SpaceX

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OUTLINE

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- Discussion
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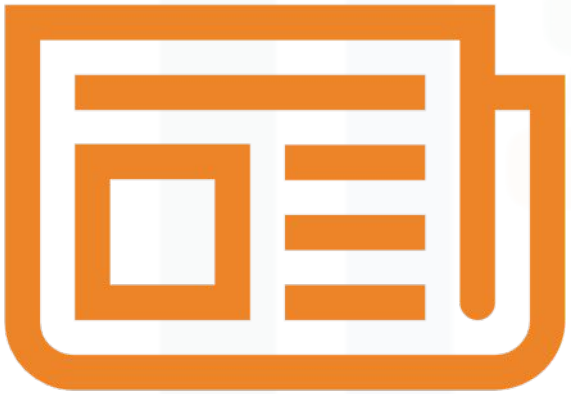
EXECUTIVE SUMMARY

- Prediction of landing success
- Depends on
  - Flight number
  - Launching site
  - Payload Mass
- Average success rate: 67 %
- Most successfull site: KSC LC-39A
- Best Payload 3-4K
- Best boosters FT, B4

INTRODUCTION

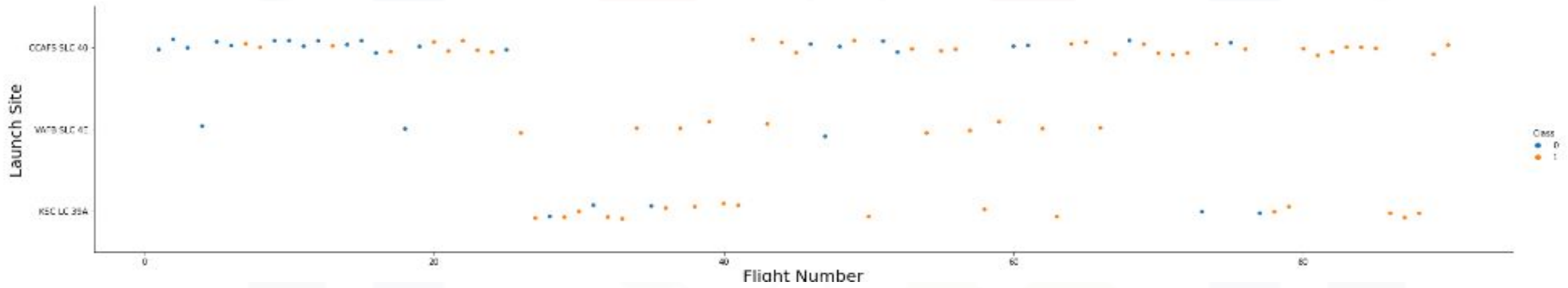
- Falcon 9
- 4 sites
- Different payloads
- Different boosters

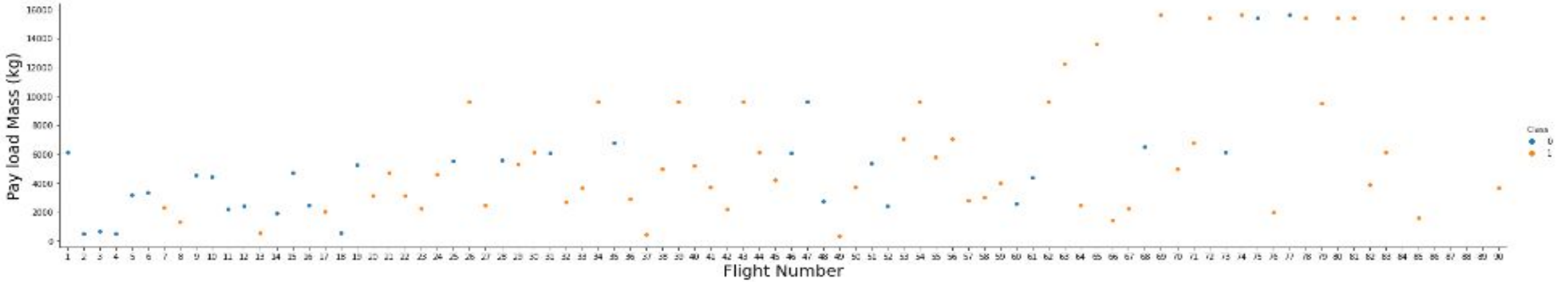
METHODOLOGY



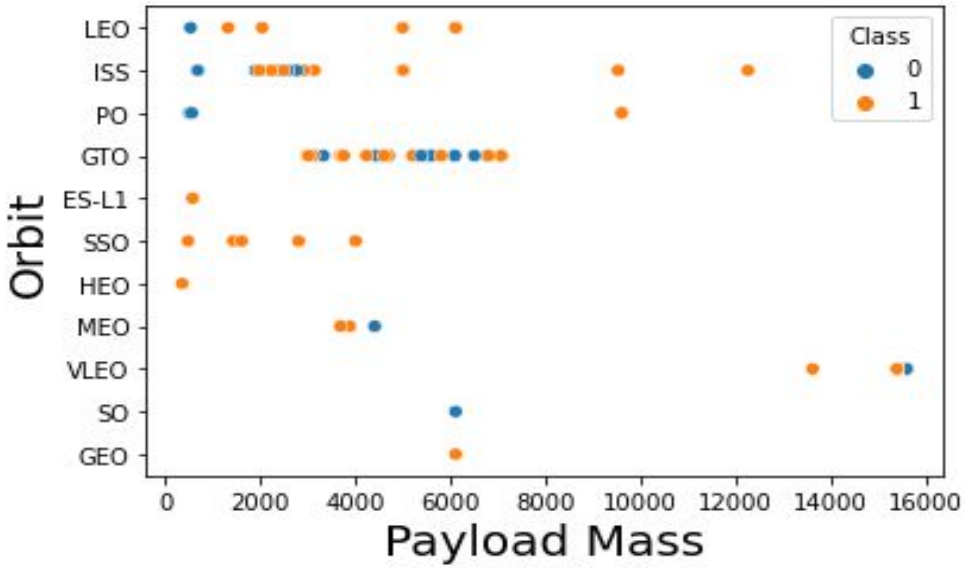
- Pandas, API
- Webscraping, BeautifulSoup
- Falcon 9 only
- Mean values for Payload Mass
- Different outcomes -> 0/1
- SQL queries
- Plotly, Dash
- Different machine learning models

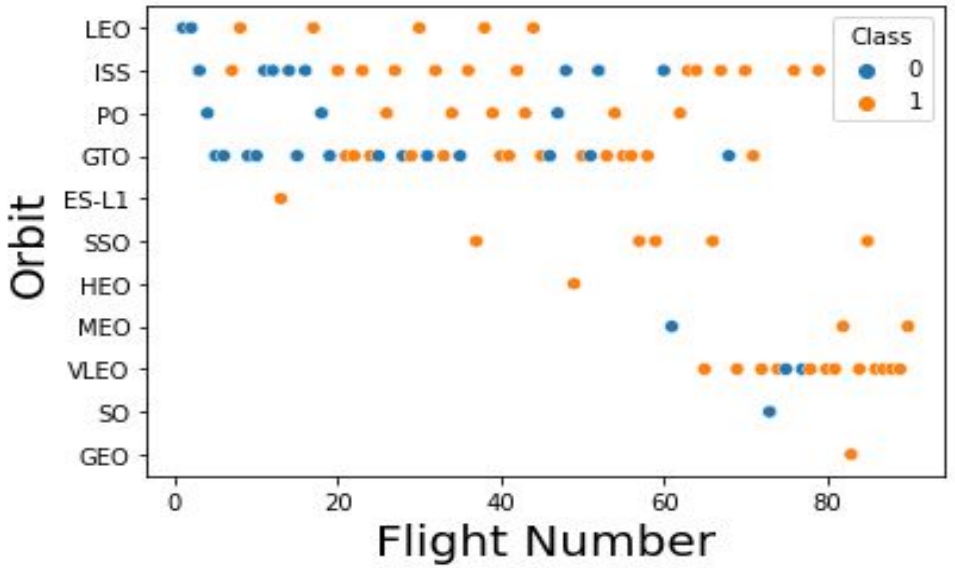
Data Visualisation

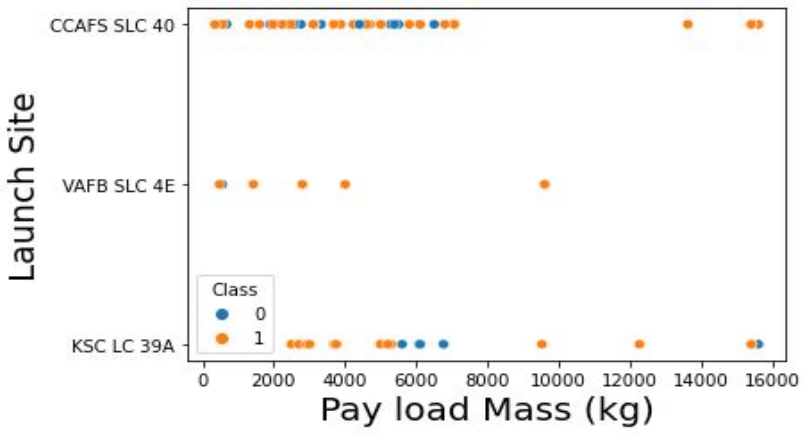


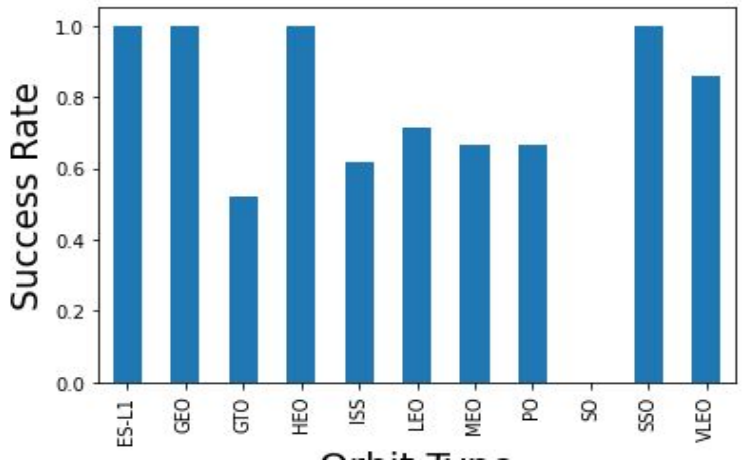


Data Visualisation









SQL findings

- Sites CCAFS LC-40, CCAFS SLC-40, KSC LC-39A, VAFB SLC-4E
- total payload 45596 kg
- avg F9 v1.1 payload 2534
- first succ. landing 2015-12-22
- 99 succ. missions, 2 fail. missions

SQL Findings

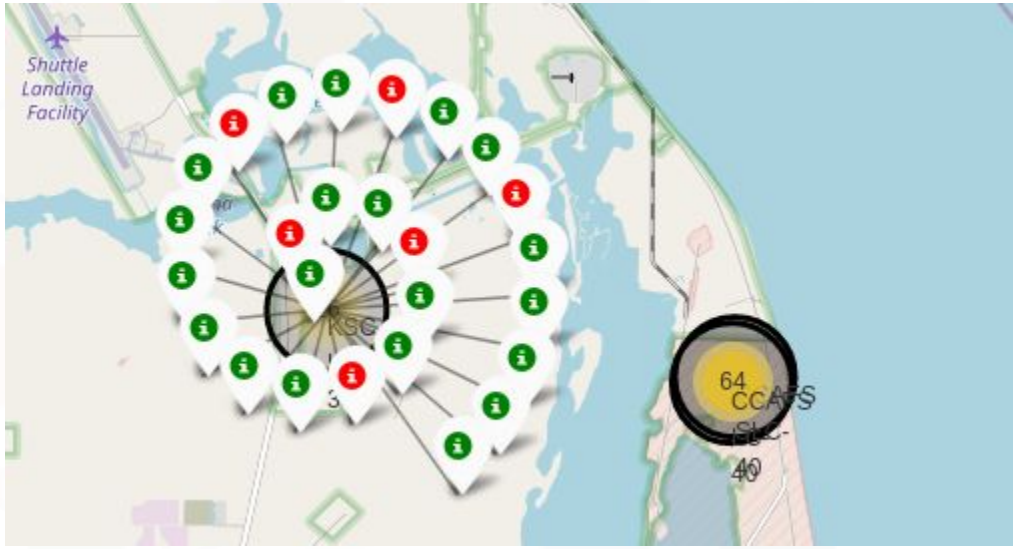
landing__outcome	2
Controlled (ocean)	3
Failure (drone ship)	5
Failure (parachute)	2
No attempt	10
Precluded (drone ship)	1
Success (drone ship)	5
Success (ground pad)	3
Uncontrolled (ocean)	2

booster_version
F9 B5 B1048.4
F9 B5 B1049.4
F9 B5 B1051.3
F9 B5 B1056.4
F9 B5 B1048.5
F9 B5 B1051.4
F9 B5 B1049.5
F9 B5 B1060.2
F9 B5 B1058.3
F9 B5 B1051.6
F9 B5 B1060.3
F9 B5 B1049.7

booster_version	landing__outcome	payload_mass__kg_
F9 FT B1022	Success (drone ship)	4696
F9 FT B1026	Success (drone ship)	4600
F9 FT B1021.2	Success (drone ship)	5300
F9 FT B1031.2	Success (drone ship)	5200

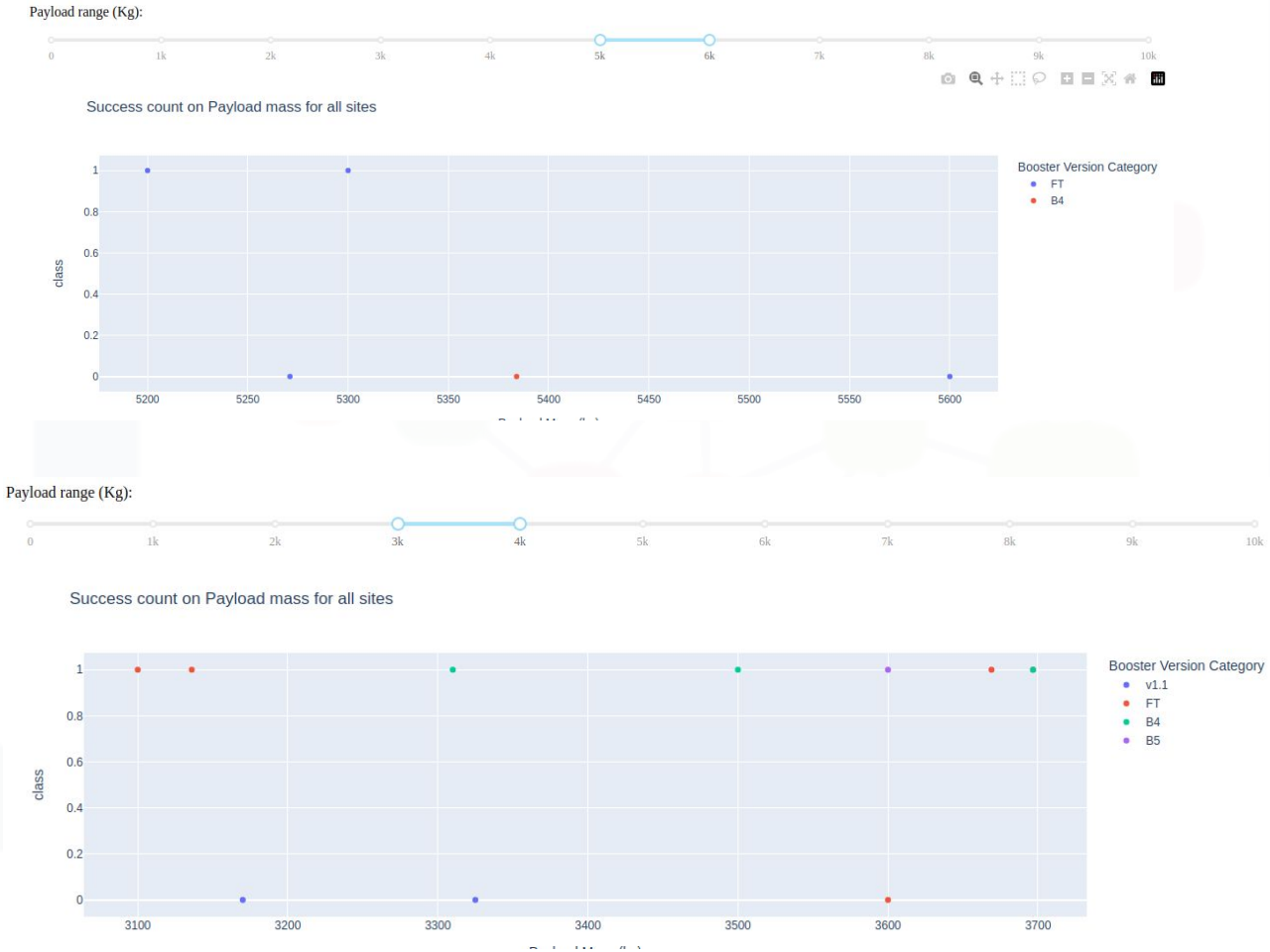
DATE	time__utc_	booster_version	launch_site	payload	payload_mass__kg_	orbit	customer	mission_outcome	landing__outcome
2010-06-04	18:45:00	F9 v1.0 B0003	CCAFS LC-40	Dragon Spacecraft Qualification Unit	0	LEO	SpaceX	Success	Failure (parachute)
2010-12-08	15:43:00	F9 v1.0 B0004	CCAFS LC-40	Dragon demo flight C1, two CubeSats, barrel of Brouere cheese	0	LEO (ISS)	NASA (COTS) NRO	Success	Failure (parachute)
2012-05-22	07:44:00	F9 v1.0 B0005	CCAFS LC-40	Dragon demo flight C2	525	LEO (ISS)	NASA (COTS)	Success	No attempt
2012-10-08	00:35:00	F9 v1.0 B0006	CCAFS LC-40	SpaceX CRS-1	500	LEO (ISS)	NASA (CRS)	Success	No attempt
2013-03-01	15:10:00	F9 v1.0 B0007	CCAFS LC-40	SpaceX CRS-2	677	LEO (ISS)	NASA (CRS)	Success	No attempt

Maps



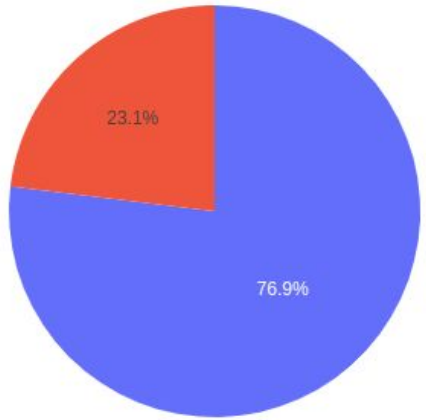
SKILLS NETWORK

Plotly Dash


Payload range (Kg):
0
1k
2k
3k
4k
5k
6k
7k
8k
9k
10k
Success count on Payload mass for all sites
class
1
0.8
0.6
0.4
0.2
0
5200
5250
5300
5350
5400
5450
5500
5550
5600
Booster Version Category
FT
B4
Payload range (Kg):
0
1k
2k
3k
4k
5k
6k
7k
8k
9k
10k
Success count on Payload mass for all sites
class
1
0.8
0.6
0.4
0.2
0
3100
3200
3300
3400
3500
3600
3700
Booster Version Category
v1.1
FT
B4
B5

Plotly Dash

KSC LC-39A



SKILLS NETWORK

Predictive analysis

- Train 72 samples, test 18
- logistic regression 0.846 train, 0.833 test
- SVM 0.848 train, 0.833 test
- decision tree 0.879 train, 0.833 test
- KNN 0.848 train, 0.833 test
- performance on test is similar for all methods (dec. trees slightly better on train)

CONCLUSION

- Average success rate: 67 %
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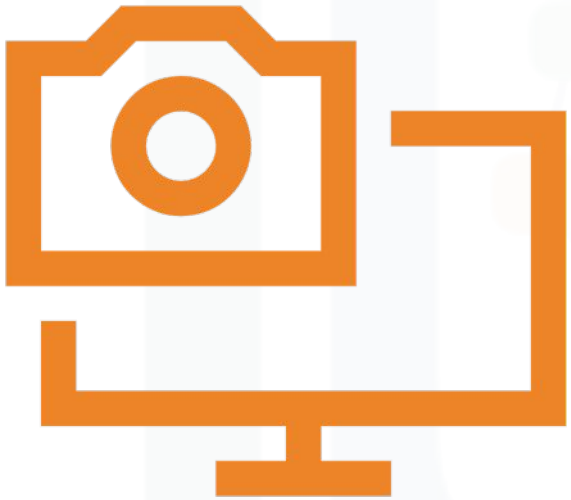
APPENDIX



- Include any relevant additional charts, or tables that you may have created during the analysis phase.