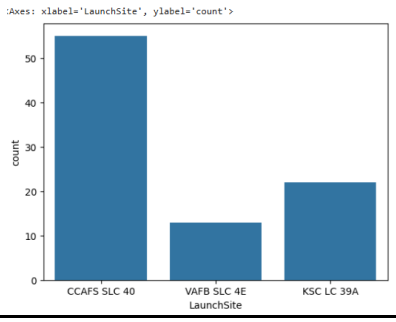
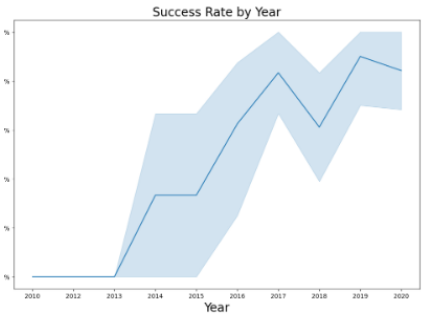
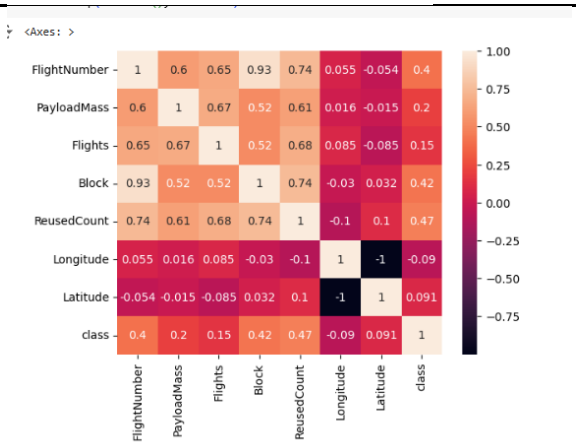
Data Collection and Preprocessing Phase

Date	15 July 2024
Team ID	739682
Project Title	SpaceX Falcon 9 First Stage Landing Success Predictor
Maximum Marks	6 Marks

Data Exploration and Preprocessing Template

Identifies data sources, assesses quality issues like missing values and duplicates, and implements resolution plans to ensure accurate and reliable analysis.

Section	Description
Data Overview	statistics `df.describe()` FlightNumber / PayloadMass / Flights / Block / ReusedCount / Longitude / Latitude / class count 90.000000 / 90.000000 / 90.000000 / 90.000000 / 90.000000 / 90.000000 / 90.000000 / 90.000000 mean 45.500000 / 6104.959412 / 1.788889 / 3.500000 / 1.655556 / -86.366477 / 29.449963 / 0.666667 std 26.124701 / 4694.671720 / 1.213172 / 1.595288 / 1.710254 / 14.149518 / 2.141306 / 0.474045 min 1.000000 / 350.000000 / 1.000000 / 1.000000 / 0.000000 / -120.610829 / 28.561857 / 0.000000 25% 23.250000 / 2510.750000 / 1.000000 / 2.000000 / 0.000000 / -80.603956 / 28.561857 / 0.000000 50% 45.500000 / 4701.500000 / 1.000000 / 4.000000 / 1.000000 / -80.577366 / 28.561857 / 1.000000 75% 67.750000 / 8912.750000 / 2.000000 / 5.000000 / 3.000000 / -80.577366 / 28.608058 / 1.000000 max 90.000000 / 15600.000000 / 6.000000 / 5.000000 / 5.000000 / -80.577366 / 34.632093 / 1.000000
Univariate Analysis	

Bivariate Analysis	
Multivariate Analysis	
Outliers and Anomalies	Identification and treatment of outliers.
Data Preprocessing Code Screenshots	
Loading Data	Code to load the dataset `df=pd.read_csv("/content/spacex_launch_data.csv")`

Handling Missing Data	`df.isnull().sum()/df.count()*100`
	FlightNumber 0.000
	Date 0.000
	BoosterVersion 0.000
	PayloadMass 0.000
	Orbit 0.000
	LaunchSite 0.000
	Outcome 0.000
	Flights 0.000
	GridFins 0.000
	Reused 0.000
	Legs 0.000
	LandingPad 40.625
	Block 0.000
	ReusedCount 0.000
	Serial 0.000
	Longitude 0.000
	Latitude 0.000
	dtype: float64
	· Removing columns
	`df.drop(["LandingPad"],axis=1,inplace=True)`

Data Transformation	`orbit_le=LabelEncoder().fit(df['Orbit'])`
	`df['Orbit']=orbit_le.transform(df['Orbit'])`
	`launchsite_le=LabelEncoder().fit(df['LaunchSite'])`
	`df['LaunchSite']=launchsite_le.transform(df['LaunchSite'])`
	`longitude_le=LabelEncoder().fit(df['Longitude'])`
	`df["Longitude"]=longitude_le.transform(df["Longitude"])`
	`latitude_le=LabelEncoder().fit(df['Latitude'])`
	`df["Latitude"]=latitude_le.transform(df["Latitude"])`
	`gridfins_le=LabelEncoder().fit(df['GridFins'])`
	`df["GridFins"]=gridfins_le.transform(df["GridFins"])`
	`legs_le=LabelEncoder().fit(df['Legs'])`
	`df['Legs']=legs_le.transform(df['Legs'])`
	
	`Scaler=preprocessing.StandardScaler()`
	`x_train=Scaler.fit_transform(x_train)`
	`x_test=Scaler.transform(x_test)`

Feature Engineering	`landing_outcomes=df["Outcome"].value_counts()`
	`landing_outcomes`
	
	Outcome
	True ASDS 41
	None None 19
	True RTLS 14
	False ASDS 6
	True Ocean 5
	False Ocean 2
	None ASDS 2
	False RTLS 1
	Name: count, dtype: int64
	
	`for i,outcome in enumerate(landing_outcomes.keys()):`
	`print(i,outcome)`
	
	0 True ASDS
	1 None None
	2 True RTLS
	3 False ASDS
	4 True Ocean
	5 False Ocean
	6 None ASDS
	7 False RTLS
	
	`bad_outcomes=set(landing_outcomes.keys()[[1,3,5,6,7]])`
	`bad_outcomes`
	
	{'False ASDS', 'False Ocean', 'False RTLS', 'None ASDS', 'None None'}
	
	`landing_class=[0 if i in set(bad_outcomes) else 1 for i in df["Outcome"]]`
	
	`df["class"]=landing_class`
	`df[["class"]].head(8)`
	
	class

Save Processed Data	`filename="project.pkl"`
	`pickle.dump(lr,open(filename,'wb'))`
	
	`pickle.dump(orbit_le, open('orbit_le.pkl', 'wb'))`
	`pickle.dump(launchsite_le, open('launchsite_le.pkl', 'wb'))`
	
	`pickle.dump(Scaler, open('scaler.pkl', 'wb'))`