

OI

Data Science Project

Data Visualization of Bird Strikes between 2000 - 2011



Ponnuri Eashwar Sai Akash



Problem Statement

Transport and communication are in the crucial domain in the field of analytics. Environmental impacts and safety are, nowadays, two major concerns of the scientific community with respect to transport scenarios and to the ever-growing urban areas. These issues gain more importance due to the increasing amount of vehicles and people. Seeking new solutions is reaching a point where available technologies and artificial intelligence, especially MAS, are being recognized as ways to cope with and tackle these kinds of problems in a distributed and more appropriate way.

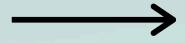
A bird strike is strictly defined as a collision between a bird and an aircraft which is in flight or on a take-off or landing roll. The term is often expanded to cover other wildlife strikes - with bats or ground animals. Bird Strike is common and can be a significant threat to aircraft safety. For smaller aircraft, significant damage may be caused to the aircraft structure and all aircraft, especially jet-engine ones, are vulnerable to the loss of thrust which can follow the ingestion of birds into engine air intakes. This has resulted in several fatal accidents.

Bird strikes may occur during any phase of flight, but are most likely during the take-off, initial climb, approach and landing phases due to the greater numbers of birds in flight at lower levels. To have a closer look the following document visually depicts the data collected on Bird Strikes by FAA between 2000-2011.



Objectives

- **Data Exploration:** Analyse and visualise the data to gain insights into the frequency, patterns, and characteristics of bird strikes between 2000 and 2011.
- **Yearly Trends:** Examine the yearly trends in bird strikes, identifying any significant variations and patterns that could inform safety measures.
- **Airline Analysis:** Identify the top 10 U.S. airlines most prone to bird strikes, shedding light on areas for potential safety enhancements.
- **Airport Incidents:** Highlight the top 50 airports with the highest incidents of bird strikes, helping prioritise areas for preventive measures.
- **Cost Analysis:** Explore the financial impact of bird strikes on a yearly basis, providing a comprehensive understanding of economic implications.
- **Temporal Analysis:** Determine the times and phases of flights when bird strikes are most prevalent, aiding in targeted safety protocols.



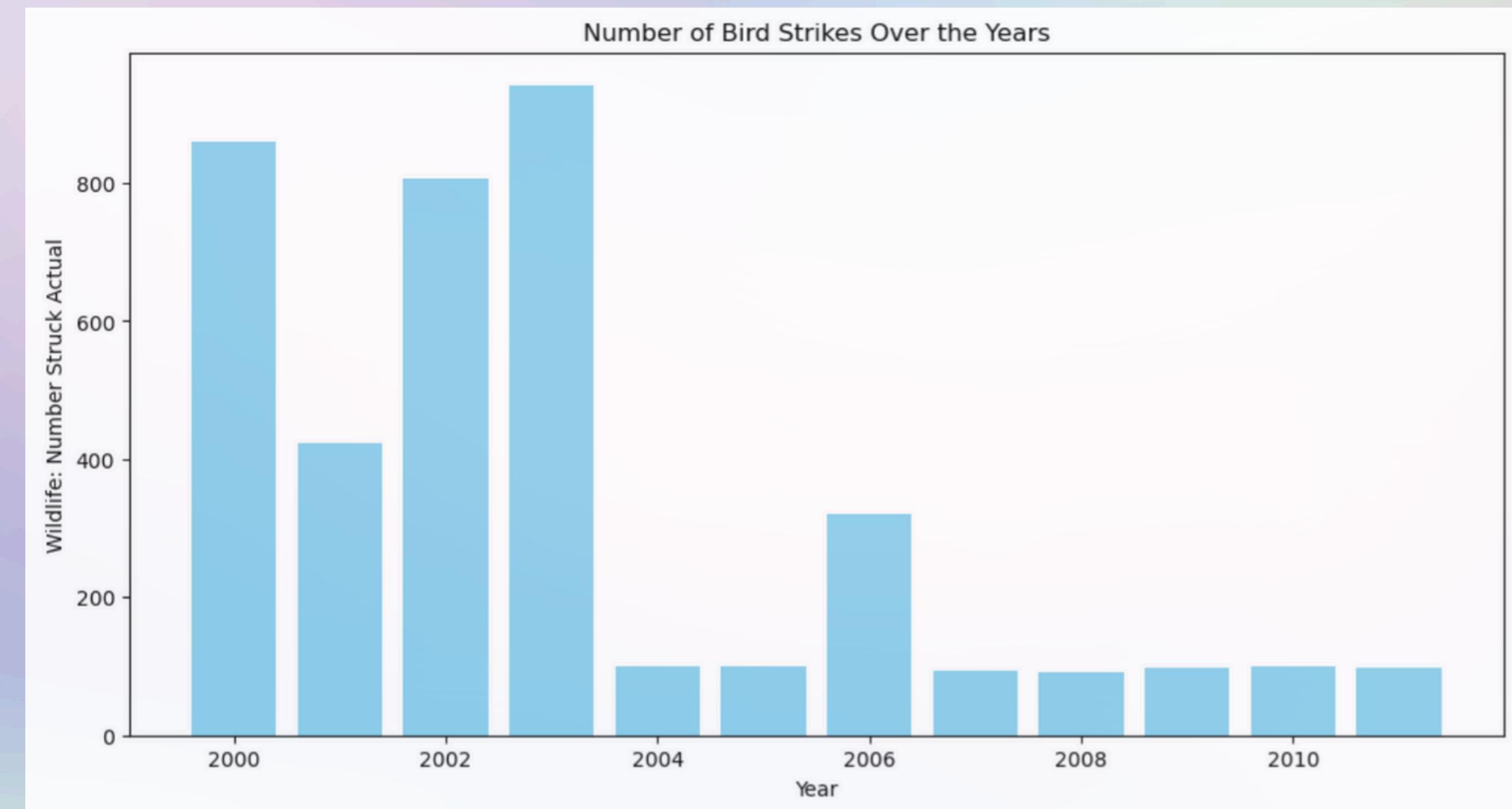
Objectives

- **Altitude Impact:** Investigate the altitude at which bird strikes commonly occur, contributing to a better understanding of the environmental factors.
- **Flight Phases:** Analyse the impact of bird strikes based on the different phases of flight, guiding safety measures during critical stages.
- **Average Altitude:** Explore the average altitude of airplanes during bird strikes across different flight phases for nuanced insights.
- **Effect on Flight:** Examine the effects of bird strikes on flights, categorizing impacts to enhance safety measures.
- **Altitude-specific Effects:** Investigate the correlation between bird strike effects and different altitudes, guiding targeted preventive strategies.
- **Pilot Communication:** Assess whether pilots were informed about birds or wildlife, exploring the relationship between prior warnings and the outcome of bird strikes.



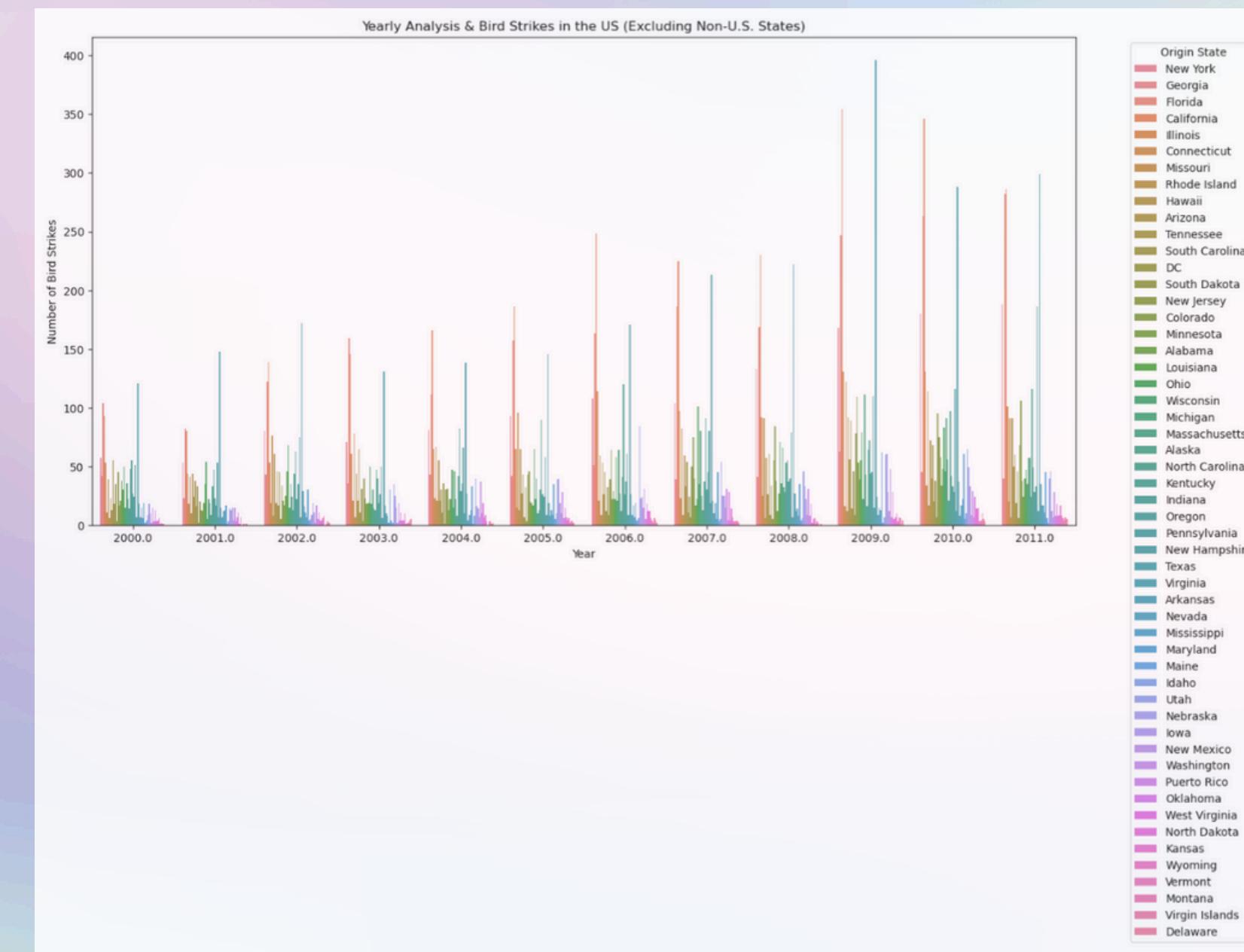
o5

Number of Bird Strikes Over the Years

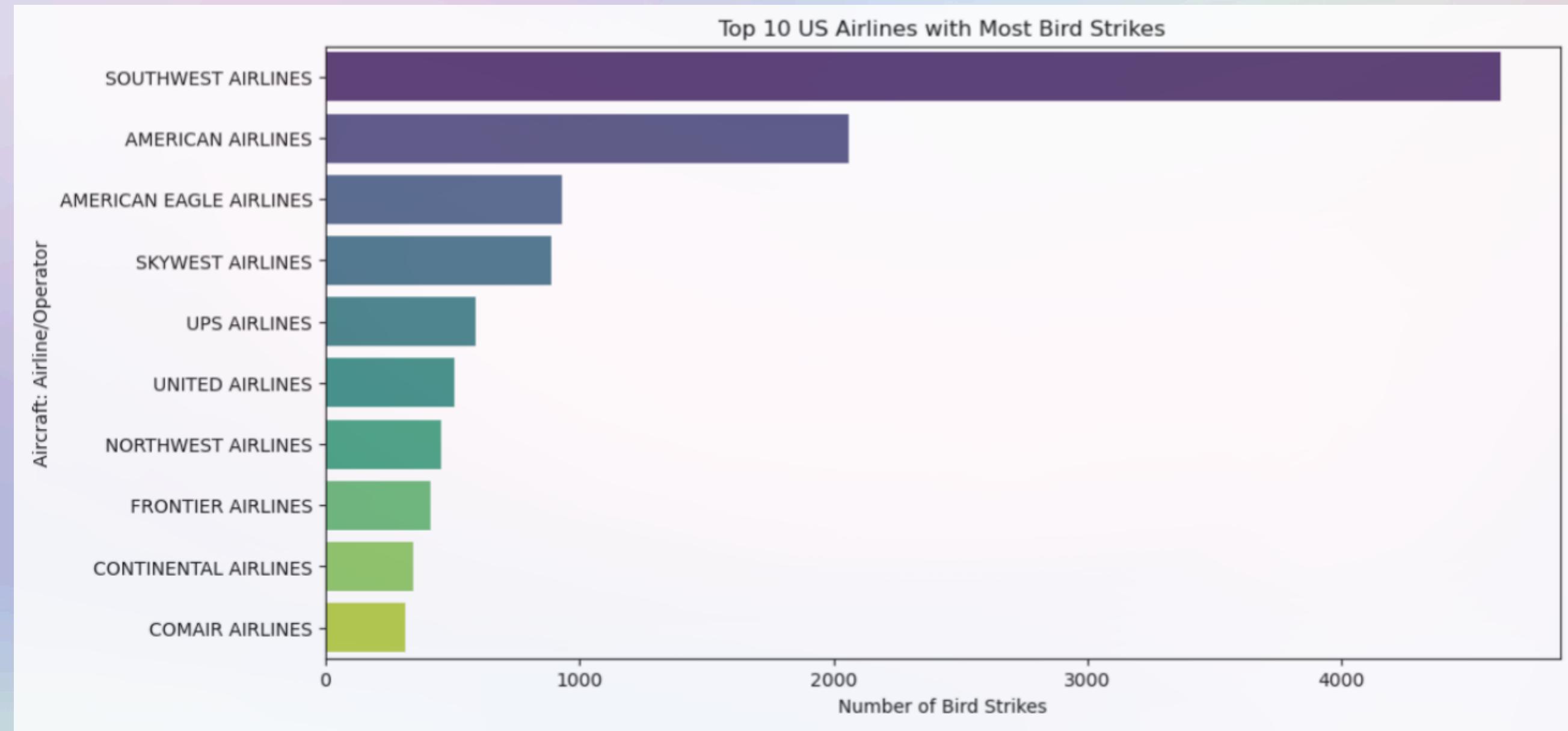


o6

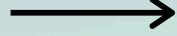
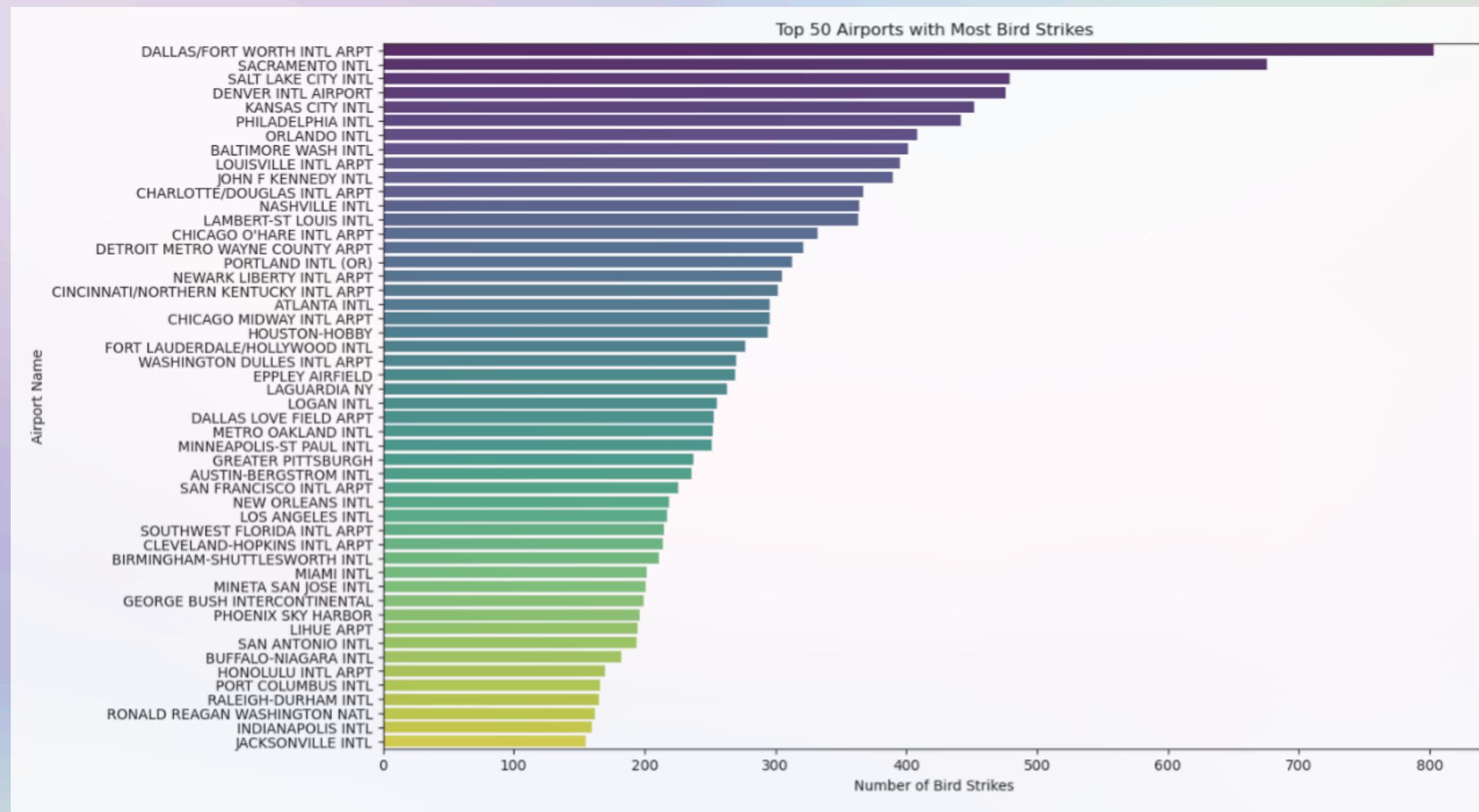
Yearly Bird Strikes in the US (Excluding Non-U.S. States)



Top 10 US Airlines in terms of having encountered bird strikes

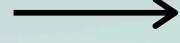
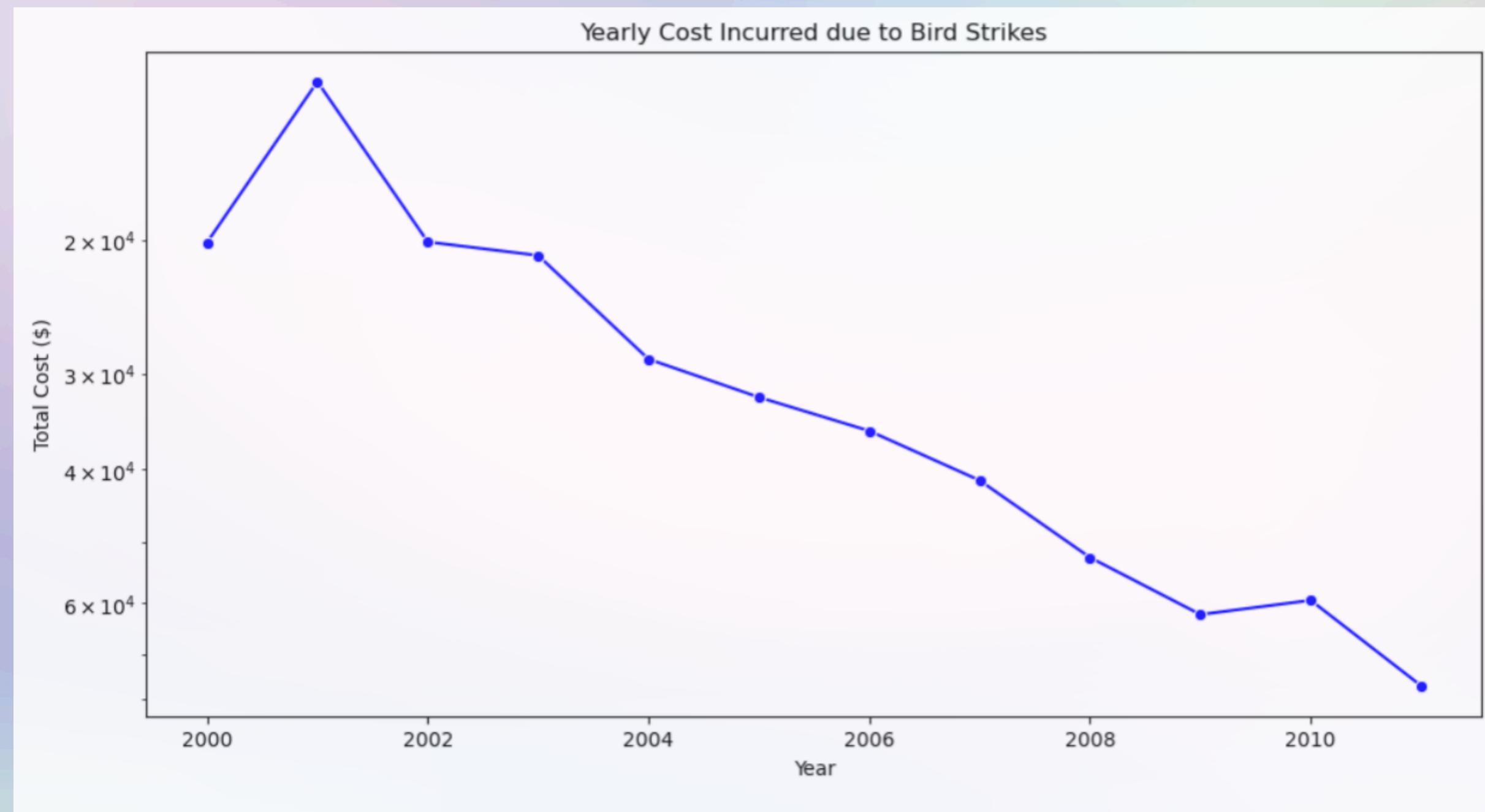


Top 50 Airports with Most Bird Strikes

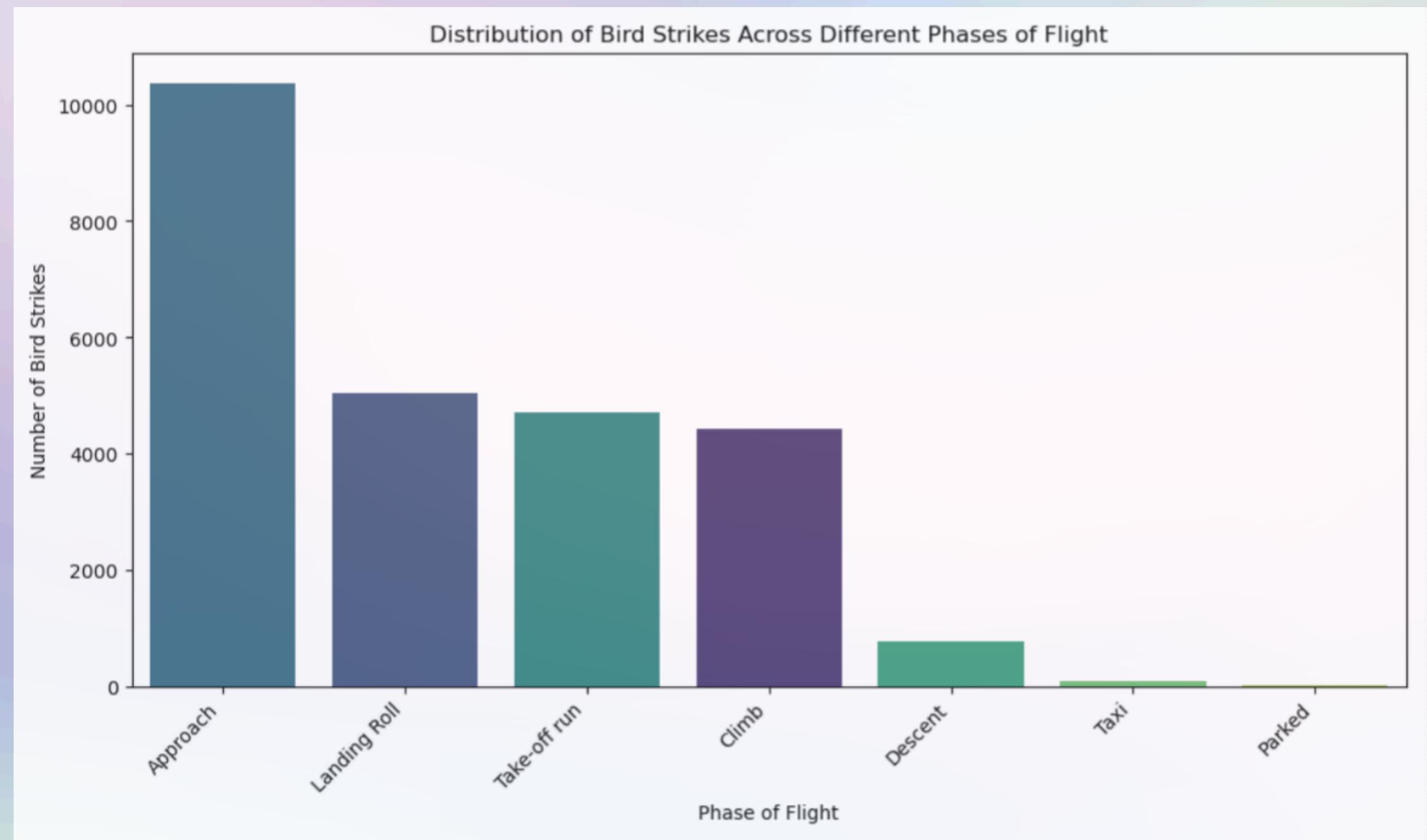


09

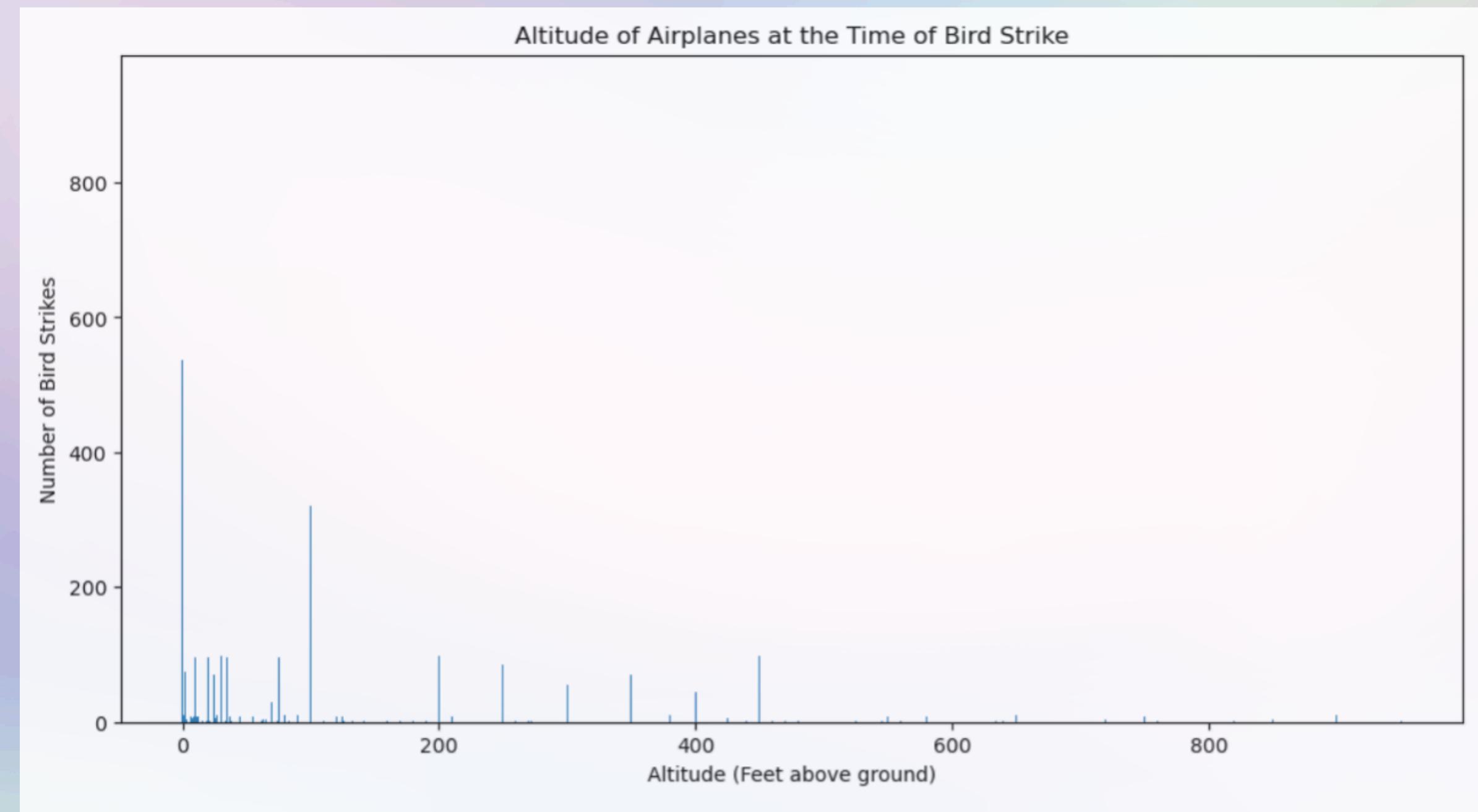
Yearly Cost Incurred due to Bird Strikes



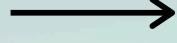
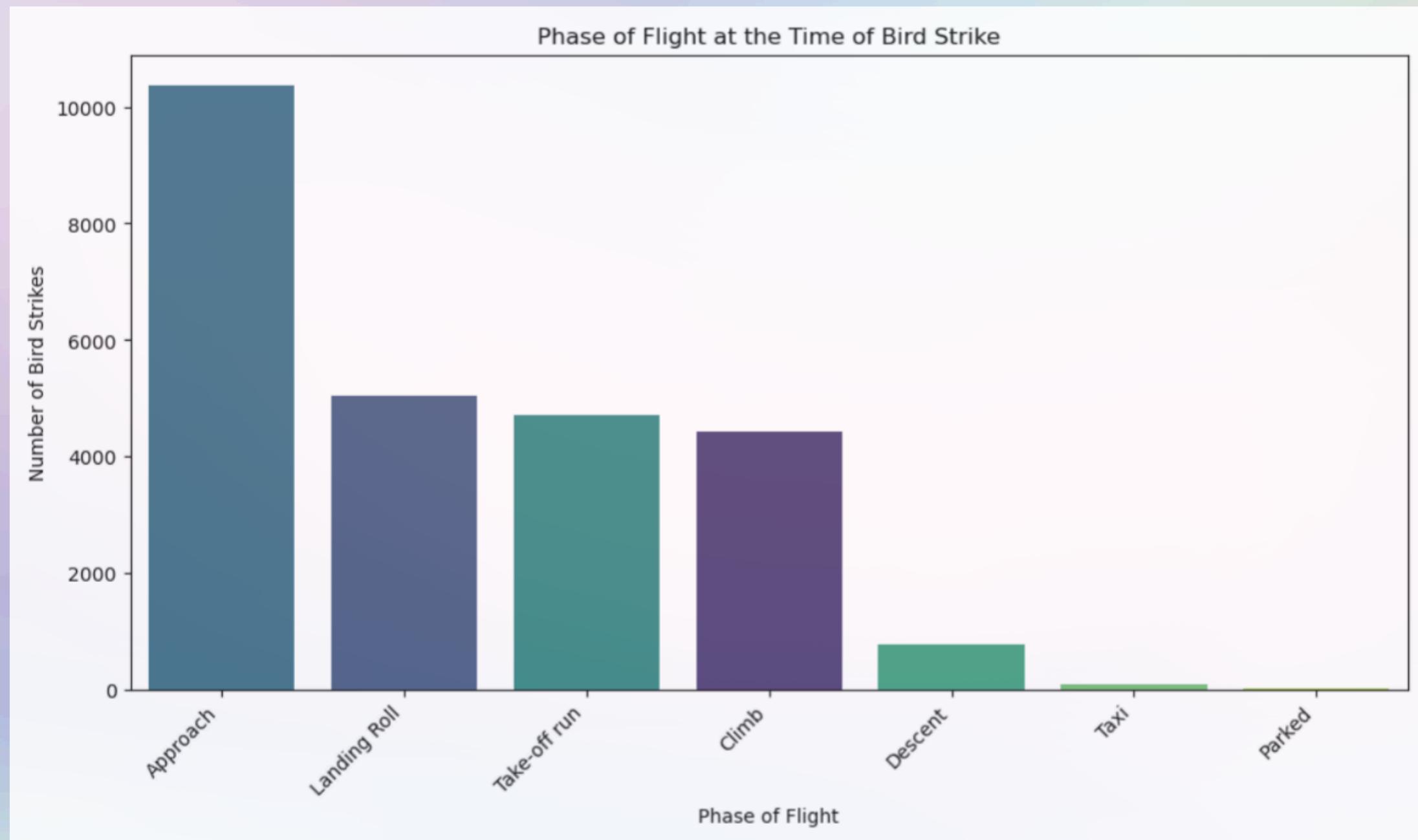
Distribution of Bird Strikes Across Different Phases of Flight



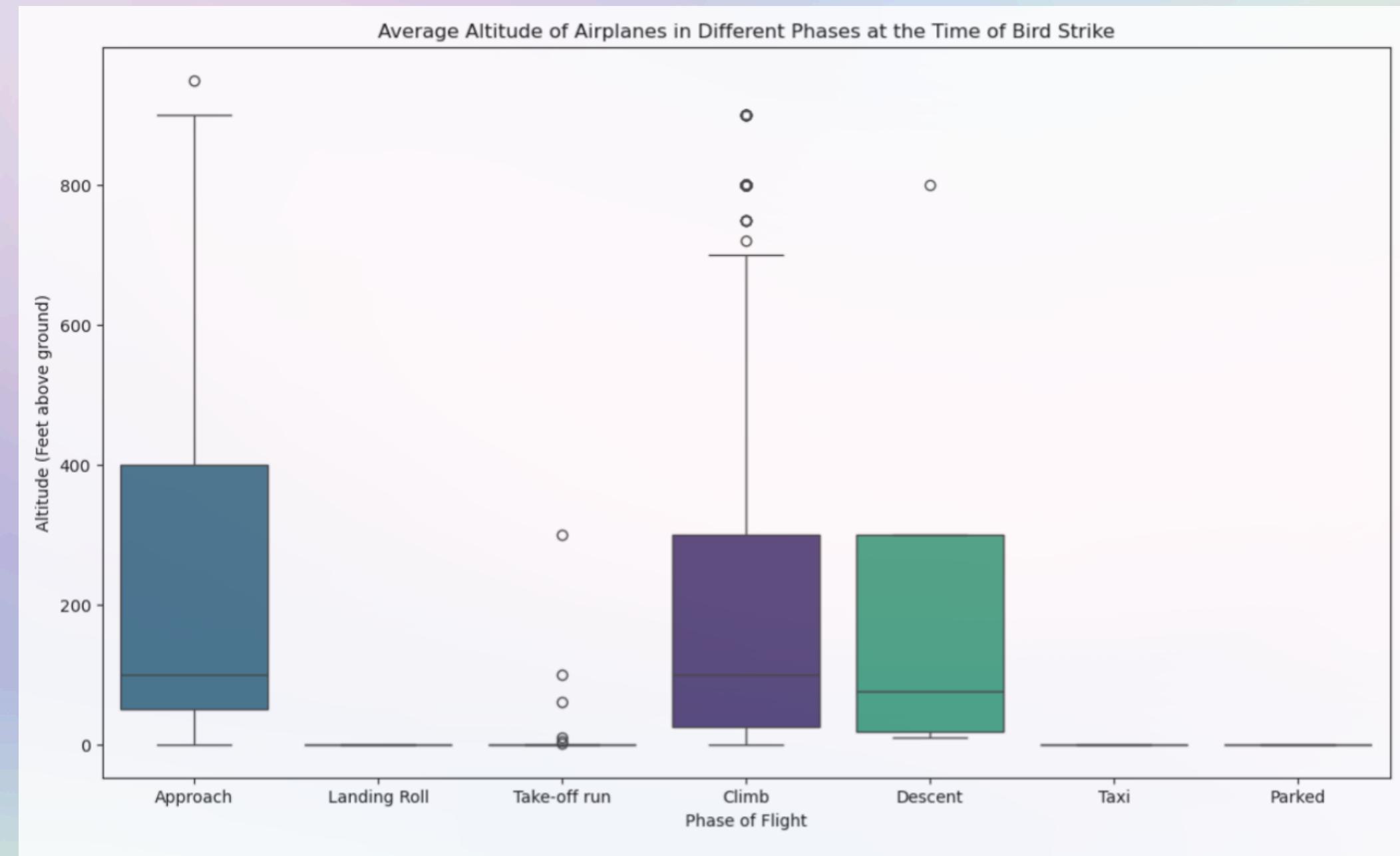
Altitude of Airplanes at the Time of Bird Strike



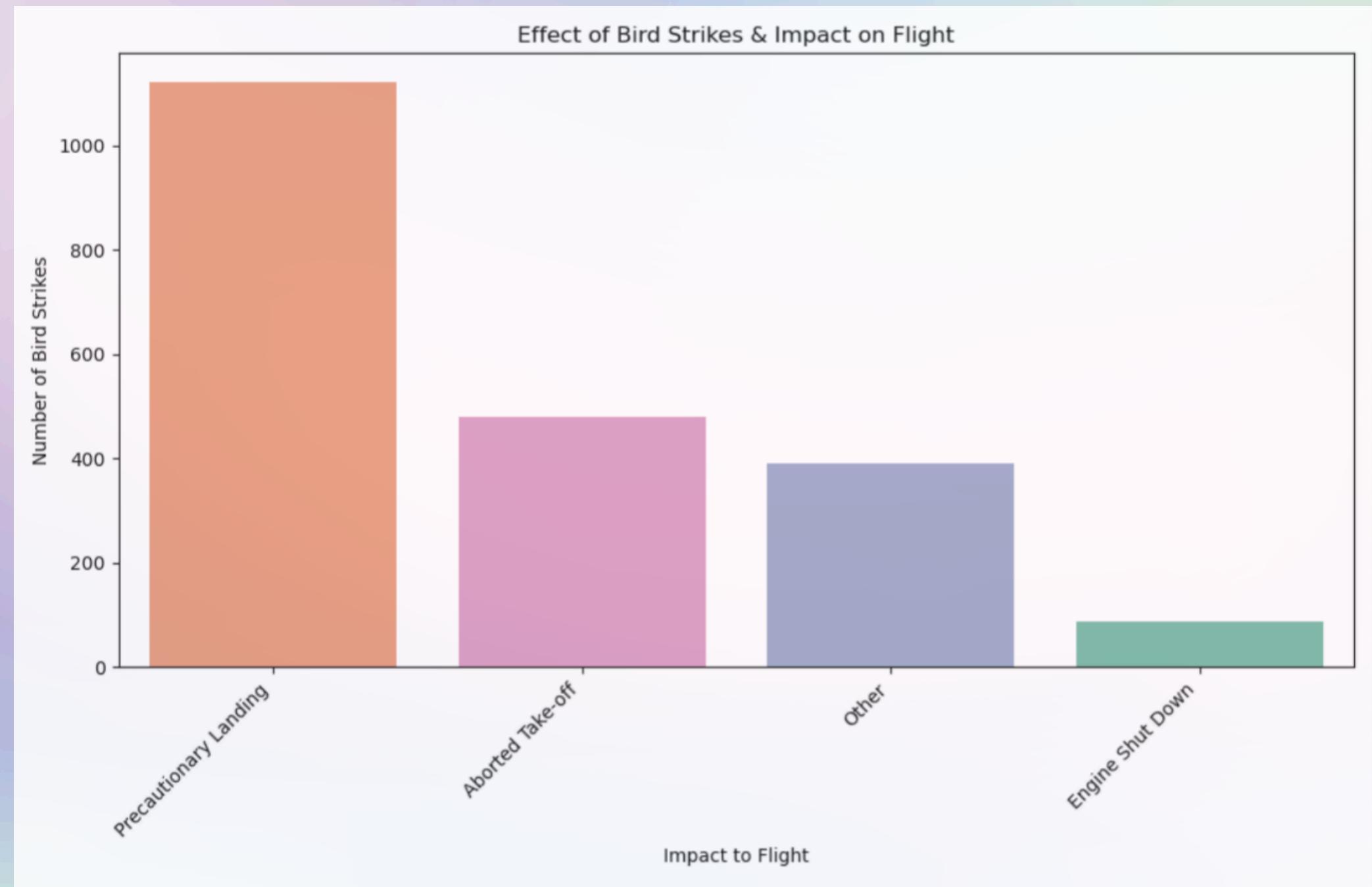
Phase of Flight at the Time of Bird Strike



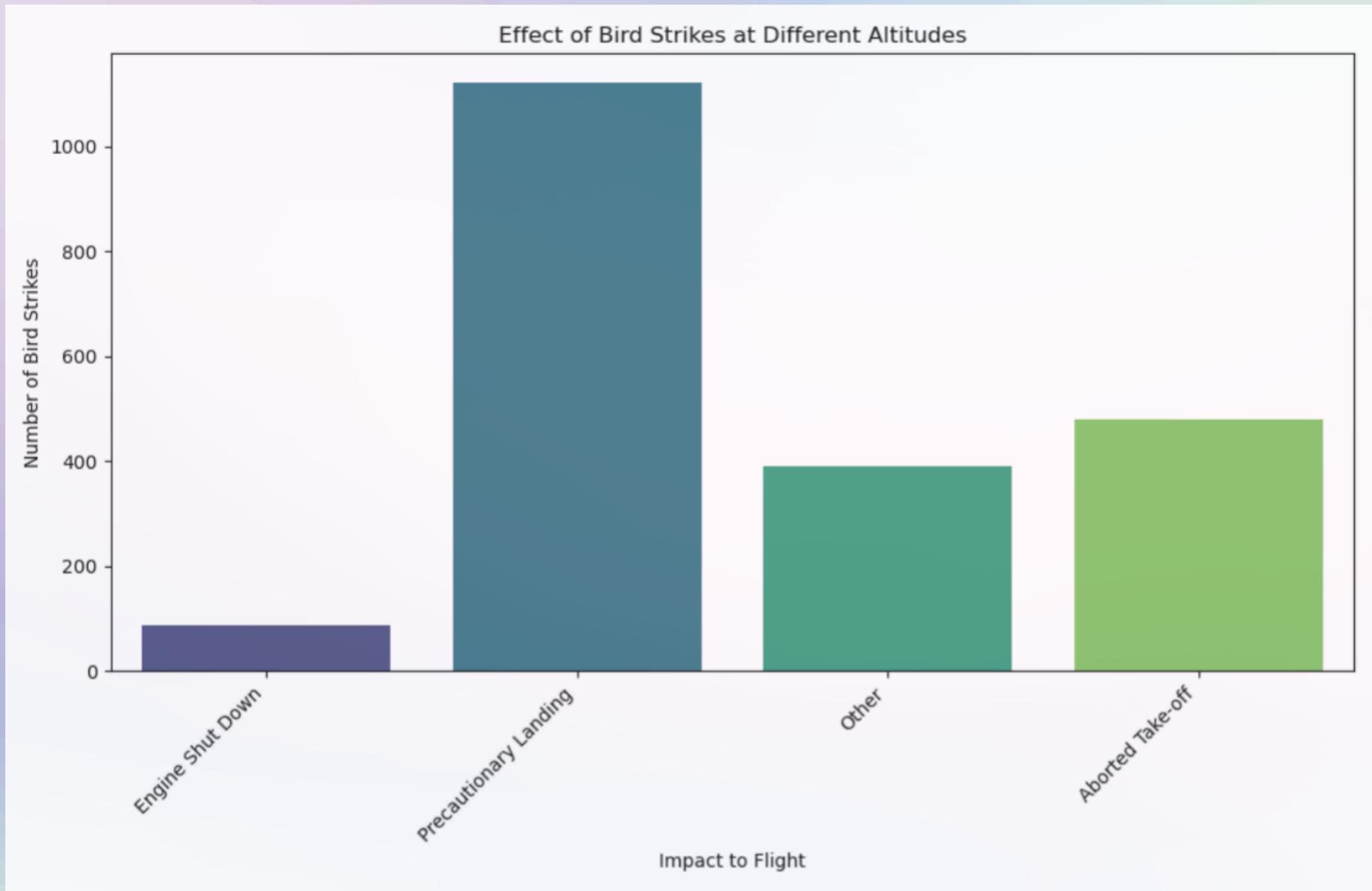
Average Altitude of the aeroplanes in different phases at the time of strike



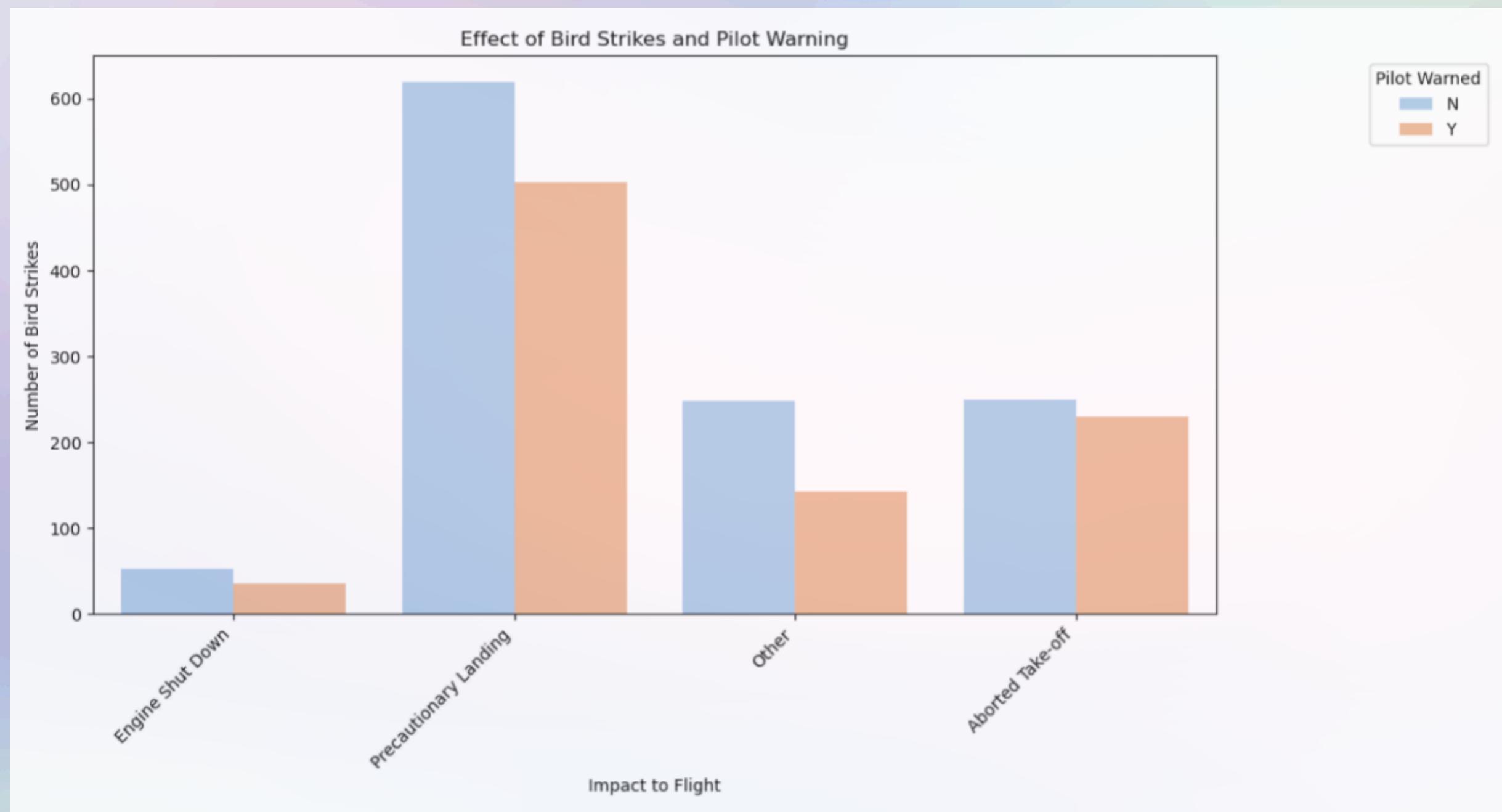
Effect of Bird Strikes & Impact on Flight



Effect of Strike at Different Altitude



Effect of Bird Strikes and Pilot Warning



Conclusion

- In conclusion, the comprehensive analysis of bird strike incidents from 2000 to 2011 provides valuable insights into the patterns, risks, and potential mitigations in aviation safety.
- By leveraging advanced data visualization techniques and statistical analyses, we have uncovered trends in bird strikes, identified high-risk scenarios, and highlighted the impact on different aspects of flight operations.
- The findings emphasise the importance of continued vigilance and proactive measures to address bird strike risks, ensuring the safety of both passengers and aircraft.
- This study contributes to the ongoing efforts in enhancing aviation safety protocols and fostering a proactive approach to wildlife management around airports.



THANK YOU