Moringa Tech company

AVIATION DATA ANALYSIS: ENHANCING SAFETY AND OPERATIONAL EFFICIENCY

Data-driven Insights for Strategic Decision-Making

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BRIEF OVERVIEW OF THE ANALYSIS PROCESS

Data Cleaning:

- Handled missing values by filling numerical data with the median and categorical data with the mode.
- Removed columns with over 75% missing data to focus on the most relevant and complete information.

Data Analysis:

- Performed Exploratory Data Analysis (EDA) to identify key patterns and trends.
- Used covariance and correlation to explore relationships between variables like injury severity, number of engines, and accident outcomes.
- Examined accident details (injury counts, aircraft type) to derive actionable insights.

Business Recommendations:

- Based on the findings, proposed three concrete recommendations to improve safety, operational efficiency, and marketing efforts.
- Visualized key relationships (e.g., engine count vs. uninjured passengers, severity vs. injury types) to support recommendations.

Business UNDERSTANDING

Problem Statement:

Goal: The aviation division is looking for data-driven strategies to enhance safety and operational performance.

Objective: Using historical aviation data, identify key patterns in accident trends and safety outcomes.

Business Challenge: Severe accidents pose a risk to the reputation and operations of the aviation division. Improving safety is critical for business growth.

BUSINESS IMPACT

Why It Matters

Enhancing safety not only reduces liabilities but also builds customer trust and brand value.

Opportunities

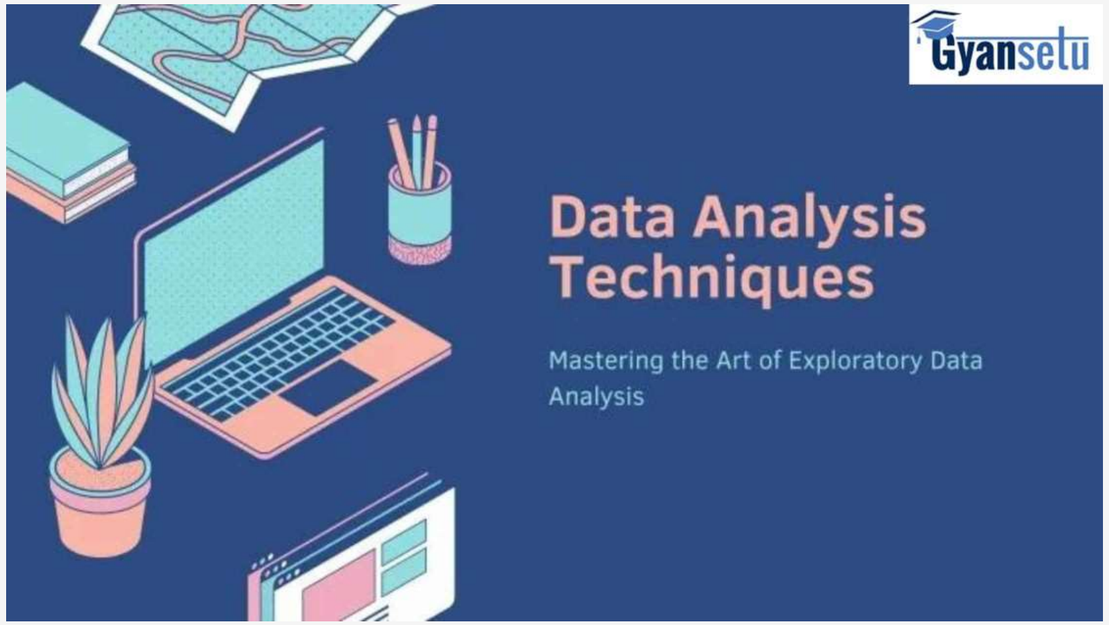
By leveraging data, we can make informed decisions to reduce accident severity and improve passenger safety outcomes.

DATA UNDERSTANDING

Dataset: Aviation accident reports with injury counts, accident details, and aircraft specifications.

Variables: Fatal injuries, serious injuries, minor injuries, number of engines, aircraft damage, weather conditions, etc.

Data Cleaning: We handled missing values using statistical techniques like filling numerical data with the median and categorical data with the mode.



DATA ANALYSIS

Techniques Used:

- Exploratory Data Analysis (EDA) to identify relationships.
- Covariance and correlation to assess injury patterns.

Goal: To uncover patterns in accident severity and factors like aircraft type, engine count, and safety outcomes.

RECOMMENDATIONS

Multi-engine Aircraft for Safety

Key Finding: Multi-engine aircraft are associated with higher survivability (Covariance between number of engines and uninjured passengers: 4.0244).
Visualization: Bar Chart showing uninjured passengers by engine count.
Recommendation: Invest in multi-engine aircraft to reduce the impact of accidents and improve safety outcomes.

Focus on Reducing Severe Accidents

Key Finding: High fatality accidents are associated with more serious injuries (Covariance: 0.7948). Preventing severe accidents will reduce both fatalities and injuries.
Visualization: Scatter Plot showing the relationship between fatal and serious injuries.
Recommendation: Implement advanced pilot training and safety protocols to reduce accident severity.

Leverage Safety Performance in Marketing

Key Finding: Many accidents result in uninjured passengers, especially in lower-severity incidents (Covariance between minor injuries and uninjured: 5.5308).
Visualization: Box Plot showing the variance of uninjured passengers in different accident categories.
Recommendation: Highlight safety performance in marketing to emphasize the division's commitment to safety.

NEXT STEPS

- Immediate Actions:

1. Explore financial analysis to support investments in multi-engine aircraft.
2. Develop enhanced pilot training programs focused on accident prevention.
3. Launch marketing campaigns focused on the division’s safety record.

Long-Term Strategy: Continue leveraging data to monitor safety performance and identify improvement opportunities.

THANK YOU

Any Questions?

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