Mitigating Critical Risks in New Aviation Ventures

Data Driven Analysis for Aviation potential risks of Aircraft

Overview

1:Project Goals-

This project analyzes the Kind of Aircraft Makes and model with relation to the purpose of flights and the number of engines. This shows case the fuel consumptions and the budget allocation to each make. Also, we are able to see from timelines the make type and the number of engines involved in historic Accidents.
In weather forecasting 70 % of the flights were not affected with more than 2 engines
Globally, 90% of Aviation industries uses one common of engine type of aircraft

2:Methodology

Some of the analytical means used are through the correlation of the variables
Drawing of the trend lines to tell us the next expectations
Plotting of the bar graphs to the relationships and geographical mappings

3:Key Outcomes

Aircrafts with the lowest number of engines were highly affected by weather and the number of fatal accidents were very high
Aircraft with more than one engine were highly used in flights

Business Understanding

Identifying the potential risks of aircraft

Objectives

1)Understanding which aircraft Make is used most in the flights

2)Analyzing which aircraft make and engine type had the highest and lowest incidence of accidents

3) Which geographical route has the highest number of flight accidents

4)Finding the relationships between the number of aircraft engines and the number of accidents

5)Identifying the Financial Risks in Fuel consumption with the number of passengers and the no. engines

6)With relation to the time lines trend, in the advancement of technology , what is the accidents trends with relation to the new make and models of aircraft in the market

Data Understanding

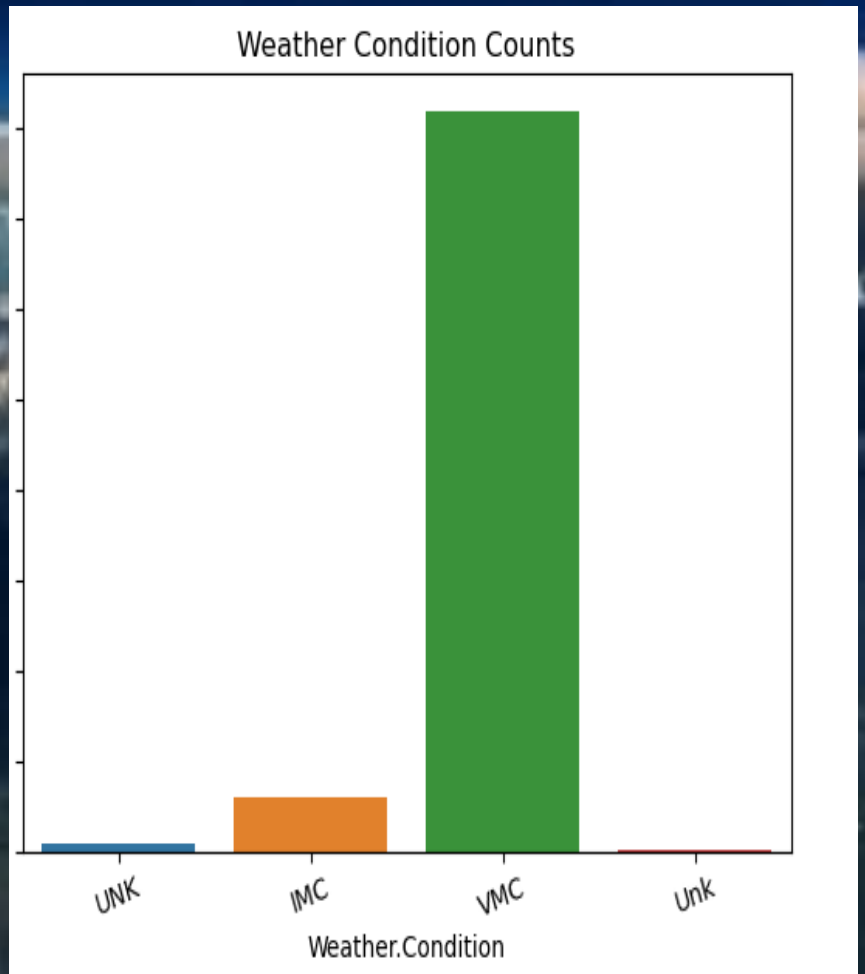
- Data Source-The source of our data is from the kaggle official website , https://www.kaggle.com/.
- Key variables and their meaning

```
 #   Column                Non-Null Count  Dtype
---  ------                --------------  -----
 0   Event.Id              88889 non-null  object
 1   Investigation.Type    88889 non-null  object
 2   Accident.Number       88889 non-null  object
 3   Date_time             88889 non-null  object
 4   Location              88837 non-null  object
 5   Country               88663 non-null  object
 6   Injury.Severity       87889 non-null  object
 7   Aircraft.damage       85695 non-null  object
 8   Registration.Number   87507 non-null  object
 9   Make                  88826 non-null  object
 10  Model                 88797 non-null  object
 11  Number.of.Engines     82805 non-null  float64
 12  Engine.Type           81793 non-null  object
 13  Purpose.of.flight     82697 non-null  object
 14  Total.Fatal.Injuries  77488 non-null  float64
 15  Total.Serious.Injuries 76379 non-null  float64
 16  Total.Minor.Injuries  76956 non-null  float64
 17  Total.Uninjured       82977 non-null  float64
 18  Weather.Condition     84397 non-null  object
 19  Broad.phase.of.flight 61724 non-null  object
 20  Publication.Date      75118 non-null  object
dtypes: float64(5), object(16)
```

From the table, these are the data variables
In the first column, we have
“Column”, =data names
“non-null count”=sum of elements within each column
“Dtype”=data type i.e object(string) and float64/interger

Data Understanding

Weather Conditions



UNK- unknown

IMC –Instrument Metrological Condition

VMC- Visual Metrological Condition

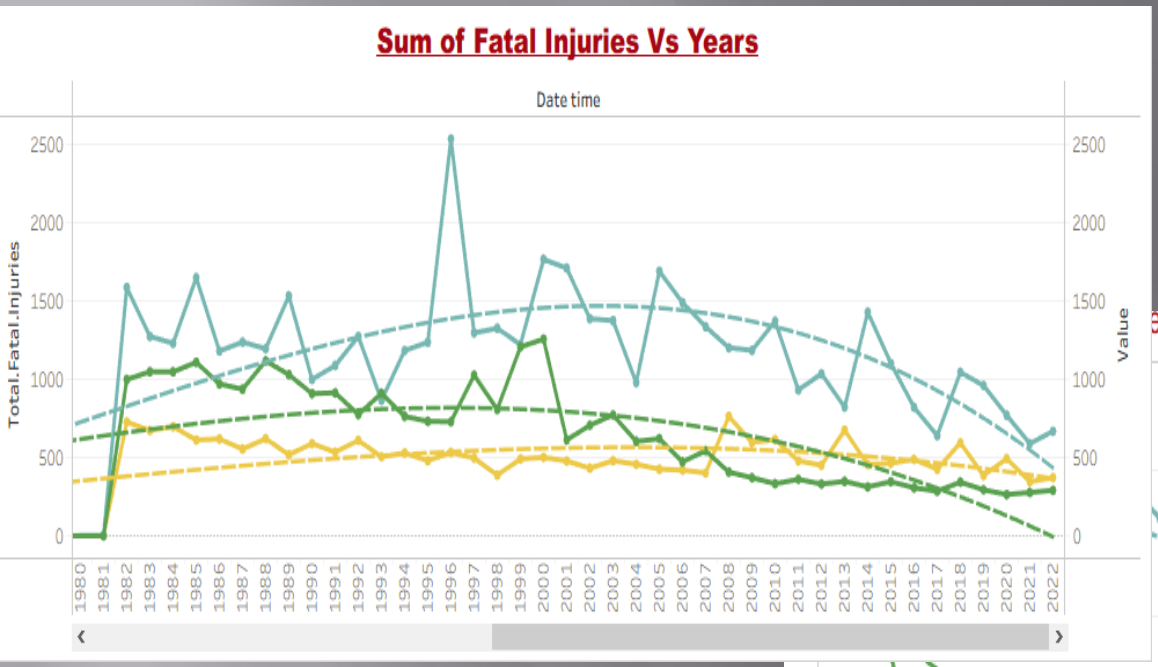
Data Understanding

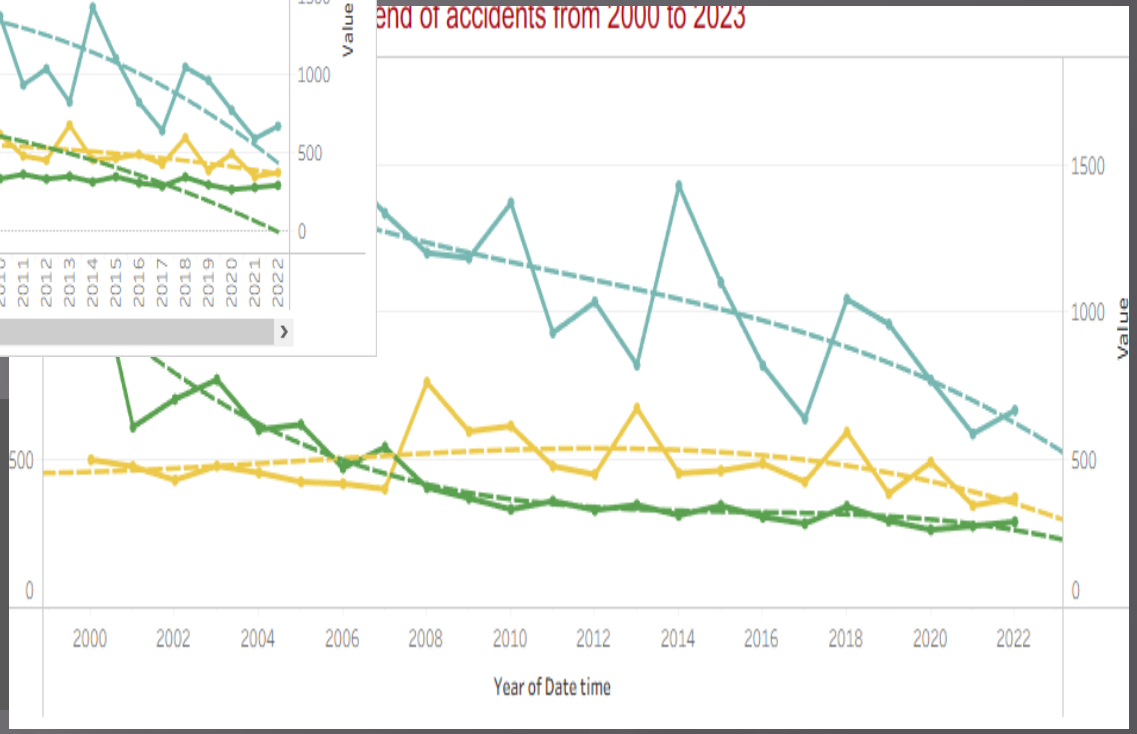
Data Qualities:

. In the data given, in terms of quality, there are a lot missing variables

- Number of passengers per flight
- Amount of fuel consumption per flight
- Amount paid per stuff members
- Power of engines
- *Missing data for 12% of flights – addressed via interpolation*

Data Analysis





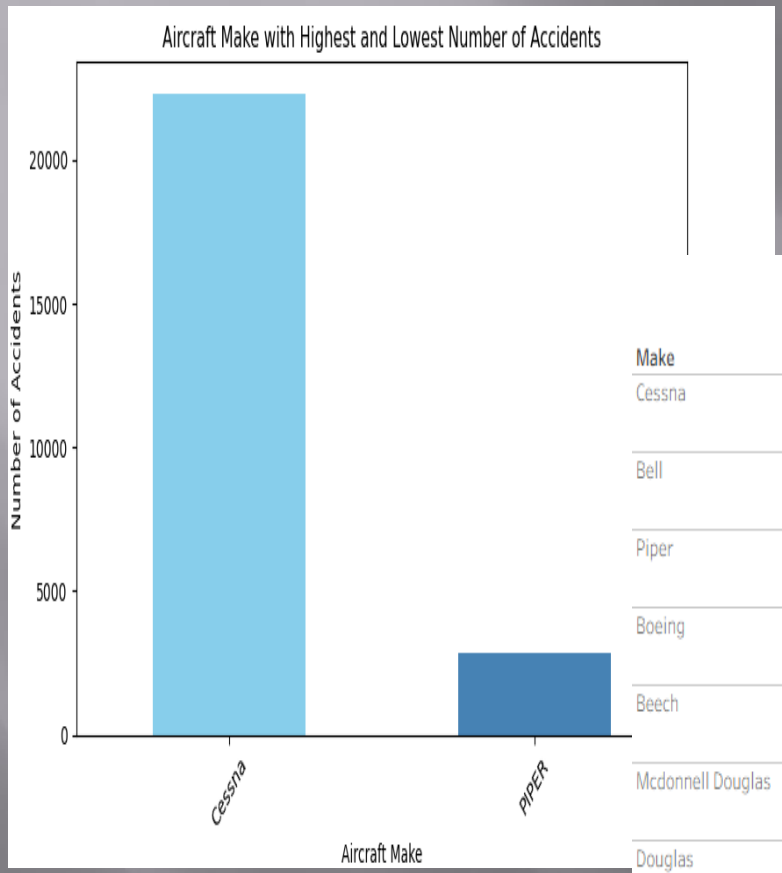
From our analysis we are able to see how the trend of the fatal injuries are decreasing with timeline up to 2022.

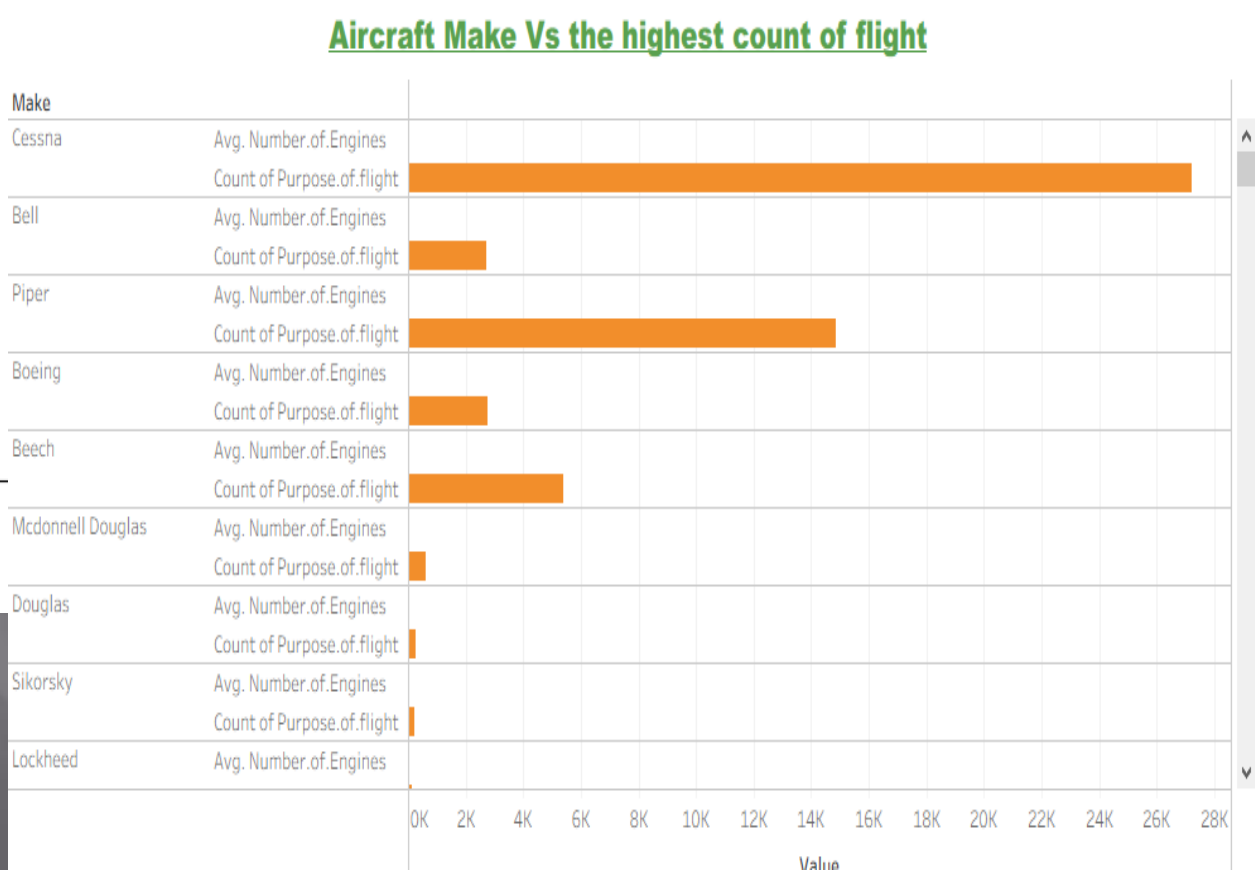
Reason

Since new make of the aircraft are increasing with the number of engines, less accidents usually will decrees.

Data Analysis

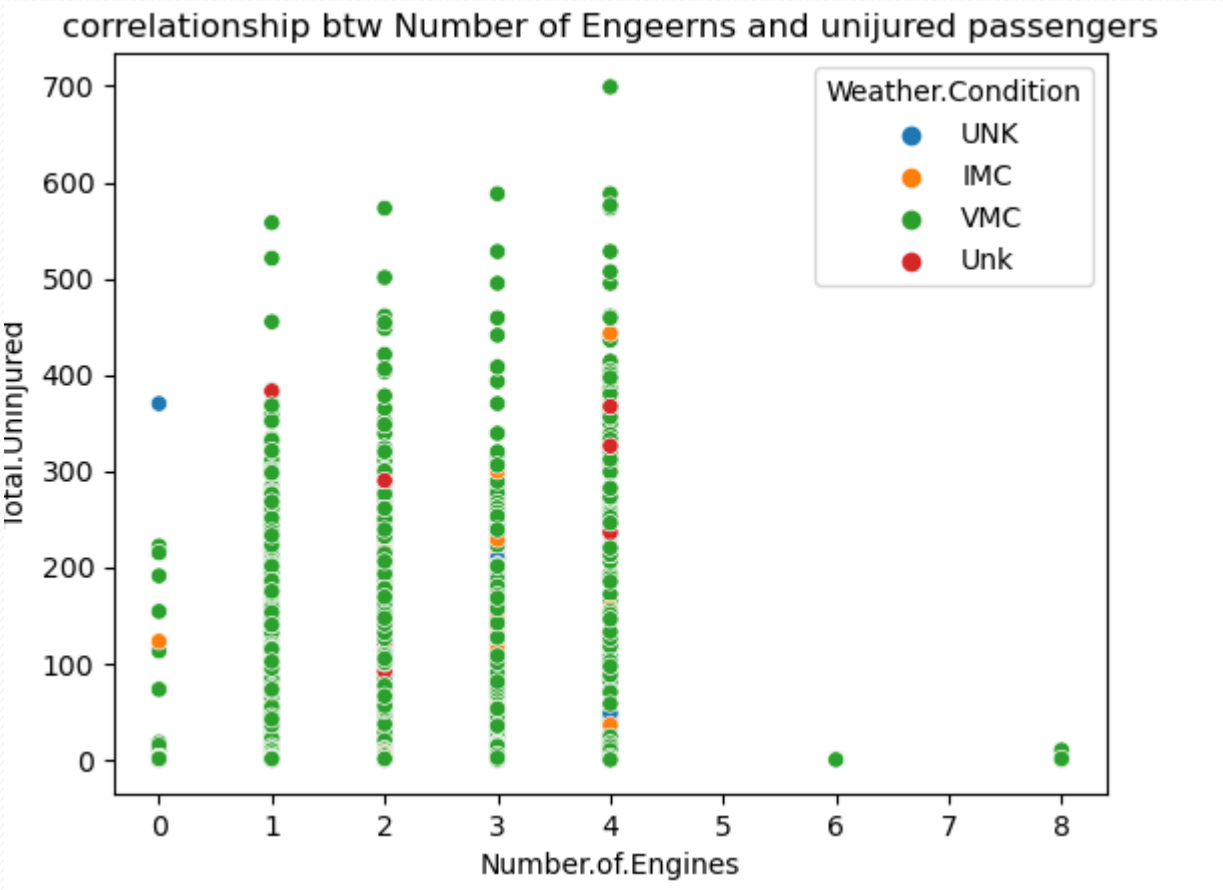
Plotting of the Aircraft Make with the highest number of accidents and flight



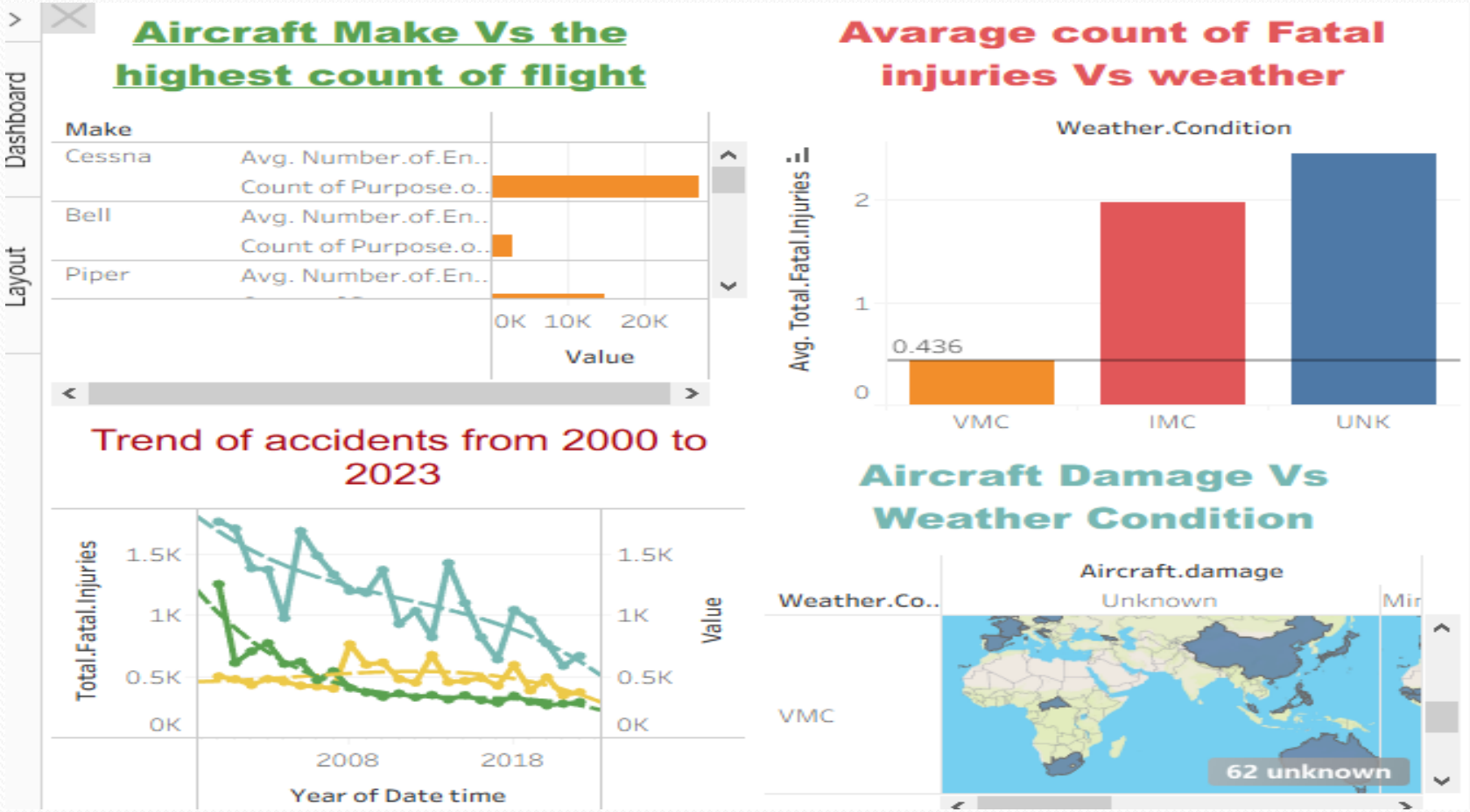


Correlation ship No.of Engines and uninjured

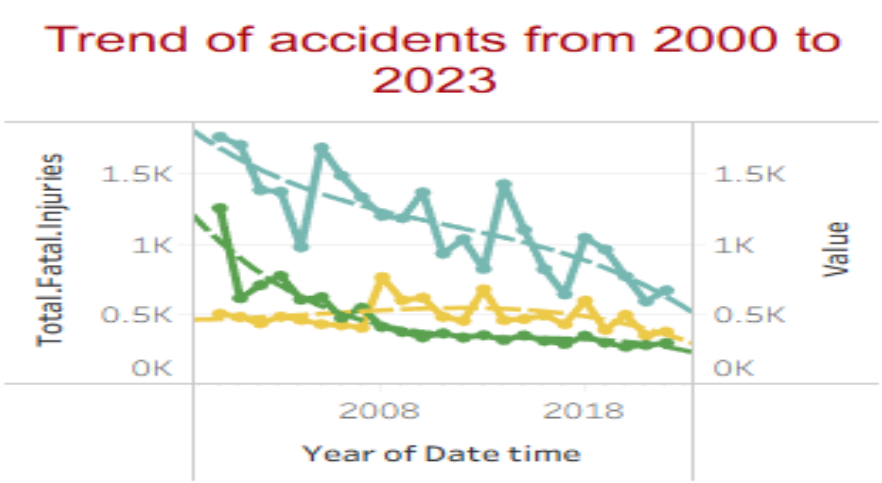
Finding out the relationship between The No. of engines and total uninjured

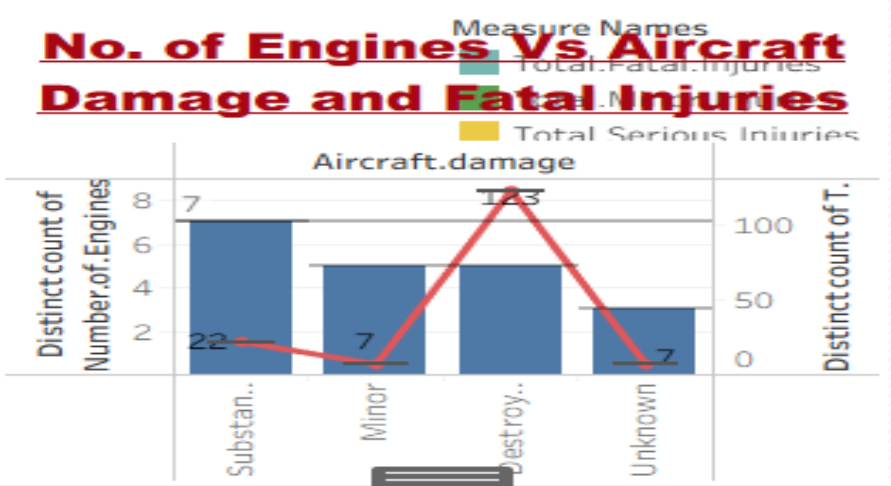


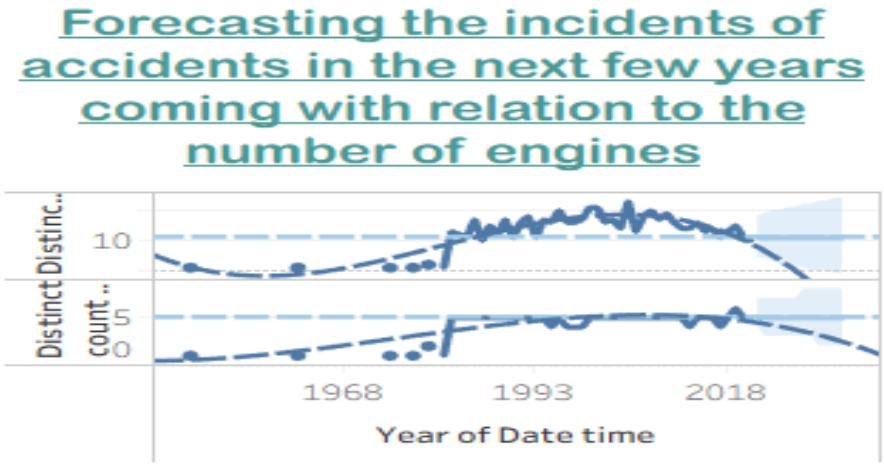
Dash boarding.1

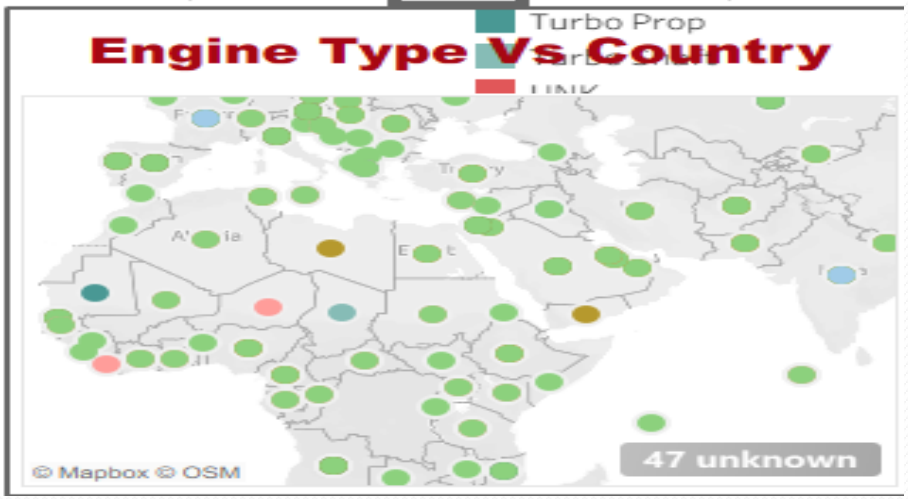


Dash boarding.2



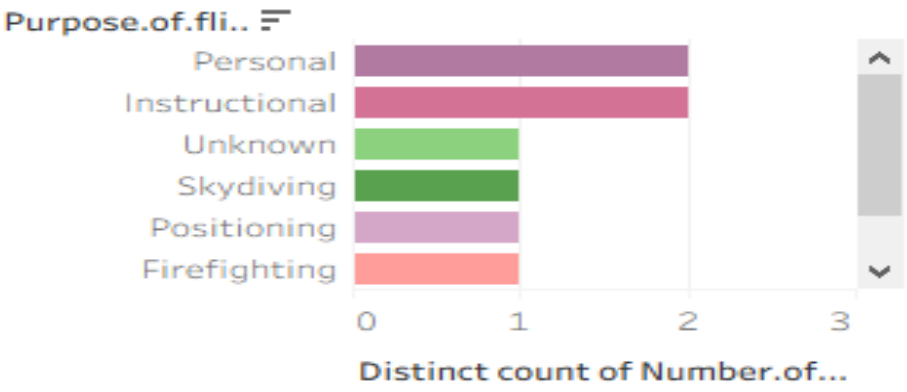




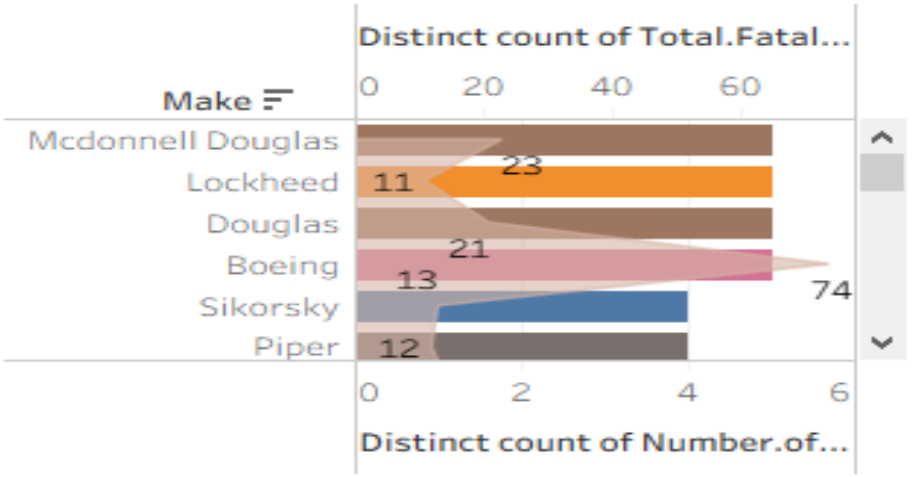


Dash boarding 3

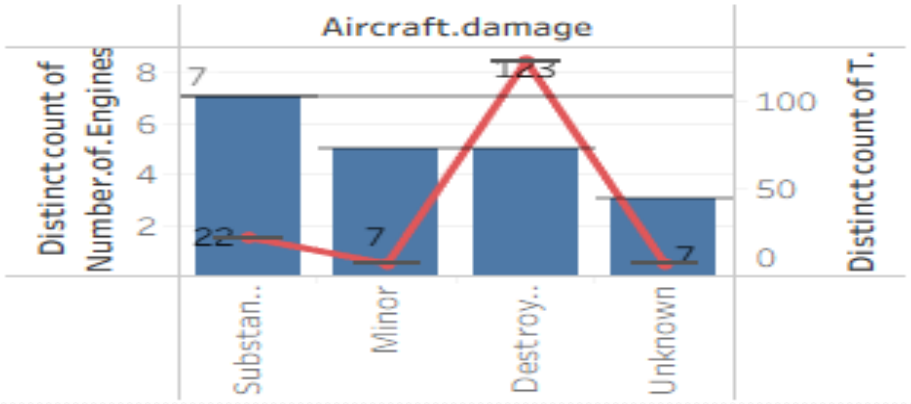
Bar Graph of Number Of Engines and Flight Purpose



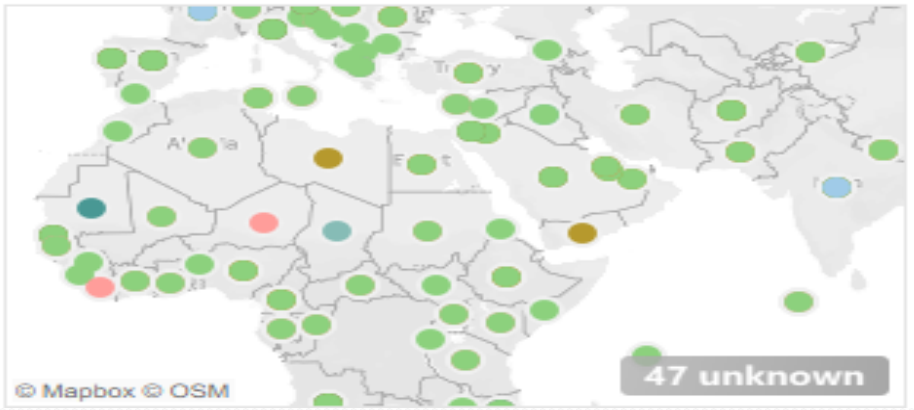
No. of Engines Vs Aircraft Make



No. of Engines Vs Aircraft Damage and Fatal Injuries



Engine Type Vs Country



Recommendations

- ✓ As far as the no. of engines are concerned, the best aircraft is that of more than 2 engines.
- ✓ The best Make of the aircraft is Cessna for it has higher purpose in flight due to the strength in its engine
- ✓ Reciprocating engine Type is the best for most coutry use it in flights , its faster and strong
- ✓ In terms of classes, executive/coperative class uses the aircraft with more than 2 engines, venture much on it
- ✓ Since the insidence of fatal accidence is decreesing due to the new improvements in technology, Maintainace and highly skilled stuff are required to operate Aircrafts with high technology manufactured

Next step

- "Collect real-world usage data to validate lab efficiency numbers."
- "Run cost-benefit analysis for hybrid engine production."
- "Expand analysis to include environmental impact metrics
- Focus on the power engines and distance coverage
- Aircraft Make and Fuel consumption

THANK YOU

Thank you for your attention!"

"Questions?"

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