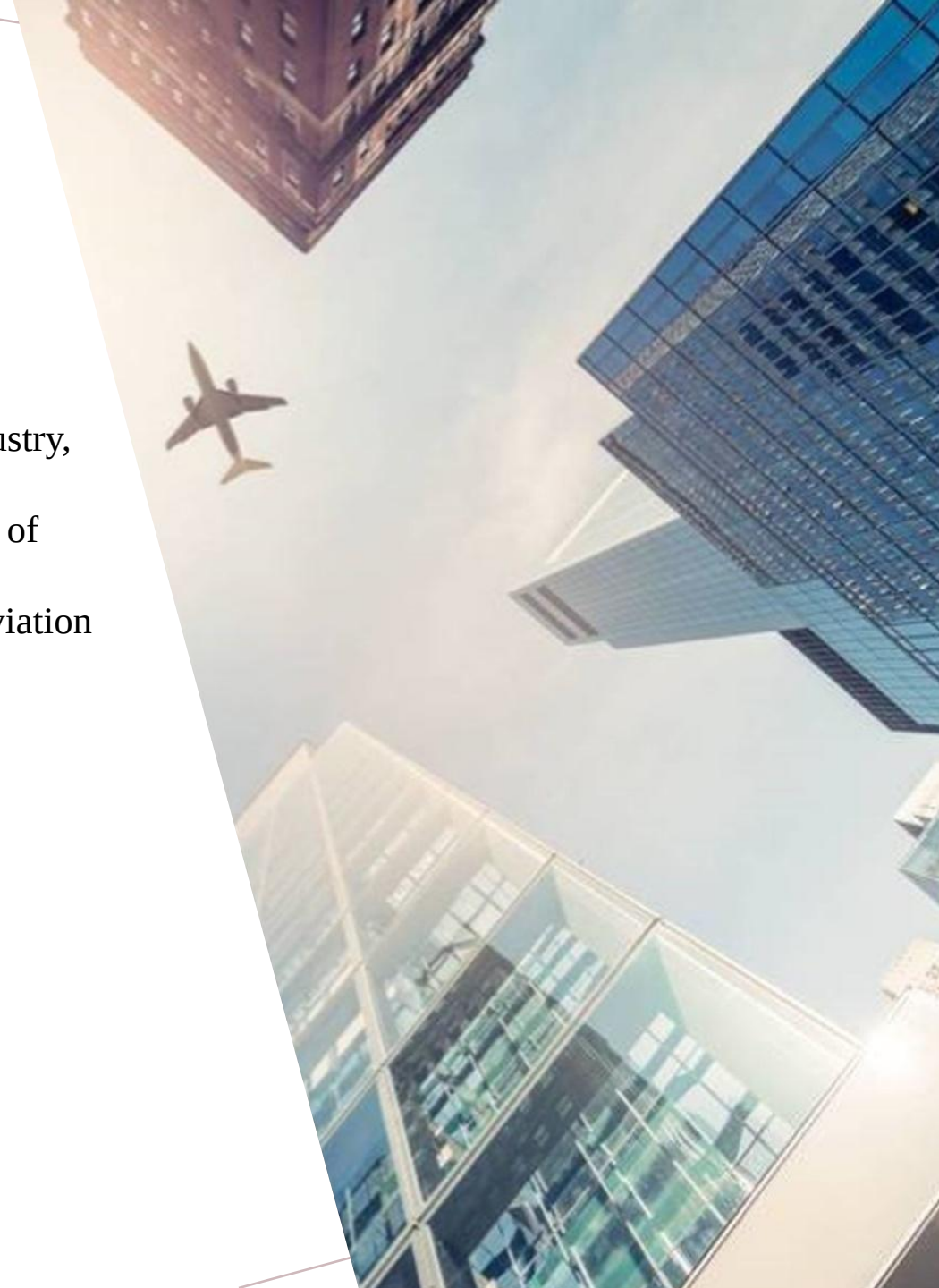
IDENTIFYING LOW-RISK AIRCRAFT FOR STRATEGIC BUSINESS GROWTH.

INTRODUCTION

•**Background:** Our company is diversifying by expanding into the aviation industry, with an aim of operating aircraft for both commercial and private enterprises.
•**Objective:** Identify the lowest-risk aircraft based on Aircraft damage, Number of Engines of the aircraft, Model of the aircraft among other factors .
•**Outcome:** Provide data-driven recommendations that will guide the head of aviation division in the process of selecting the best aircraft for our company.

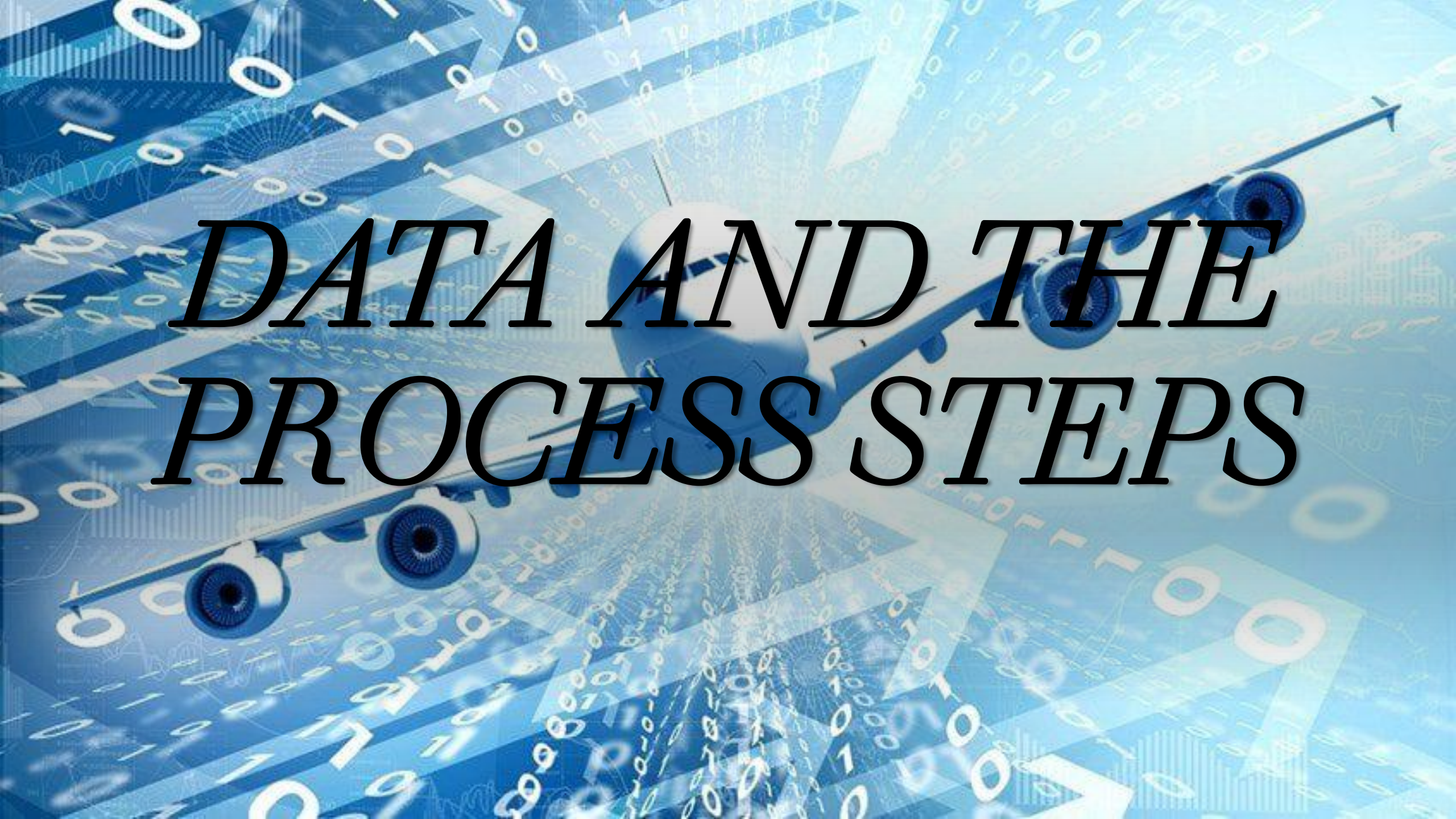


BUSINESS CONTEXT

7 FACTORS TO CONSIDER BEFORE PURCHASING AN AIRCRAFT

The most important factors to consider when purchasing an aircraft include:

- Number of Engines
- Make of the Aircraft
- Model of the Aircraft
- Engine Type
- Weather Conditions
- Injury Severity.
- Uninjured


DATA AND THE
PROCESS STEPS

A DATA DRIVEN APPROACH

- In this project I made use of aviation accident data from the National Transportation Safety Board (1962–2023), we will analyze risks, identify trends, and provide actionable recommendations.

- The Aviation data used for this analysis can be accessed using the link below: https://www.kaggle.com/datasets/khsamaha/aviation-accident-database-synopses

- We used numpy, pandas and matplot libraries for our analysis

- **Approach:**
  ✓ Clean and preprocess data to handle missing values
  ✓ Aggregate and visualize key risk factors
  ✓ Derive three concrete business recommendations
  ✓ Present findings using clear, impactful visualizations

DATA CLEANING

We handled the below when doing data cleaning;

- Understanding the dataset
- Removal of duplicates
- Dropping unwanted Columns
- Handling missing data

DATA ANALYSIS

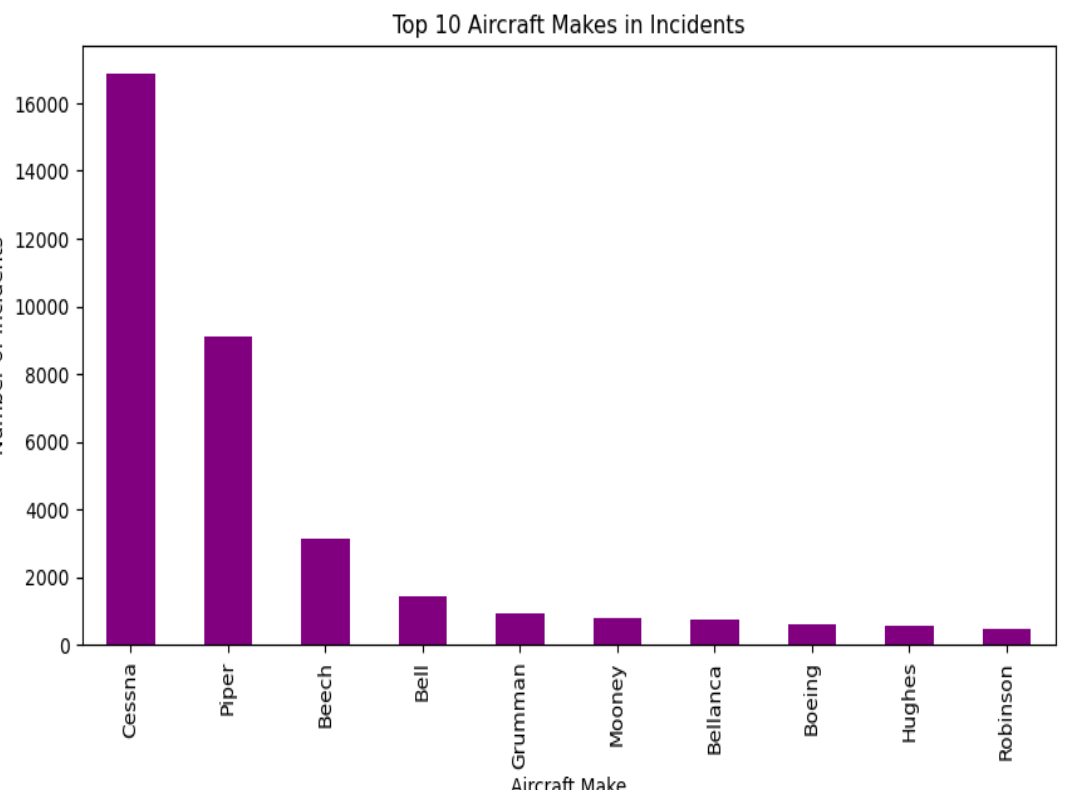
•Conducted an analysis by first examining categorical data:
✓ Identified unique top values
✓ Identified unique bottom values
•Performed a numerical data summary using the describe function

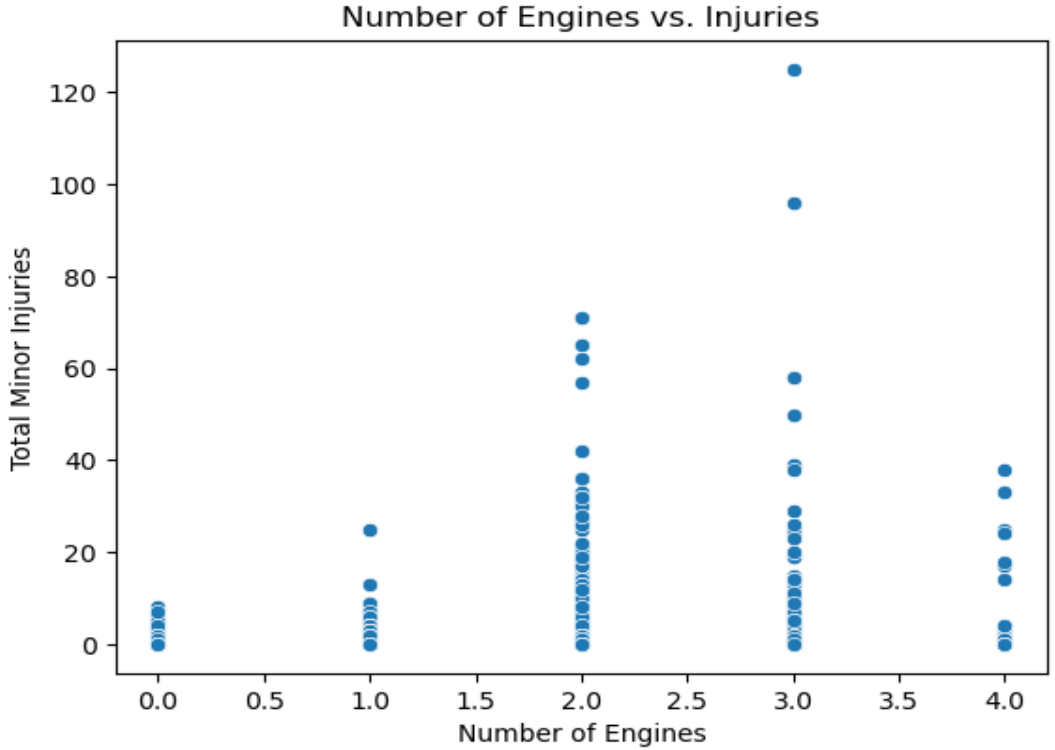
DATA VISUALIZATION

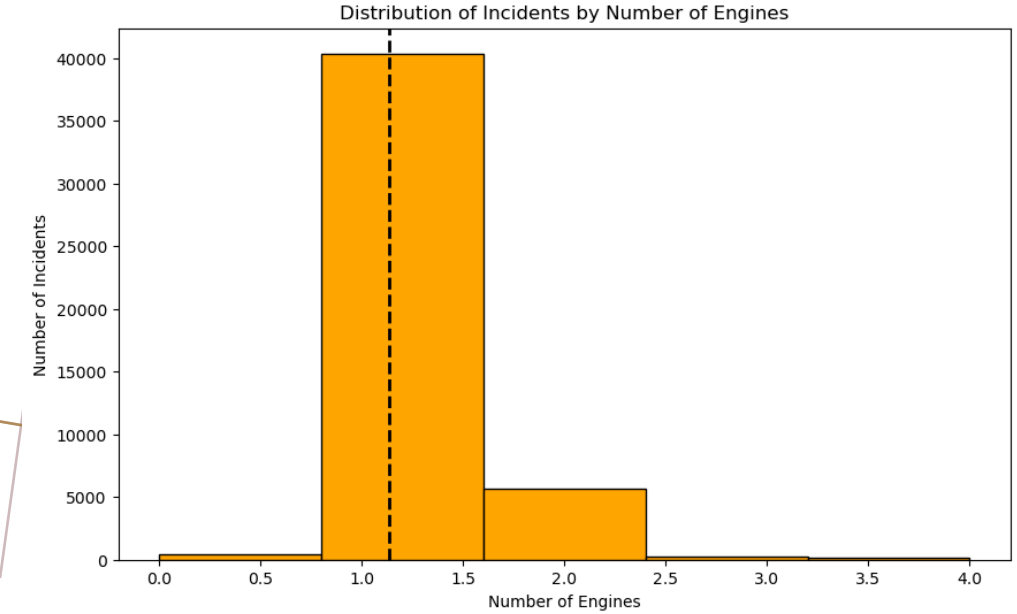
We have created visualizations to enhance data understanding and simplify analysis.
These visualizations help us to identify trends, patterns, and major insights in the dataset.

Key Visualizations:

📊 Bar Graph – Effective comparison of categorical data
📈 Line Chart – Shows trends of a given dataset over time
📉 Histogram – Displays the distribution of data.
⚫ Scatter Plot – Shows the relationships that exist between variables


Top 10 Aircraft Makes in Incidents
16000
14000
12000
10000
8000
6000
4000
2000
0
Cessna
Piper
Beech
Bell
Grumman
Mooney
Bellanca
Boeing
Hughes
Robinson
Aircraft Make


Number of Engines vs. Injuries
Total Minor Injuries
120
100
80
60
40
20
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Number of Engines


Distribution of Incidents by Number of Engines
Number of Incidents
40000
35000
30000
25000
20000
15000
10000
5000
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Number of Engines


Trend of Aviation Incidents Over the Years
Number of Incidents
3500
3000
2500
2000
1500
1000
500
0
1950
1960
1970
1980
1990
2000
Year

RECOMMENDATIONS

Recommendations

The data shows that Cessna and Piper aircraft have the highest number of incidents. The operators and manufacturers of these models should enhance safety measures, provide better training for pilots and maintenance protocols.

The scatter plot indicates a correlation between the number of engines and minor injuries. The Aircraft with more engines might experience different safety risks, requiring further analysis to optimize engine design and safety features.

Since incidents are more frequent in aircraft with fewer number of engines, companies should consider investing in models with proven safety records to minimize operational risks and enhance passenger safety.

EVALUATION AND FUTURE IMPROVEMENTS

FUTURE IMPROVEMENTS

- ✓ Examine occurrence patterns to raise the bar for aviation safety, paying particular attention to high-risk models and manufactures.
- ✓ To better prepare pilots for managing emergency scenarios and a range of weather conditions, implement customized training programs.
- ✓ To lower mechanical failures and mishaps, promote the use of safer aircraft types and make sure they receive routine maintenance.

THANK YOU

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