Aviation Risk Analysis: Identifying Low-Risk Aircraft for Expansion

Phase 1 Data Science Project

Overview (Project Goal)

- **Goal**
- To analyze historical aviation accident data in order to **identify patterns, risks, and safety insights**.
- To provide **data-driven recommendations** that reduce investment risk and guide strategic decision-making.
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- **Why This Analysis Matters**
- Aviation is a **high-risk industry** with significant safety and financial implications.
- Understanding historical accident trends by **season, decade, region, and aircraft type** helps in **anticipating risks**.
- Enables stakeholders to **make informed investment choices** with safety as a core priority.
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- **Deliverables**
- **Data Insights** → Key findings on accident distribution across time, region, and aircraft type.
- **Visual Dashboards** → Clear graphs (seasonal, regional, and historical trends) for stakeholder clarity.
- **Recommendations** → Strategic actions to **reduce aviation risk** and guide safe business entry.

Business Understanding (Problem Statement)

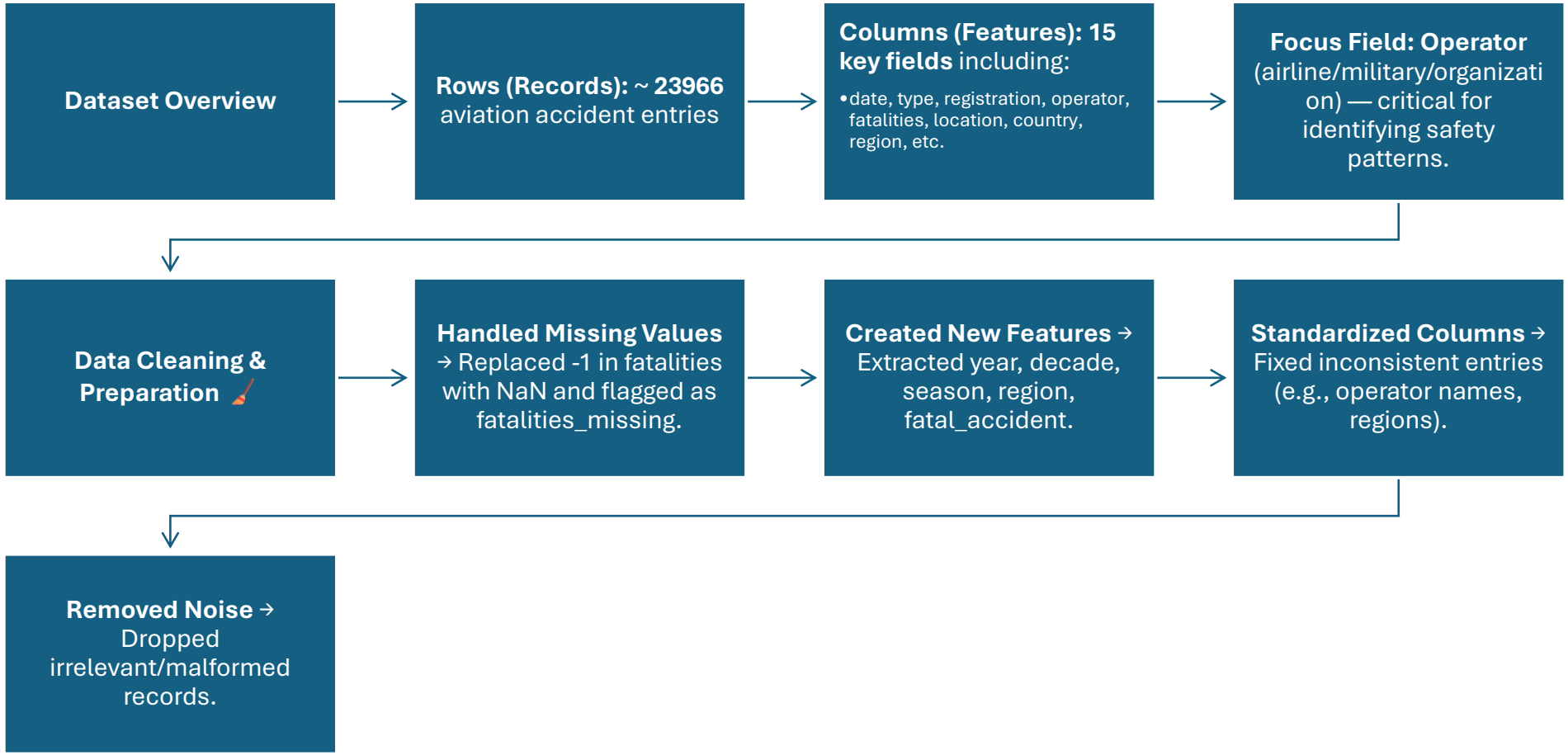
Business Problem: The company wants to enter the aircraft industry but needs to minimize risks.

Key Questions:

- Which aircraft types have the lowest risk?
- Which operators and regions show higher safety concerns?
- What factors influence risk the most?

Visual: An airplane icon with arrows to “Operators,” “Aircraft Types,” “Regions.”

Data Understanding

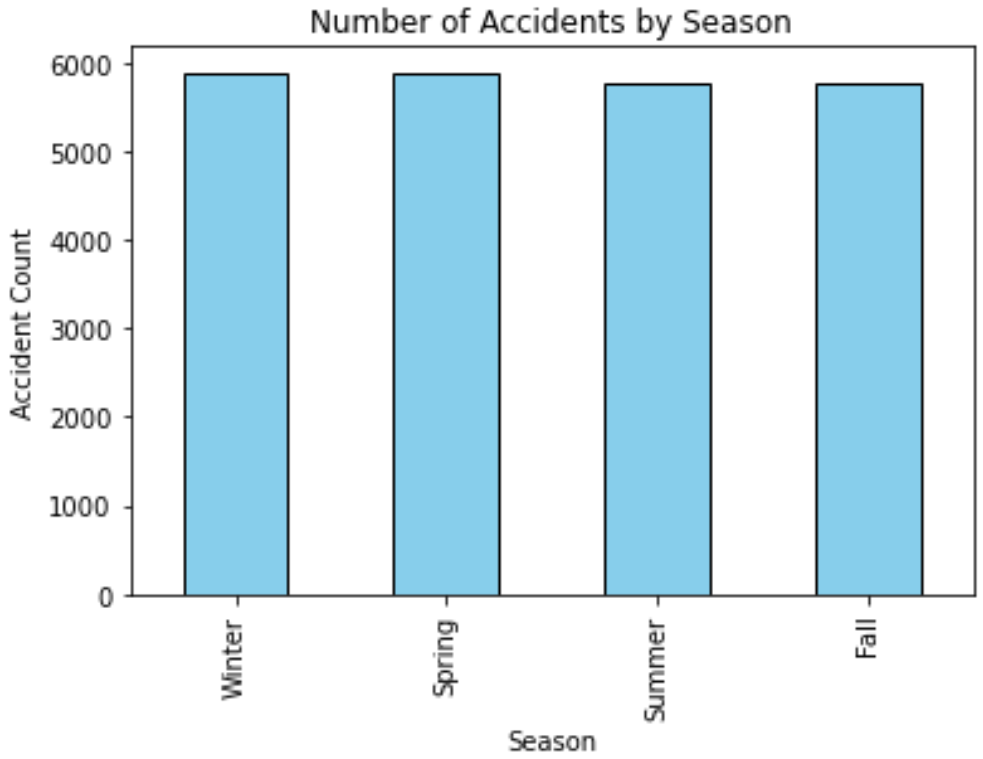


Data Analysis – Key Insights (Visualization 1)

Finding 1:The number of aviation accidents is fairly **consistent across all four seasons** (Winter, Spring, Summer, Fall), with only slight variations

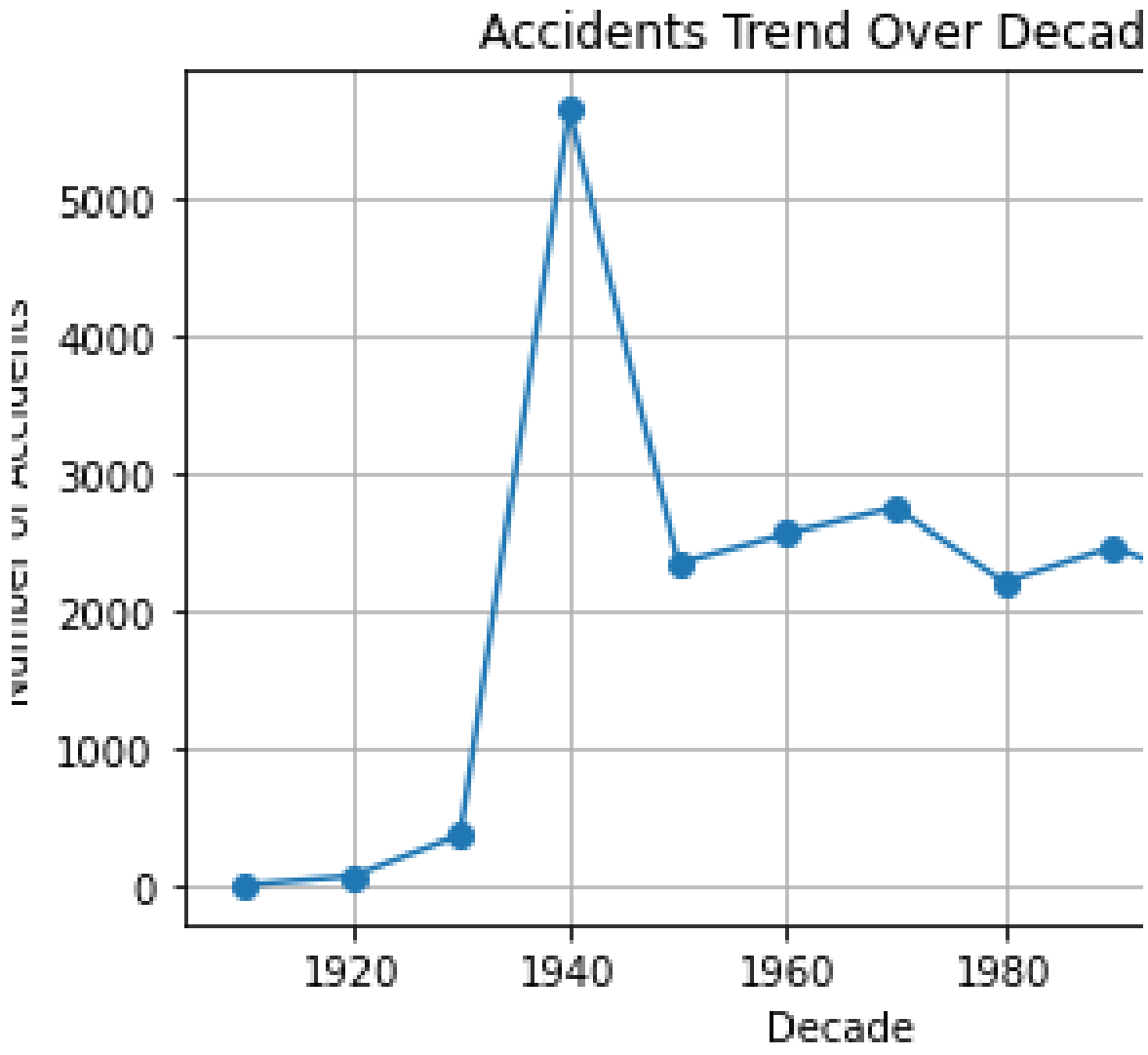
Visualization 1: Bar chart showing number of accidents by season

Business takeaway:Seasonal patterns do **not significantly affect accident risk.**
→ This suggests that safety strategies should focus more on **aircraft type and operational practices** rather than seasonal timing.



Data Analysis – Key Insights (Visualization 2)

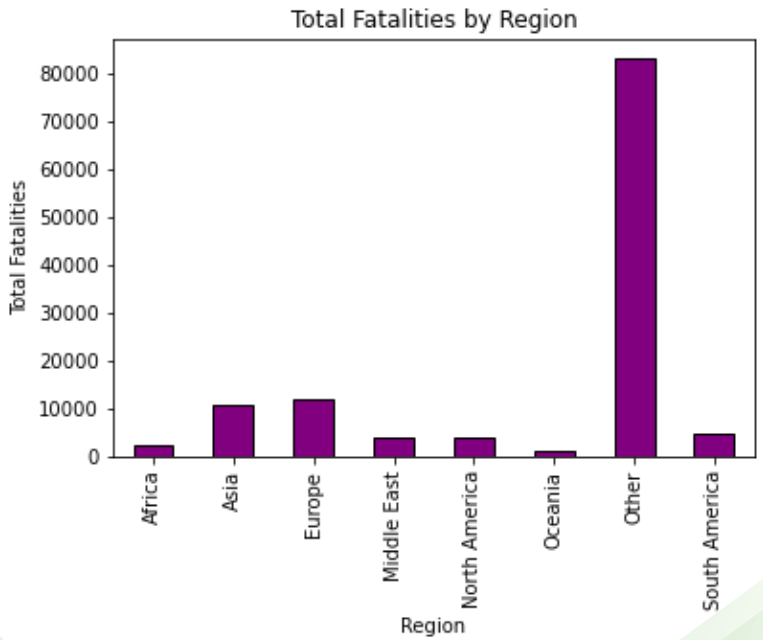
- Finding 2: Aviation accidents peaked sharply in the **1940s**, followed by a significant decline. From the 1950s onward, the number of accidents decreased steadily, reflecting major **safety improvements** in the industry.
- **Visualization 2:** Line chart of accidents by decade.
- Business takeaway: Modern aviation is **much safer today than in past decades** due to technological advances, stricter regulations, and improved safety protocols.
  → The company can be confident that entering the aviation sector now carries **lower historical risk** compared to earlier decades.



Data Analysis – Key Insights (Visualization 3)

- Finding 3: The distribution of fatalities varies significantly by region.
- Europe and Asia have relatively high totals.
- North America shows lower fatalities compared to its large aviation activity.
- The “Other” category dominates, likely due to incomplete or uncategorized regional data.

- Visualization 3: Bar chart showing total fatalities by region.
- Business takeaway: Regional context matters for safety decisions.
  → Expanding operations in regions with **stronger safety records (e.g., North America)** may reduce risk exposure, while regions with weaker records may require stricter safety protocols.



Recommendations

- ✅ **Prioritize Safer Aircraft Types**
- Avoid high-risk aircraft models with historically high fatality rates.
- Focus investment on aircraft types with strong safety records.
- ✅ **Choose Low-Risk Regions for Operations**
- Favor regions like **North America** where accident/fatality rates are lower.
- If entering higher-risk regions (e.g., Asia, Africa), implement strict safety monitoring and partnerships with trusted operators.
- ✅ **Leverage Modern Aviation Safety Improvements**
- Historical data shows significant safety gains since the 1950s.
- Invest in **newer fleets** and modern technology to benefit from improved safety standards.
- ✅ **Develop a Data-Driven Safety Strategy**
- Continuously track aircraft incident data to update risk profiles.
- Incorporate season, operator performance, and regulatory oversight in safety planning.

Next steps

1. In-depth Analysis

- Perform **trend analysis** (accidents & fatalities over time).
- Compare across **regions, operators, and aircraft types**.
- Highlight **seasonal & decade patterns**.

2. Insights Development

- Identify **high-risk operators & regions**.
- Detect **root causes & contributing factors**.
- Provide **benchmark comparisons** with global safety standards.

3. Business Recommendations

- Suggest **operator-specific safety interventions**.
- Develop **region-focused aviation safety programs**.
- Recommend **policy actions for regulators**.

4. Future Opportunities

- Use predictive modeling to **forecast accident risks**.
- Integrate **external data** (e.g., weather, flight hours, fleet age).
- Build an **interactive dashboard (Tableau/Power BI)** for continuous monitoring.

Thank You (Q&A)

- Thank audience for attention.
- Prompt for **Questions**.
- Ashono Bravian
- My linkin @Ashono bravine