FALCON 9
FIRST STAGE LANDING PREDICTION

EXECUTIVE SUMMARY

This is the capstone project for the **IBM Data Science Professional Certificate**. The goal of this project is to conduct **predictive analysis** on the **first-stage landing outcomes** of SpaceX's **Falcon 9** launches. The project will involve **data collection**, **exploratory data analysis (EDA)**, **interactive visualizations**, and the use of **machine learning models** for predictive analysis.

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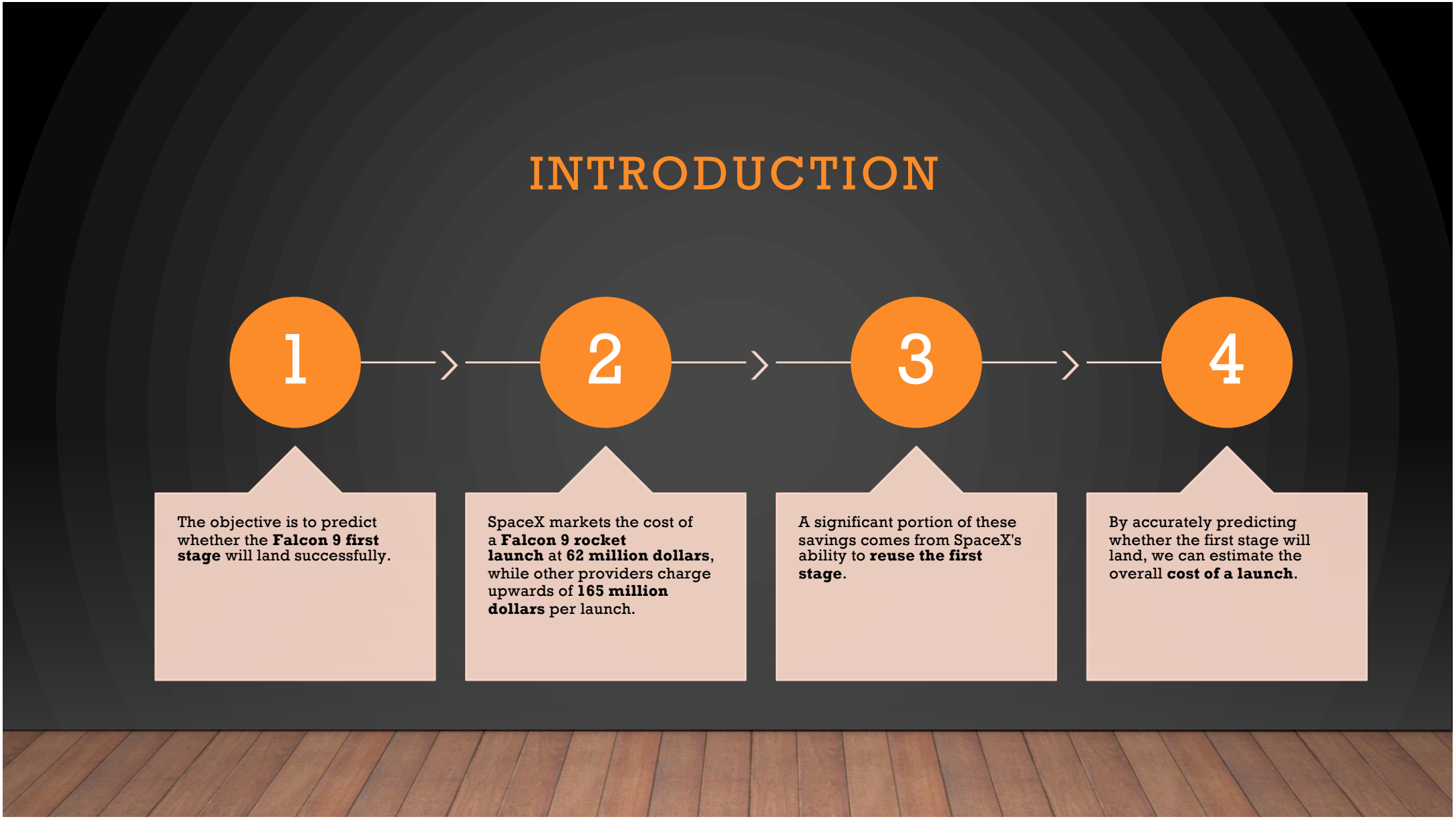


METHODOLOGIES

Data collection

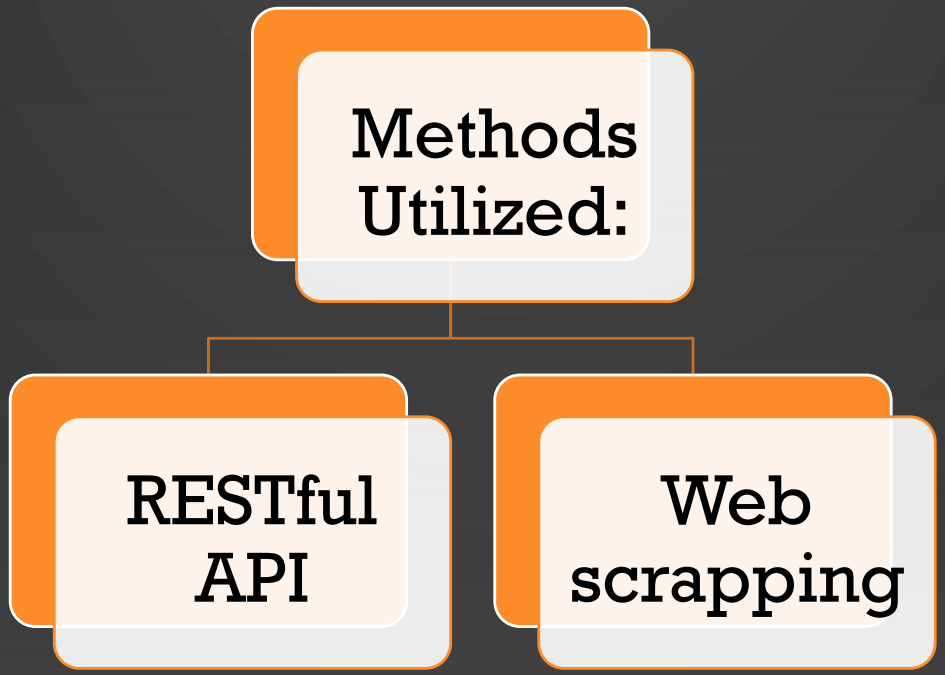
Data wrangling

EDA

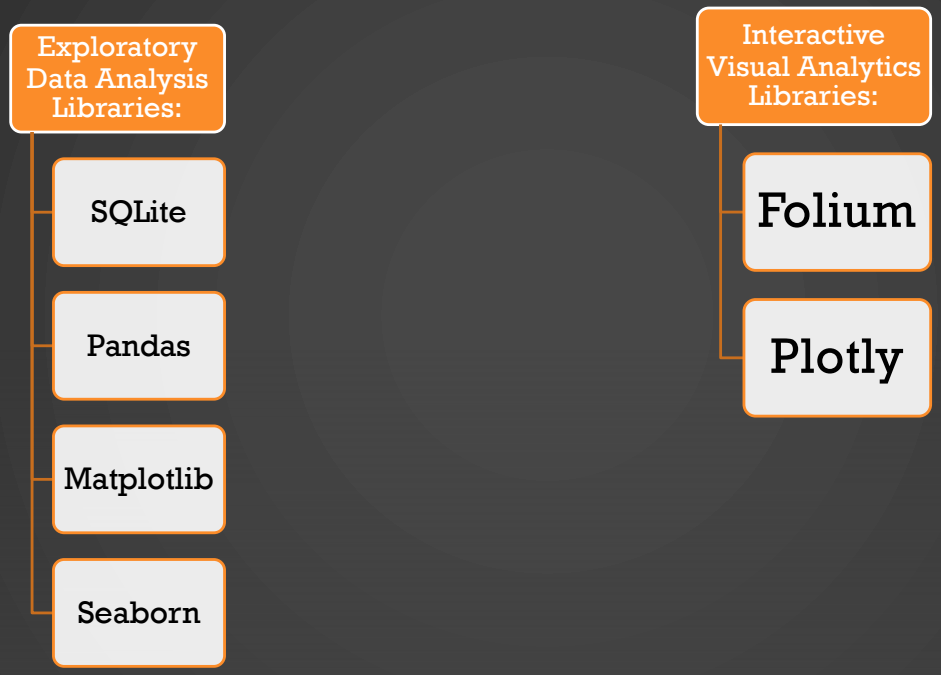
Interactive visual analytics

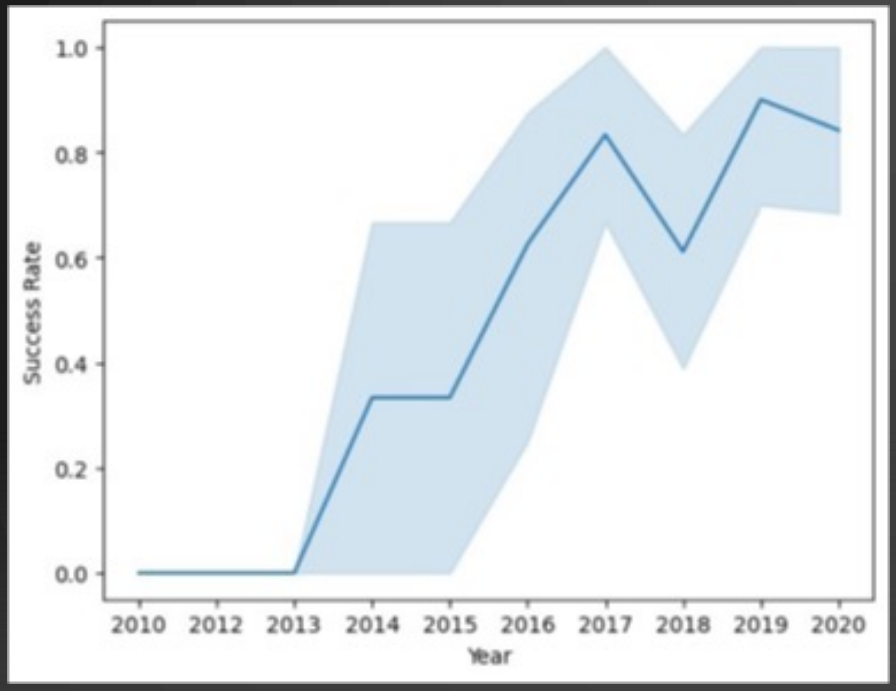
•Predictive analysis

DATA COLLECTION & DATA WRANGLING



EDA & INTERACTIVE VISUAL ANALYTICS

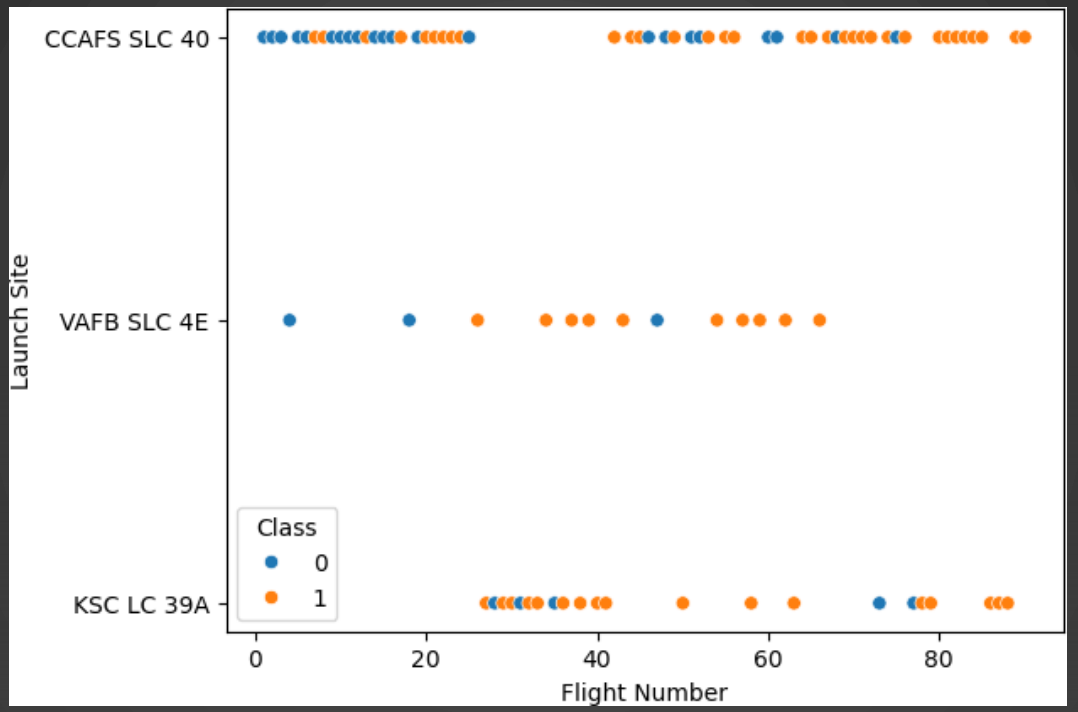




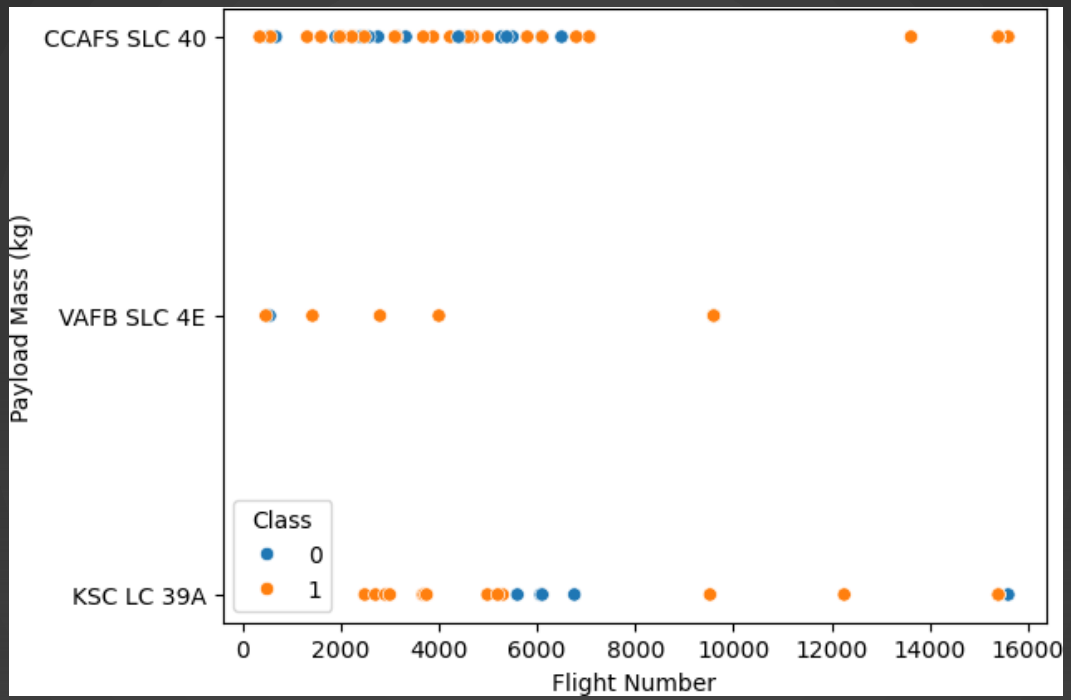
SUCCESS RATE OF FIRST STAGE LANDING OVER YEARS

EDA VISUALISATION RESULTS

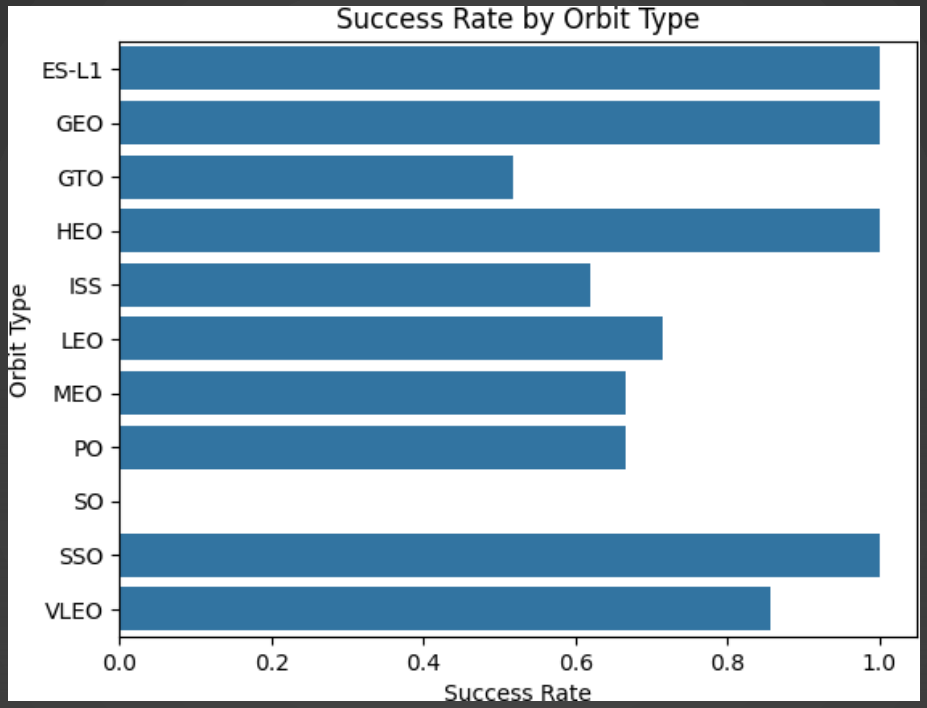
FLIGHT NUMBER VS LAUNCH SITE



FLIGHT NUMBER VS PAYLOAD MASS(KG)



SUCCESS RATE VS ORBIT TYPE



SQL ANALYTICS RESULTS

Unique Launch Sites

- CCAFS LC-40
- VAFB SLC-4E
- KSC LC-39A
- CCAFS SLC-40

Total Payload Mass (KG)

总计：45,596 kg

First Successful Landing

首次成功的地面着陆：

- 日期：2015-12-22

SQL ANALYTICS RESULTS

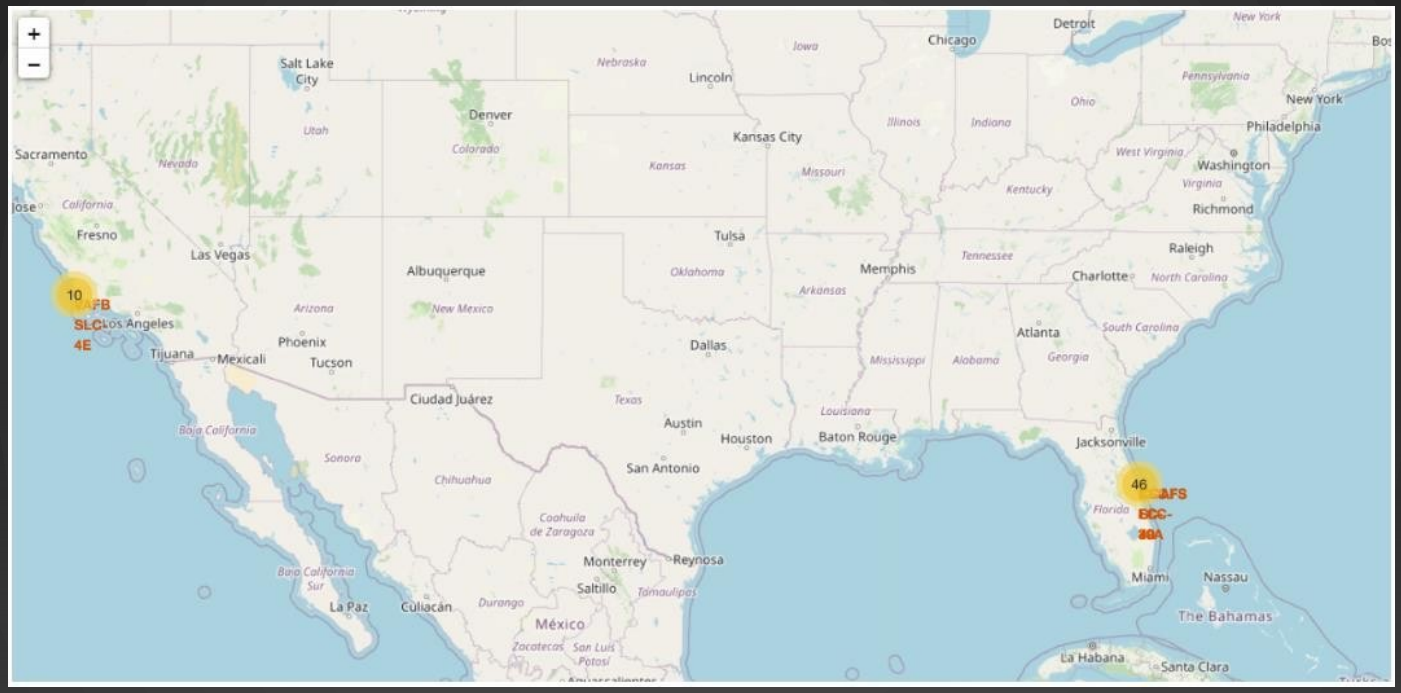
Successful Drone Ship Landings

Booster_Version
F9 FT B1022
F9 FT B1026
F9 FT B1021.2
F9 FT B1031.2

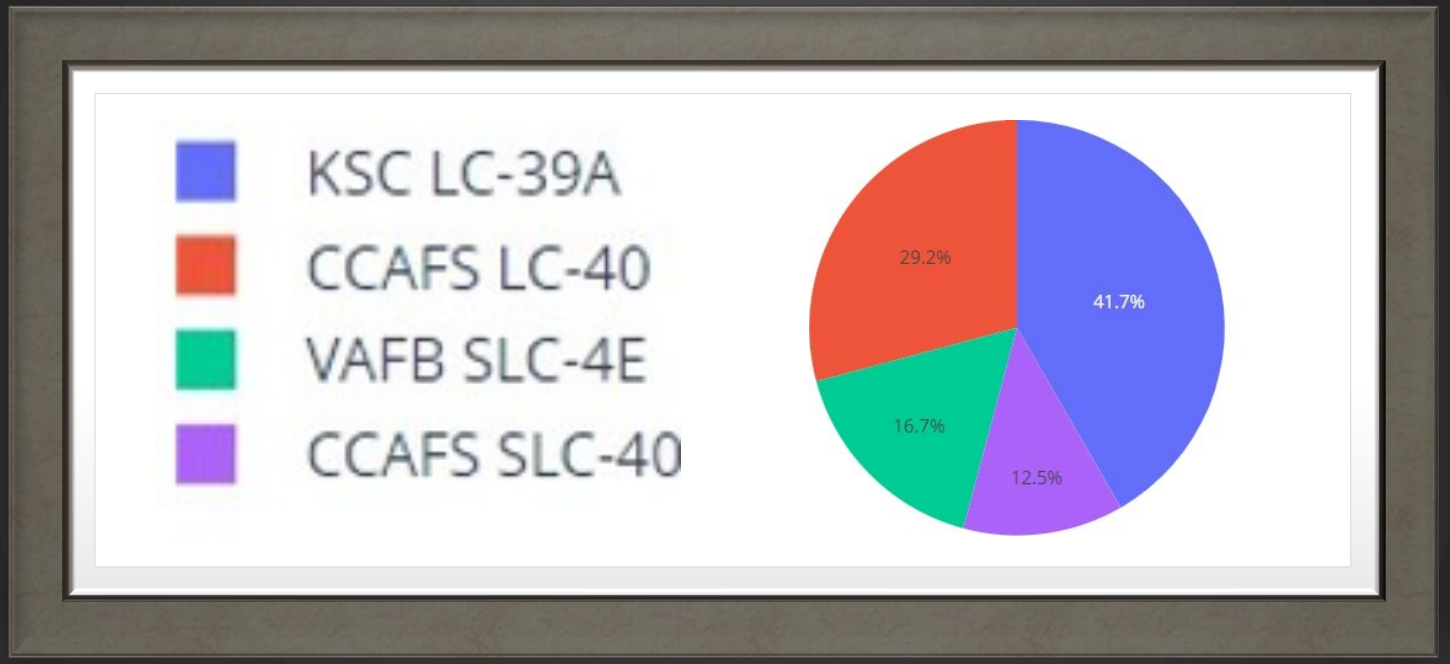
total successful missions

Mission_Outcome	total_count
Success	98

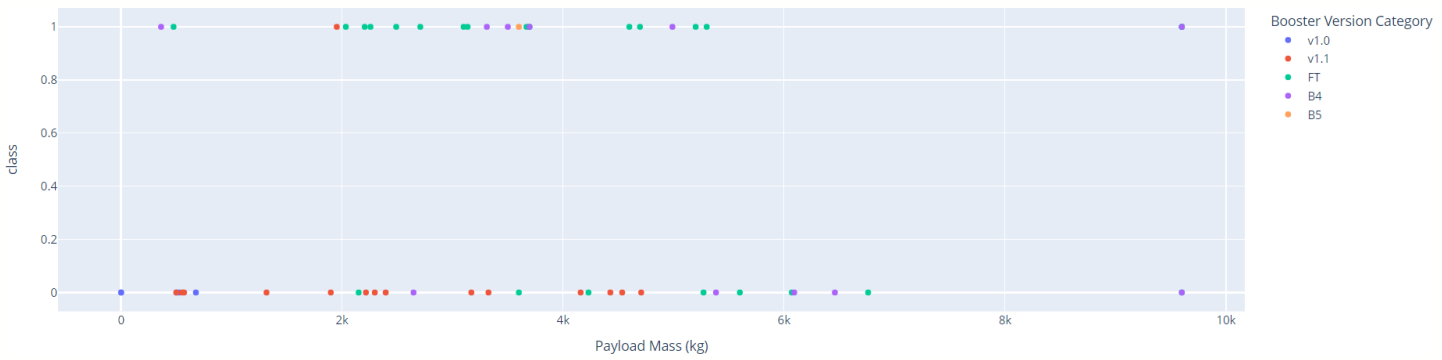
LAUNCH SITE LOCATIONS IN USA



NEAREST COASTAL LINE FROM A SELECTED LAUNCH SITE



TOTAL LAUNCHES FOR ALL SITES

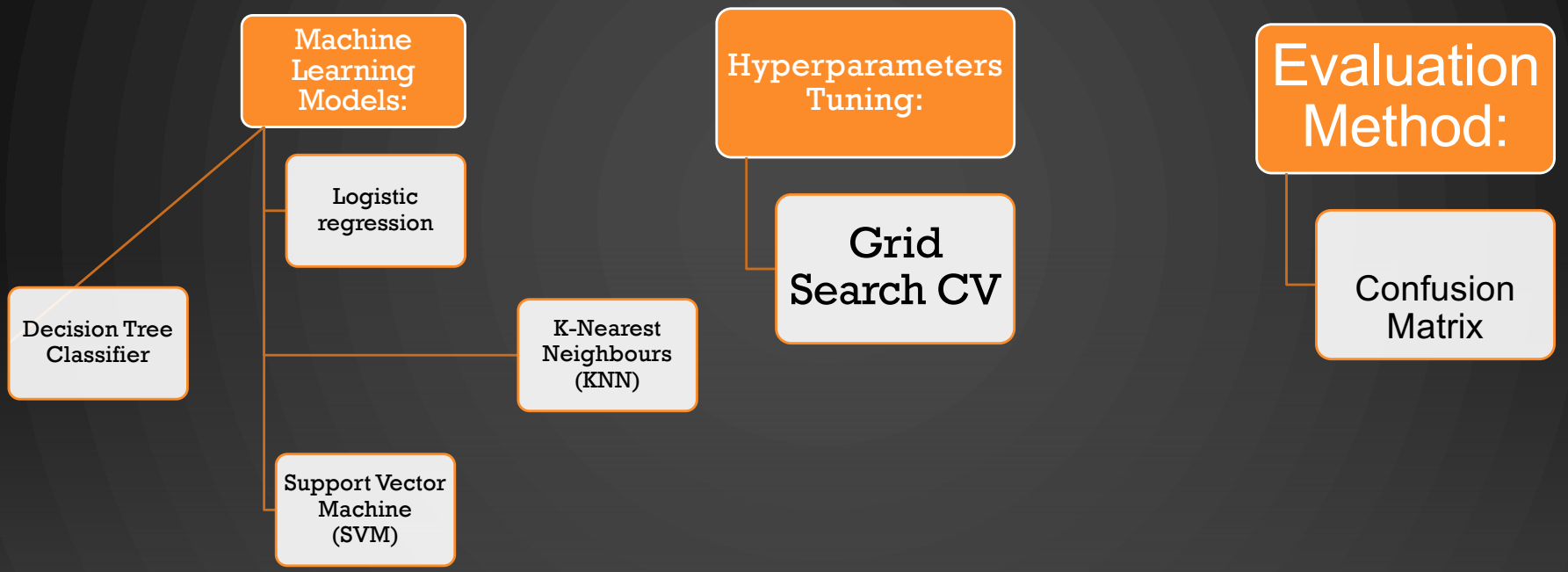


BOOSTER VERSIONS, PAYLOAD MASS & THEIR SUCCESS RATE

Machine Learning Models:

- Logistic regression
- Support Vector Machine (SVM)
- Decision Tree Classifier
- K-Nearest Neighbours (KNN)

PREDICTIVE ANALYSIS

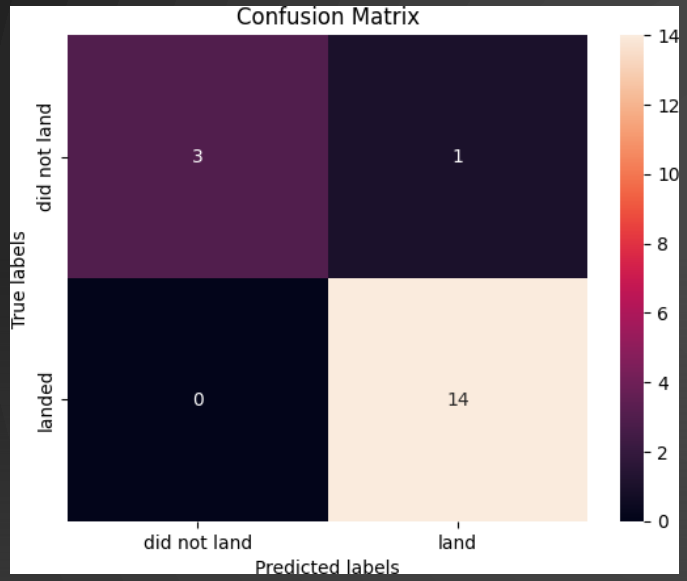


PREDICTIVE ANALYSIS (CLASSIFICATION) RESULTS

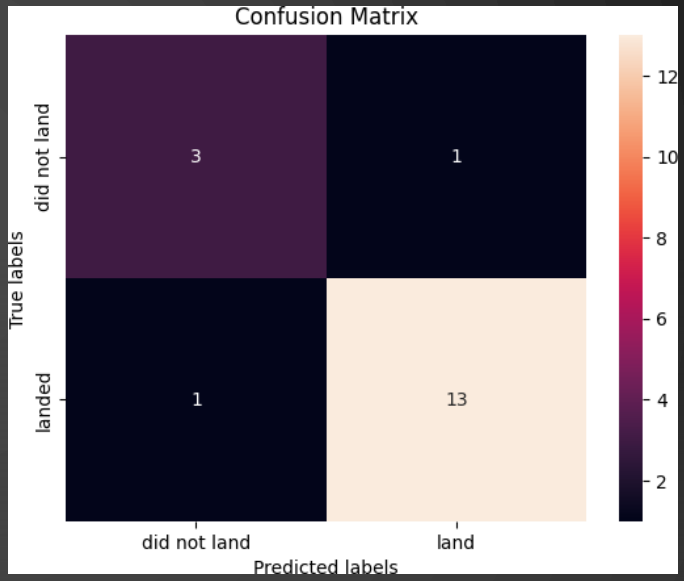
Model No.	Machine Learning Models	Accuracy on Test data
1	Logistic Regression	0.9444
2	Support Vector Machine (SVM)	0.8888
3	Decision Tree Classifier	0.9444
4	K-Nearest Neighbours (KNN)	0.9444

CONFUSION MATRICES

Logistic Regression

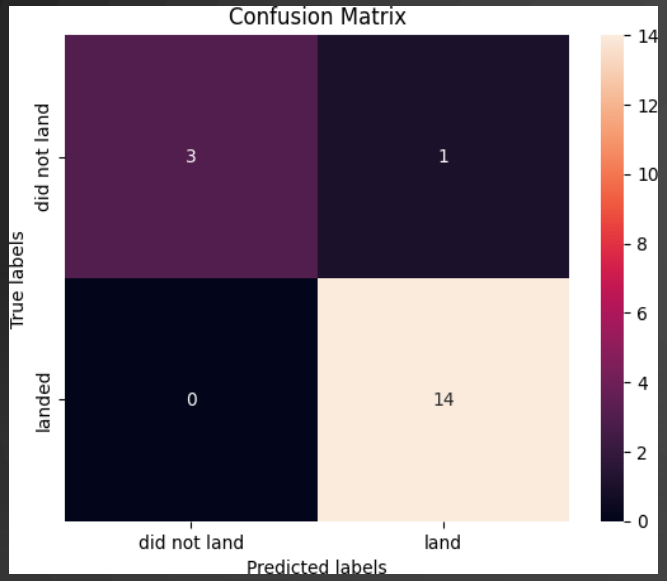


Support Vector Machine

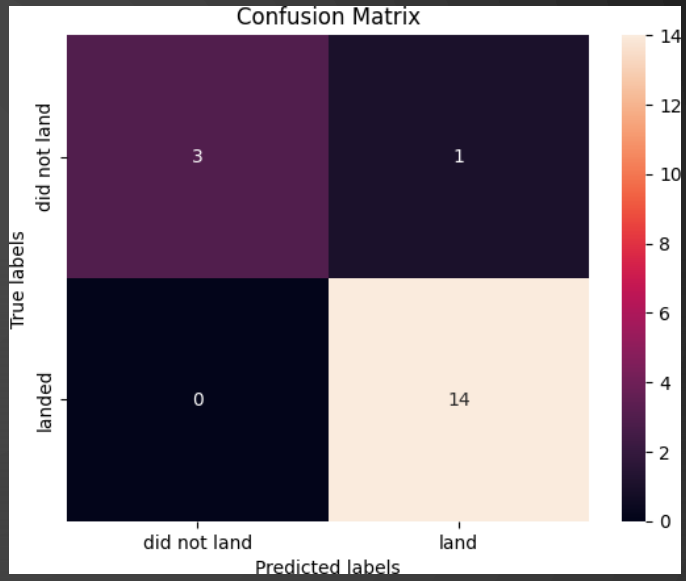


CONFUSION MATRICES

Decision Tree Classifier



K-Nearest Neighbours



CONCLUSION