident rates, including enhanced training for pilots and maintenance personnel.
- **Ongoing Monitoring:** Establish a continuous monitoring system to regularly analyze aviation incident data.
- **Data-Driven Decision Making:** Encourage aviation authorities to incorporate data analytics into their decision-making processes for safety improvements.

Next Step

- Further Research: Conduct research to incorporate external factors influencing incident rates.
- Expand Analysis: Broaden the analysis to include more variables such as geographical regions and operational contexts.
- Stakeholder Engagement: Engage with industry stakeholders to disseminate findings and collaborate on safety initiatives.

Thank you !

GitHub:@BlackXWulf

LinkedIn:www.linkedin.com/in/jeremiah-r-025a391b6