PHASE 1 PROJECT: AVIATION DATA ANALYSIS

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Overview

- ##### our company is expanding in to new industries to diversify its portfolio. Specifically, they are interested in purchasing and operating airplanes for commercial and private enterprise which will be a key step in our growth strategy. To align this expansion with our strategic goals, we will rely on data-driven insights to inform our decisions. A thorough risk assessment will be carried out using aviation accident data spanning from 1993 to 2023. The analysis aims to identify aircraft models with a lower likelihood of severe accidents or operational failures, determine locations that pose higher risks for aircraft operations, and assess the optimal number of engines required for stable and safe flights.

Business understanding

Our company is expanding into the aviation industry, seeking to purchase and operate aircraft for both commercial and private enterprises. To ensure this venture is both safe and financially sustainable, we need to assess the risks associated with different aircraft models, operational environments, and structural designs. Specifically, the objectives of this analysis are to answer these questions:

1. Which Aircraft Models Demonstrate the Highest Safety Standards and Least Risk of Severe Accidents?

2. Which geographic regions or airports pose higher risks for aircraft operations, and what environmental or infrastructural factors influence these risks?

3. What is the Ideal Number of Engines for Maximizing Aircraft Safety and Efficiency?

The main business objective is to expand into the aviation sector in order to achieve this we need to minimize operational risks by identifying the safest aircraft models to purchase, while considering:

i. Uncover the Aircraft Models That are Safest for Air Travel.

ii. Determine locations that pose higher risks for aircraft operations

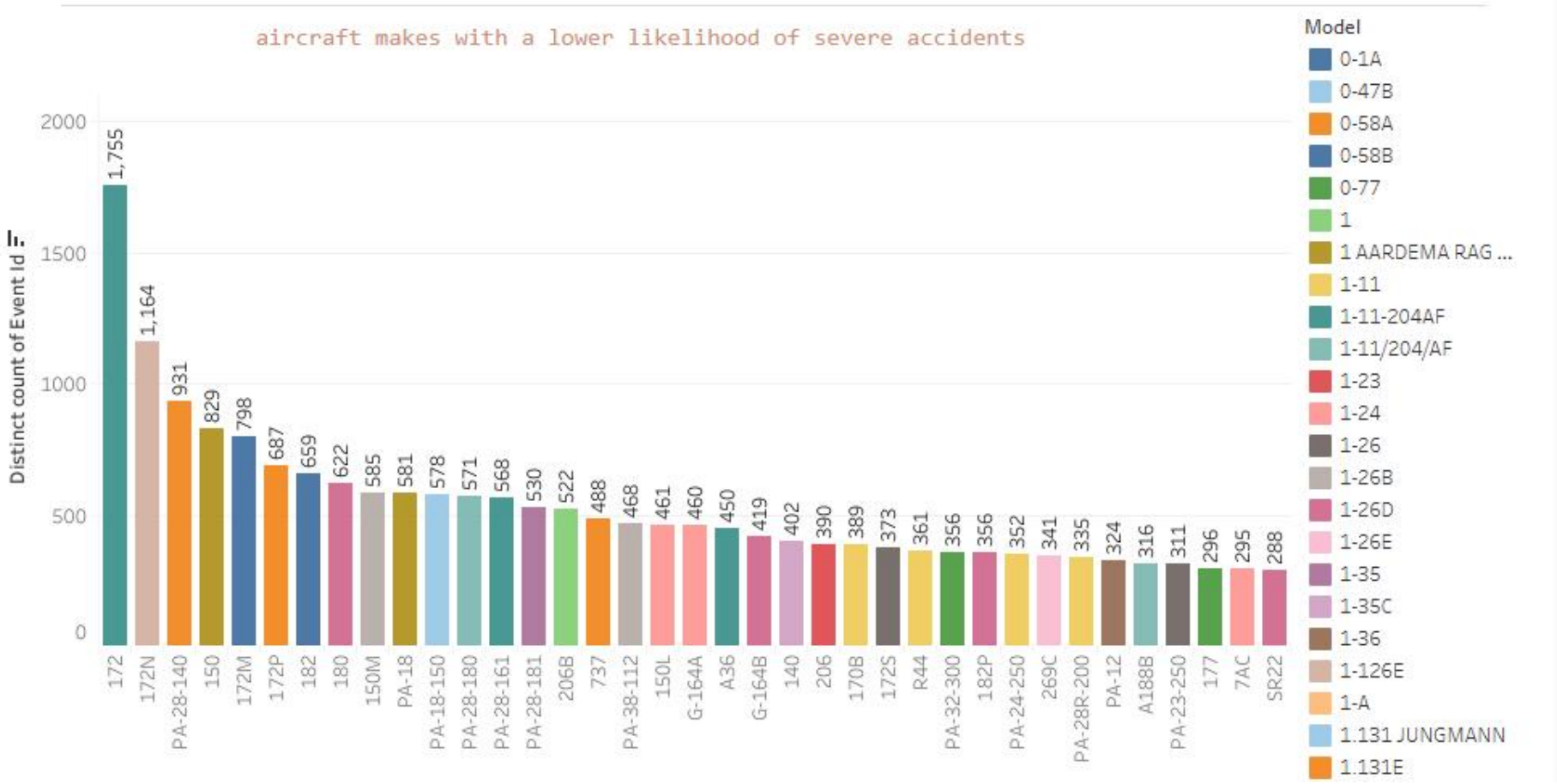
iii. Identify how many engines Does a Plane Really Need

DATA UNDERSTANDING

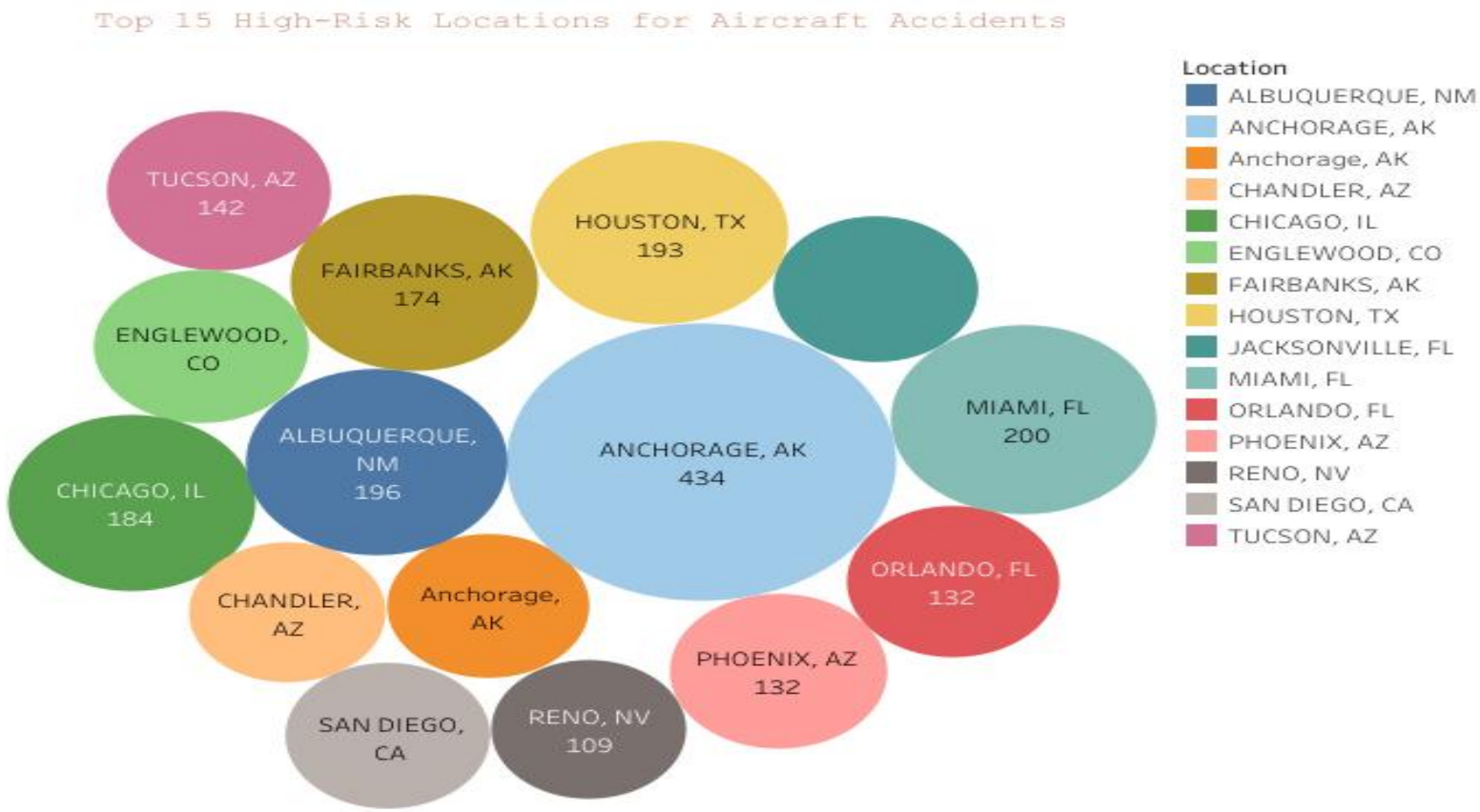
.This dataset was obtained from kaggle it Contains 3,000+ records of aviation incidents from the years (1948–1982)

.Primarily U.S.-based, with some international cases ,Aircraft Information,Accident Details and Operational Context.

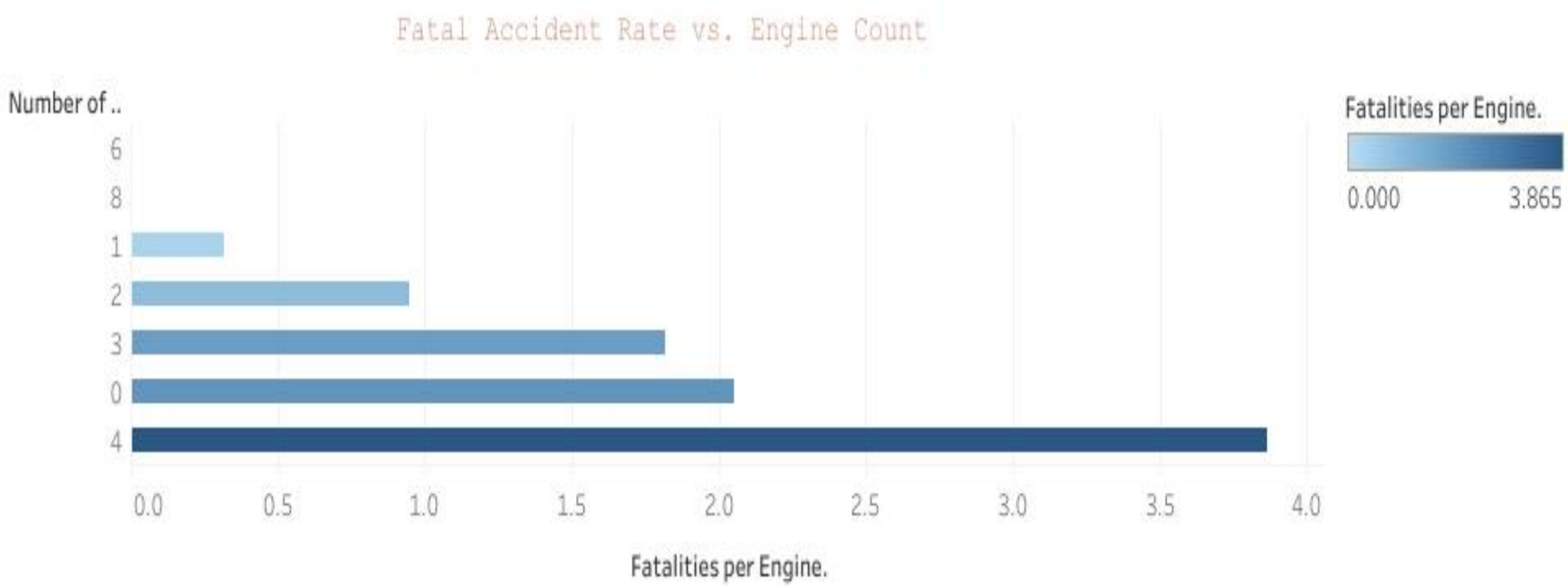
Data visualization



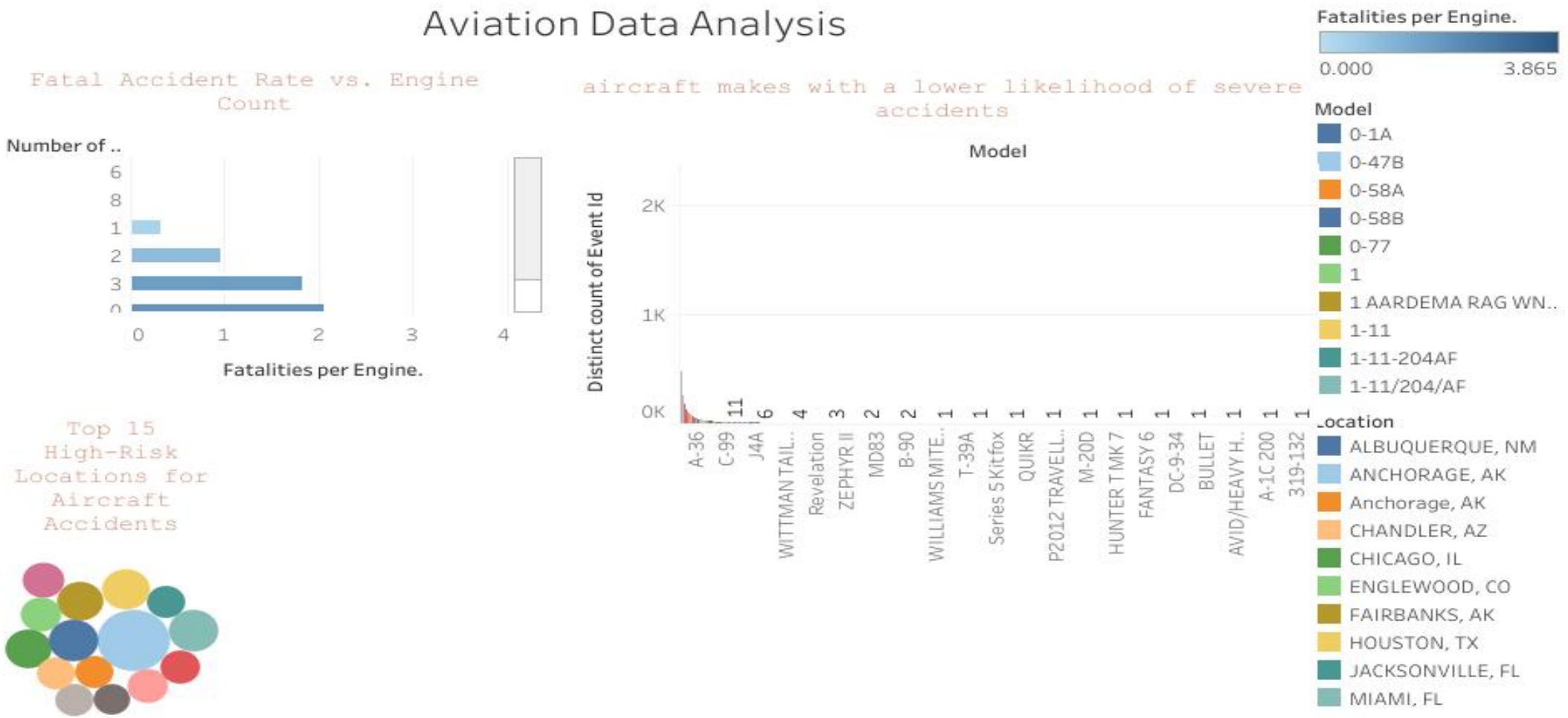
Data visualization.contd



Data visualization.contd



Data visualization.contd



Conclusions

- From the objectives above i can conclude that:
- Safer Aircraft Models: Single-engine planes (e.g., Cessna 172, Piper PA-28) are frequently involved in accidents but with lower fatality rates. Beechcraft models and helicopters also show relatively safer outcomes in certain conditions.
- High-Risk Locations: Mountainous regions (e.g., Alaska, Colorado) and urban areas (e.g., Los Angeles, New York) see more accidents due to weather, terrain, and traffic complexity. Rural areas also pose risks due to limited infrastructure.
- Optimal Engine Count: Single-engine aircraft are safe in good conditions but riskier in emergencies. Twin-engine planes offer redundancy but face more severe conditions. Turbojet/turboprop aircraft are highly reliable but have higher fatality rates in accidents.

Recommendations

- 1. Single-Engine Aircraft: Improve pilot training, adopt modern safety technologies, and enhance weather awareness to reduce risks.
- 2. High-Risk Locations: Strengthen weather forecasting, air traffic management, and emergency infrastructure in mountainous, urban, and rural areas.
- 3. Engine Optimization: Encourage multi-engine aircraft for high-risk flights, integrate advanced avionics in single-engine planes, and enforce stricter safety guidelines for turbojet/turboprop operations

Next step

- Presenting the findings and ensuring the insights are actionable and lead to further improvements.

Thank you for your time and attention.

Your support and feedback are invaluable.

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