Aviation Risk Analysis for Aircraft Acquisition

Identifying Low-Risk Aircraft Types Using Historical Accident Data

Overview

- 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.
- Analyze accident trends.
- Goal: Support data-driven purchasing decisions.
- Success criteria: actionable recommendations for safer aircraft acquisition, clear visuals, interactive dashboard.

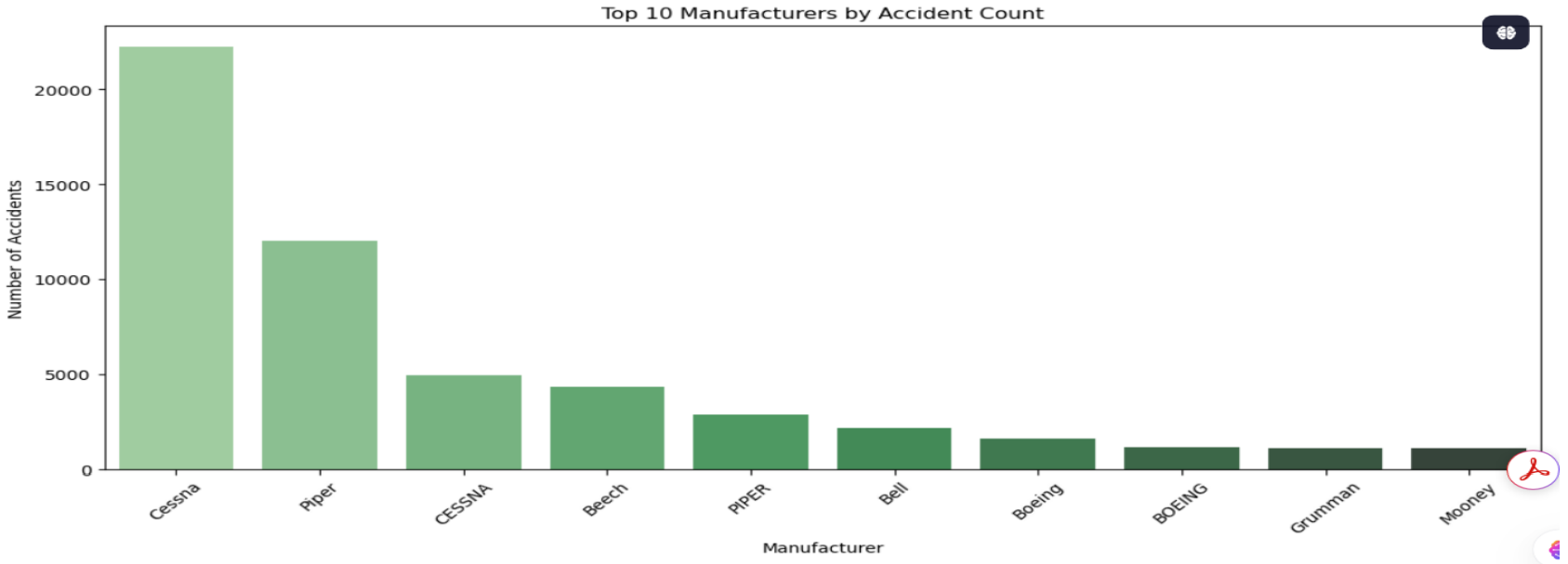
Data understanding

Data Overview:

- Source: National Transportation Safety Board (NTSB).
- Coverage: 1962–2023, US and international waters.
- Columns: Aircraft type, manufacturer, year, fatalities, location, accident date, severity, etc.

Accident Counts by Manufacturer

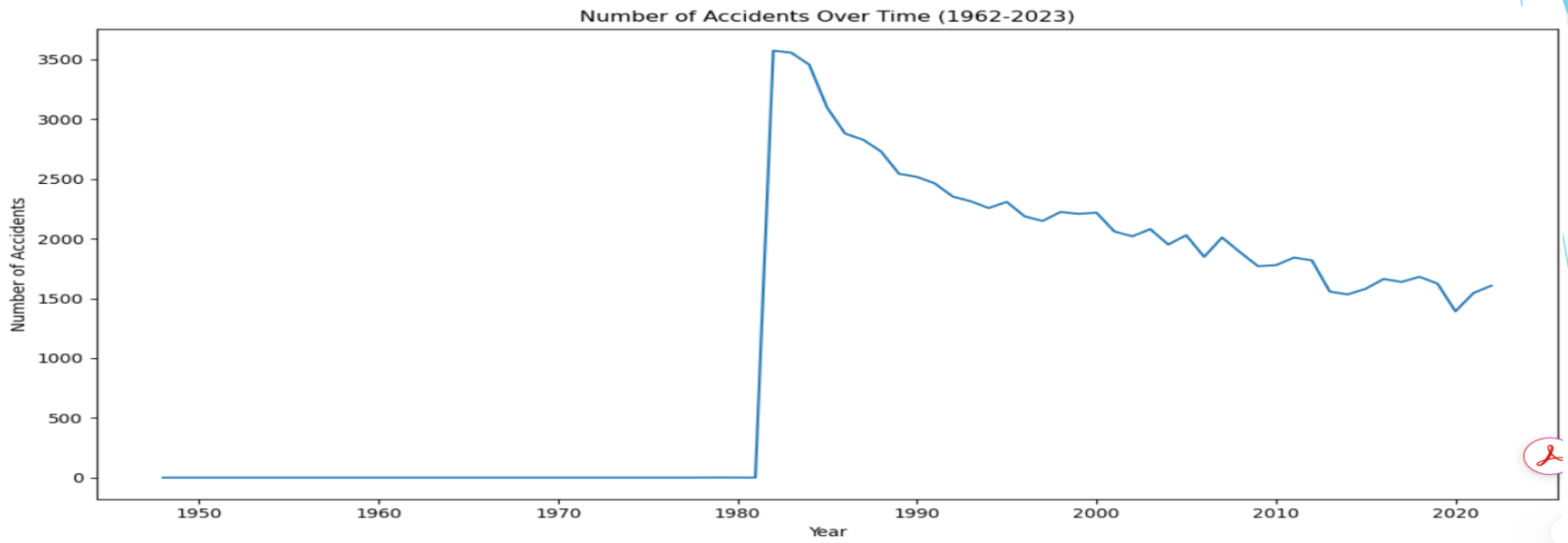
- Accident Counts by Manufacturer chart:



- Cessna & Piper have the highest accident counts.
- Mooney, Beechcraft have fewer accidents.
- High counts are partly due to fleet size & popularity.
- Takeaway : Accident concentration is highest in popular manufacturers (Cessna, Piper).

Accident Trends Over Time

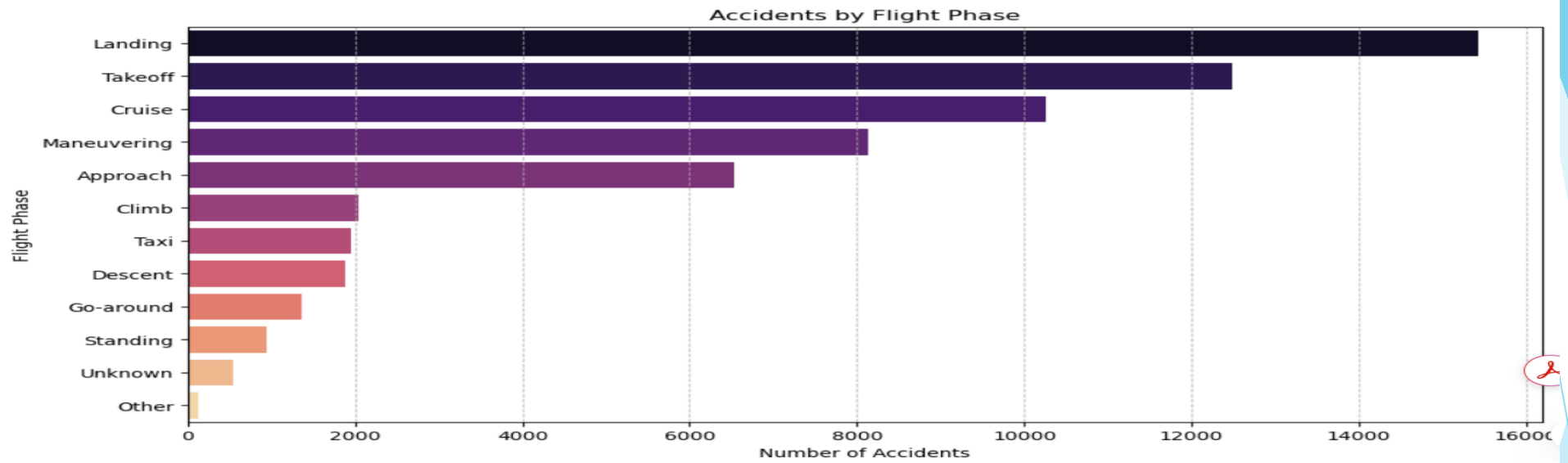
- Accident Trends Over Time (1962–2023) chart:



- Peak in accidents around the 1980s.
- Steady decline since mid-1980s.
- Small fluctuations after 2000s.
- Takeaway: Overall, accidents have decreased, showing strong safety improvements.

Accident by Flight Phase

- Accident by Flight Phase chart:



- Landing is the most accident-prone phase.
- Takeoff also shows a high risk.
- Cruise, maneuvering, and approach contribute significantly.
- Takeaway : Critical phases (Landing & Takeoff) account for most accidents.

Key Findings

- Cessna & Piper have the **highest accident counts** (due to wide usage).
- Accident rates have **declined since the 1980s**, showing safety improvements.
- Most accidents occur during the **Landing and Takeoff** phases.
- Smaller manufacturers like **Mooney** show fewer reported accidents.
- **Takeaway:** Safety has improved overall, but **critical phases & high-use aircraft** remain risk areas.

Recommendations

Key Recommendations:

- Prioritize acquisition of **aircraft with lower accident records** (e.g., Mooney, Beechcraft).
- Invest in **training & safety protocols** for Landing/Takeoff.
- Consider **modern aircraft models** benefiting from post-1980s safety improvements.
- Use findings to **guide procurement & operational risk management**.
- **Takeaway:** A **balanced strategy**: safe aircraft choices and strong pilot training to minimize risks.

Conclusion

- Accident data reveals **clear safety trends** over decades.
- Manufacturers & flight phases play a major role in accident risk.
- Data-driven insights enable **smarter, safer fleet acquisition**.

- ✈ *“Safer skies through data-driven decisions.”*

Thank You