Optimal Low-Risk Aircraft Selection for Operations

Background **knowledge**

Since 1962 ,the Aviation Business has had flactuations and many of these have resulted from Aircraft accidents caused by various factors. This is from a report made by The NTSB aviation accidents Database .

Project goal

Identify:

1.Which Aircraft has the lowest risk for the company?

2.Which Aircraft has the highest number of accidents?

3.Which location had the highest number of accidents?

4.Which state had the highest number of incidents?

This project is from [Aviation Accident Database & Synopses, up to 2023](#) and is about an analysis of Aircraft accidents from the year 1962 to 2023.This project aims at finding the Lowest Risk Aircraft for purchase by answering the following questions:

Business Understanding

This project highlights a problem that has been a menace for many years.Many lives have been lost through plane crashes and there are many reasons behind this.This directly impacts the Aircraft business and for an organization intending to invest in this business.A good background check and analysis must be done to ensure the safety,maintenance cost as well as operational cost of running such a business.This is the main purpose of doing this research so as to find the Lowest-Risk Aircraft for purchase for both personal and commercial use.

Data Understanding

I used 17 columns after cleaning for my Analysis,which included the following variables :

1.Total number of accidents caused by various aircrafts
2.The categories of Aircrafts involved
3.Location of the Aircrafts accidents
4.The weather patterns for when the accidents happened

Exploratory Data Understanding

Summary Statistics

	Fatal injuries	Serious injuries	Minor Injuries	Uninjured
Mean	0.564761	0.240491	0.309127	5.037755
std	5.126649	1.434614	2.083715	26.990914

Univariate Analysis

AIRCRAFT CATEGORY - From this data ,not many aircrafts are in use at the moment. Among the top 5 most used Aircrafts is the Aeroplane.This means it is the most popular Category of Aircraft used .This maybe because it has low maintenance cost and is mostly available in the market

 WEATHER CONDITION-The VMC condition has highest distribution ,meaning this is when most Aircrafts leave the stations .
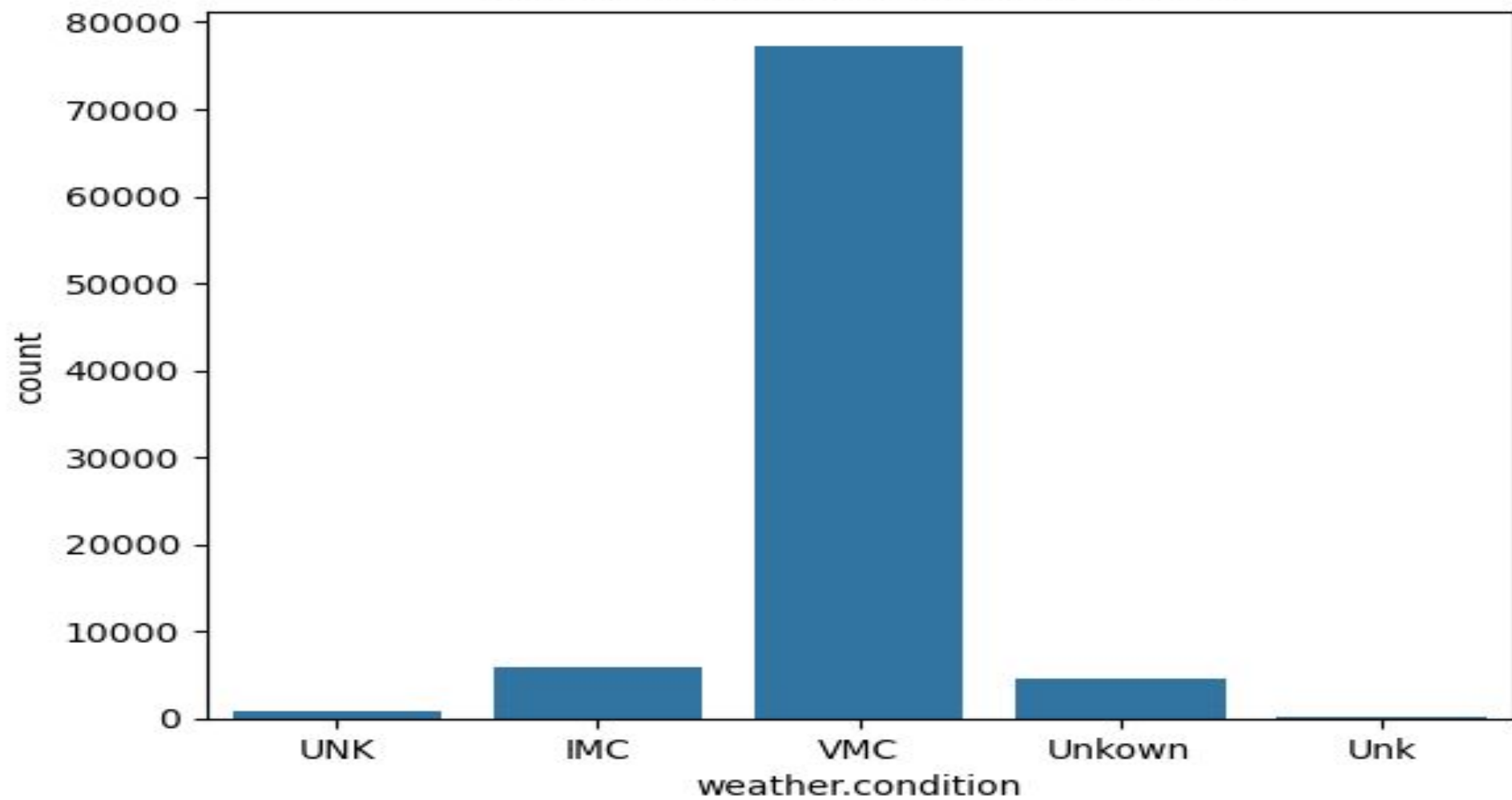
Aircraft Category bar plot
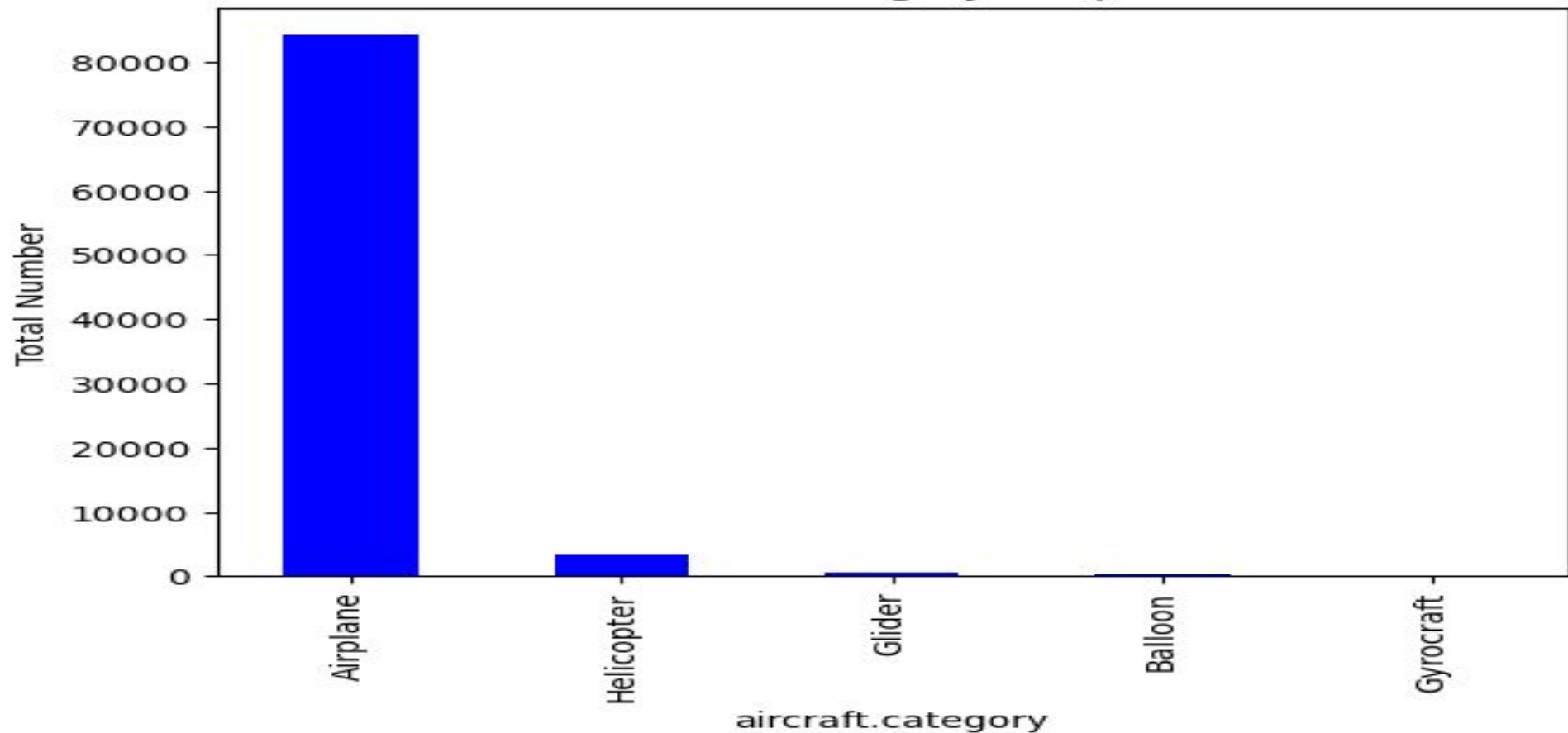
From the above ,we see a majority of Aircrafts are the Aeroplanes, unfortunately most accidents are also caused by the Aeroplanes

Abbreviations

VMC -Visual Meteorological Conditions

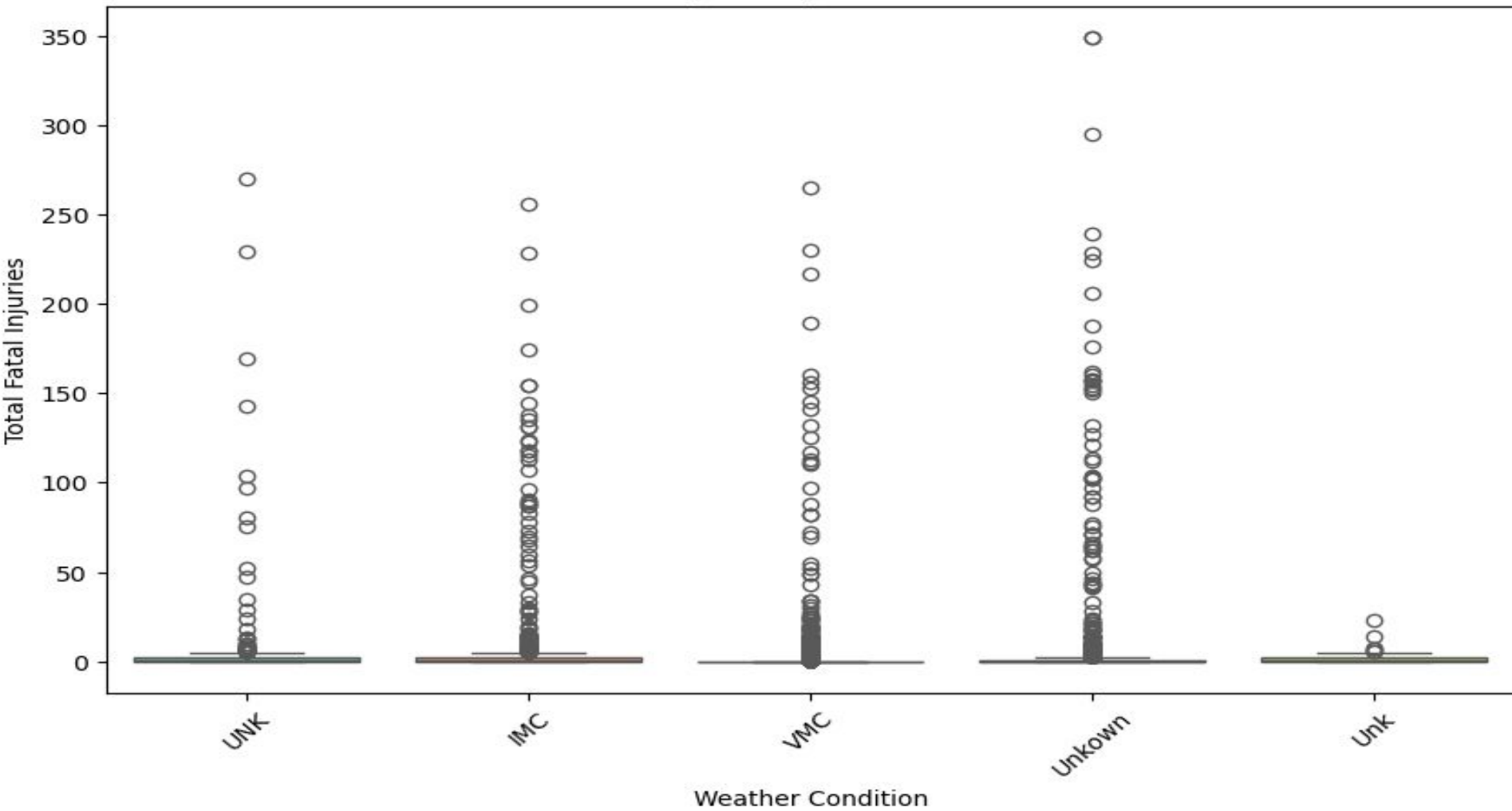IMC -Instrument Meteorological Conditions

Distribution of Weather Conditions

Bivariate Analysis:

Finding relationship between two variables

Total Fatal Injuries by Weather Condition

Weather condition versus fatal injuries:

From the data we can see that in the VMC weather condition,where most Aircrafts have been in use,there are likely to be many fatal accidents as compared to the rest of the conditions.This is likely because the weather condition though mostly used, is not as convenient

Multivariate Analysis:

Finding relationships between many variables
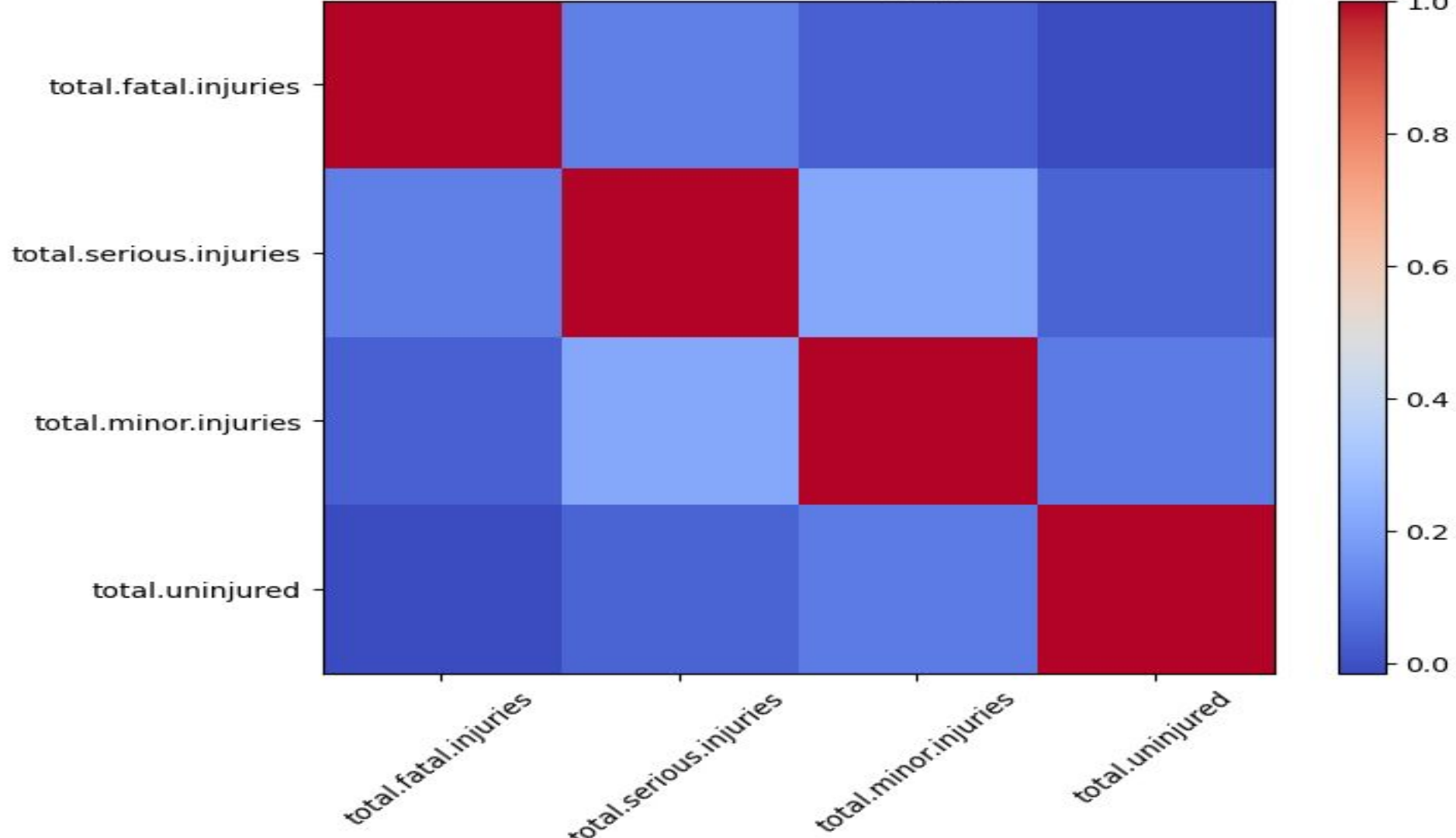
There is a positive correlation between fatal injuries and serious injuries.This is to say an increase in fatal injuries will increase the number of serious injuries

Recommendation

1.From the data ,various categories of Aircrafts need to be updated ,since a good number of them are no longer in use. This makes the process of selection more difficult.
2. Despite most Aircrafts working in the VMC weather condition, more safety precautions need to be taken to ensure safety of passengers
3. A deeper research needs to be undertaken on the severity of accidents to understand more on the causes of this accidents.