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Flying Safely: Identifying Low-Risk Aircraft for Business Expansion

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Content Today

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Overview

Enhancing Decision-Making

- Which aircraft should our company purchase to minimize operational risk as we enter the aviation industry?
- We analyzed 60+ years of aviation accident data to identify the safest aircraft options for your business.

Read More

Business Uderstanding

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Why This Matters:

01 The company is diversifying into aviation, an industry with unique safety and financial risks.

02 Choosing the right aircraft is critical for safety, reputation, and profitability.

Key Business Question:

03 Which aircraft types present the lowest risk for our new aviation venture?

Data Understanding

Data Source

- National Transportation Safety Board accident dataset (1962–2023)

What's in the Data:

- Aircraft types, accident causes, severity, locations, and dates etc

Data Preparation:

- leaned missing values, focused on relevant variables (e.g., aircraft model, accident rate, fatality rate)

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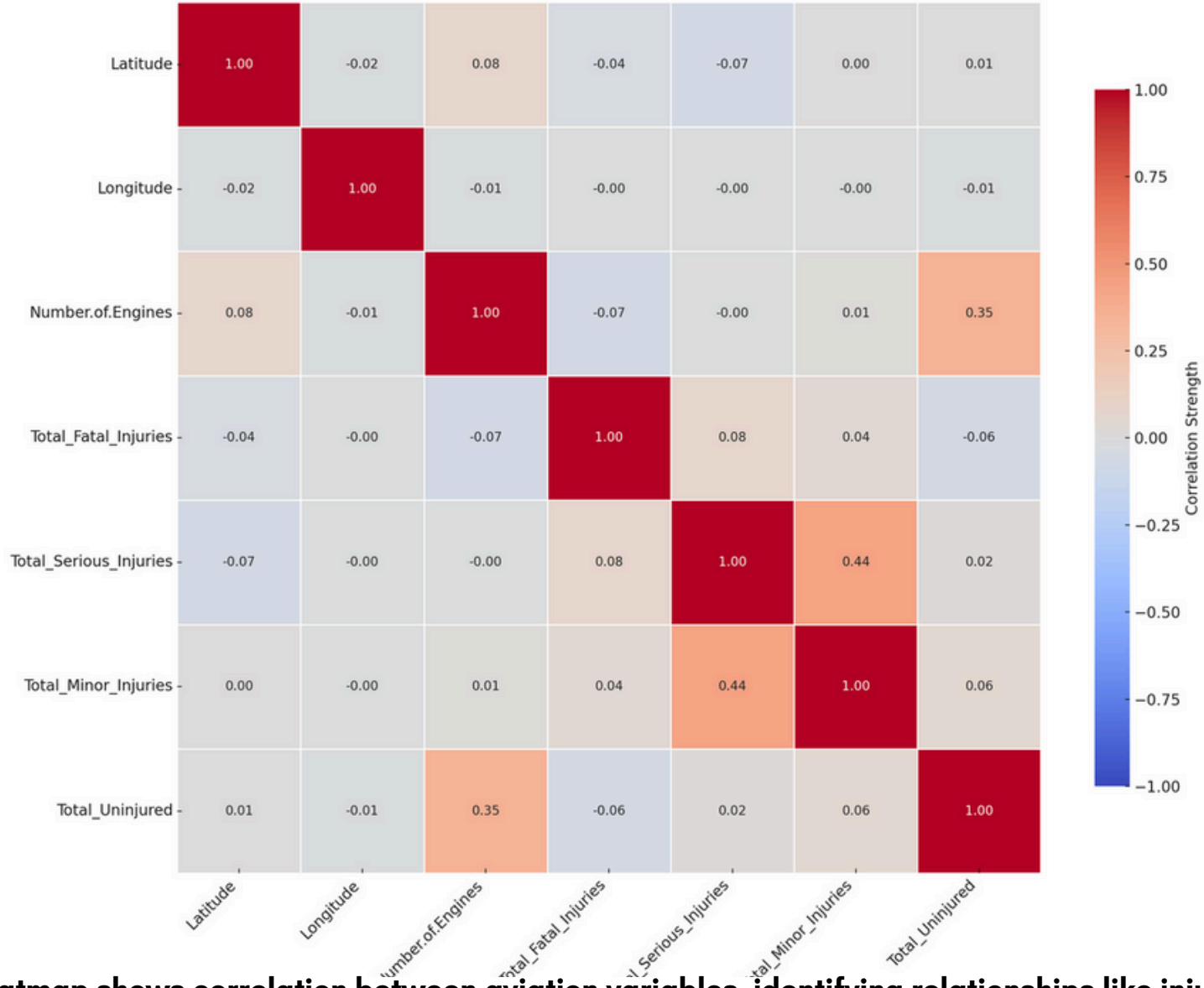
Data Analysis Approach

How We Analyzed Aviation Risk

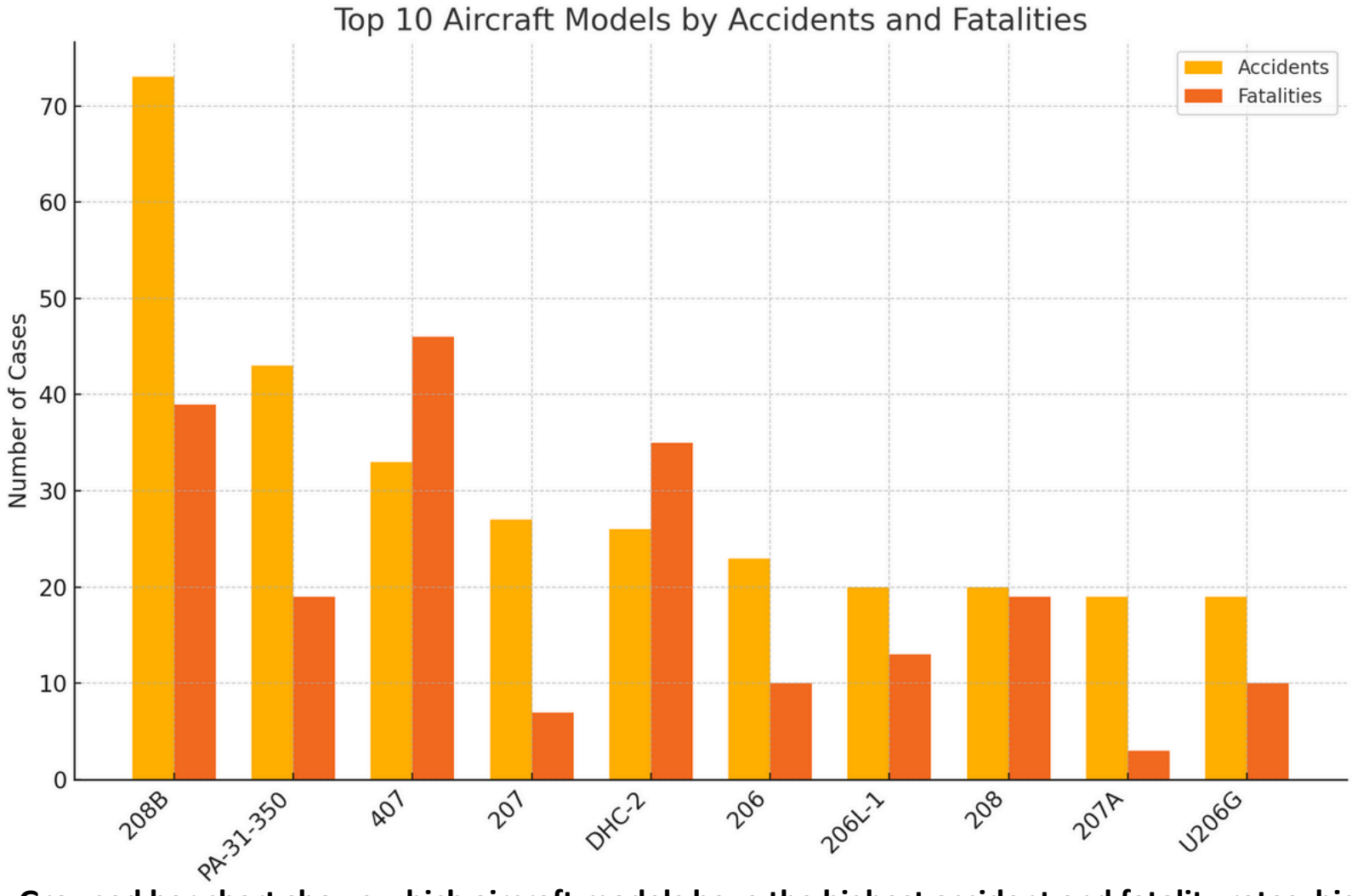
- *Descriptive Statistics*
  - Compared accident/fatality rates across aircraft types
  - Calculated key metrics: mean, median, and fatality-per-accident ratios
- *Data Aggregation*
  - Grouped by aircraft model and usage type (commercial vs. private)
  - Focused on high-risk clusters
- *Trend Analysis*
  - Identified temporal patterns in accidents
  - Flagged outliers needing investigation

Feature Correlation Heatmap



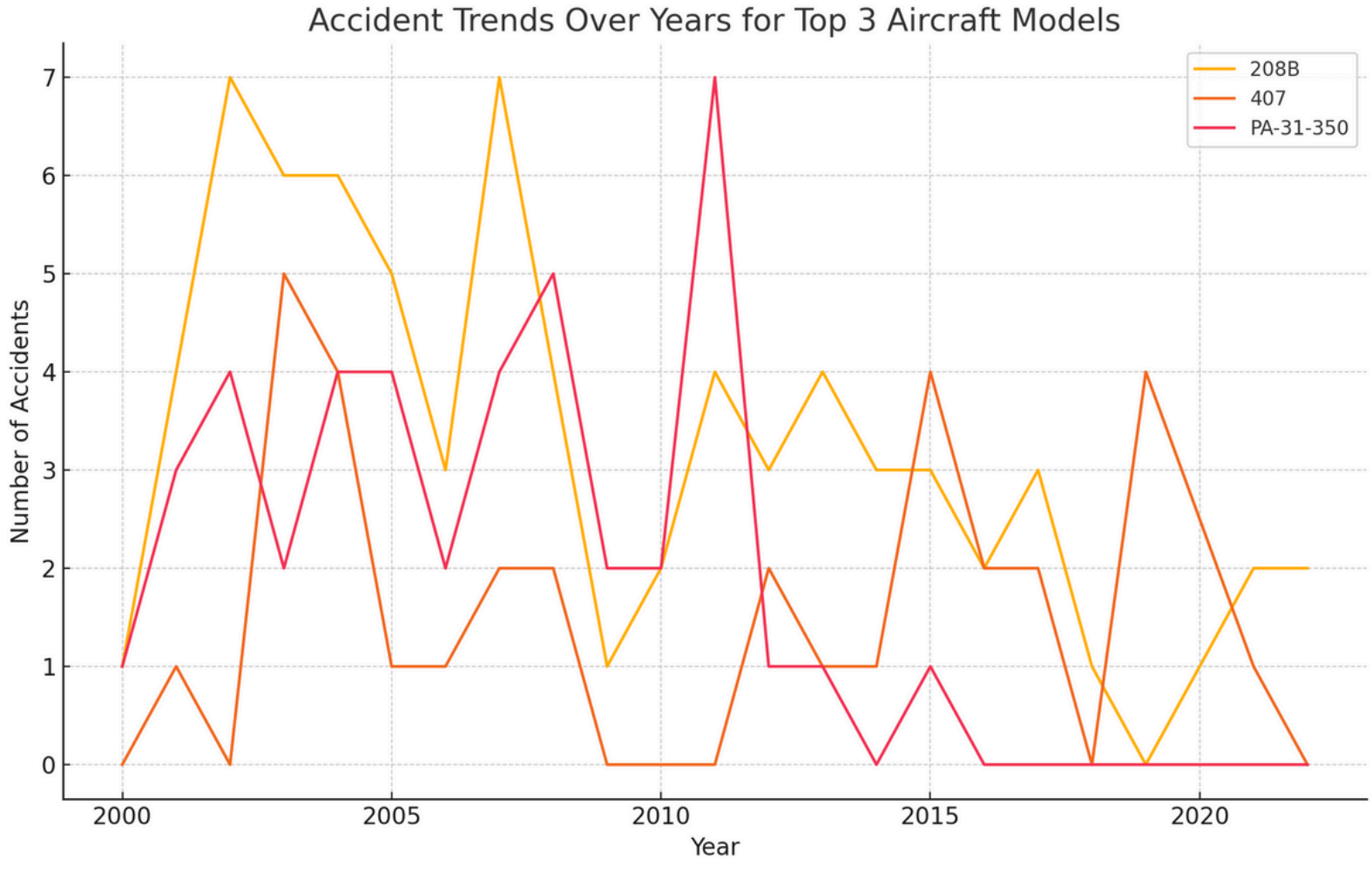
Insight: Heatmap shows correlation between aviation variables, identifying relationships like injuries and number of engines

Accidents and Fatalities by Aircraft



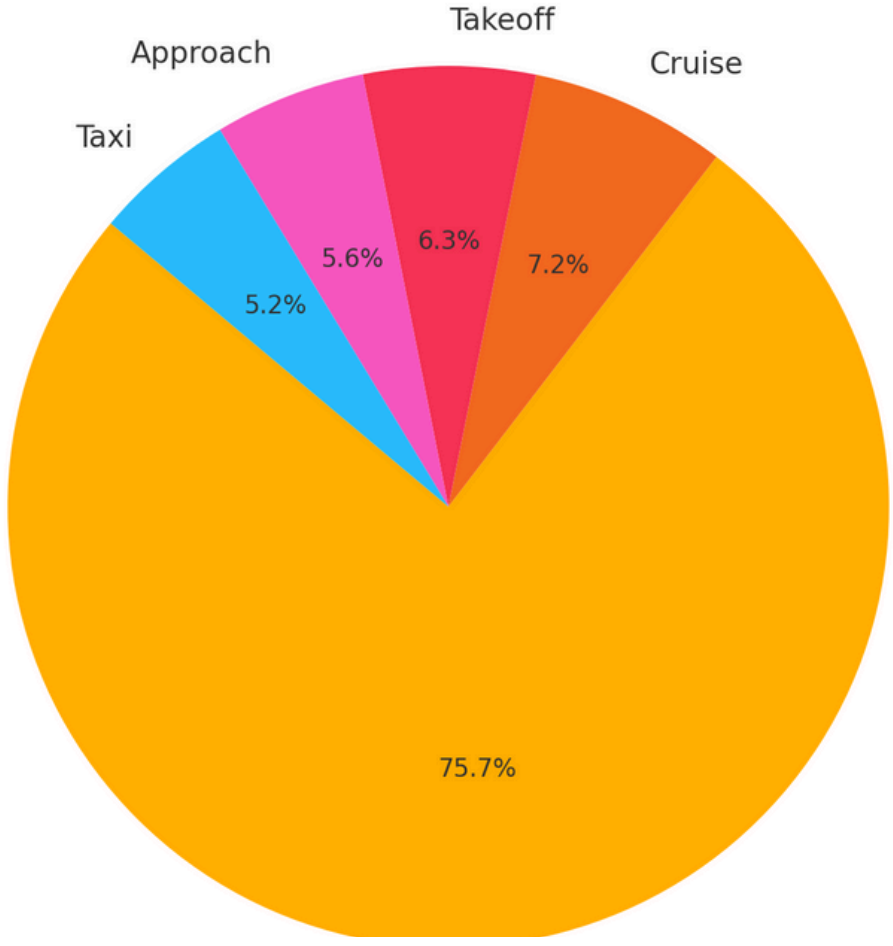
Insight: Grouped bar chart shows which aircraft models have the highest accident and fatality rates, highlighting high-

Accident Trends Over Years for Top 3



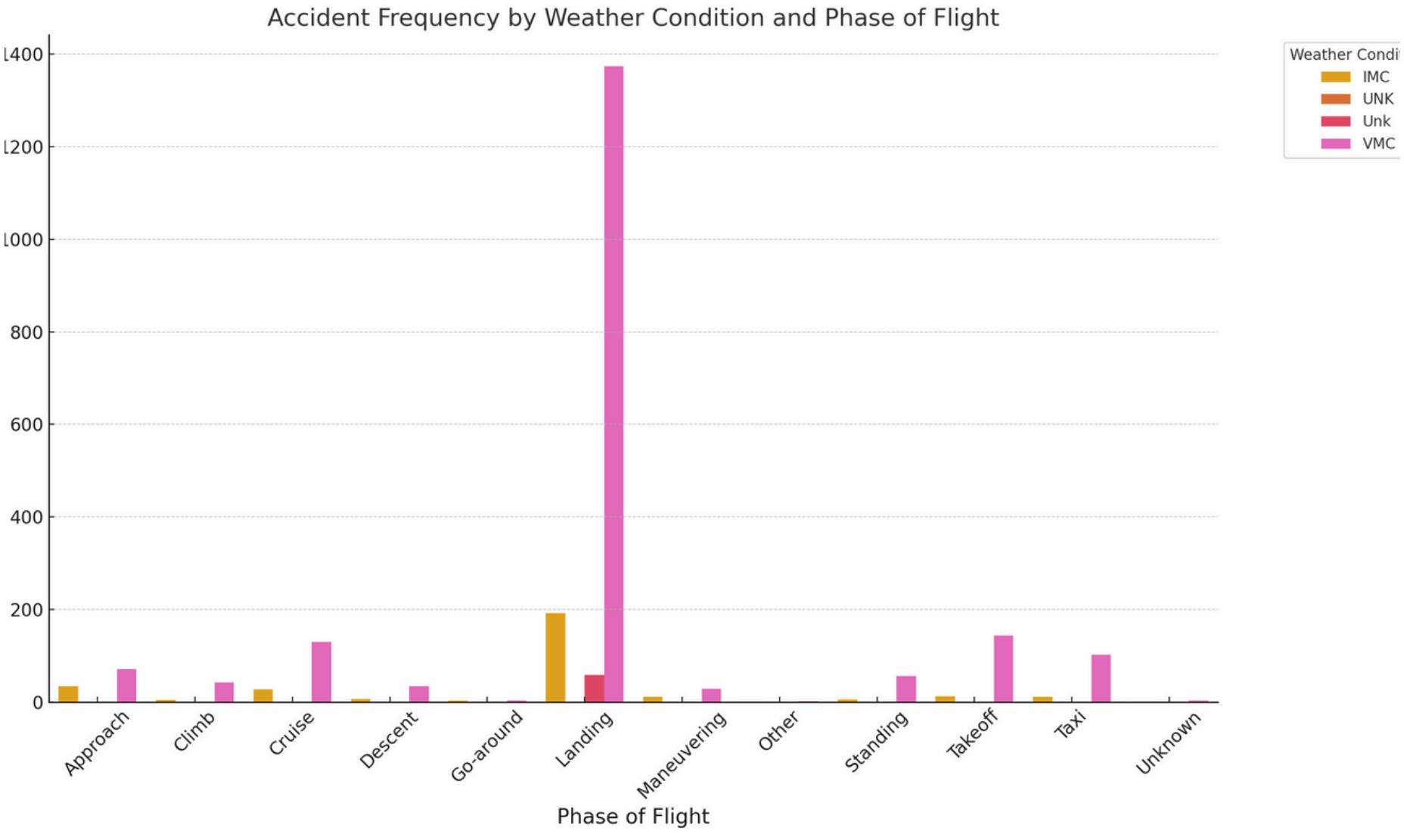
Insight: Line chart shows accident trends over time for top aircraft models, revealing any increasing or decreasing patt

Distribution of Accident Phases



Insight: Pie chart shows the distribution of accident phases, indicating which flight phases are most dangerous.

Accident Frequency by Weather



Insight: Weather condition and flight phase impact accident frequency, highlighting critical weather risks during differ

Business Recommendations Based on Aircraft Risk Analysis

1. **Aircraft Model Risk**:?Avoid purchasing high-accident aircraft models; prioritize models with lower accident rates and improving safety trends.

2. **Feature Correlation**:?Prioritize acquisition of larger, multi-engine aircraft to lower fatality risks during operations.

3. **Weather and Phase Risk**:?Invest in planes equipped with advanced avionics, automatic landing systems, and weather navigation technologies to mitigate weather-related risks

Next Steps

Data & Analysis Enhancements

- Integrate maintenance and pilot experience data for deeper risk insights
- Expand dataset to include international and newer aircraft models

Advanced Modeling & Monitoring

- Develop predictive models to forecast accident risk per aircraft type
- Establish real-time dashboards for continuous safety monitoring

Operational & Business Actions

- Prioritize maintenance and training on high-risk aircraft and flight phases
- Use risk scores to guide aircraft acquisition and fleet management decisions

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ANY QUESTIONS?

THANK YOU

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