

AVIATION SAFETY ANALYSIS

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Project: Aviation Safety Analysis

Problem:

A company is interested in purchasing and operating airplanes for commercial and private enterprises, but do not know anything about the potential risks of aircraft.

Solution:

Conducting an analysis to determine low risk aircrafts and ways to manage or mitigate the risks. Give three business recommendations from insights provided to help the shareholders make a better decision.

Link to the dashboard:

https://public.tableau.com/app/profile/cindy.tumaini2195/viz/AviationSafetyAnalysis_17186377233960/AirplanesAnalysisDashboard

Datasource:

[cleaned_AviationData.xls](#)

Tools:

- Tableau
- Visual Studio Code

Skills:

- Data Cleaning
- Data Visualization
- Filters and Action

Business Understanding:

Objective:

Determining the lowest risk aircrafts i.e:

- Those with lowest fatalities
- Causes of accidents
- Level of damage to the aircraft during accident

Data mining goal:

- Cleaned data with *no null vales* that can be visualized.

Data Description:

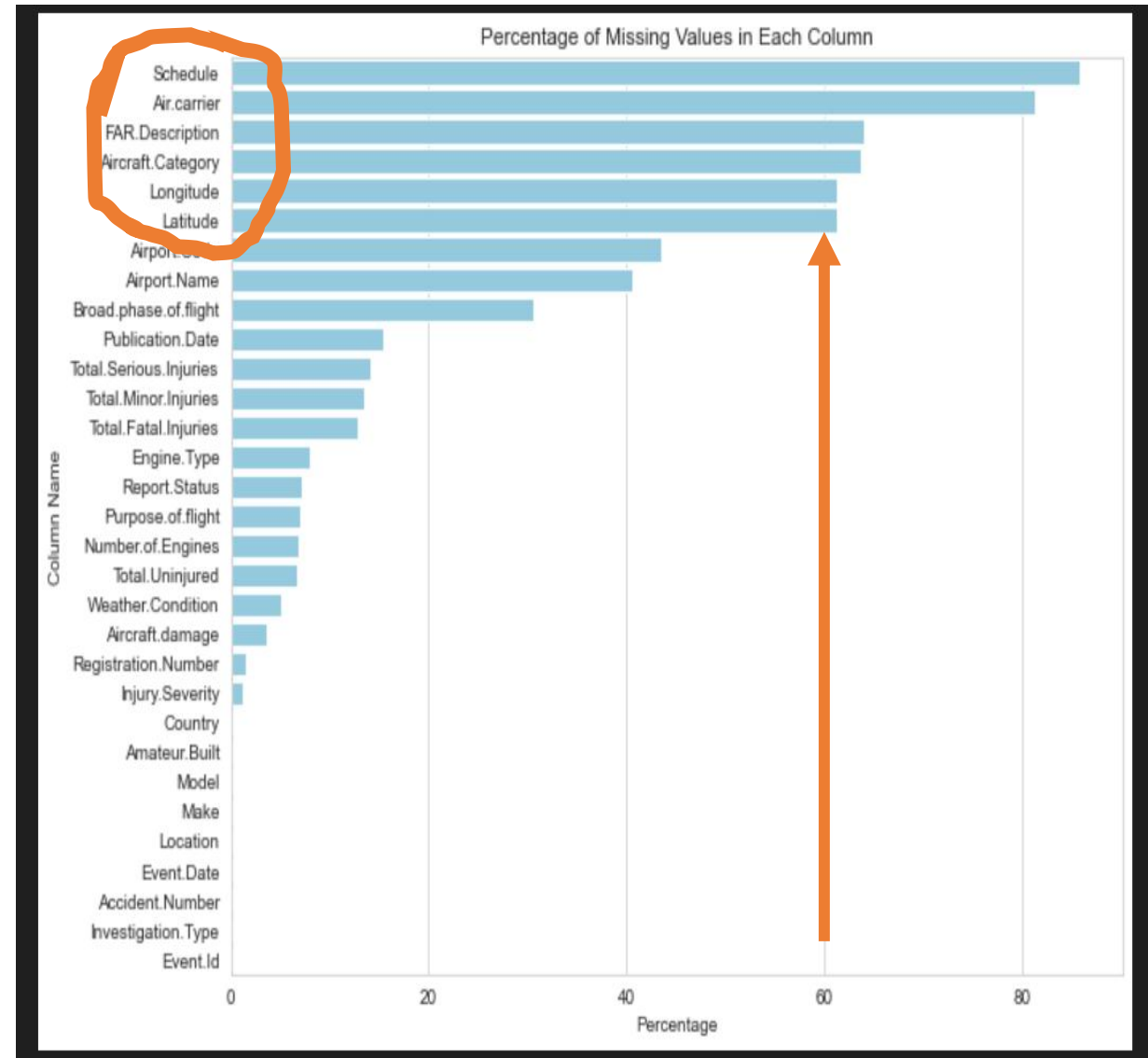
- Data initially contained 88889 rows, 31 columns. After cleaning the data contained 88889 rows, 28 columns.
- Columns with **over 60% of missing data** were **dropped**.
- Missing values were filled with appropriate measures per column.
- 'Location' column generated new 'State.Codes' column.

Type of approach:

Descriptive and exploratory analysis:

This involved:

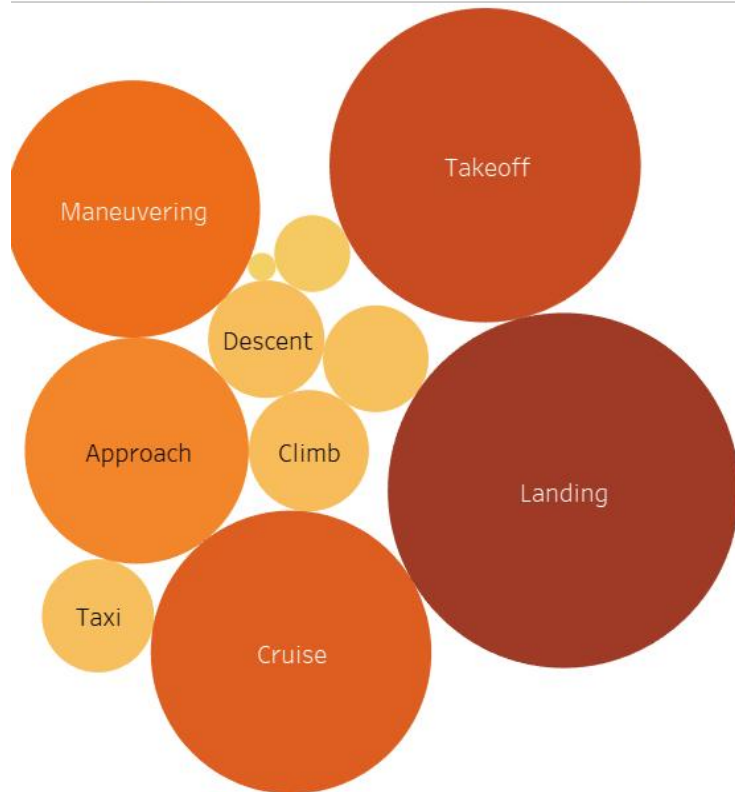
- Finding out the *level of injury* to passenger depending on the plane.
- Determining the level of *damage to the plane*.



Findings:

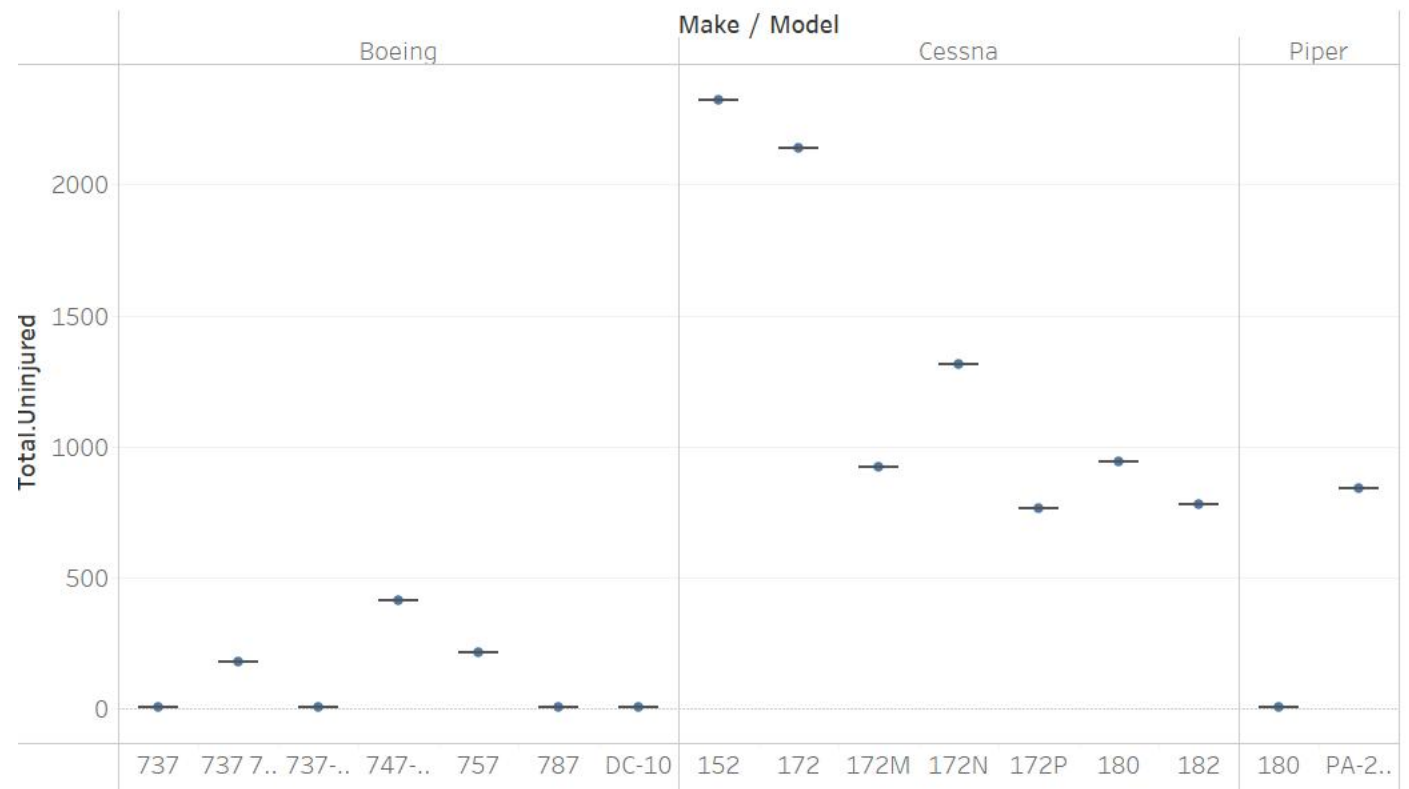
- Majority of accidents occur during **Landing** and **Takeoff** of the planes.

Flight Phases and Accidents



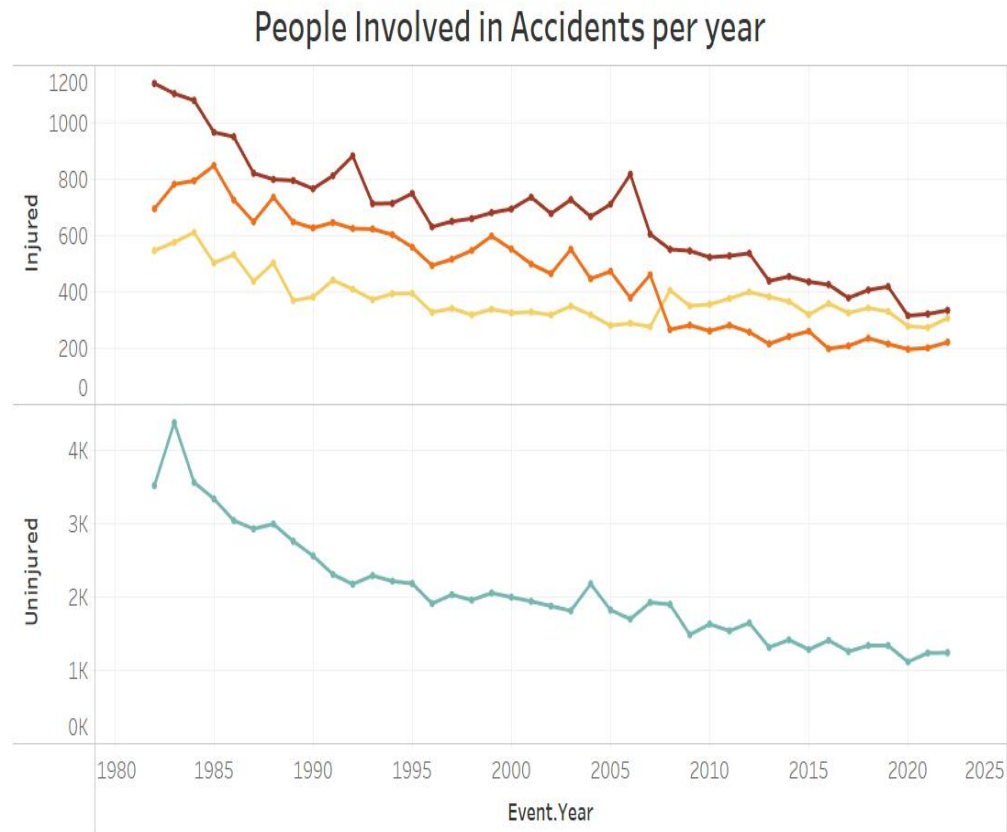
- The most popular make of planes is 'Cessna' and has the **highest number of uninjured passengers** compared to other popular makes such as 'Boeing'.

Make and Model of Uninjured Passengers



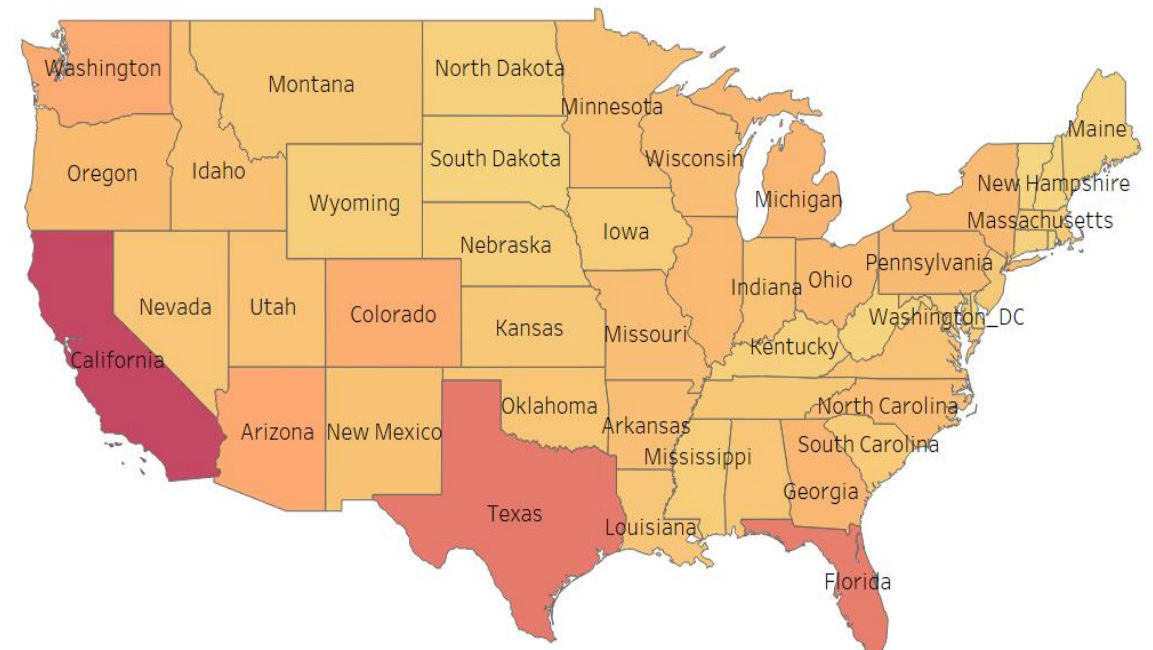
Other Findings:

- Over the years the number of accidents happening has reduced.



- The data reveals a higher accident rate for flights departing from specific airports(considering potential infrastructure or environmental factors)

Geographical distribution of Accidents



Recommendations:

- **Targeted Pilot Training:**

Insight: The data shows a higher frequency of accidents during take off and landing.

Actionable Recommendation: Invest in pilot training programs specifically designed to improve handling of aircraft during aircraft landing and take off. This could involve simulator training scenarios and monitoring of pilots' state during these periods.

- **Engine Maintenance Strategies:**

Insight: The analysis identifies a correlation between specific engine types and a higher frequency of accidents involving substantial aircraft damage.

Actionable Recommendation: Implement more frequent and rigorous maintenance inspections for these engine types. Consider replacing engines nearing the end of their lifespan or with a higher risk profile based on the data.

- **Operational Adjustments:**

Insight: The data reveals a higher accident rate for flights departing from specific airports (considering potential infrastructure or environmental factors).

Actionable Recommendation: Conduct a safety review of operational procedures at these airports, potentially involving collaborations with airport authorities to address identified risks. This might involve rerouting flights to safer airports in some cases.

Considerations and Next steps:

Why my solution is better:

- Recommendations are backed up by data.
- Recommendations are specific to the needs of the company that is looking to purchase low risk aircrafts

Limitations:

- The recommendations focus on identifying risks associated with different aircraft models. A *comprehensive safety analysis* might consider other factors such as pilot training, diverse weather conditions, maintenance procedures and operational procedures.
- Underlying assumptions: Assuming each unique 'Event.Id' represents a separate flight.
- The absence of details such as flight count and accident rates, necessitates assumptions and calculations.

Next Steps:

- Data enrichment: Exploring possibilities for acquiring additional data points to enrich the analysis.
- Predictive modelling: Exploring possibilities of developing predictive models to identify flights/aircraft types with higher likelihood of accidents.

THANK YOU

I welcome any questions from the analysis.

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