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FALCON 9 SPACEX

Capstone Project

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Capstone Project

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Introduction



SpaceX is a revolutionary company:
Rocket Reusability: SpaceX was the first to successfully develop and test reusable rockets. Falcon 9 became the first rocket to return to Earth and land vertically after completing a mission. This significantly reduced the cost of launches into space.

Executive summary

THE RESEARCH ATTEMPTS TO IDENTIFY THE FACTORS FOR A SUCCESSFUL ROCKET LANDING (SECOND STAGE)

COLLECT DATA USING SPACEX REST API

WRANGLE DATA TO CREATE SUCCESSFUL/FAIL OUTCOME

EXPLORE DATA WITH THE DATA VISUALIZATION TECHNIQUES

ANALYZE DATA WITH SQL

EXPLORE LUCH SITE SUCCESS RATE

VISUALIZE THE LUCH SITES

BUILD MODELS TO PREDICT LANDING OUTCOMES



Methodology



- Collect data using SpaceX REST API and web scapping techniques
- Wrangle data – by filtering the data, handling missing values, and applying one hot encoding
- Explore data via EDA with SQL and data visualization techniques
- Visualize the data using Folium and Plotly Dash
- Build models

EDA with SQL



Display

Names of unique launch sites
5 records where launch site begins
with “CCA”

Total payload mass carried by
boosters launched by NASA (CRS)

Average payload mass carried by
boosters version by NASA F9 v1.1.

EDA with SQL



List

- Date of first successful landing on ground pad
- Names of boosters
- Total number od successful and failed mission
- Names of boosters version
- Failed landing outcome
- Count of landing outcome

EDA with visualization



Charts

Flight number vs Payload

Flight number vs Launch Site

Payload (kg) vs Launch Site

Payload (kg) vs Orbit type

Predictive Analytics



Charts

Create NumPy array

Standardize Standardize the data with
Standart Scalar

Split the data

Create a GridSearchCV object

Apply GridSearchCV on different algorithms

Calculate accuracy

Assess the confusion matrix

Identify the best model

Results Summary

Exploratory Data Analysis

Launch success has improved over time

KSC LC-39 has the highest success rate

Orbits ES-LI, GEO, HEO ans SSO have a
100% success rate

