Activism Campaign and Machine Learning

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Data Science Capstone Project
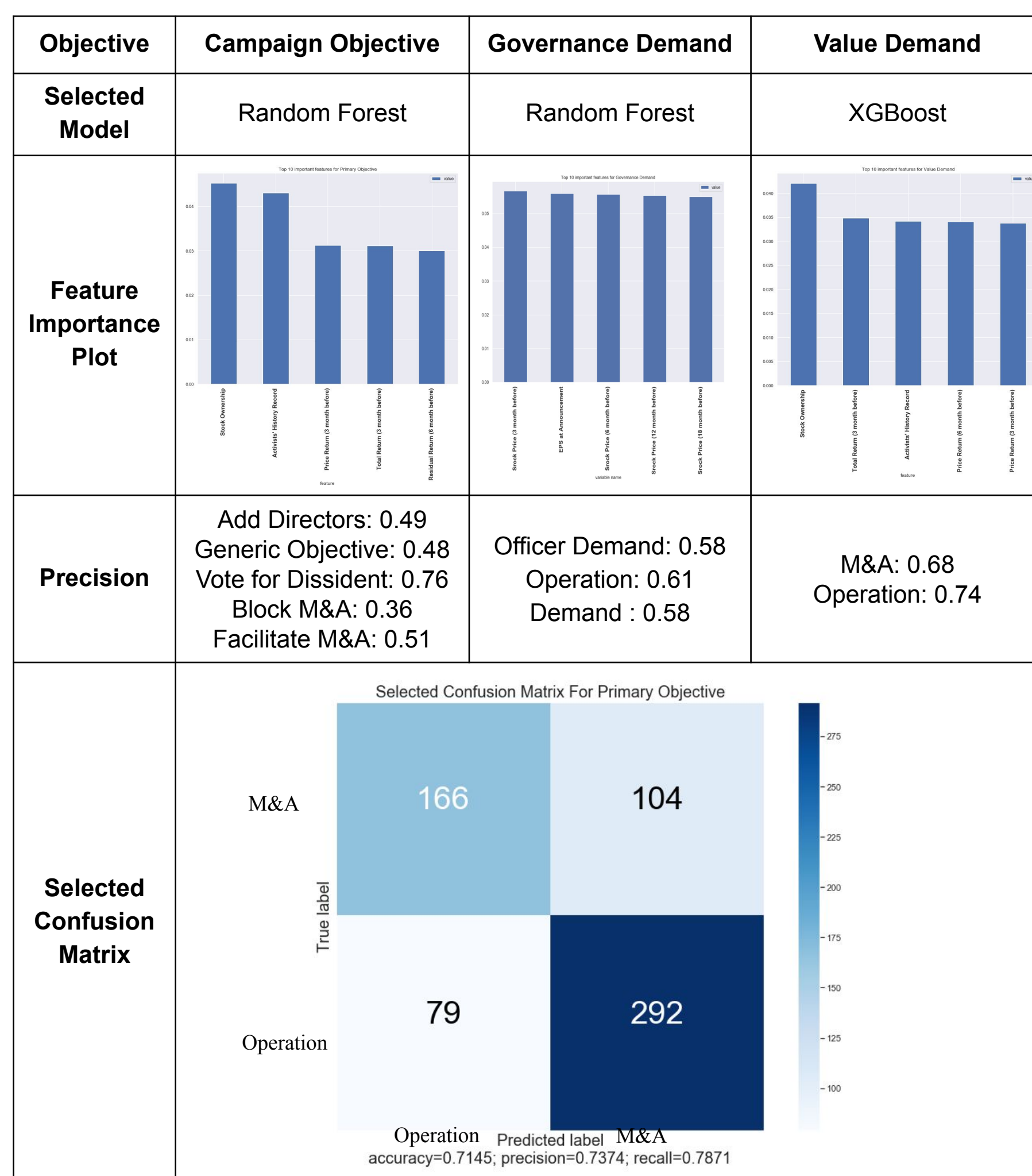with Moelis & Company

Introduction and Problem Statement

The project's objective is to help the **Moelis Activism Advisory** team better advise their client companies that are the target of activist campaigns by predicting both the **objective** and the **likelihood of success** of an activist campaigns.

Outcome Examples	
campaign objective	Remove Directors
value demand	M&A
governance demand	Operation
proxy campaign result	Dissident
board seat acquisition	Failure
residual return	2%

Models and Results

Based on the temporal nature of the activist campaign, we designed separate models for the activist's **objective**, the campaign's **outcome**, and finally the campaign's associated stock **return**. We use cross validation with time filtrations to ensure no lookahead bias.
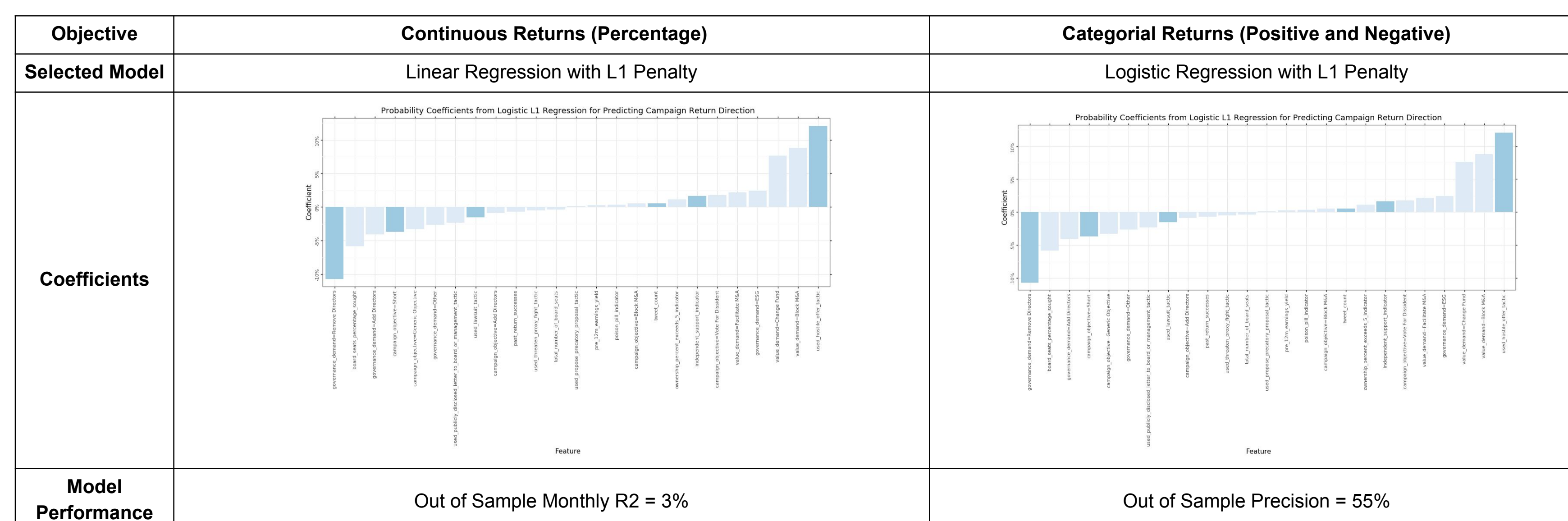
Campaign Objective Model

Objective	Campaign Objective	Governance Demand	Value Demand
Selected Model	Random Forest	Random Forest	XGBoost
Feature Importance Plot			
Precision	Add Directors: 0.49 Generic Objective: 0.48 Vote for Dissident: 0.76 Block M&A: 0.36 Facilitate M&A: 0.51	Officer Demand: 0.58 Operation: 0.61 Demand: 0.58	M&A: 0.68 Operation: 0.74
Selected Confusion Matrix			

Campaign Outcome Model

Objective	Proxy Campaign Result	Board Seat Acquisition Result
Selected Model	Logistic Regression	XGBoost
Precision	Management: 0.60 Dissident: 0.62	Failure: 0.65 Partial success: 0.33 Success: 0.40
Feature Importance Plot		
Model Performance		

Campaign Return Model

Objective	Continuous Returns (Percentage)	Categorial Returns (Positive and Negative)
Selected Model	Linear Regression with L1 Penalty	Logistic Regression with L1 Penalty
Coefficients		
Model Performance	Out of Sample Monthly R2 = 3%	Out of Sample Precision = 55%

Data Collection and Feature Engineering

Campaign Examples	
campaign name	Icahn x Exxon
campaign date	2015-01-01
glass lewis support	true
iss support	false

Activist Examples	
activist name	Icahn
past successes	5
past objectives	2 x Remove Directors, 1 x Divest, …
past tactics	Private Letter, …
used tactics	Public Letter, …
ownership percent	7%

Target Company Examples	
company name	Exxon
sector	Energy
beta	0.8
past 12m return	-5%
earnings yield	6%
has poison pill	false
added poison pill	true
tweet count	57

Market Benchmark Examples	
campaign date	2015-10-01
market return	-4%

The primary dataset was **FactSet Shark Repellent**, a proprietary corporate activism dataset from a financial services data vendor.

We supplemented this with **Factset Pricing, Yahoo Finance** and **Twitter** data sets to build a **unified campaign, activist and target company data set** for feature engineering.

Production and Reporting

We productionize our models via an end-to-end **data, model and dashboard pipeline** that runs through data, feature engineering, model fitting and reporting. The final product is an **interactive dashboard** that the user can use to analyze a campaign.
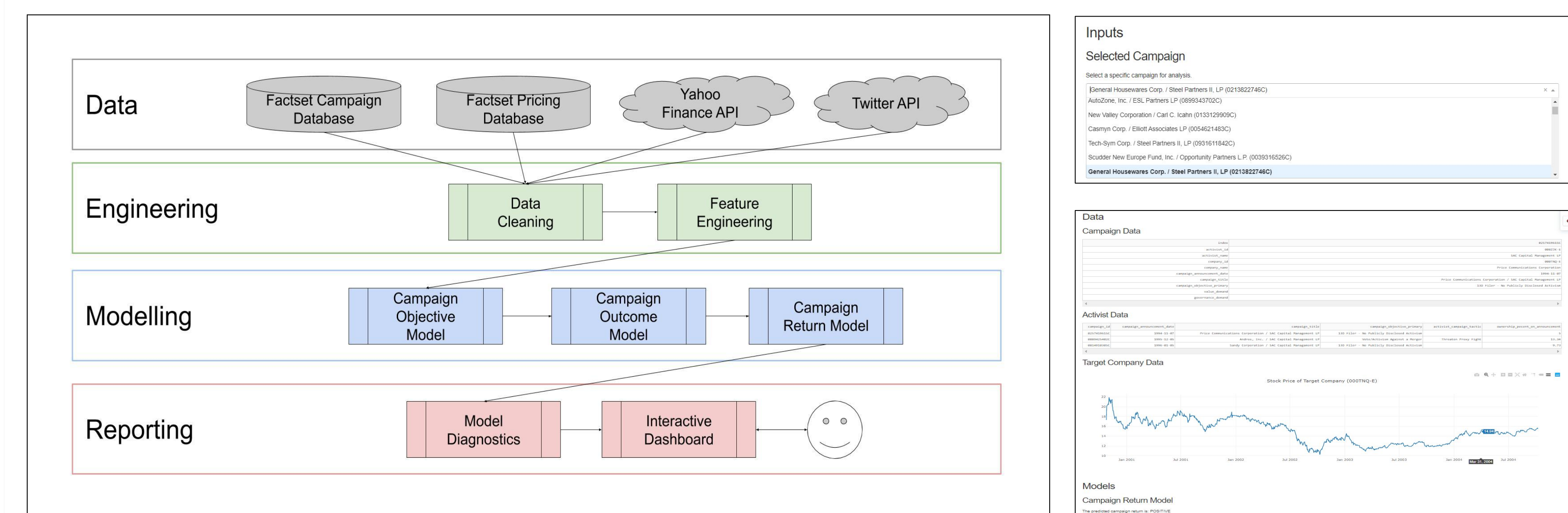

Figure 1. Model Pipeline including Data, Features, Models and Reports

Conclusions and Recommendations

We conclude that campaign, activist and target company features can come together to be used to help predict relevant outcomes of interest for target companies.

Acknowledgments

References

Denev, A. (2015). Probabilistic graphical models. Risk Books.

Goranova, M., & Ryan, L. V. (2014). Shareholder activism. Journal of Management, 40(5)

See Final Report for full list of additional references.