Analyzing the Space Race with Data Science

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Outline

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- Introduction
- Methods
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Executive Summary

The objective is to transform raw data into actionable insights that will provide strategic decision-making by implementing data science tools and skills to uncover patterns, trends, and correlation within our data set.

Introduction

Using concepts, methods, and tools learned from the course we will apply it to collecting and analyze all information about the Falcon 9 Launch. Critical thinking and graphic techniques will be used for proper analyzes to provide the best decision.

Methods

DATA COLLECTION: UTILIZING API

PERFORMING DATA WRANGLING VIA JUPYTER

EXECUTING EXPLORATORY DATA ANALYSIS (EDA) USING GRAPHICS

UTILIZING FOLIUM AND PLOTLY DASH FOR INTERACTIVE VISUAL ANALYTICS

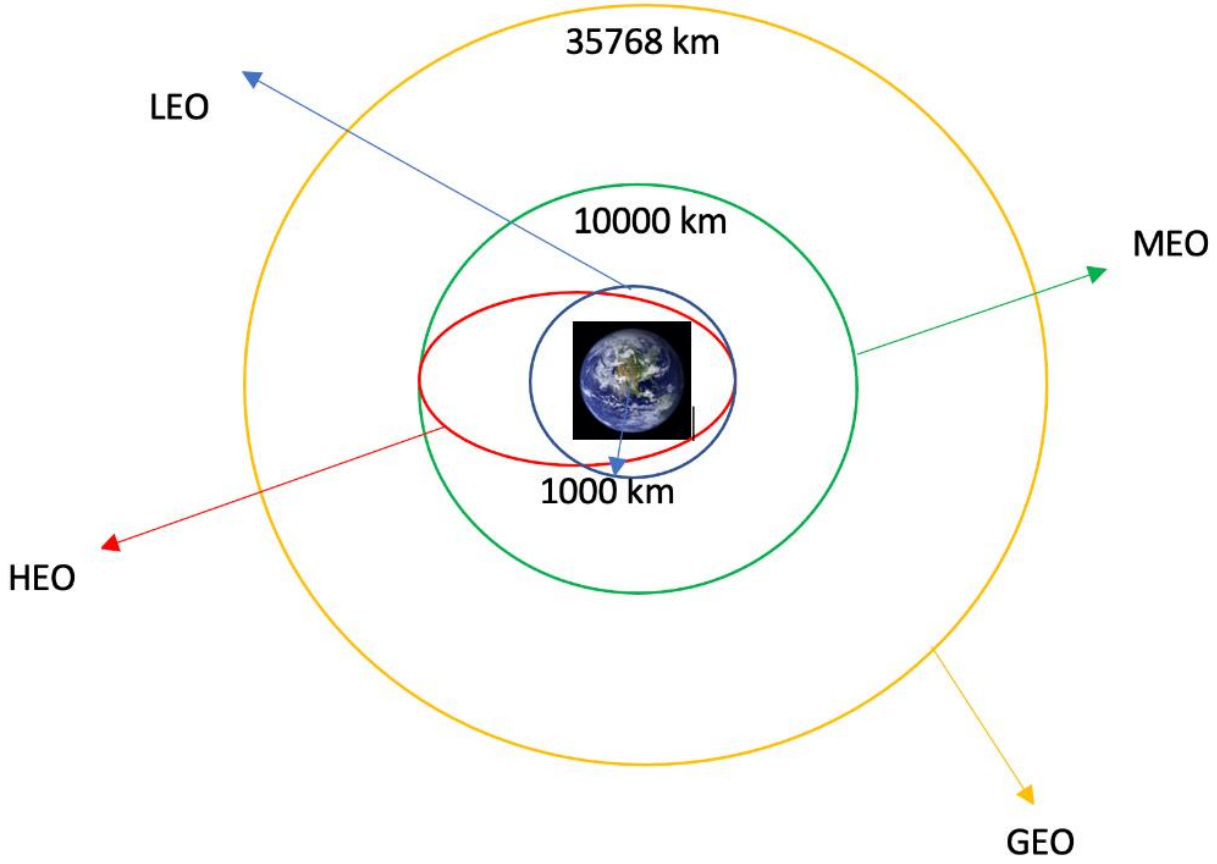
PREDICTING ANALYSIS USING MODELS

Data Collection

Using libraries such a Pandas and Numpy, data was narrowed for Falcon 9 Launch

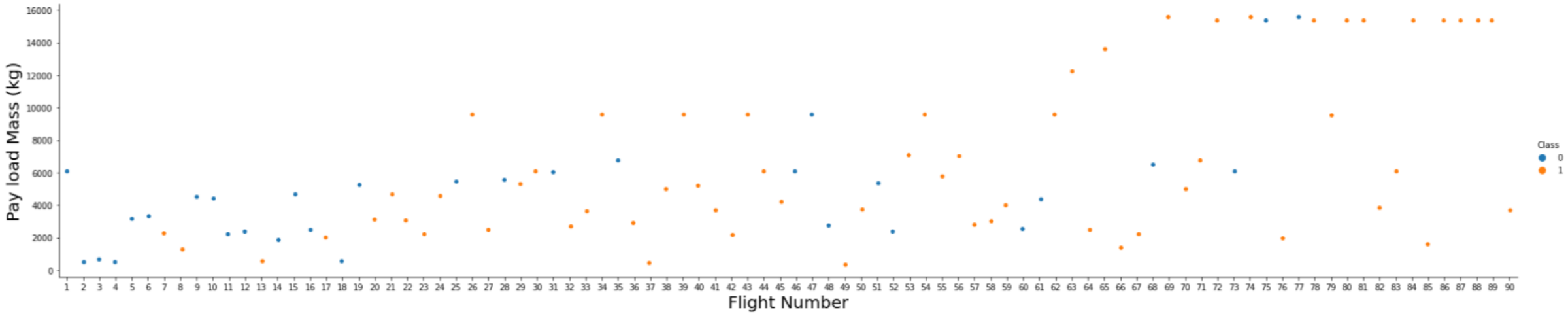
	FlightNumber	Date	BoosterVersion	PayloadMass	Orbit	LaunchSite	Outcome	Flights	GridFins	Reused	Legs	LandingPad	Block	ReusedCount	Serial	Longitude	Latitude
4	1	2010-06-04	Falcon 9	6123.547647	LEO	CCSFS SLC 40	None None	1	False	False	False	None	1.0	0	B0003	-80.577366	28.561857
5	2	2012-05-22	Falcon 9	525.000000	LEO	CCSFS SLC 40	None None	1	False	False	False	None	1.0	0	B0005	-80.577366	28.561857
6	3	2013-03-01	Falcon 9	677.000000	ISS	CCSFS SLC 40	None None	1	False	False	False	None	1.0	0	B0007	-80.577366	28.561857
7	4	2013-09-29	Falcon 9	500.000000	PO	VAFB SLC 4E	False Ocean	1	False	False	False	None	1.0	0	B1003	-120.610829	34.632093
8	5	2013-12-03	Falcon 9	3170.000000	GTO	CCSFS SLC 40	None None	1	False	False	False	None	1.0	0	B1004	-80.577366	28.561857

EDA Insight: Flight Number vs Payload Mass

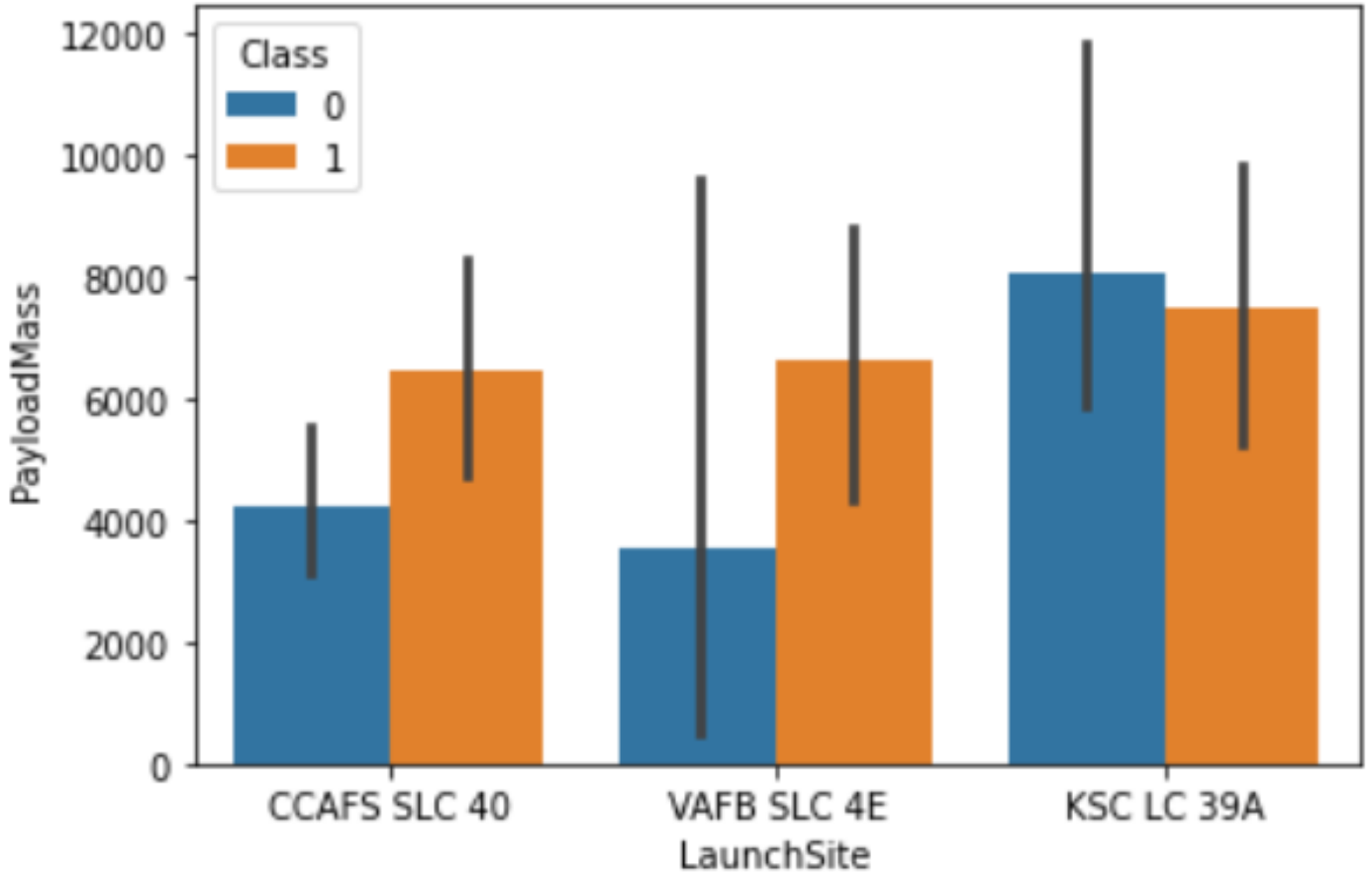


- **LEO:** Low Earth orbit
- **HEO:** Highly elliptical orbit
- **GEO:** Circular geosynchronous orbit
- **MEO:** Geocentric orbit

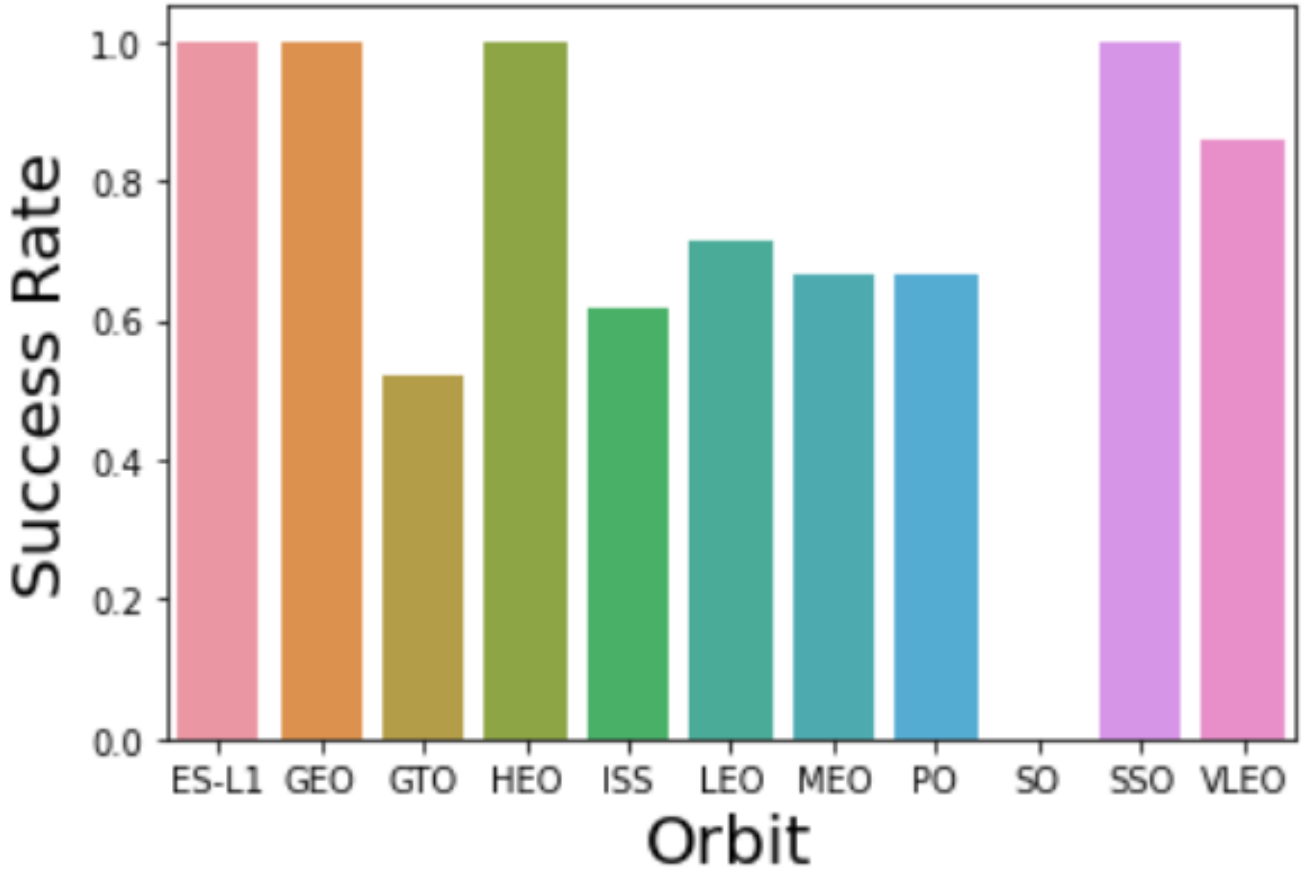
EDA Insight: Flight Number vs Payload Mass



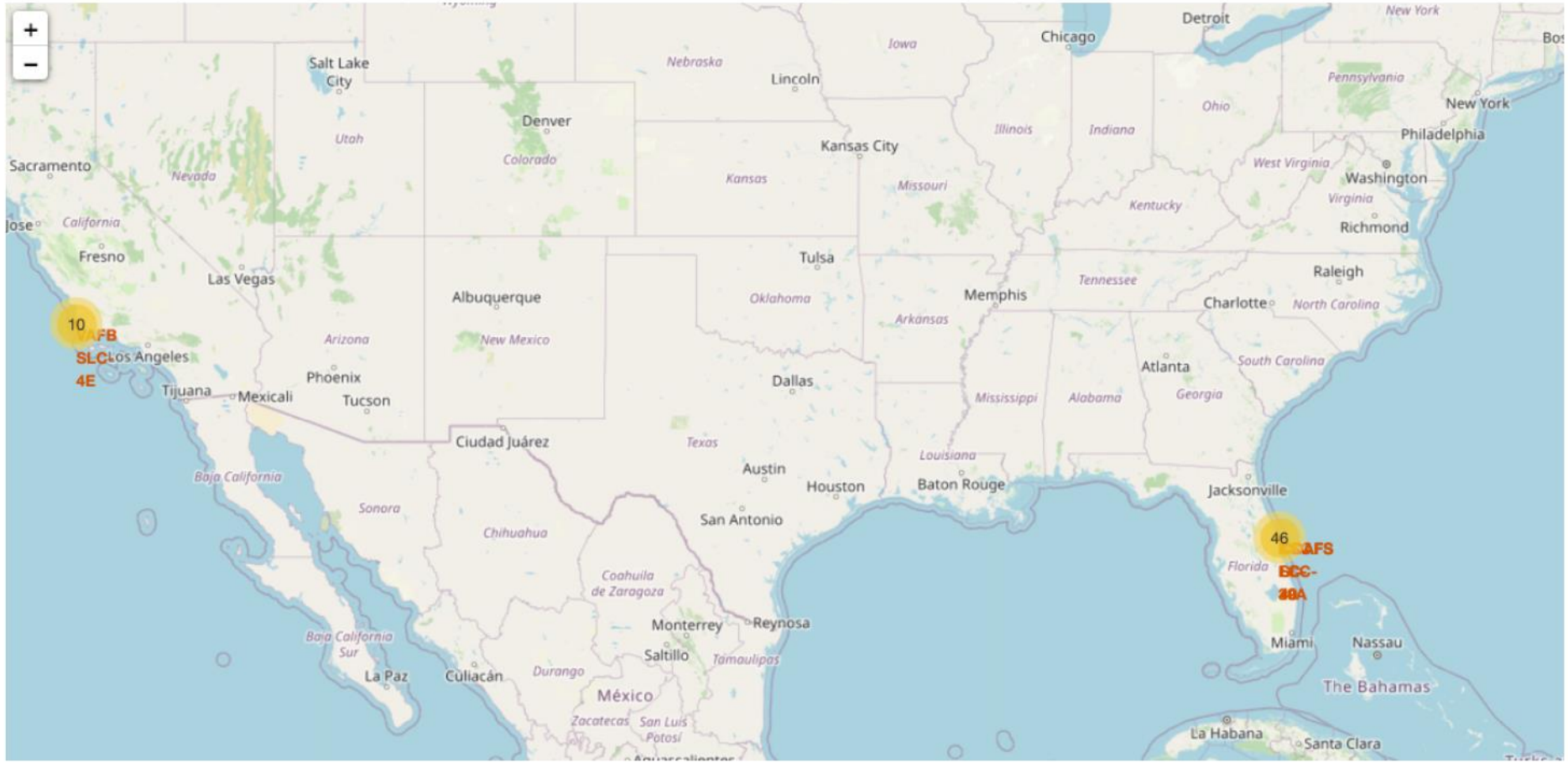
EDA Insight: Launch Site vs Payload Mass



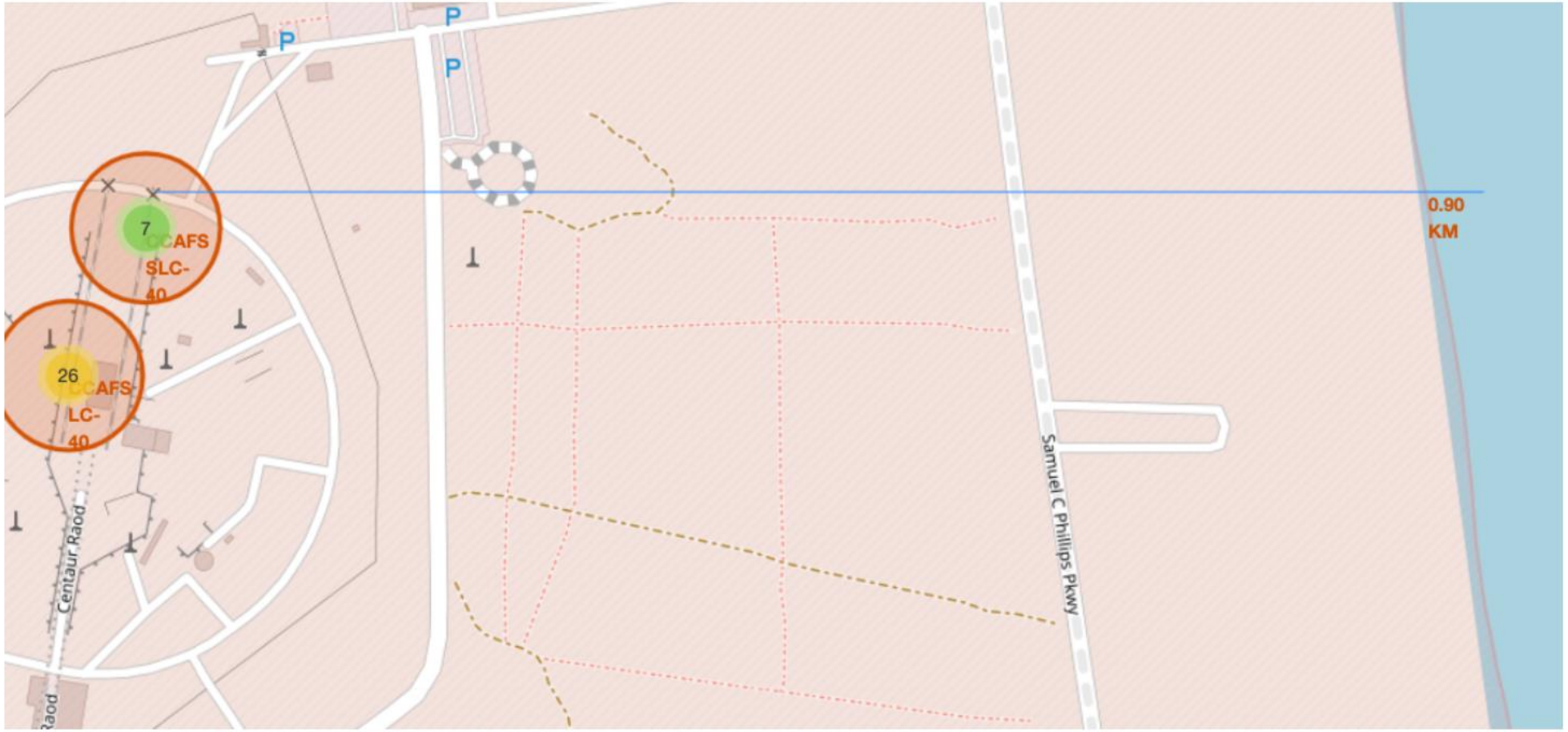
EDA Insight: Success Rate vs Orbit



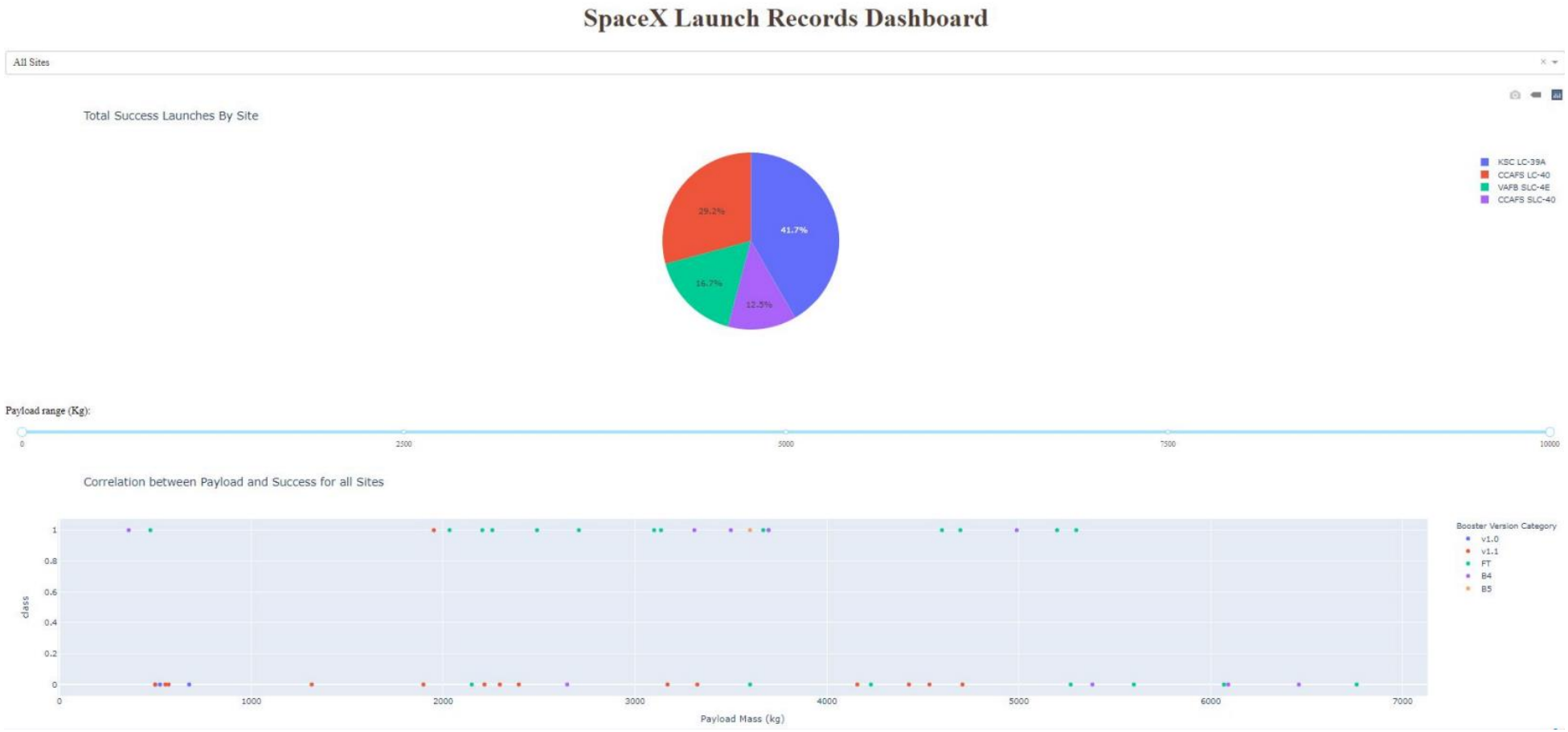
Launch Sites



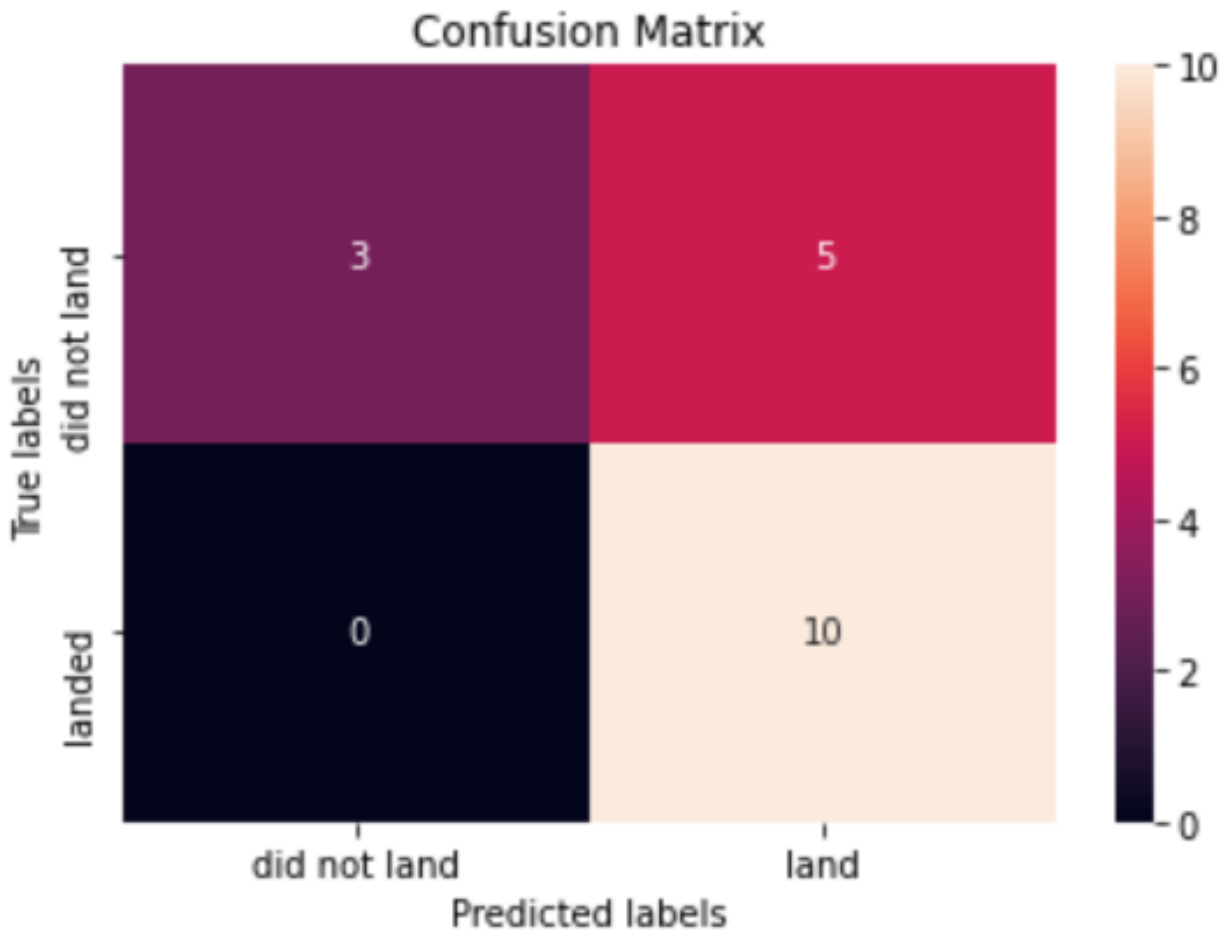
Location 26


P
P
P
7
CCAFS
SLC-
40
26
CCAFS
LC-
40
0.90
KM
Samuel C Phillips Pkwy
Centaur Raod

Dashboard


SpaceX Launch Records Dashboard
All Sites
Total Success Launches By Site
KSC LC-39A
CCAFS LC-40
VAFB SLC-4E
CCAFS SLC-40
29.2%
41.7%
16.7%
12.5%
Payload range (Kg):
0
2500
5000
7500
10000
Correlation between Payload and Success for all Sites
Booster Version Category
v1.0
v1.1
FT
B4
B5
class
Payload Mass (kg)

Confusion Matrix



Conclusion

- Overall graphic representation by bar graph and decision tree provided suitable results in confusion matrix.