EXPLORING SPACEX LAUNCH DATA

Executive Summary

- **Objective:** Explore SpaceX launch data to uncover insights and trends.
- **Approach:** Conducted data collection, preprocessing, exploratory data analysis (EDA), interactive visual analytics, and predictive analysis.
- **Key Findings:** Identified success factors for launches, visualized launch trends, and built predictive models.
- **Recommendations:** Provide insights for optimizing future SpaceX launches and decision-making processes.

Introduction

- **Project Overview:** Investigate SpaceX launch data to understand mission outcomes and factors influencing success.
- **Data Sources:** Utilized publicly available SpaceX launch data from various sources.
- **Scope:** Focus on analyzing launch success, payload characteristics, launch sites, and predictive modeling.

Data Collection and Wrangling Methodology

- **Data Sources:** Retrieved data from SpaceX API and other online repositories.
- **Preprocessing:** Cleaned and transformed raw data, handled missing values, and standardized formats.
- **Data Quality:** Ensured data integrity and consistency for accurate analysis.

Exploratory Data Analysis (EDA) Methodology

- **Objectives:** Understand data distributions, correlations, and trends.
- **Techniques:** Utilized descriptive statistics, data visualizations, and hypothesis testing.
- **Insights:** Identified patterns in launch success rates, payload characteristics, and launch site performance.

Interactive Visual Analytics Methodology

- **Approach:** Developed interactive visualizations using libraries such as Matplotlib, Seaborn, and Plotly.
- **Tools:** Created interactive maps with Folium and dynamic dashboards with Plotly Dash.
- **Enhancements:** Improved data exploration and communication of insights through interactive elements.

Predictive Analysis Methodology

- **Objective:** Build predictive models to forecast launch outcomes.
- **Data Preparation:** Prepared features, split data into training and testing sets.
- **Modeling Techniques:** Employed classification algorithms such as logistic regression, decision trees, and random forests.
- **Evaluation:** Assessed model performance using metrics like accuracy, precision, recall, and F1-score.

EDA with Visualization Results

- **Flight Number vs. Payload Mass:** Visualized the relationship between flight number and payload mass.
- **Launch Site Success Rates:** Analyzed success rates across different launch sites.
- **Orbit Success Rate Bar Chart:** Presented success rates for different orbits.

EDA with SQL Results

- **SQL Queries:** Executed SQL queries to extract insights from the data.
- **Launch Site Analysis:** Investigated launch outcomes by launch site.
- **Orbit Analysis:** Examined success rates for different orbital trajectories.

Interactive Map with Folium Results

- **Folium Map:** Displayed launch sites and mission outcomes on an interactive map.
- **Geospatial Analysis:** Explored launch locations and associated characteristics.

Plotly Dash Dashboard Results

- **Dynamic Dashboard:** Created a dynamic dashboard to explore launch data interactively.
- **Customization:** Added filters, dropdowns, and interactive elements for data exploration.
- **Insights:** Provided insights into launch success factors and trends.

Predictive Analysis (Classification) Results

- **Model Performance:** Evaluated classification models' performance using various metrics.
- **Feature Importance:** Determined key features influencing launch outcomes.
- **Future Predictions:** Forecasted launch success based on predictive models.

Conclusion

- Key Insights: Summarized main findings and observations from the analysis.
- Challenges: Discussed challenge s encountered and lessons learned.
- Future Directions: Suggested areas for further exploration and improvement.

THANK YOU

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