Aviation Risk Analysis for Aircraft Acquisition

Identifying Low-Risk Aircraft Types Using Historical Accident Data

Summary

- Goal: identify aircraft types with the lowest risk profiles.
- Company expanding into the aviation industry (commercial & private operations).
- Stakeholder: Head of Aviation Division.
- Purpose: provide safety insights to reduce risk & guide investment.

Business Understanding

Business Problem & Objectives:

- Company expanding into the aviation industry.
- Need to identify low-risk aircraft types and manufacturers.
- Goal: Support data-driven purchasing decisions.
- Success criteria: actionable recommendations, clear visuals, interactive dashboard.

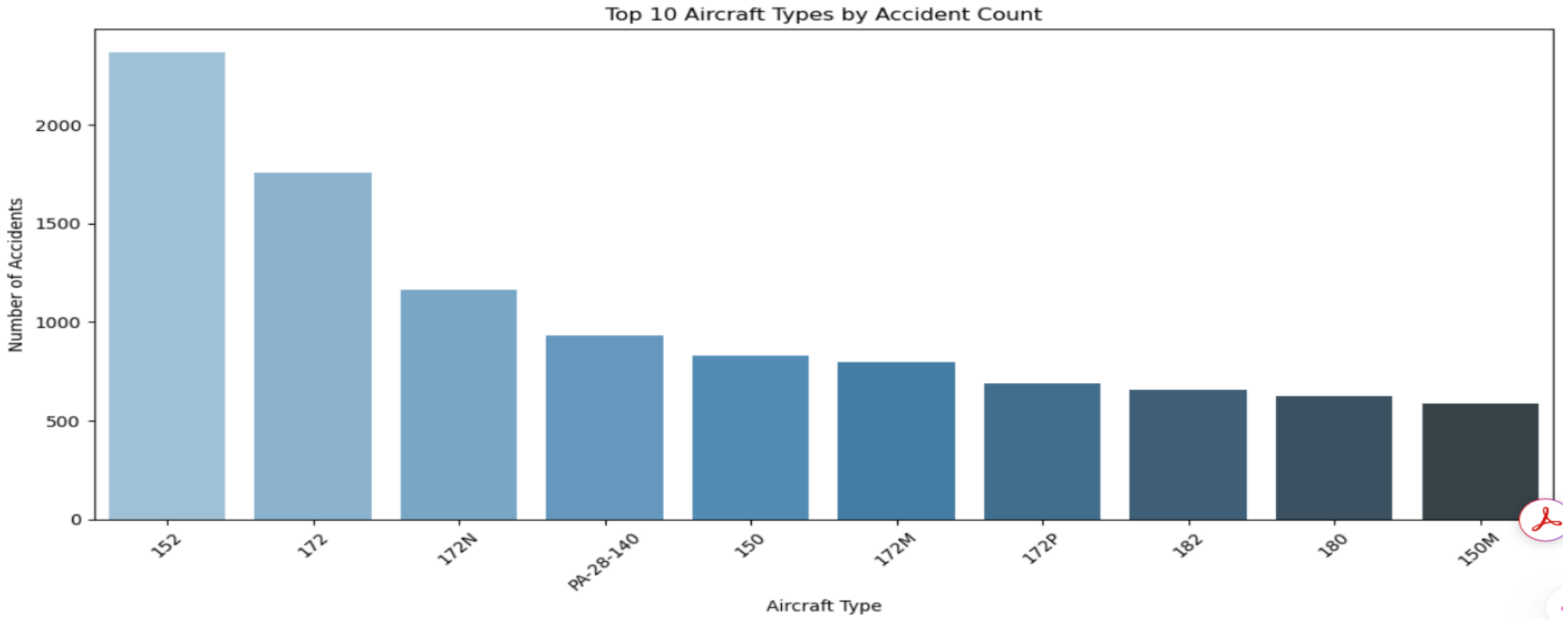
Data Description

Data Overview:

- Source: National Transportation Safety Board (NTSB).
- Coverage: 1962–2023, US and international waters.
- Key variables: Aircraft type, manufacturer, accident date, severity.
- Data quality: Some missing values, cleaned for analysis.

Accident Counts by Aircraft Type

Accident Counts by Aircraft chart:

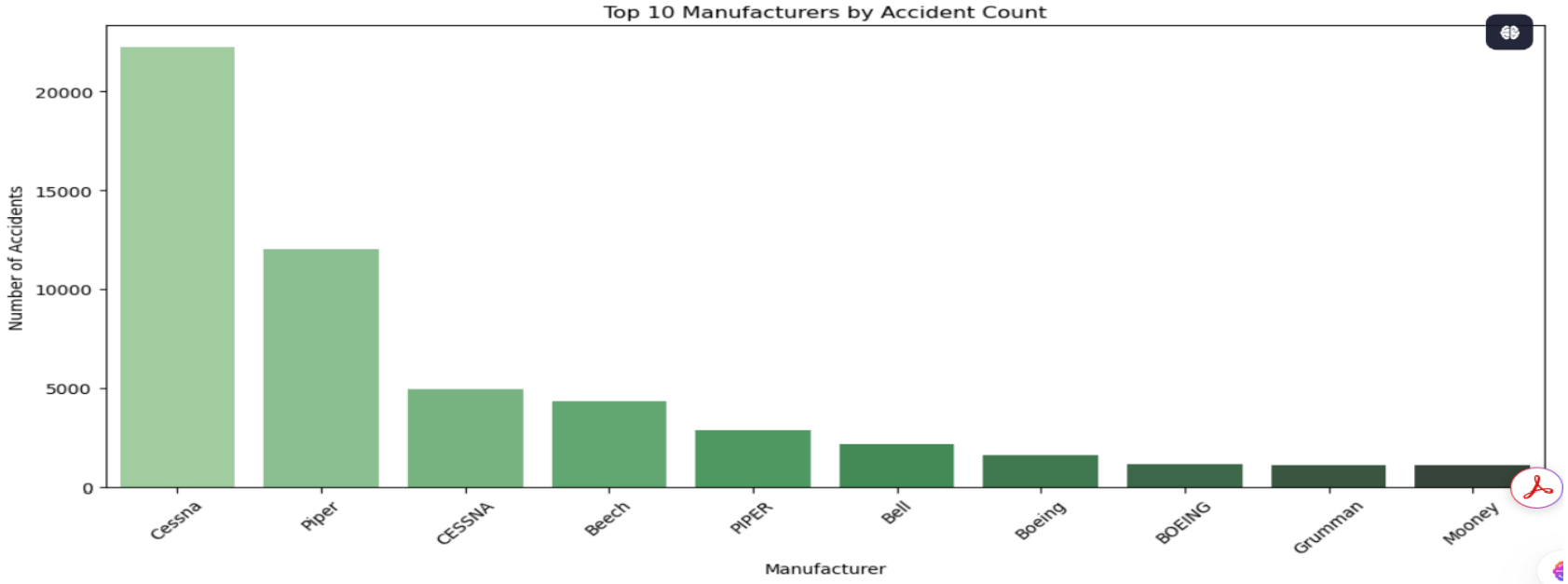


Highlights:

- High accident count: Cessna 152 (over 2,300 accidents).
- Low accident count: Cessna 150M (slightly above 500 accidents).

Accident Counts by Manufacturer

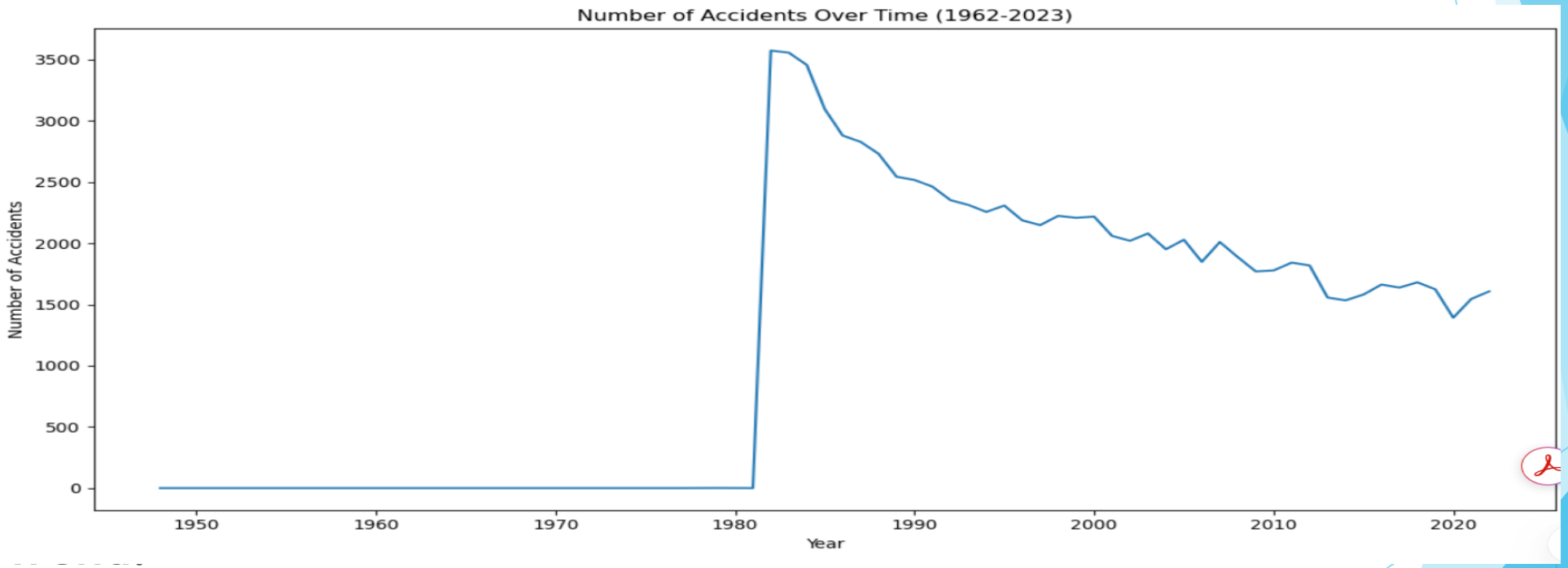
- Accident Counts by Manufacturer chart:



- High accident count: Cessna 152 (>2300 accidents).
- Lower accident count: Mooney Aircraft.

Accident Trends Over Time

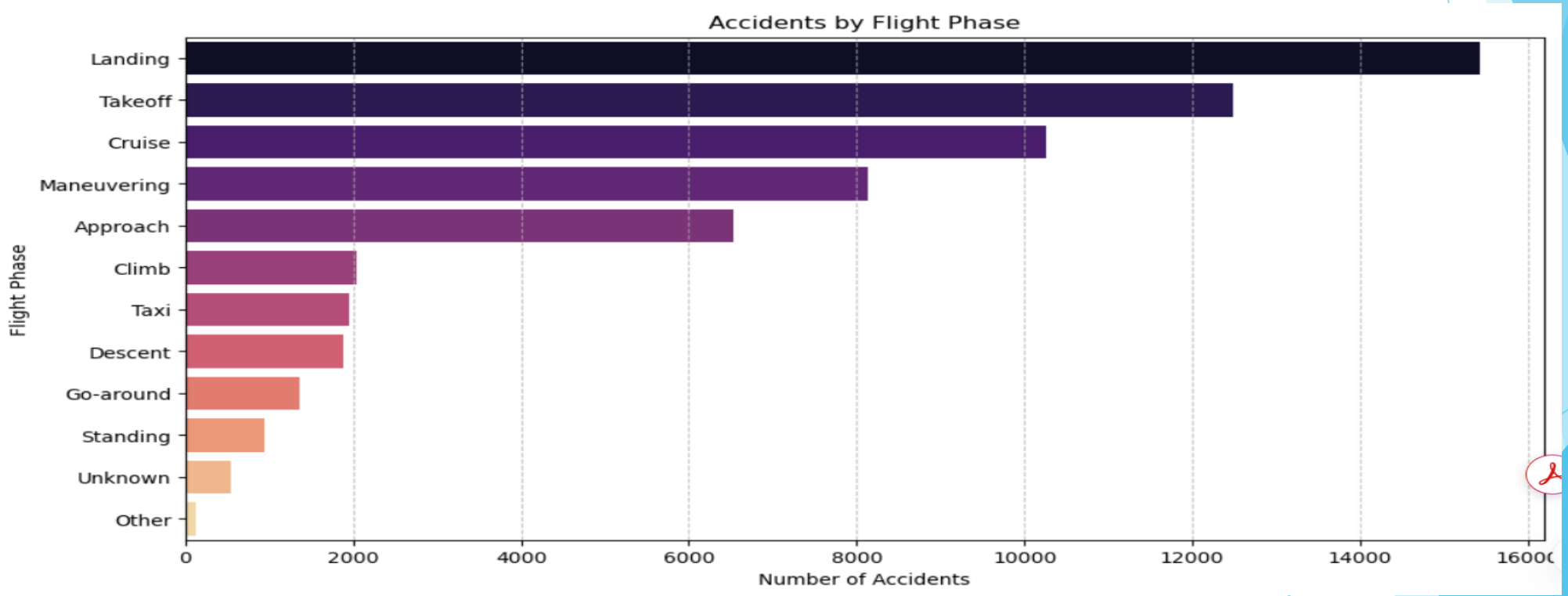
- Accident Trends Over Time (1962–2023) chart:



- Aviation accidents show a **decreasing pattern over time** (especially after the 1980s), reflecting improvements in technology, regulations, and pilot training.

Accident by Flight Phase

- Accident by Flight Phase chart:



- **Landing** is the most accident-prone phase, followed by **Takeoff** and **Cruise**

Recommendations

Key Recommendations:

- Prioritize aircraft types with low accident counts (e.g., Cessna 150M).
- Avoid manufacturers with high accident rates (e.g., Cessna 152).
- Monitor accident trends regularly to update risk assessments.
- Enhance Safety Protocols During Critical Flight Phases.
- The Landing, Takeoff, and Cruise phases account for the majority of accidents. These are high-risk moments that require focused operational strategies.

Next Steps

- Develop predictive risk models.
- Incorporate additional data sources (maintenance, operational conditions).
- Enhance interactive dashboard with real-time updates.

Thank You