

# Multivariate Stock Returns Analysis

Alpha Gen Analytics



# Introduction & Purpose

- Run ML models for stock & crypto
- See what happens



# What Data Was Used

- Stock data from Alpaca
- Crypto data from Kraken



# Short-Term Trading Strategy 1

Multivariate feature set

- Top 10 stocks of S&P500
- Bitcoin and Ethereum

24 hour forward returns:

- Calculate pct\_change for a 24 hour period and shift backwards

60 hours of previous closing price data per stock

Buy signals generated as:

- If 24 hour forward return exceeds 0.75% for stocks
- If 24 hour forward return exceeds 1.0% for Crypto



# Short-Term Trading Strategy 2

Training Data:

- Hourly data from Jan 2017-March 2021 for stocks
- Hourly data from March 2015-March 2021 for crypto

Trading Window - June 2021, on an hourly basis

Buy-Sell Strategy:

- If model predicts 1, buy stock and hold for at least 24 hours. Continue holding if model keeps predicting 1
- Sell after 24 hours if mode predicts 0



# Machine Learning Strategy

Six Models compared:

- Linear Regression
- Logistic Classifier
- Random Forest Classifier
- Gradient Boosted Random Forest
- Imbalanced Learn
- XGBoost



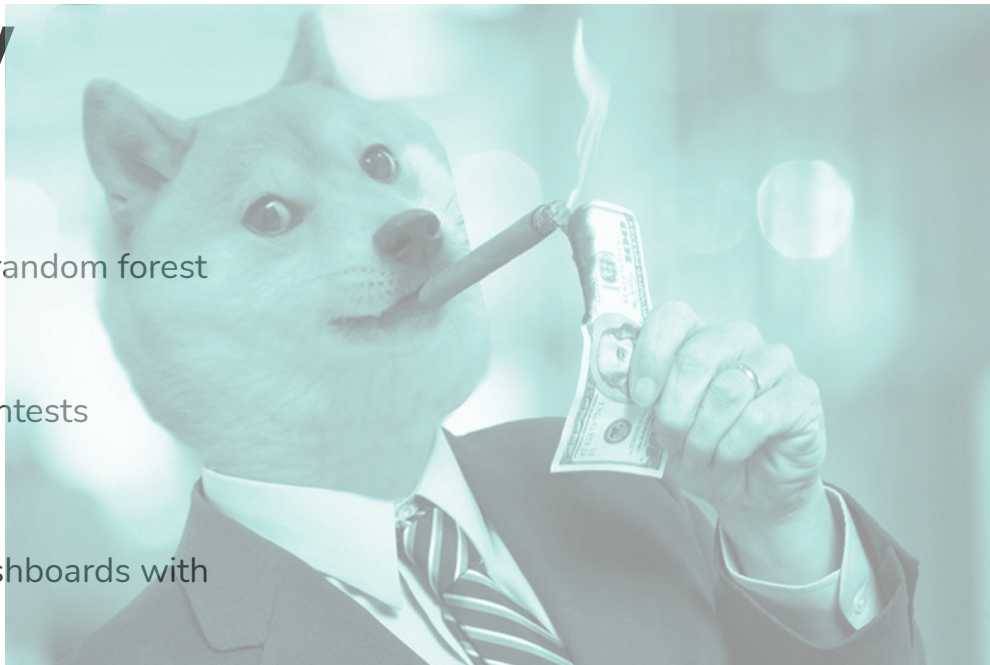
# Outside Library

## XGBoost

- Variation of Gradient boosted random forest found in sklearn
- Used to win several Kaggle contests

## Plotly Dash

- Alternate to Panel to make dashboards with tight integration into Plotly
- Live editing capabilities
- Better HTML/CSS control





## Side note - Python Environments

The road to DLL Hell is paved with Conda errors





# General Findings

- Both Logistic Regression and Random Forest classifiers failed to generate any Buy signals for June 2021 in either stocks or crypto
- Imbalanced Learn and XG Boost performed similarly to each other for stocks
- This strategy underperformed buy and hold on the stock side, but XG Boost outperformed buy and hold for crypto



# Visualization ...

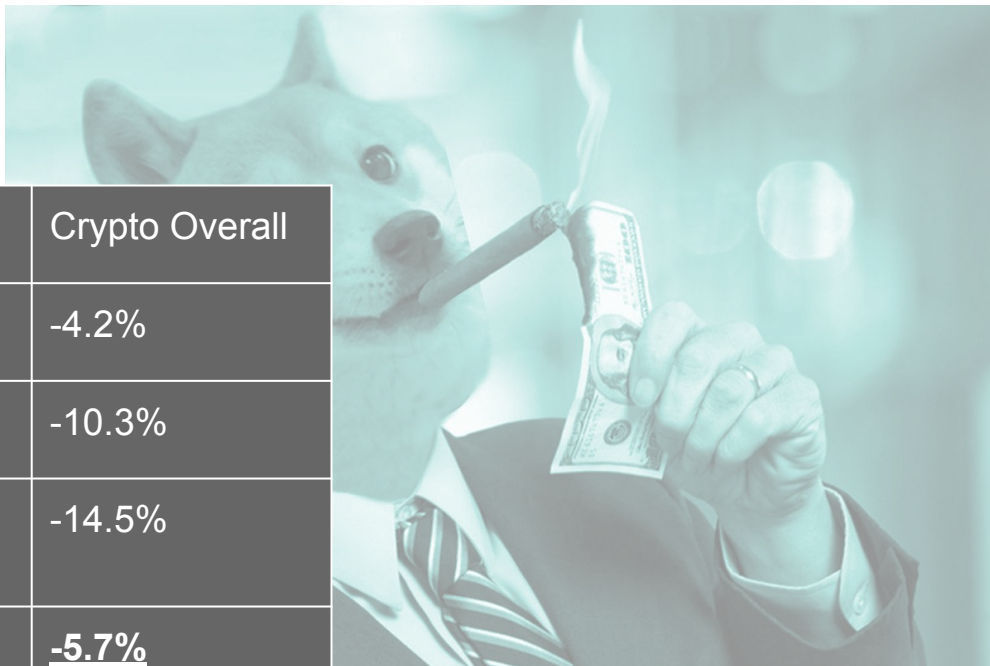
See Plotly Dash Dashboard:

<http://127.0.0.1:3000/>



# Returns

	Stock Overall	Crypto Overall
Linear	1.4%	-4.2%
Gradient Boost	2.4%	-10.3%
Imbalance Learn	4.7%	-14.5%
<b><u>XGboost</u></b>	<b><u>4.5%</u></b>	<b><u>-5.7%</u></b>
Buy and Hold	5.0%	-12.7%



# Final Words

