



AIRCRAFT RISK ANALYSIS

by Grace Gitau

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Business Understanding

The company is expanding into the aviation industry and needs the head of the new aviation division to understand:

1. What are the trends in aviation accidents?
2. What are the potential risks of aircraft?
3. What extent of injuries and damage types are caused by accidents?
4. Which aircraft types are the lowest risk profile to purchase for commercial and private enterprises?

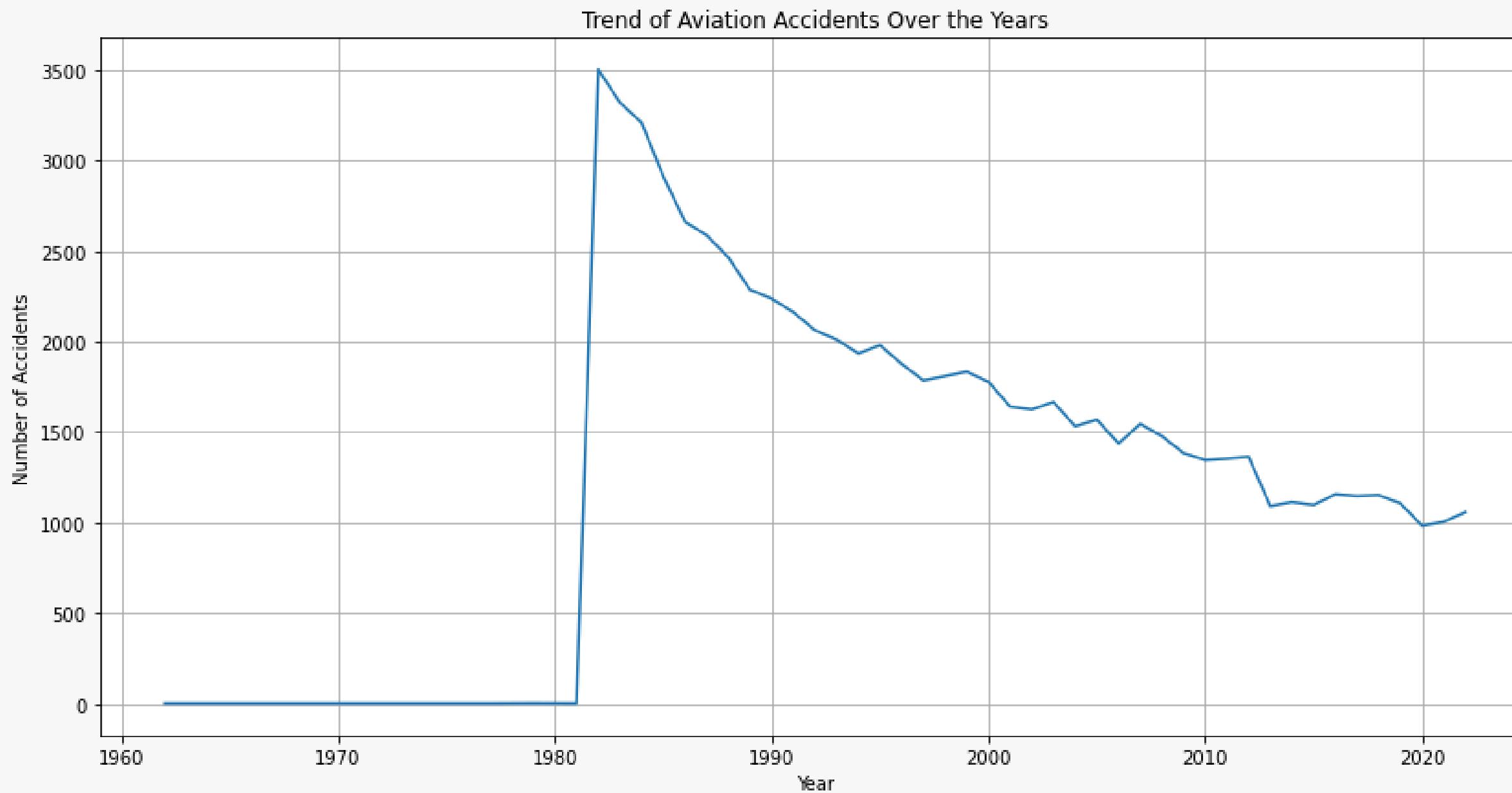
Data

The dataset is sourced from the National Transportation Safety Board, containing aviation accident data from 1962 to 2023.

Includes various details about aviation accidents, such as aircraft type, injury severity, damage type, flight purpose, and location.

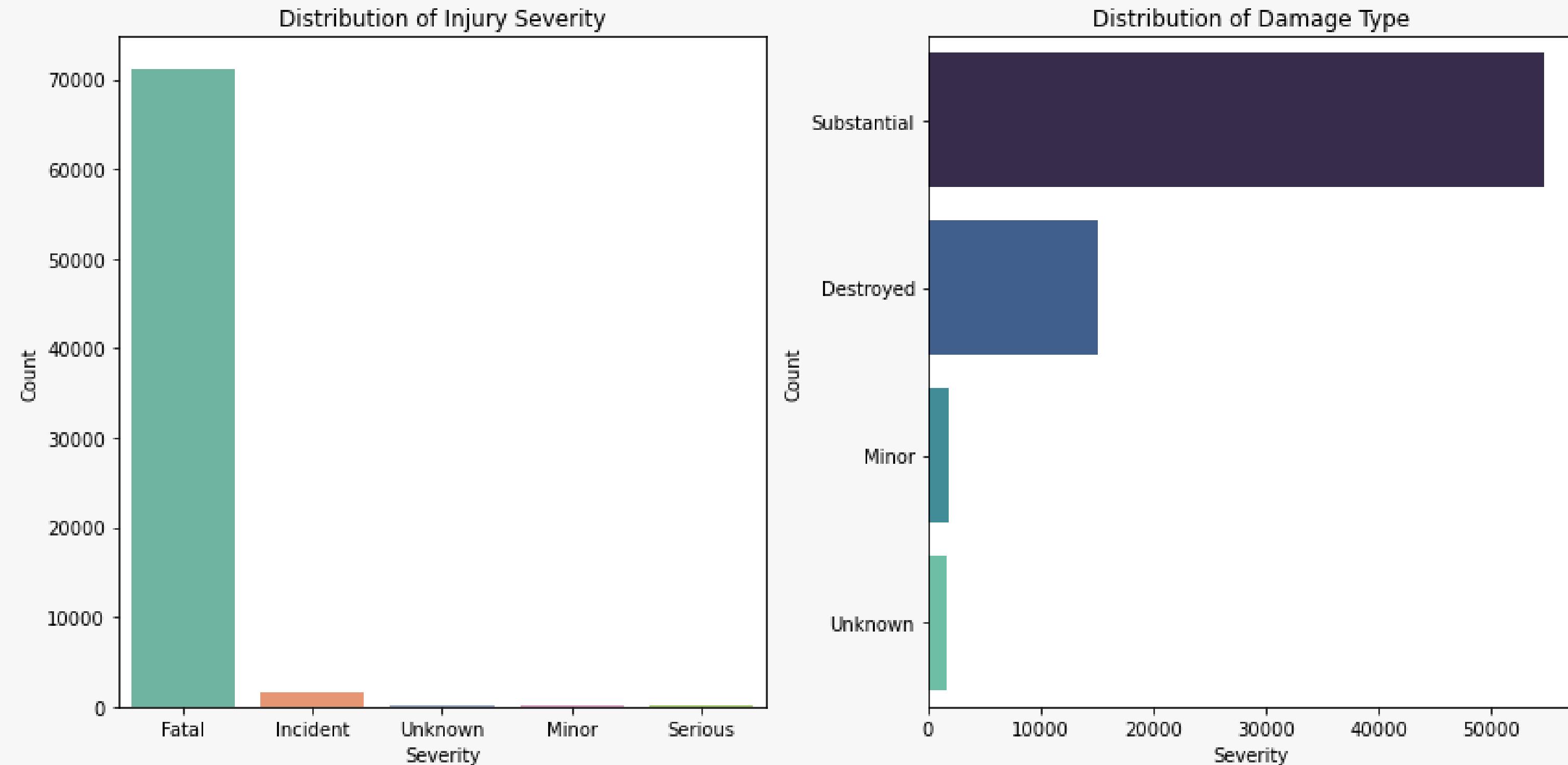
Many columns have missing values and inconsistent data types, necessitating thorough cleaning and preprocessing. Key tasks include handling missing values, converting data types for accurate analysis, and extracting relevant information from categorical data.

Data Analysis

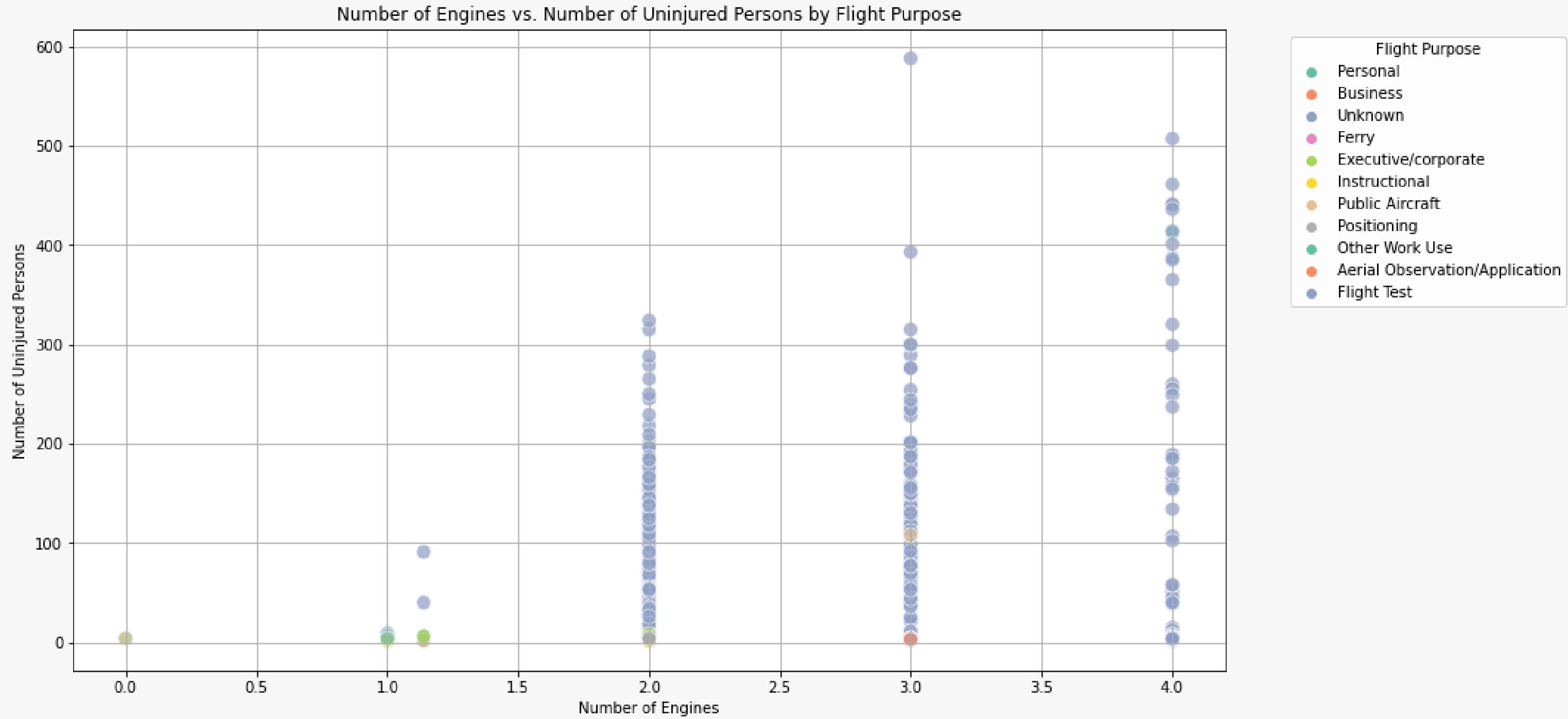


This line plot shows the number of accidents over the years. There is a noticeable peak around the early 1980s, followed by a general decline. This trend indicates improvements in aviation safety over time.

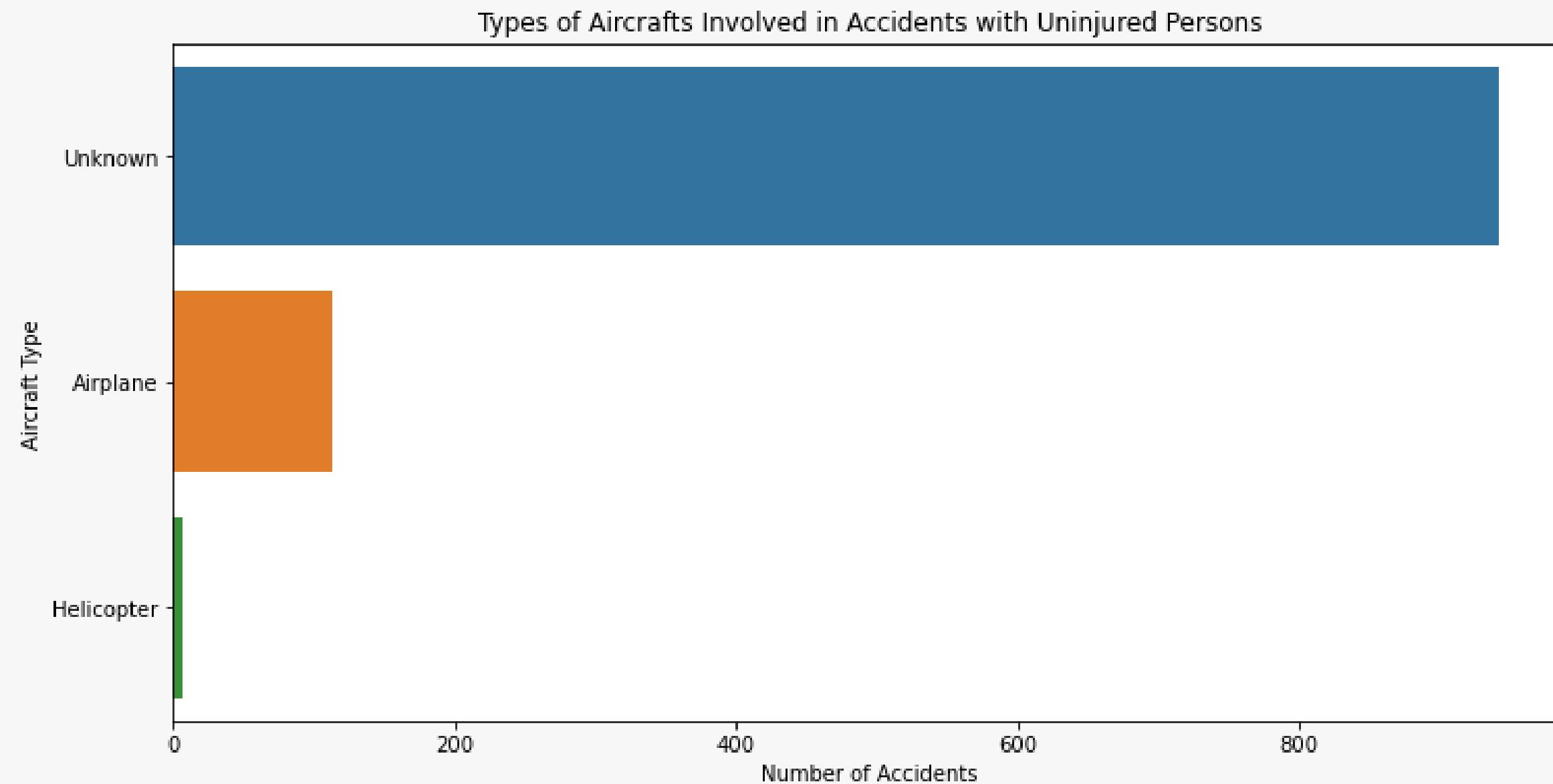
The first distribution shows the majority of incidents from aircrafts result in 'Fatal' injuries, indicating that while accidents occur, they mostly do result in severe fatal injuries.



The second plot demonstrates that 'Substantial' damage is the most prevalent type, followed by 'Destroyed'.



The scatter plot indicates that most accidents (with injuries) involve aircraft with fewer engines and are primarily for personal flights or instructional purposes. This insight suggests that single-engine aircraft used for private ventures or training may present higher risks since they contain few counts of uninjured persons.



The distribution shows that 'Airplane' and 'Helicopter' are the most common aircraft types with records of uninjured persons.

Conclusion

The analysis reveals several key insights:

1. A declining trend in aviation accidents over the years suggests improvements in safety practices.
2. Aircraft accidents often result in fatal injuries and substantial damage.
3. Airplanes and helicopters are the most common types involved in accidents with highest count of uninjured persons.
4. Aircrafts with fewer engines tend to have higher involvement in high risk accidents.
5. There is no strong correlation observed between different variables in aviation accidents.

Recommendation

Aircraft Type:

1. Airplane: Considering the prevalence of airplane accidents with uninjured persons, airplane exhibit the lowest risks.
2. Helicopter.

Flight Purposes (Top Models):

1. Personal: Cessna 210L.
2. Business: Cessna S550.
3. Ferry: CESSNA PA-31-310
4. Executive/corporate: Airplane, PIPER PA-31-350
5. Instructional: Airplane, PIPER PA-44-180
6. Public Aircraft: BEECH BE-200
7. Positioning: CESSNA 402C
8. Other Work Use: CESSNA MU2B
9. Aerial Observation/Application: AIR TRACTOR AT-401
10. Flight Test: PIPER PA-28-236

Next steps:

Thorough safety evaluations and continuous monitoring of safety metrics are essential to mitigate risks and ensure the success and safety of aviation operations.

Thank you

Email: gracegitau2@moringaschool.com

github:

https://github.com/Divinegrace05/aircraft_risk_data_analysis

