



SPACE-Y COST ANALYSIS

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EXECUTIVE SUMMARY

- In this project, we are determined to predict the features that affect cost effective launching.
- We gathered available dataset on web, clean and save it to a database.
- Then we did exploratory data analysis to identify the features deciding successful landing of first stage.
- Once its identified, we train our model to do predictive analysis.
- Finally we created a interactive dashboard for the user to get different insights from the data.

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INTRODUCTION

- In this presentation, we will help space-Y to develop building low-cost space craft by collecting data of similar agencies.
- We will collect the space-X launch data which is reusing its first stage of space craft to minimize cost of rocket launch.
- Then we use to data to analysis and find best methods to build similar space crafts.



METHODOLOGY

DATA COLLECTION AND CLEANING

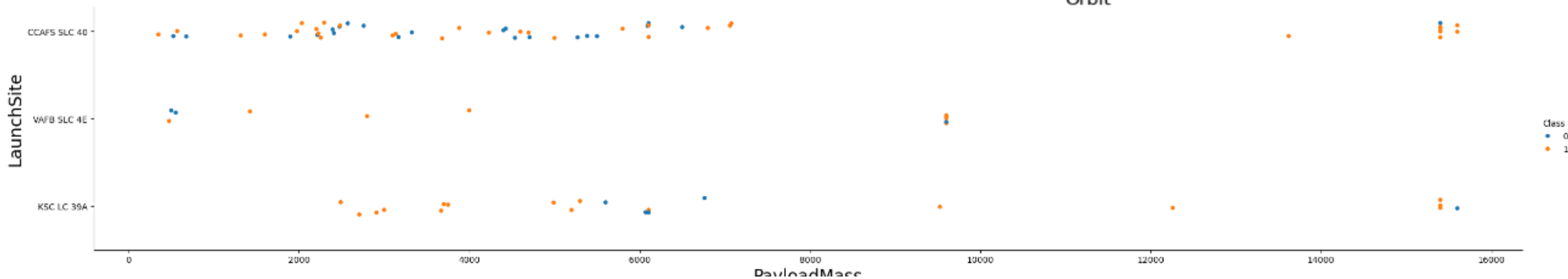
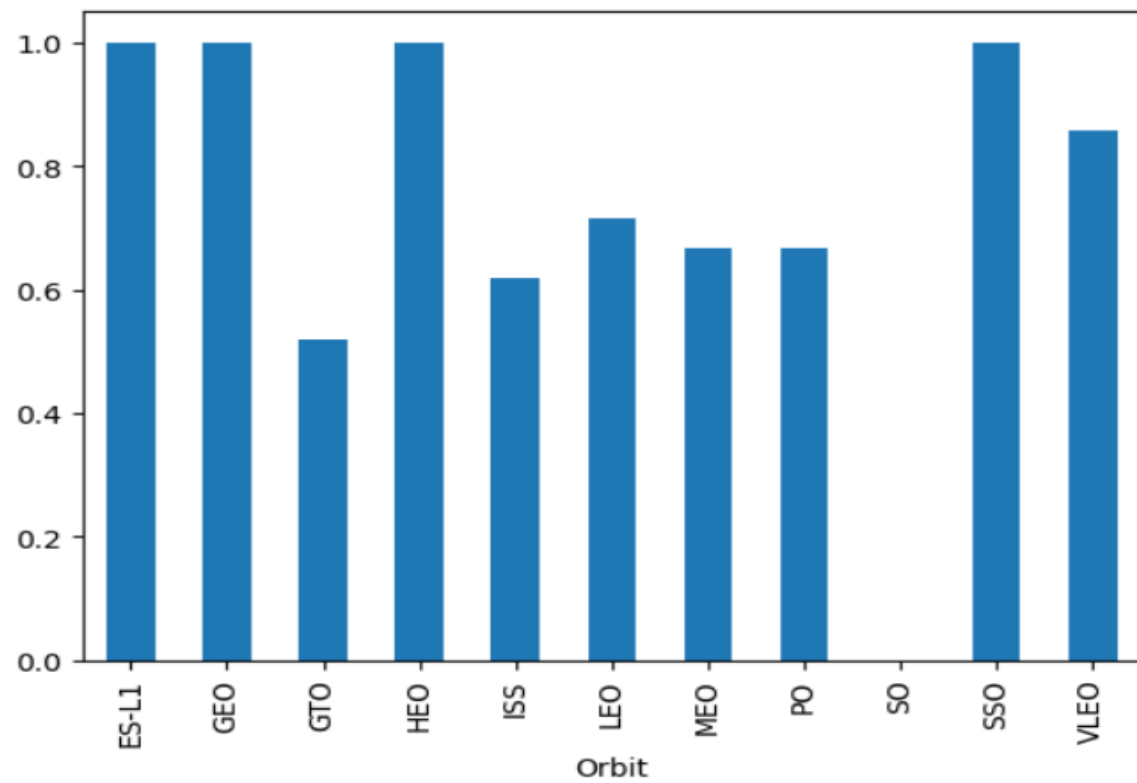
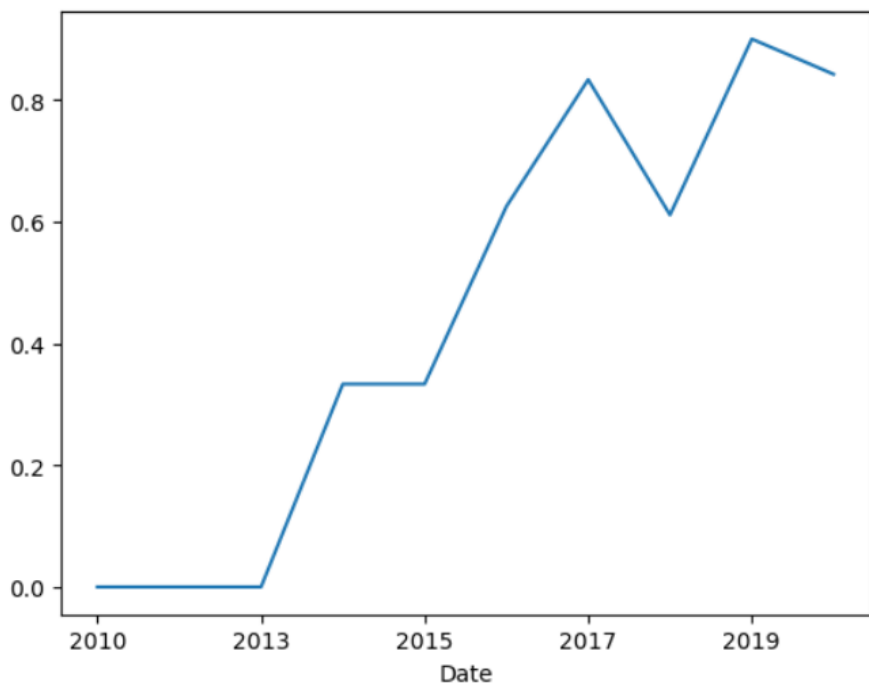
- We collected all space-X launch details using get request from spaceX website and from Wikipedia
- Collected data are converted to DataFrame and filtered to have only Falcon 9 Launches which has less launching cost
- We also handled missing values in the DataFrame.

EXPLORATORY ANALYSIS USING SQL

- Loaded the clean dataframe into database using magic commands
- Performed various analysis on the data by querying the DB
- Some of the analysis are:
 - Different Launch sites
 - Max and Avg Payloads and their success rate
 - Mission Outcome of launch sites
 - Types of boosters used
 - Count of successful and failure missions

EXPLORATORY ANALYSIS USING VISUALIZATION

- We used matplotlib and pandas to visually analyze the features that helps the stage I to land successfully.
- We used scatter plots, bar plots to plot the features and we can come to a conclusion of features to use in predictive analysis.



EDA RESULT

- From EDA, we can conclude the features that determine the success rate of landings are Flight Number, Payload Mass, Orbit, Launch Site, Flights, Grid Fins, Reused, Legs, Landing Pad, Block, Reused Count, Serial
- After features are identified, we need to convert the categorical values in the above features to numerical values to use this in Predictive analysis

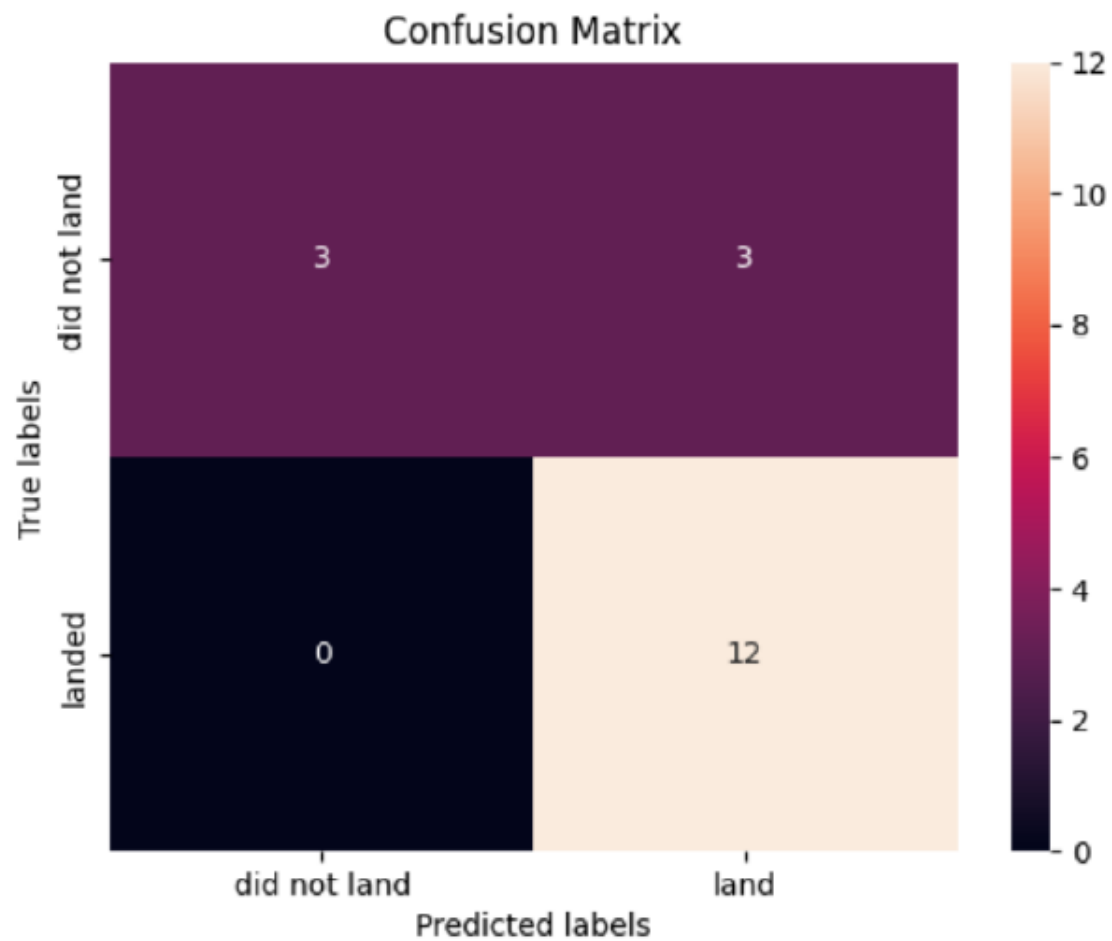


PREDICTIVE ANALYSIS

PREDICTIVE ANALYSIS

- In this module, we will train our model using the spaceX data to predict if the first stage will land successfully.
- We standardised the data, then divided into Training and testing data to train the model. Also we found the right hyper parameters for the model using GridSearchCV.
- We used different Model to predict the Test data and compared the scores to choose the best out of it.

CONFUSION MATRIX



PREDICTIVE ANALYSIS RESULTS

- By training different models, we get similar results for all Models.
- In conclusion we can use Logistic regression which is best in predicting Binary values.

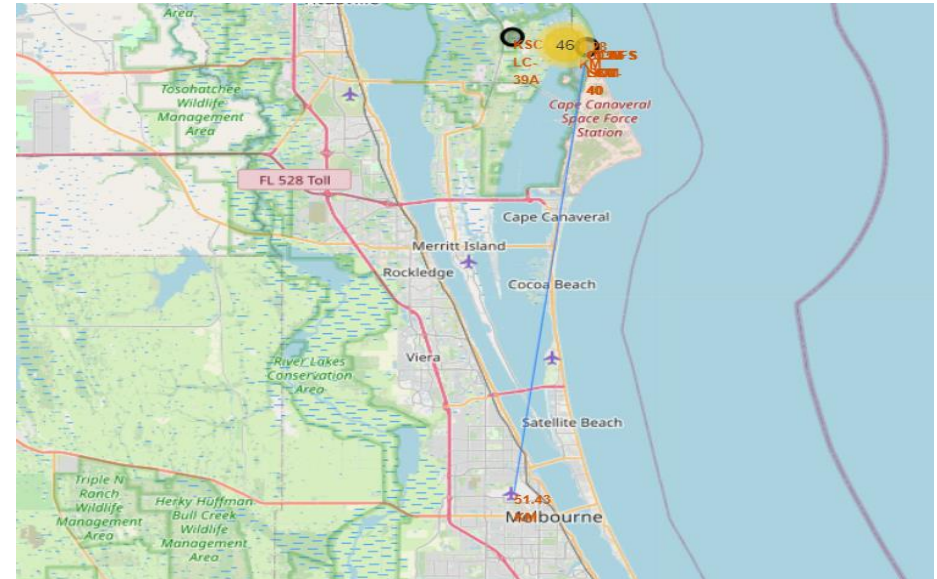
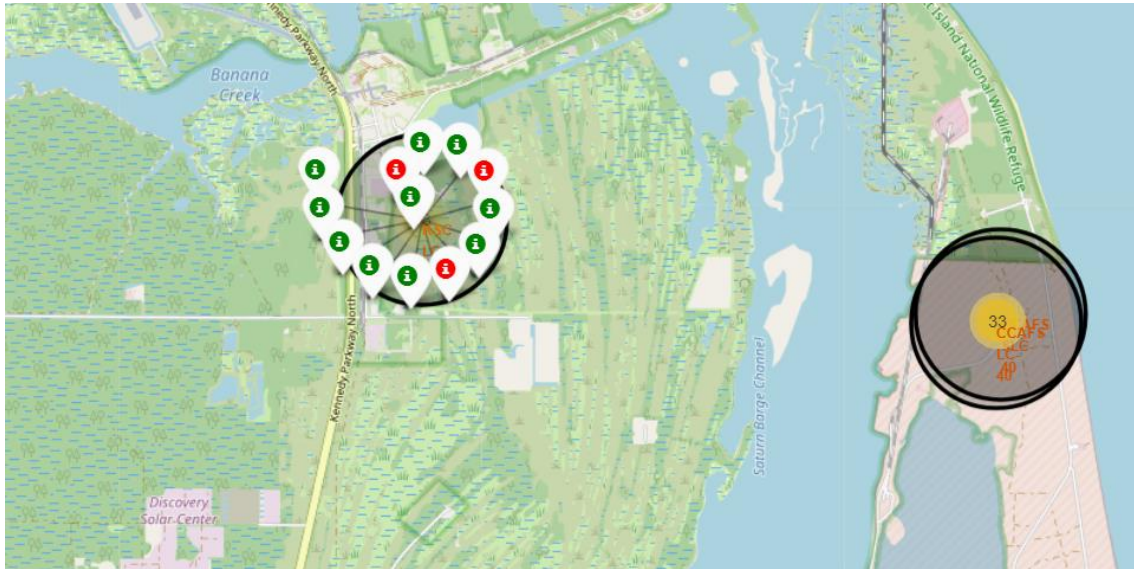


DASHBOARD

LAUNCH SITES MAP USING FOLIUM

- In this, we mark the locations and proximities of launch
- We discovered patterns by exploring the map and choose optimal launch site location

FOLIUM MAP



INTERACTIVE DASHBOARD

- We build a interactive dashboard using dash.
- We gain multiple insights by using the dashboard. Best example is given in next slide

DASH

SpaceX Launch Records Dashboard

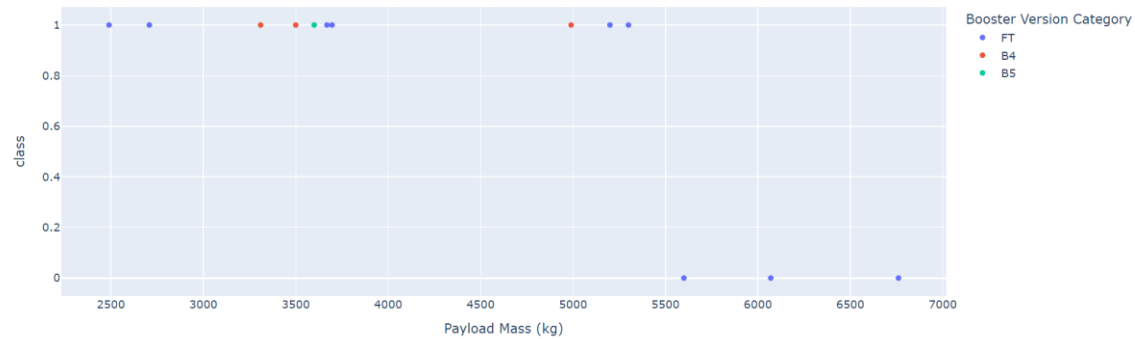
All Sites

Success rate for all Launch sites



- KSC LC 39A has more successful launches
- We filter the KSC LC 39A to view success rate using payload mass and boosters used to launch.

DASH



- In this scatter plot, we can see payload less than 5500 Kgs has more success rate

CONCLUSION

- All the launch sites are close to the coast
- KSC LC 39A has the highest success rate among launch sites. Has a 100% success rate for launches less than 5,500 kg
- Across all launch sites, the higher the payload mass (kg), the higher the success rate and launch success increase over time period.
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