ACCIDENT ANALYSIS

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OVERVIEW

- The aviation industry is constantly evolving and it comes with its own set of complexities making safety an essential focus. To succeed in this field, a strong understanding of historical incidents and accident data is required to develop preventative strategies. For organizations new to aviation, learning about previous incidents is critical as the insights help to improve safety processes and ensures that the industry maintains the greatest degree of safety.

INTRODUCTION

The goal of my project is to analyze and identify the Aircraft make which poses the lowest potential risk while operating it .

This will involve assessing accident trends , injury severity and evaluating the impact of purpose of flight.This will provide actionable recommendations for Aircraft selection.

DATA LOADING AND Data Cleaning

Inorder to analyze and manipulate data better I used the following libraries :

Pandas

Seaborn

Matplotlib

With the help of pandas, this are the steps I followed when cleaning the data

Identify any issues it the data like missing values

Remove any missing values

Remove duplicates

Checking for outliiers

DATA EXPLORATION

- With the help of matplotlib and seaborn I created some virsualizatons inorder to understand the data better.

Accidents trends

A bar plot Top 10 Aircraft Makes by Accident Count

A bar Plot for Top 10 Aircraft Makes by Total Fatal Injuries

A bar plot For Top 10 Aircraft Makes by Total.Uninjured

A bar plot for Top 10 Aircraft Makes by Total.Serious

A bar plot for Top 10 Aircraft Makes by Total.injured

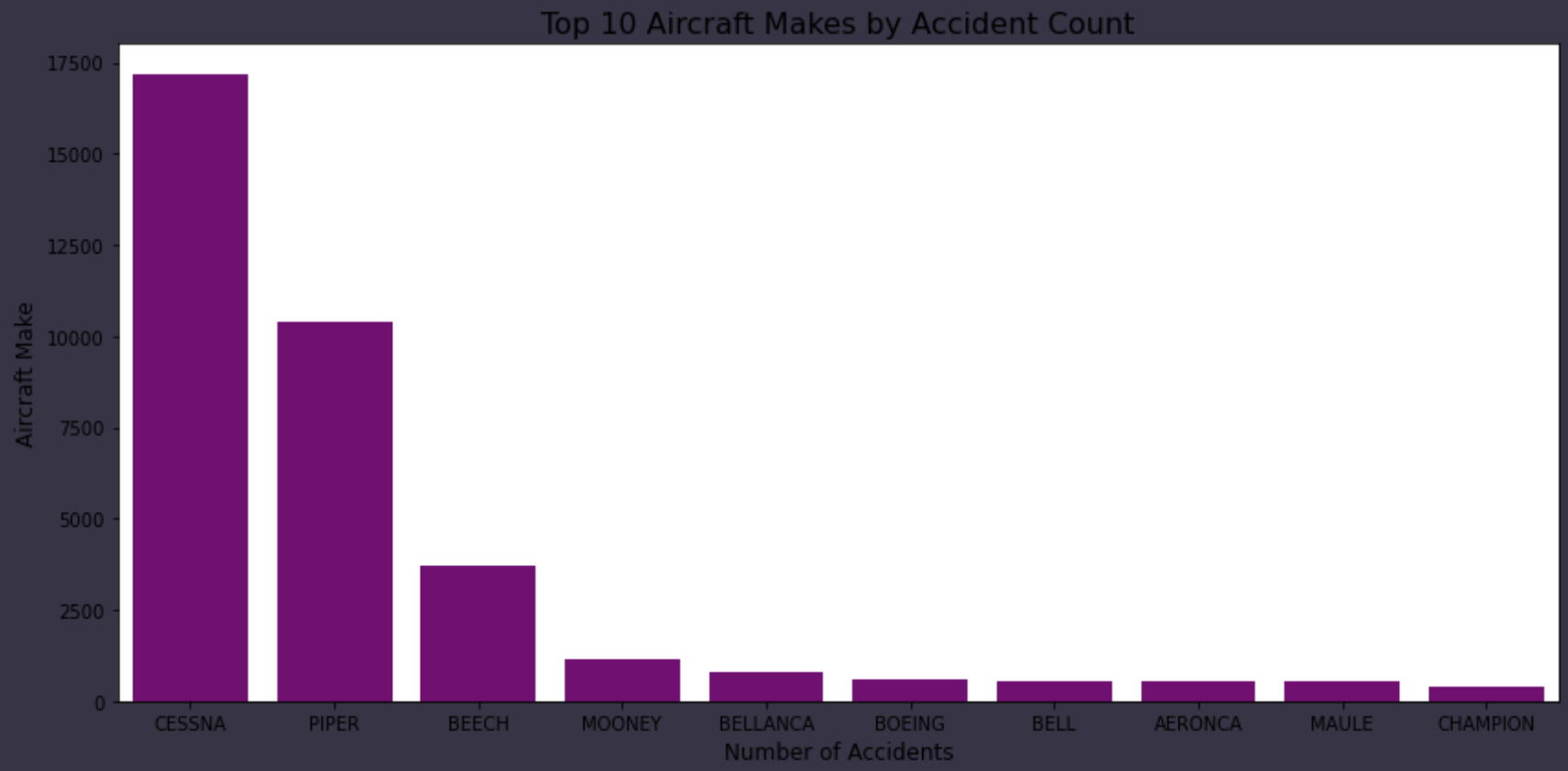
A bar plot for Total Uninjured by Number.of.Engines

A bar plot for Total injured by Number.of.Engines

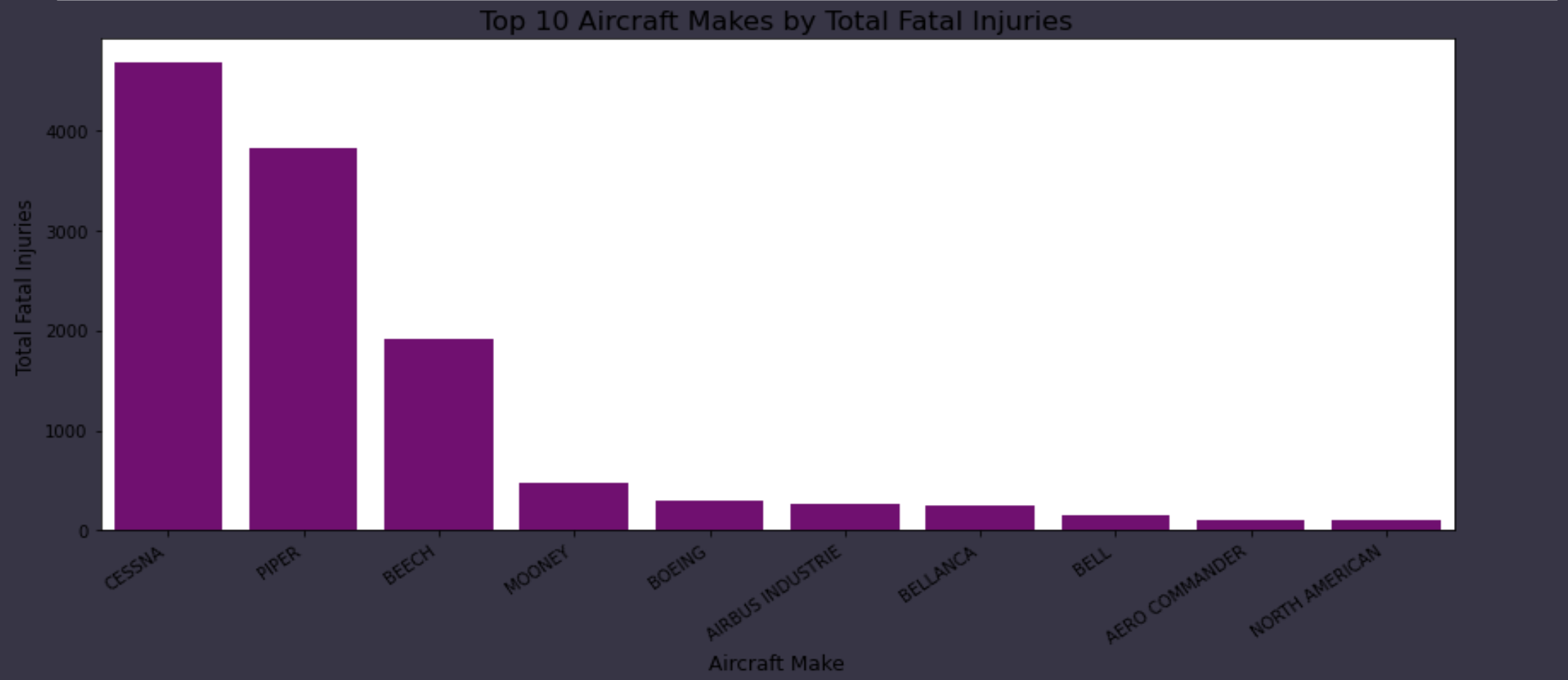
A bar plot for Total serious by Number.of.Engines

A bar plot for Total Fatal by Number of Engines

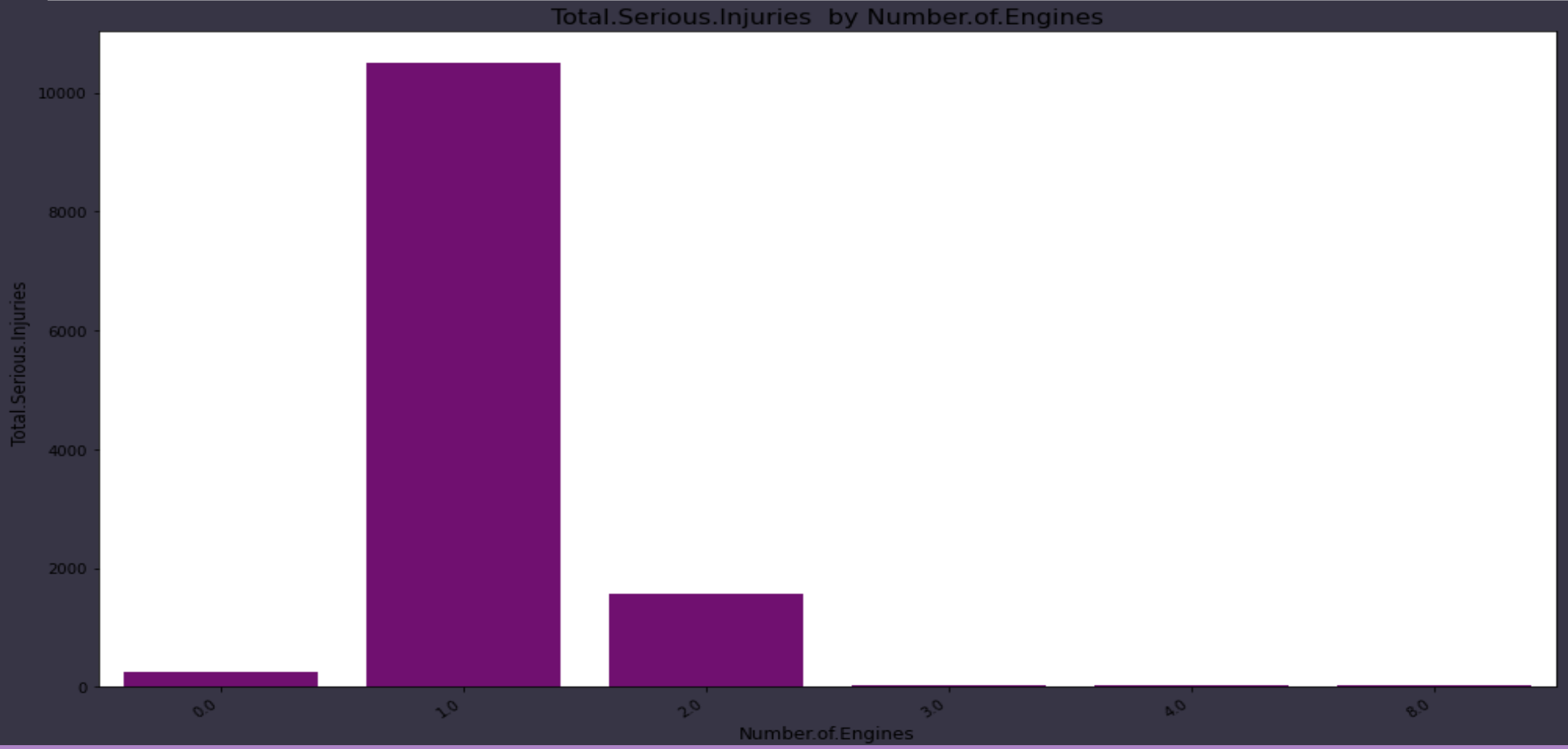
A bar plot Top 10 Aircraft Makes by Accident Count



A bar Plot for Top 10 Aircraft Makes by Total Fatal Injuries



A bar plot for Total serious by Number.of.Engines



Injury Severity

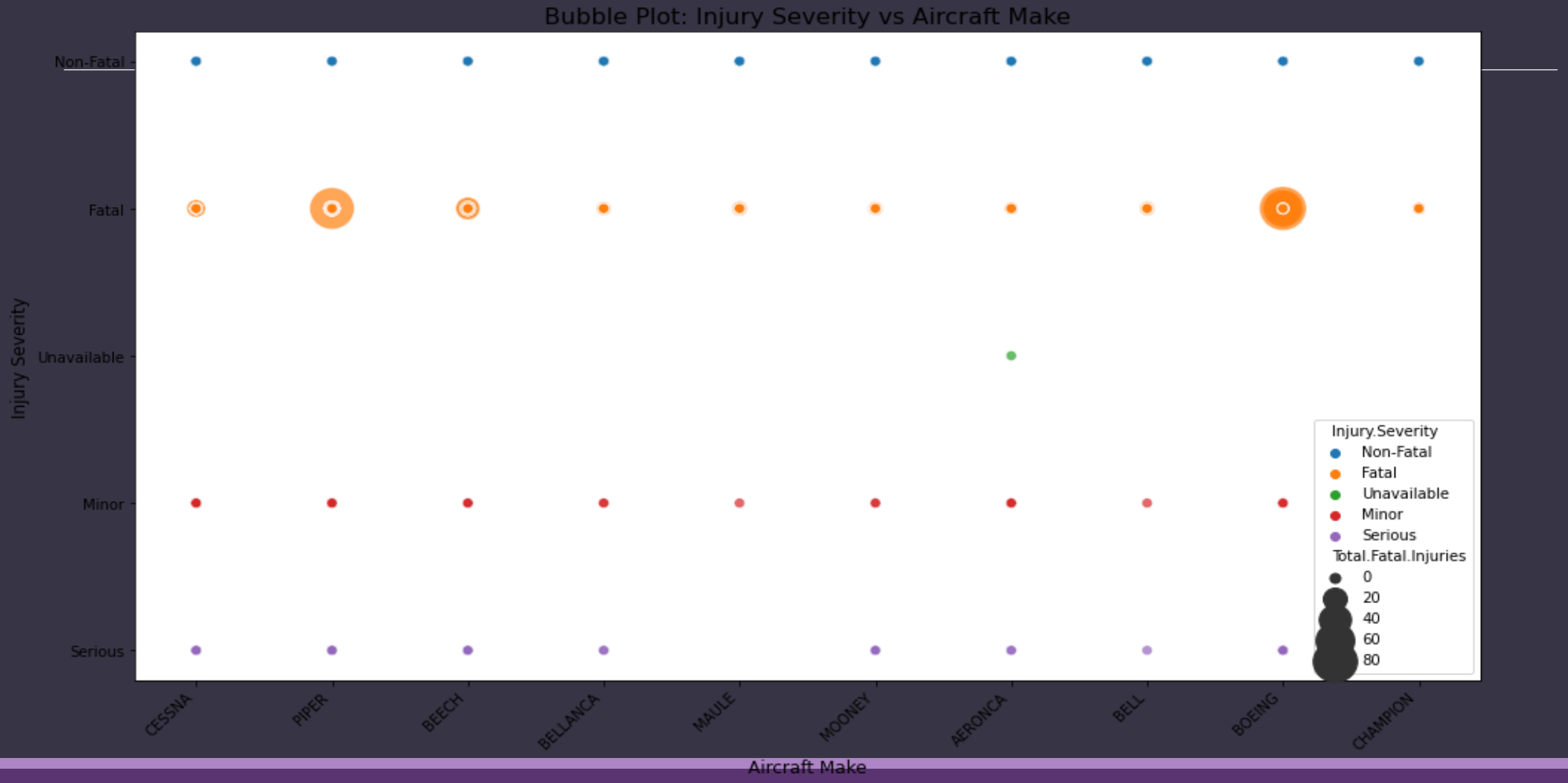
A Bubble Plot for Injury Severity vs Aircraft Make

A bar plot for Total Fatal Injuries by Injury Severity and Aircraft Make

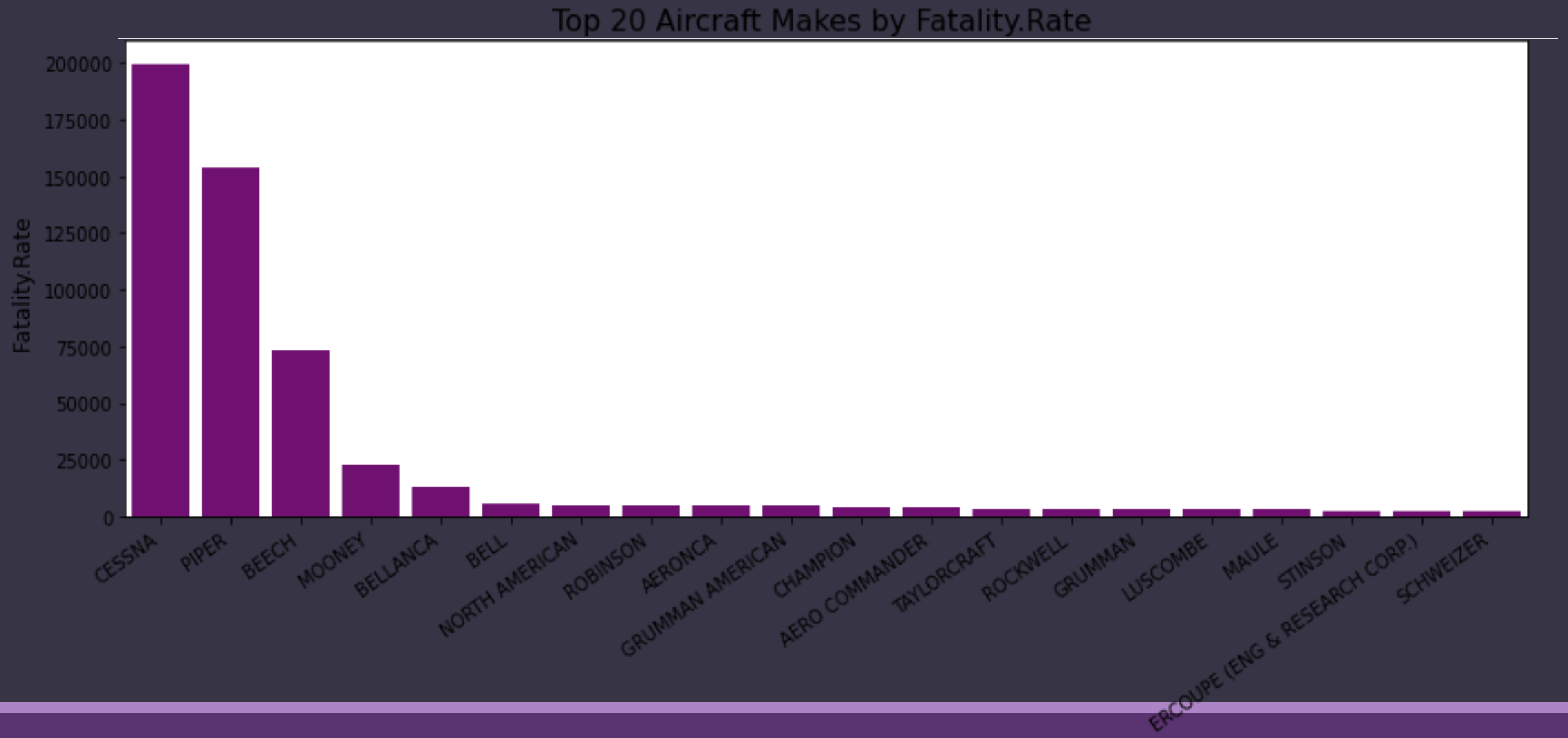
A bar plot for Injury Severity vs Make for top ten aircrafts

A bar plot for Top 10 Aircraft Makes by Fatality.Rate

A Bubble Plot for Injury Severity vs Aircraft Make



A bar plot for Top 10 Aircraft Makes by Fatality.Rate

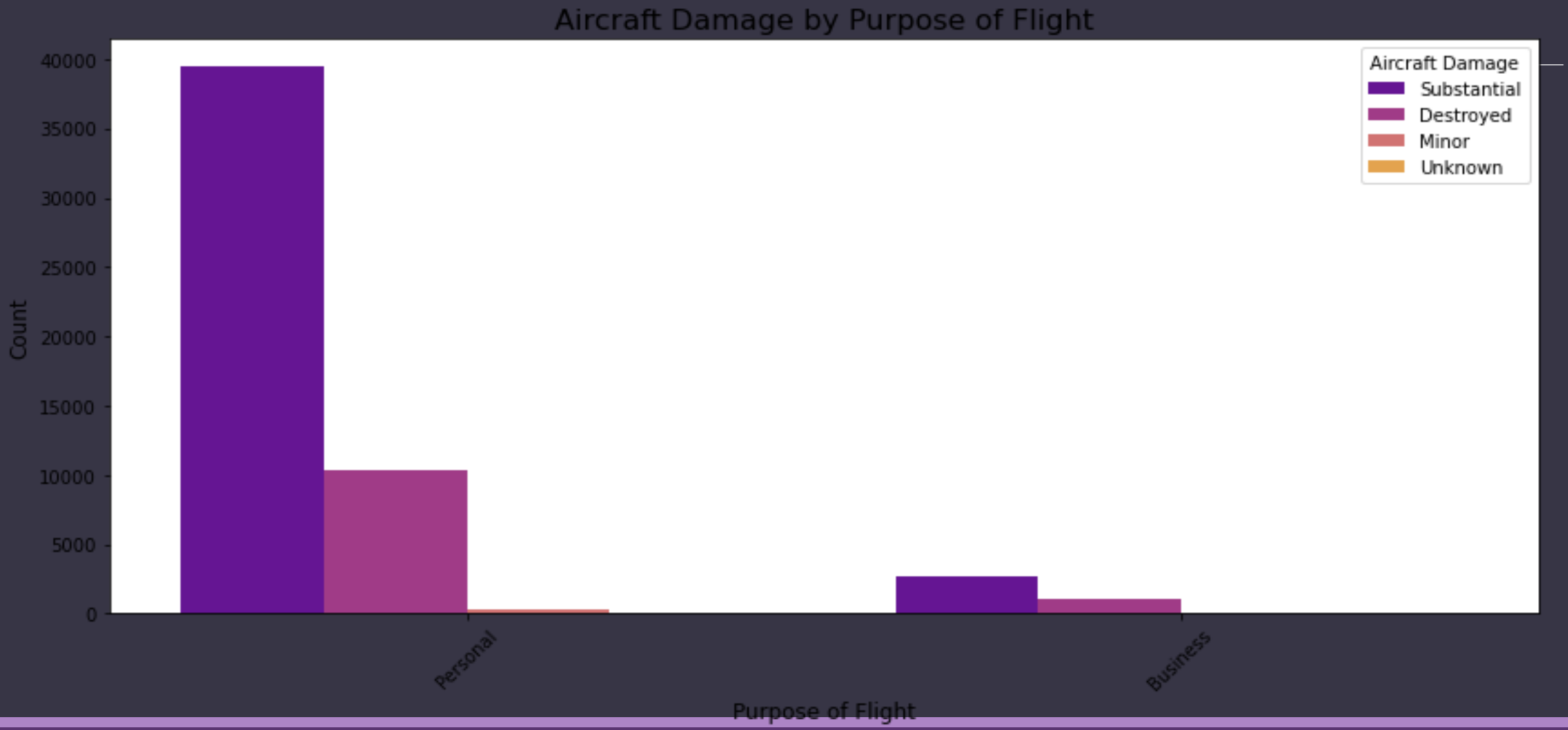


The impact of purpose of flight.

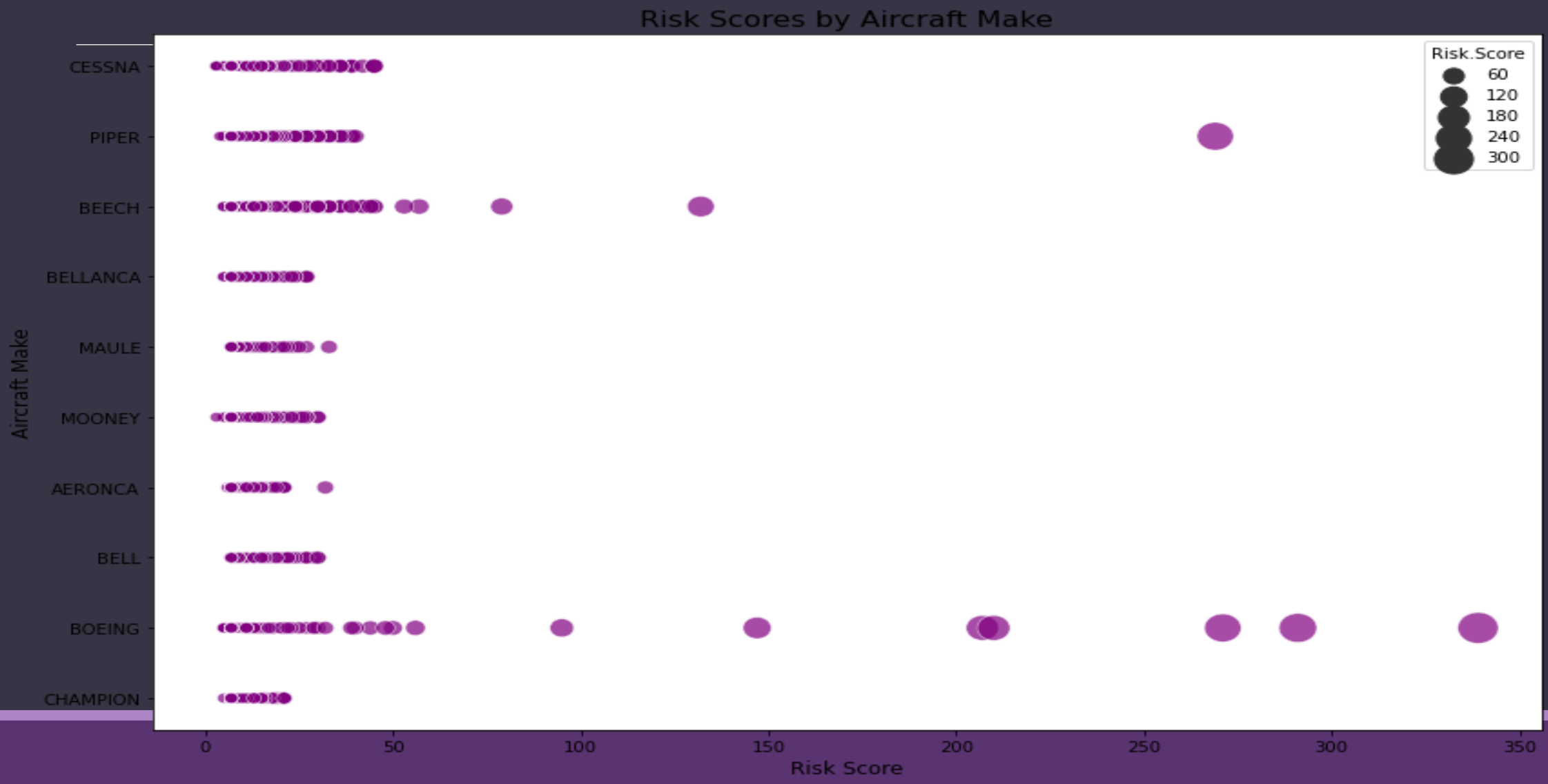
A bar plot for Aircraft Damage by Purpose of Flight

A pile chart Distribution of Purpose of Flight

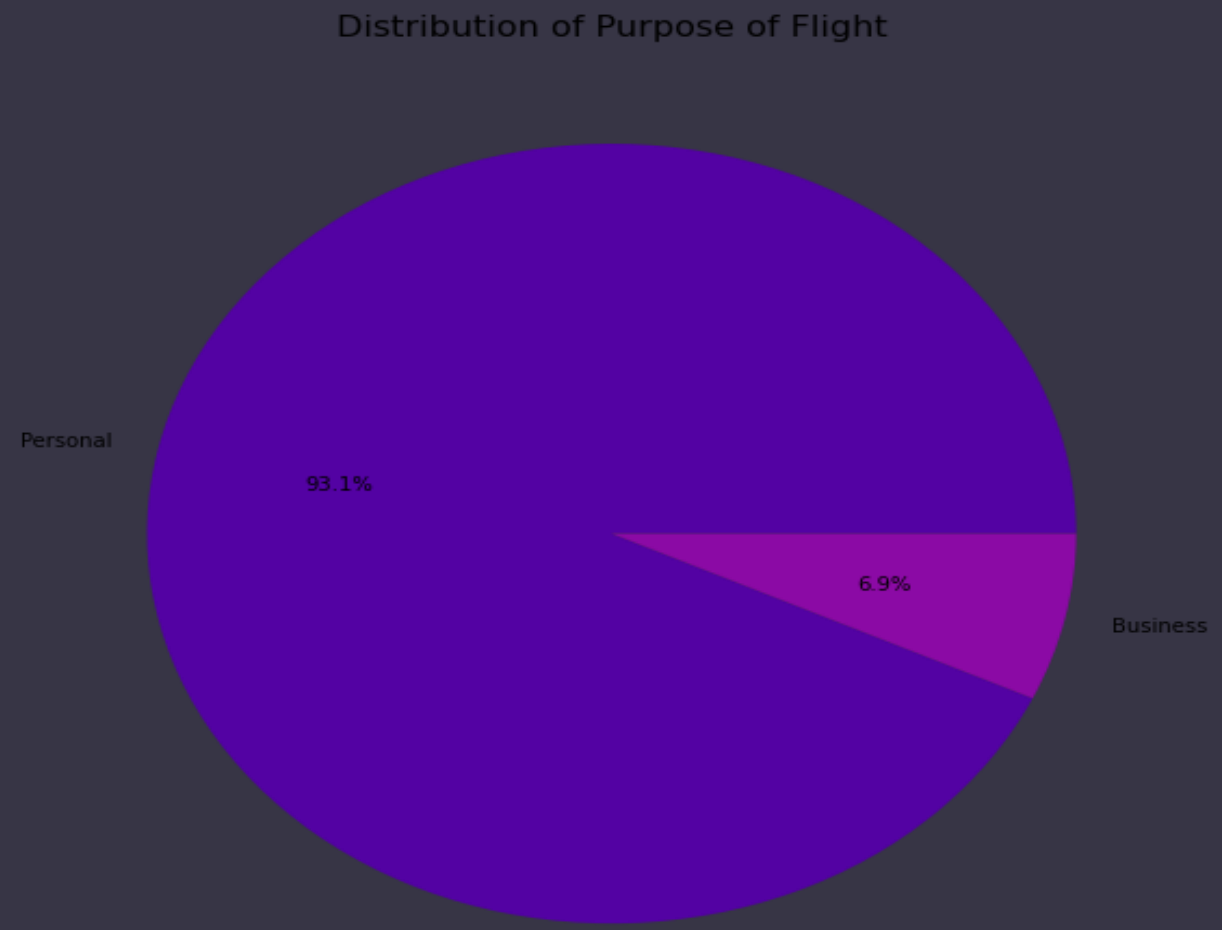
A bar plot for Aircraft Damage by Purpose of Flight



A scatter plot for riskscore by aircraft make



A pile chart Distribution of Purpose of Flight



FINDINGS

Certain aircraft makes like Boeing consistently show the lowest fatality rate, indicating their superior safety record compared to CESSNA and Piper for an Aircraft with 2 engines

Aircraft makes like Piper and **Cessna** exhibit the highest fatality rates, suggesting they may be associated with higher operational risks and accidents.

Fatal injuries constitute a significant portion of accidents involving certain makes, while others primarily report non-fatal or minor injuries, indicating differences in safety design or usage.

Personal flights tend to have higher fatality rates compared to business flights, possibly due to less stringent regulations or inexperienced pilots.

Commercial flights concistenly show the lowest injury severity, highlighting high safety standards.

Aircraft categorized as "Destroyed" during accidents have an overwhelming majority of fatal outcomes, while "Substantial" damage is more often associated with non-fatal injuries.

FINDINGS

Single-engine aircraft exhibit a higher accident rate compared to multi-engine aircraft, particularly in personal flights.

Larger commercial aircraft have fewer accidents but account for a greater number of people involved in a single incident when they occur.

RECOMMENDATION

Aircraft makes with consistently low fatality rates, such as **Boeing**, should be prioritized. Their superior safety records make them suitable for both commercial and private operations.

Multi-engine aircraft demonstrate higher reliability and safety, especially in emergency situations. Boeing is an ideal choice for ensuring operational safety.

Aircraft makes with high numbers of uninjured passengers in accidents like Boeing)indicate effective safety features. These designs minimize the impact of incidents, making them a safer investment.

For commercial operations, select models like Boeing, which have a proven track record of safety even with large passenger volumes.

Aircraft like CESSNA which have historically high fatality rates or those frequently associated with "Destroyed" damage outcomes should be excluded from consideration. Instead, focus on manufacturers with proven durability and safety.

Regardless of aircraft choice, invest in comprehensive training programs for pilots and crew to minimize human error, especially for business and personal flights.