

UNIFIED MENTOR PROJECT

PROJECT - 3

Analyzing Bird Strikes -- Transportation and Communication

PROBLEM STATEMENT:

As transportation and urbanization surge, so do concerns about environmental impact and safety. Bird strikes pose a serious threat to aircraft safety, particularly during critical flight phases. By analyzing FAA data on bird strikes (2000-2011) and leveraging advanced technologies like Multi-Agent Systems (MAS), we aim to devise innovative solutions to enhance aviation safety and sustainability.

KPI'S REQUIREMENT:-

1. Total Airports:

- The total number of airports included in the analysis.
- Provides an overview of the geographical scope of the study and the diversity of airport environments considered.

2. Total Aircraft:

- The total number of aircraft involved in reported bird strike incidents.
- Indicates the frequency and extent of bird strike incidents across different aircraft types, aiding in risk assessment and mitigation strategies.

3. Total Damage Aircrafts:

- The total number of aircraft that sustained damage due to bird strikes.
- Highlights the impact of bird strikes on aircraft safety and operational costs, guiding preventive measures and resource allocation.

4. Total Damage Cost:

- The total cost incurred as a result of aircraft damage from bird strikes.
- Quantifies the financial implications of bird strikes on the aviation industry, informing cost-benefit analyses and investment decisions in safety measures.

5. Total People Injured:

- The total number of individuals injured as a result of bird strike incidents.
- Reflects the human toll of bird strikes, underscoring the importance of mitigating these incidents to protect passenger and crew safety.

6. Total Wildlife Strikes:

- The total number of reported wildlife strikes, including bird strikes and strikes involving other wildlife such as bats or ground animals.
- Provides a comprehensive view of the broader wildlife strike phenomenon, informing holistic strategies for wildlife hazard management at airports.

CHARTS REQUIREMENT:-

1. Year vs Total Wildlife Strikes:

- Analysis of the total number of wildlife strikes reported each year.
- Insights into trends and patterns in wildlife strike occurrences over time, aiding in long-term risk assessment and mitigation planning.

2. Year vs Total Damage Cost:

- Examination of the total cost incurred due to aircraft damage from wildlife strikes each year.
- Provides insight into the financial impact of wildlife strikes on the aviation industry, guiding investment decisions in safety measures and infrastructure improvements.

3. Month vs Total Wildlife Strikes:

- Evaluation of the total number of wildlife strikes reported each month.
- Identification of seasonal variations and peak periods of wildlife strike incidents, informing operational planning and resource allocation.

4. Month vs Total Damage Cost:

- Assessment of the total cost incurred due to aircraft damage from wildlife strikes each month.
- Helps identify months with higher financial losses due to wildlife strikes, facilitating targeted interventions and risk management strategies.

5. Top 10 US Aircraft vs Total Wildlife Strikes:

- Analysis of the top 10 aircraft models involved in wildlife strike incidents in the US.
- Provides insights into aircraft vulnerability to wildlife strikes, guiding aircraft design improvements and operational procedures.

6. Top 10 US Airports vs Total Wildlife Strikes:

- Examination of the top 10 airports with the highest number of reported wildlife strikes in the US.
- Helps identify high-risk airport environments and prioritize wildlife hazard management efforts and infrastructure enhancements.

7. Phase of Flights vs Wildlife Strikes:

- Analysis of the phase of flight (e.g., takeoff, climb, approach, landing) during which wildlife strikes occur.
- Helps identify critical phases of flight with higher likelihoods of wildlife strikes, guiding operational procedures and risk mitigation strategies.

8. Pilot Warned vs Total Wildlife Strikes:

- Evaluation of the number of wildlife strikes reported when pilots were warned about wildlife presence.
- Provides insights into the effectiveness of pilot warnings in preventing wildlife strikes and informs decision-making regarding wildlife management strategies.

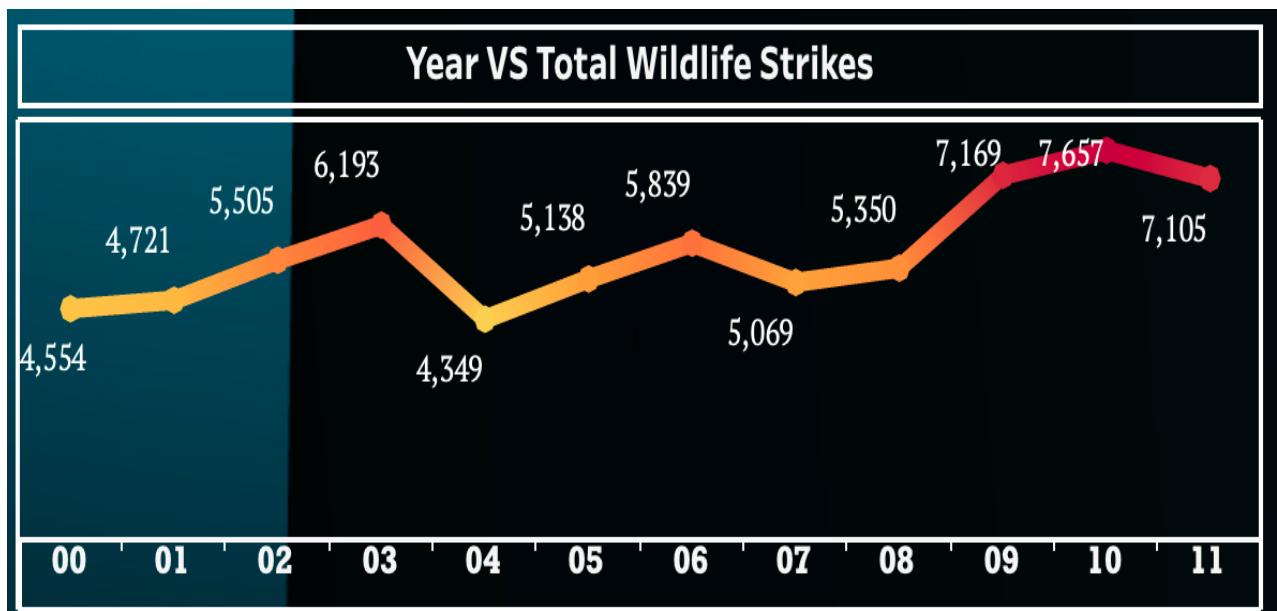
9. Altitude vs Total Strikes:

- Examination of the altitude at which wildlife strikes occur.
- Helps identify altitude ranges with higher risks of wildlife strikes, guiding airspace management and flight planning.

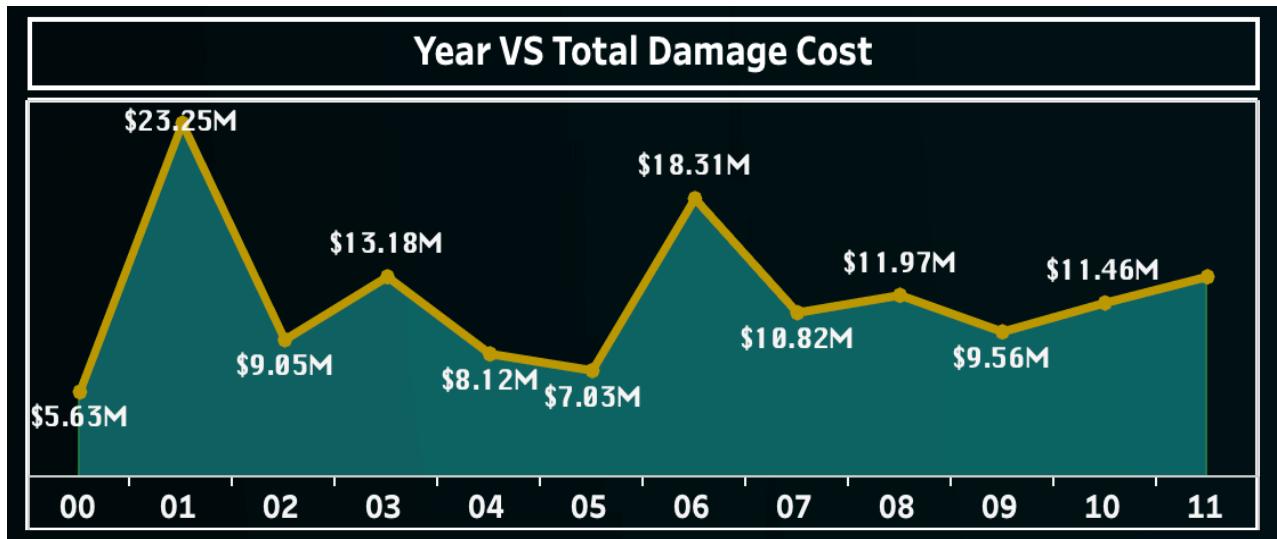
KPI'S REPORTS:-

Total Airports	Total Aircraft	Total Damage Aircrafts	Total Damage Cost	Total People Injured	Total Wildlife Strikes
1,109	25,429	2,454	\$ 141.55M	21	68,649

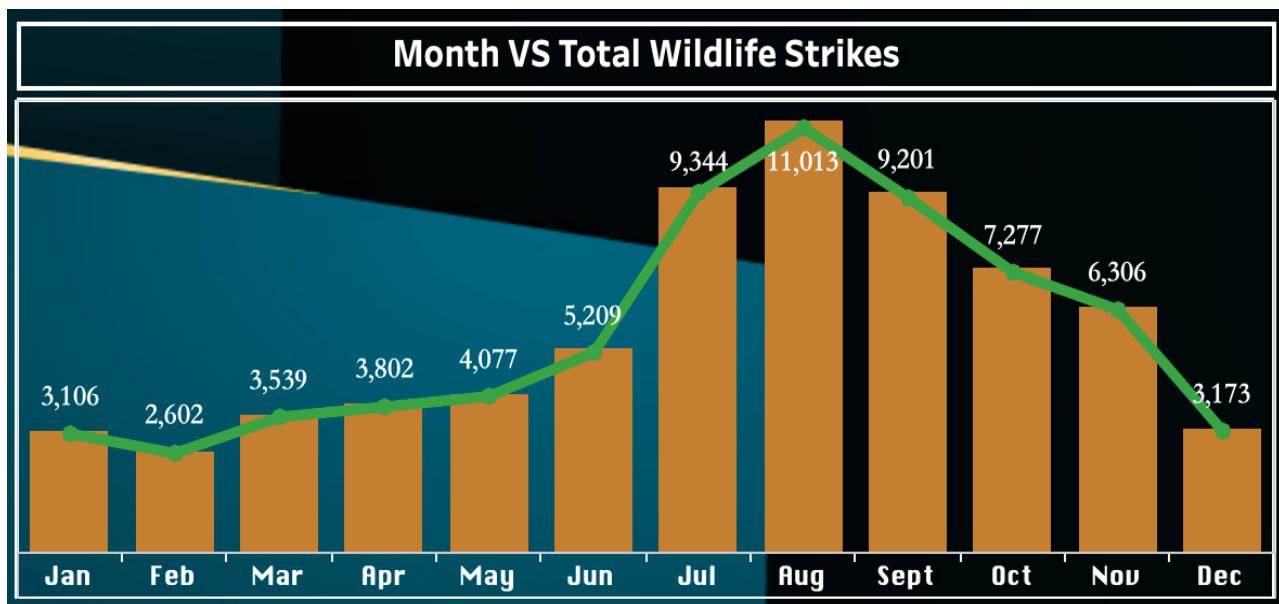
1. Year vs Total Wildlife Strikes:-



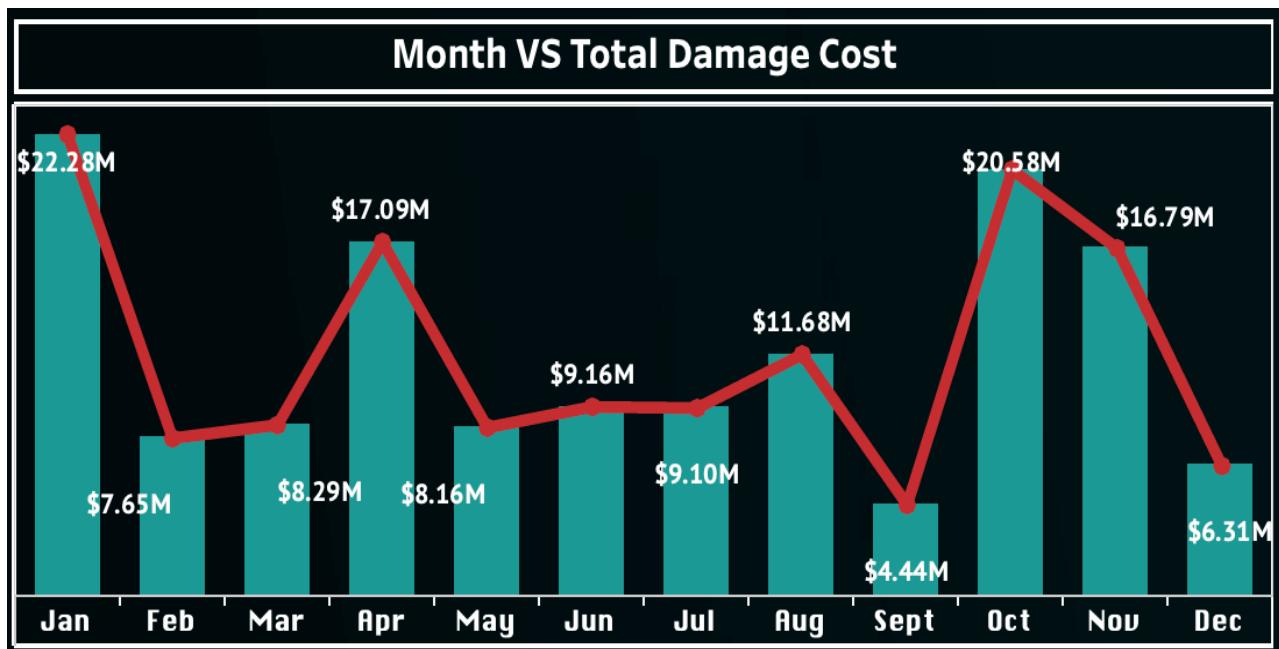
2. Year vs Total Damage Cost:-



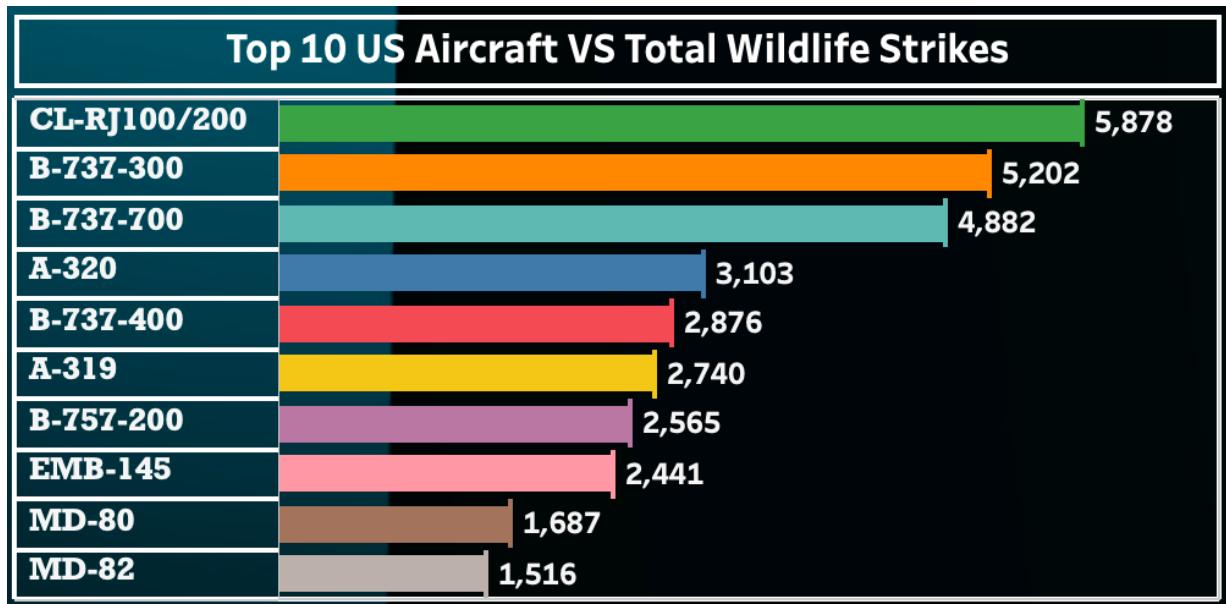
3. Month vs Total Wildlife Strikes:-



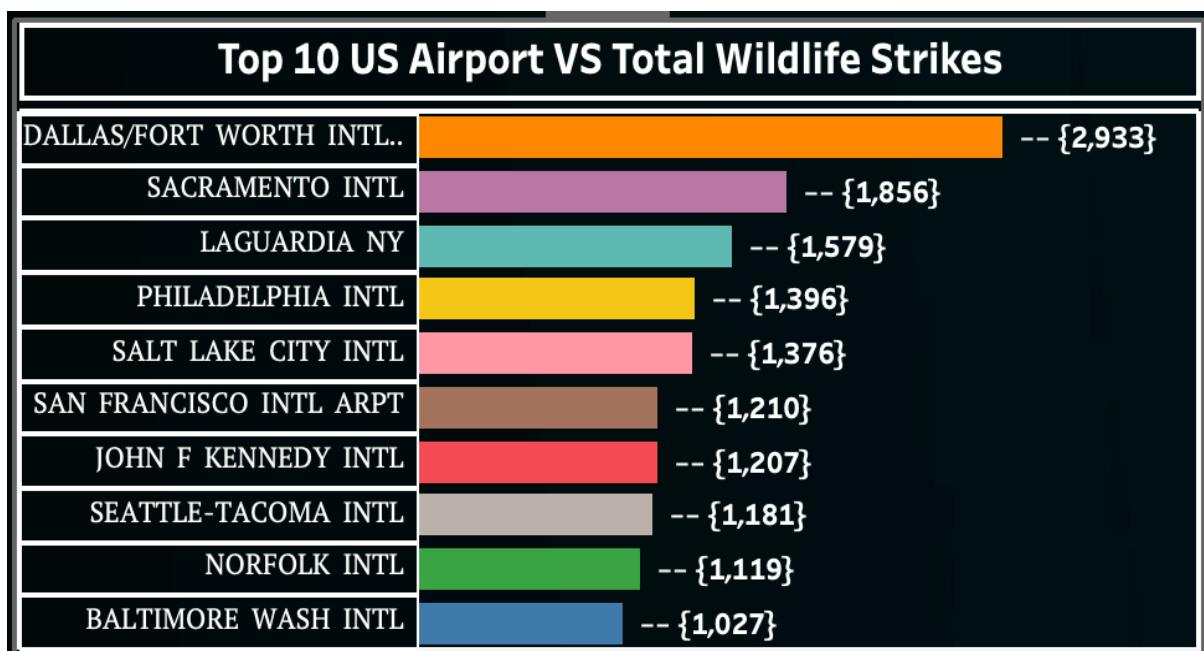
4. Month vs Total Damage Cost:-



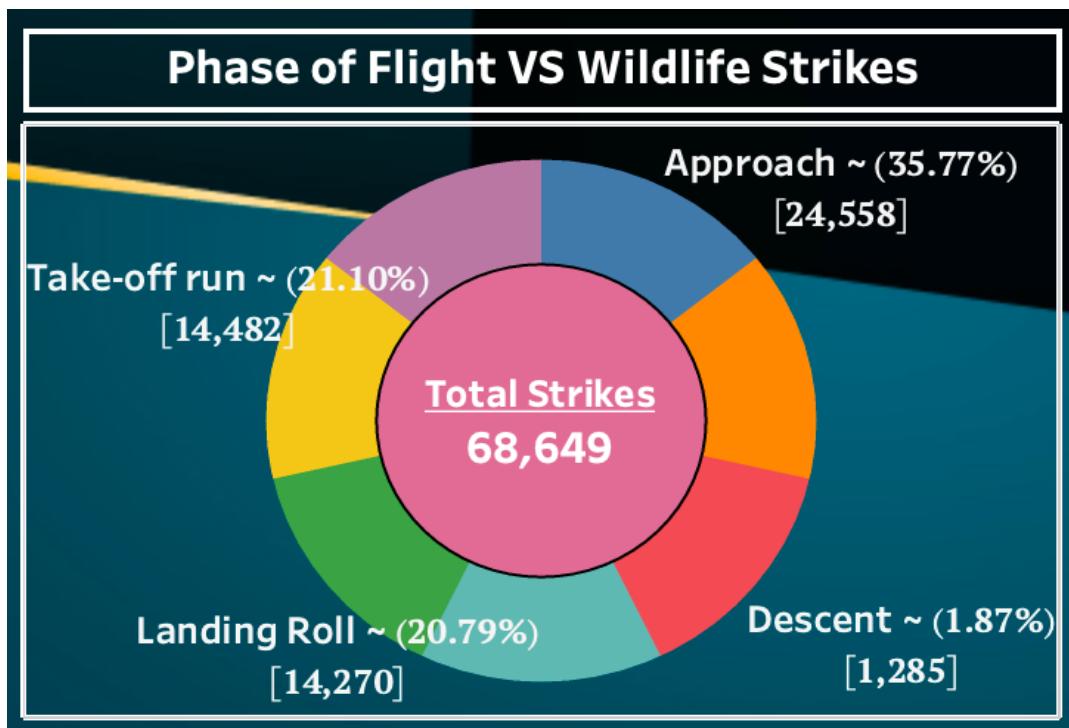
5. Top 10 US Aircraft vs Total Wildlife Strikes:-



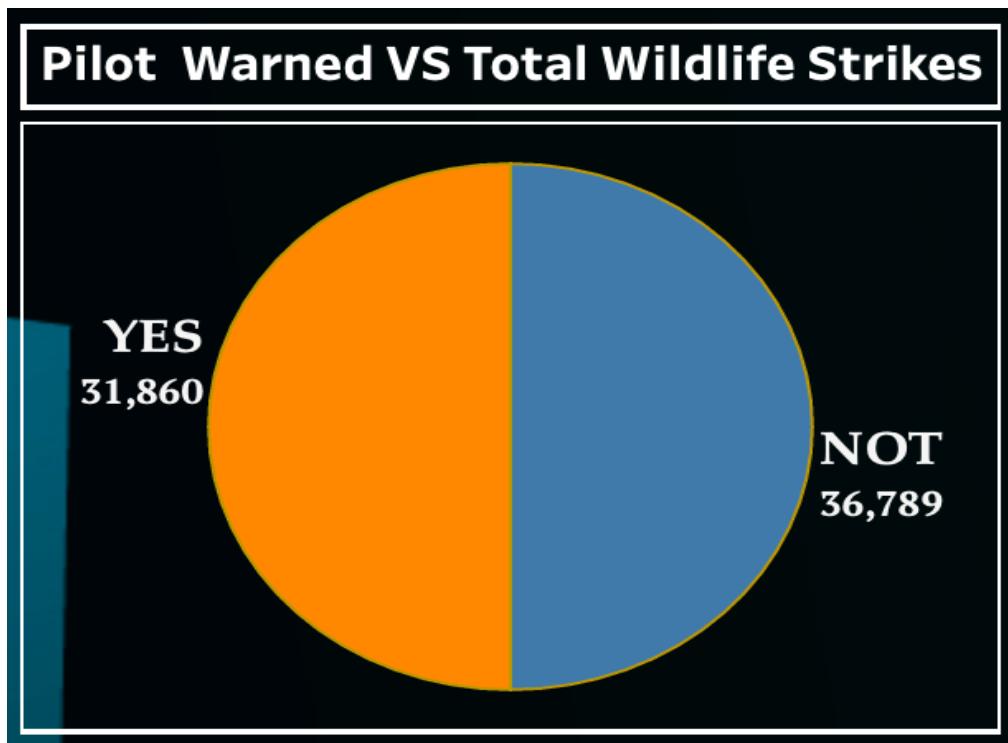
6. Top 10 US Airports vs Total Wildlife Strikes:



7. Phase of Flights vs Wildlife Strikes:



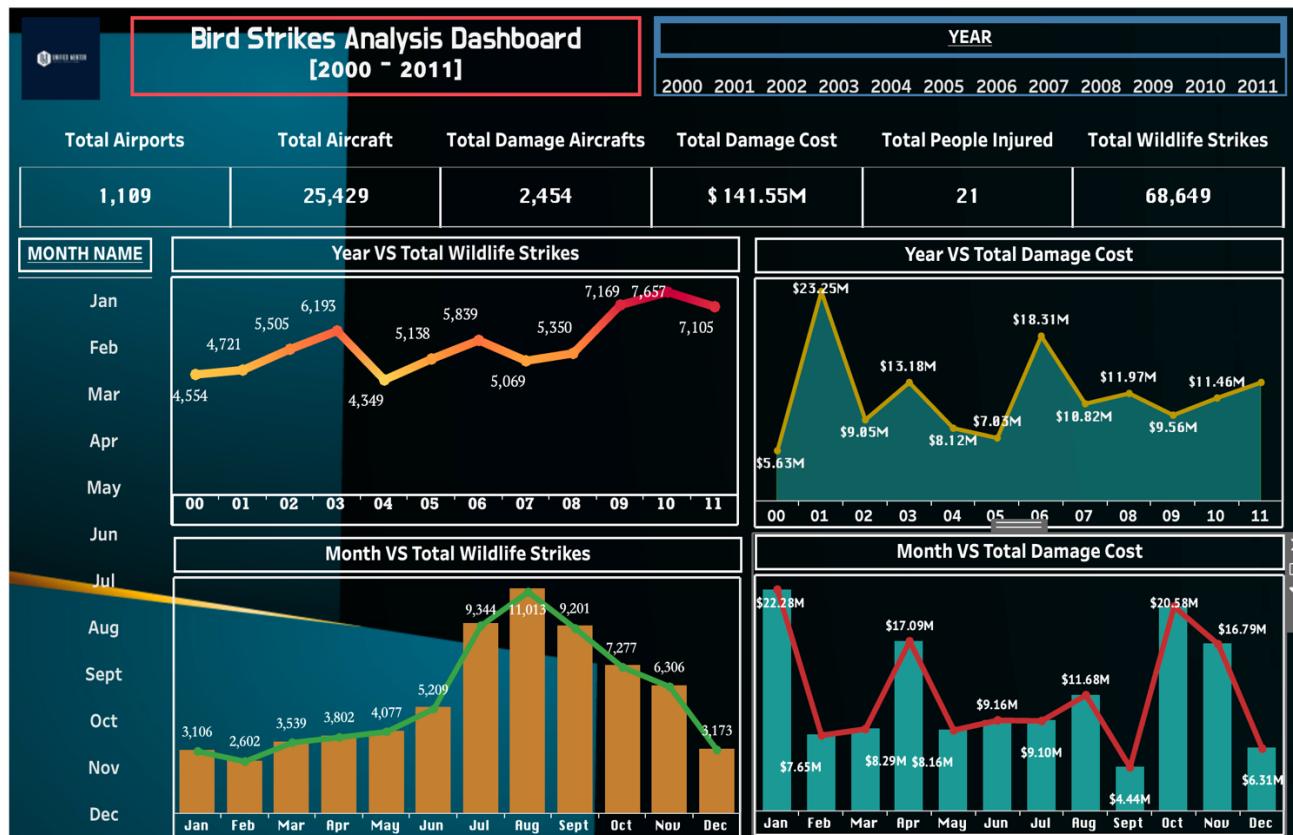
8. Pilot Warned vs Total Wildlife Strikes:



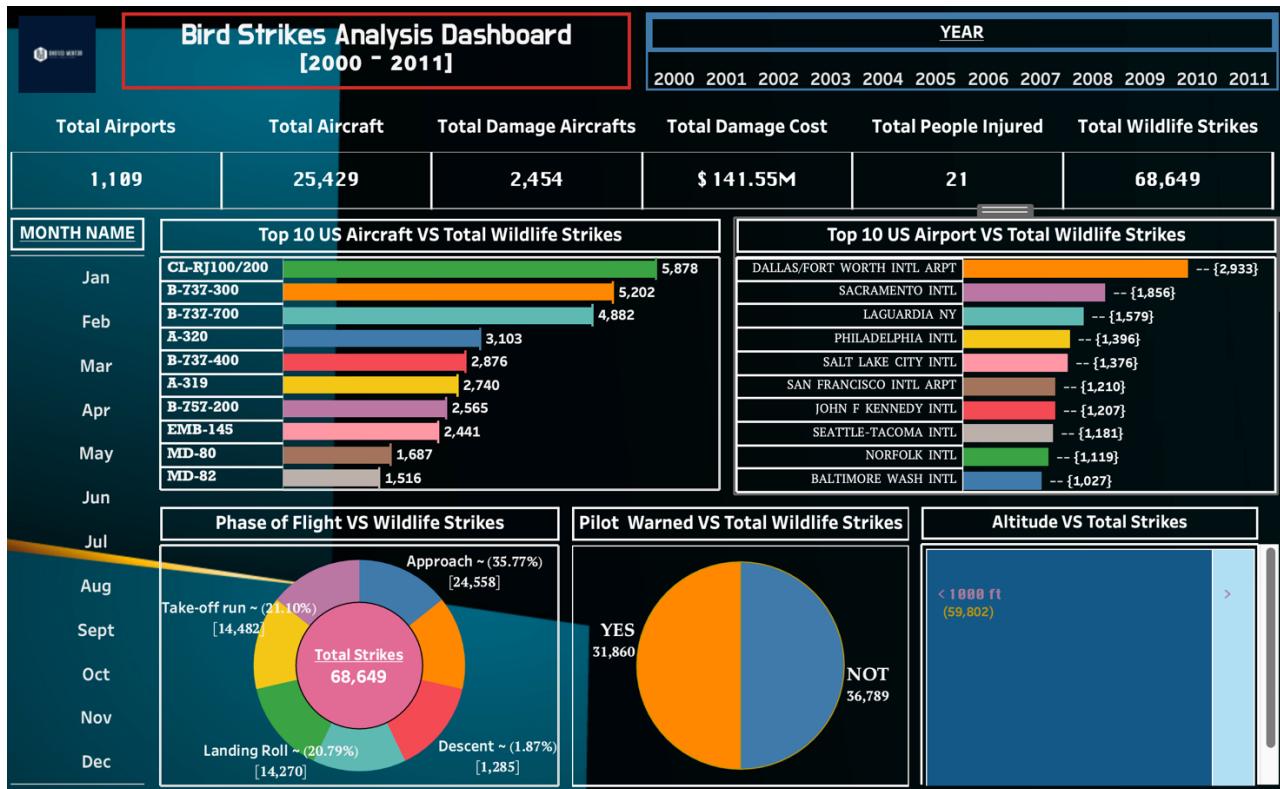
9. Altitude vs Total Strikes:-



Dashboard 1:-



Dashboard 2:-



Conclusion:-

I. Year vs Total Wildlife Strikes:

- The years 2009 and 2010 experienced the highest number of wildlife strikes, indicating periods of heightened risk to aircraft safety.
- Conversely, the years 2000 and 2004 saw the lowest number of wildlife strikes, suggesting potential areas of success in mitigation efforts during those periods.

2. Years vs Total Damage Cost:

- The years 2001 and 2006 recorded the highest total damage costs resulting from wildlife strikes, highlighting significant financial implications for the aviation industry during those years.
- Conversely, the year 2000 had the lowest total damage cost, indicating a potential correlation between wildlife strike frequency and associated costs.

3. Month vs Total Wildlife Strikes:

- Wildlife strikes were most prevalent from July to October, emphasizing the importance of heightened vigilance and mitigation efforts during these months.
- Conversely, the period from January to June experienced the lowest number of wildlife strikes, suggesting potential seasonal patterns in wildlife activity and aircraft interactions.

4. Month vs Total Damage Cost:

- The months of January and October recorded the highest total damage costs from wildlife strikes, underscoring the need for targeted interventions during these periods.
- Conversely, September had the lowest total damage cost, indicating potential opportunities for effective risk mitigation strategies.

5. Top 10 US Aircraft vs Total Wildlife Strikes:

- Aircraft models CL-RJ100/200 and B-737-300 experienced the highest number of wildlife strikes, highlighting vulnerabilities that warrant further investigation and mitigation measures.

- Conversely, aircraft models MD-82 and MD-80 had the lowest number of wildlife strikes, suggesting potential areas of success in aircraft design or operational procedures.

6. Top 10 US Airports vs Total Wildlife Strikes:

- Dallas/Fort Worth International Airport reported the highest number of wildlife strikes, indicating a need for targeted wildlife management strategies in high-risk airport environments.
- Conversely, Baltimore/Washington International Airport had the lowest number of wildlife strikes, suggesting effective wildlife management practices or environmental conditions conducive to reduced wildlife interactions.

7. Phase of Flight vs Wildlife Strikes:

- Wildlife strikes were most frequent during the approach phase of flight, highlighting the critical importance of vigilance and mitigation measures during this stage.
- Conversely, wildlife strikes were least frequent during descent, suggesting potential opportunities for risk mitigation strategies targeting specific flight phases.

8. Altitude vs Wildlife Strikes:

- Wildlife strikes were significantly more common at altitudes below 1000 feet, indicating heightened risk during take-off and landing phases.
- Conversely, the frequency of wildlife strikes decreased at altitudes above 1000 feet, suggesting potential altitude-based mitigation strategies.

Ways to Reduce Wildlife Strike Problems:-

- 1. Implement Wildlife Management Programs:** Create comprehensive programs to control wildlife populations and modify habitats around airports.
- 2. Enhance Airport Infrastructure:** Improve airport infrastructure to deter wildlife and minimize bird strike hazards.
- 3. Conduct Wildlife Hazard Assessments:** Regularly assess wildlife hazards to prioritize mitigation efforts and allocate resources effectively.
- 4. Improve Pilot Training and Awareness:** Provide pilots with training on bird strike avoidance techniques and increase awareness about reporting procedures.
- 5. Enhance Reporting and Data Analysis:** Encourage reporting of wildlife strikes and analyze data to identify trends and implement targeted mitigation strategies.
- 6. Develop Innovative Technologies:** Invest in technologies such as bird detection radar and acoustic deterrents to reduce the risk of bird strikes.
- 7. Collaborate with Stakeholders:** Work with airport operators, airlines, regulators, and wildlife experts to develop holistic approaches to wildlife strike mitigation.
- 8. Public Education and Outreach:** Increase public awareness about bird strike risks and promote responsible behavior near airports to minimize wildlife attractants.