1. Smoothing

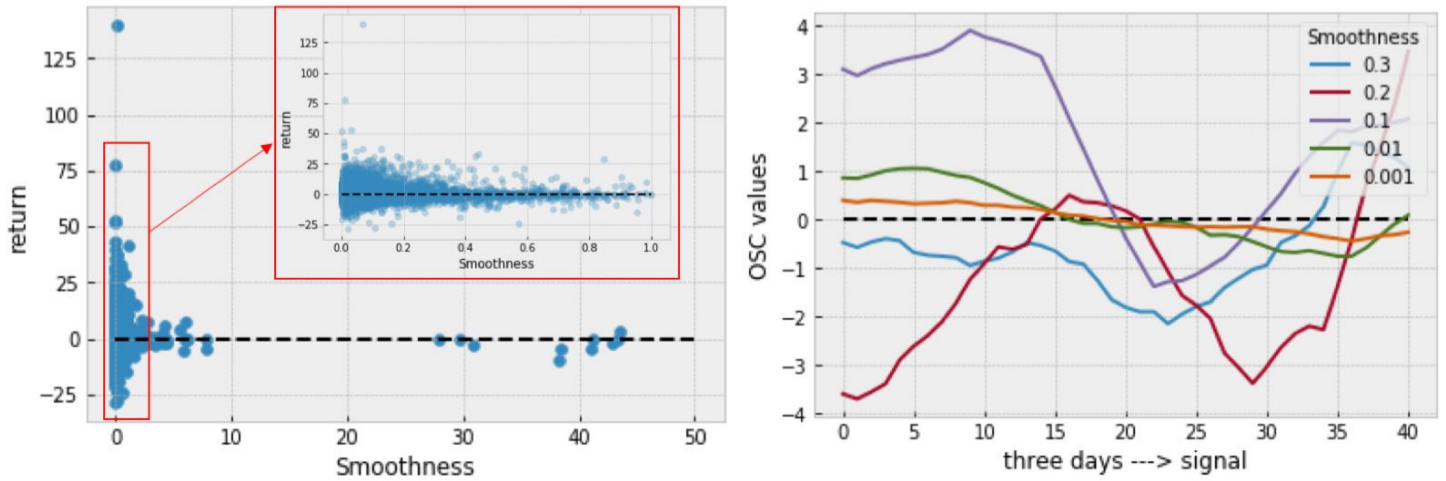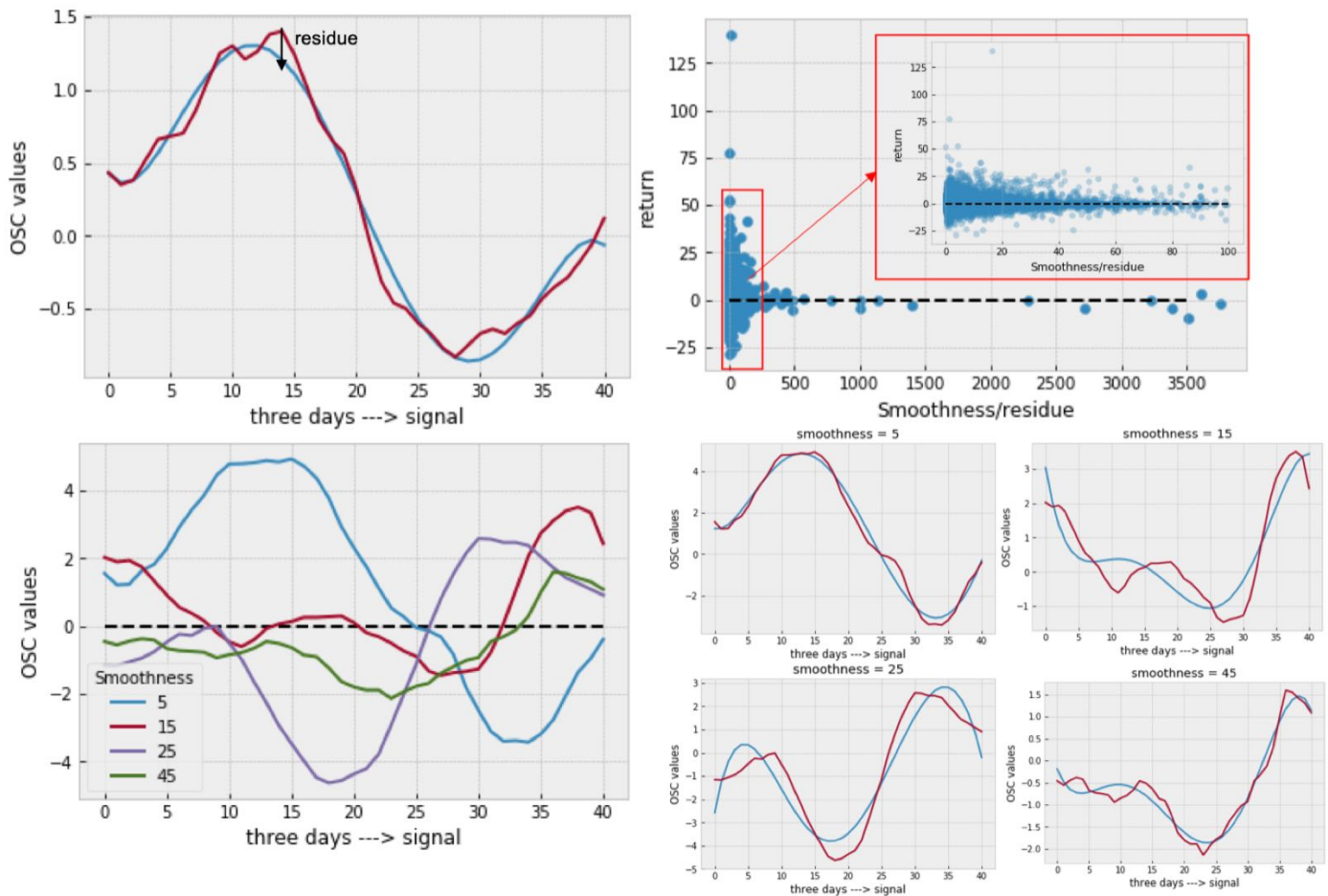Figure 1a. Smoothness of Different OSC Values – Differencing Method

Figure 1b. Smoothness of Different OSC Values – Residue Method

2. Modeling

Table 2a-1. Random Forest Model Result Under Buy Condition – Probability

prob	WinRate	Count	Avg. Return	% of All Trades
-0.000000	0.157068	191	-0.487068	1.15
0.100000	0.298913	736	-0.224470	4.41
0.200000	0.387097	1798	-0.004099	10.78
0.400000	0.405361	3059	0.035002	18.34
0.500000	0.413784	3932	0.082917	23.57
~~0.600000~~	~~0.000000~~	~~1~~	~~-5.470000~~	~~0.01~~
0.700000	0.414485	3438	0.093927	20.61
0.900000	0.420670	2061	0.069660	12.36
1.200000	0.458897	961	0.218065	5.76
1.600000	0.544073	329	0.508237	1.97
2.300000	0.765625	128	1.211953	0.77
inf	0.956522	46	2.386087	0.28

Table 2a-2. Random Forest Model Result Under Buy Condition – Four Classes

trade_class	WinRate	Count	Avg. Return	% of All Trades
Excellent	0.922389	39.6	1.444526	0.236
Great	0.771809	112.4	0.954073	0.668
Good	0.539523	337.6	0.428464	2.006
Average	0.403551	16340.4	0.031535	97.092

## Table 2b-1. Random Forest Model Result Under Buy & Sell Condition – Probability

prob	WinRate	Count	Avg. Return	% of All Trades
-0.000000	0.110048	209	-0.774976	0.63
0.100000	0.314246	716	-0.249832	2.16
0.200000	0.392311	2029	-0.020675	6.12
~~0.300000~~	~~0.500000~~	~~2~~	~~0.565000~~	~~0.01~~
0.400000	0.444419	4327	-0.026124	13.04
0.500000	0.477001	6522	0.043484	19.66
~~0.600000~~	~~0.333333~~	~~3~~	~~0.390000~~	~~0.01~~
0.700000	0.492783	7413	0.088312	22.35
~~0.800000~~	~~0.333333~~	~~3~~	~~4.673333~~	~~0.01~~
0.900000	0.509434	6042	0.056120	18.21
~~1.100000~~	~~1.000000~~	~~2~~	~~1.515000~~	~~0.01~~
1.200000	0.529475	3715	0.061712	11.20
1.600000	0.539312	1628	0.018299	4.91
2.300000	0.629067	461	0.174577	1.39
inf	0.777778	99	0.757273	0.30

Table 2b-2. Random Forest Model Result Under Buy & Sell Condition – Four Classes
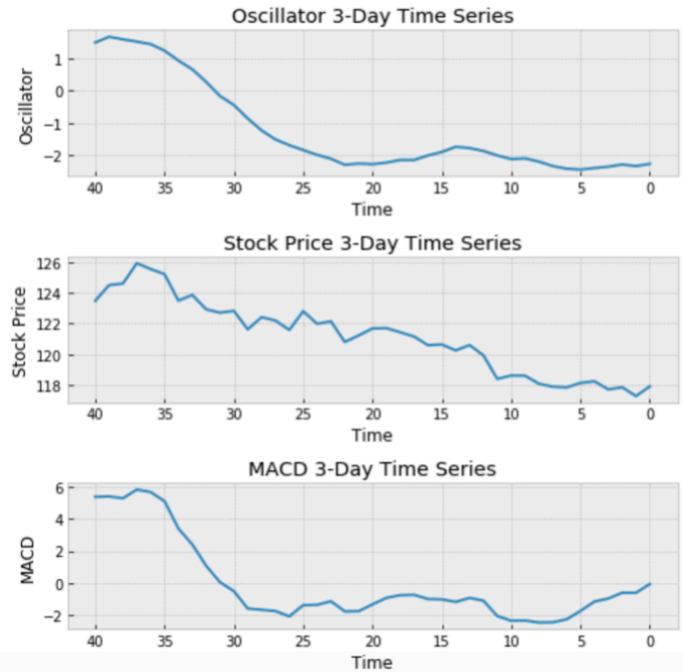
| trade_class	WinRate	Count	Avg. Return	% of All Trades
Excellent	0.775576	91.2	0.698951	0.276
Great	0.594987	478.2	0.183039	1.440
Good	0.566598	1604.0	0.080691	4.836
Average	0.480109	30997.6	0.023155	93.448

Figure 2. Sample Results

Model Rating: Excellent
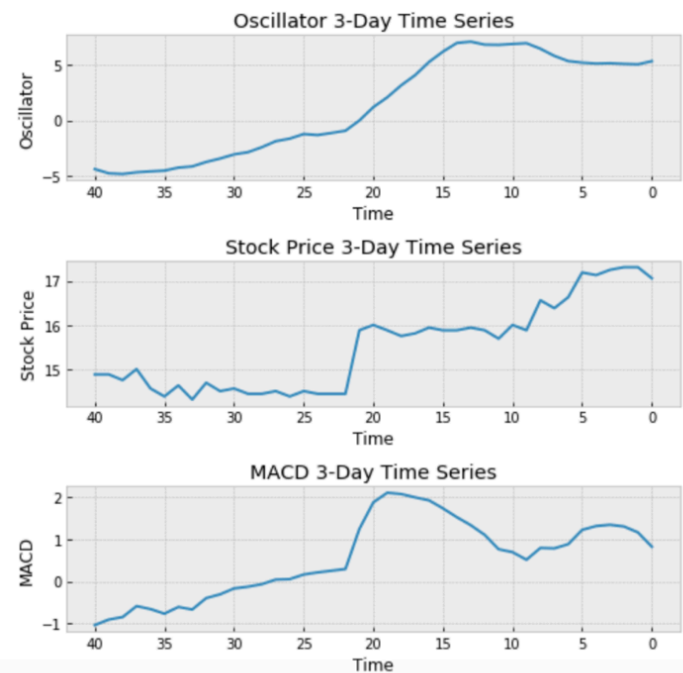Log Prob: inf
Actual Return: 6.36
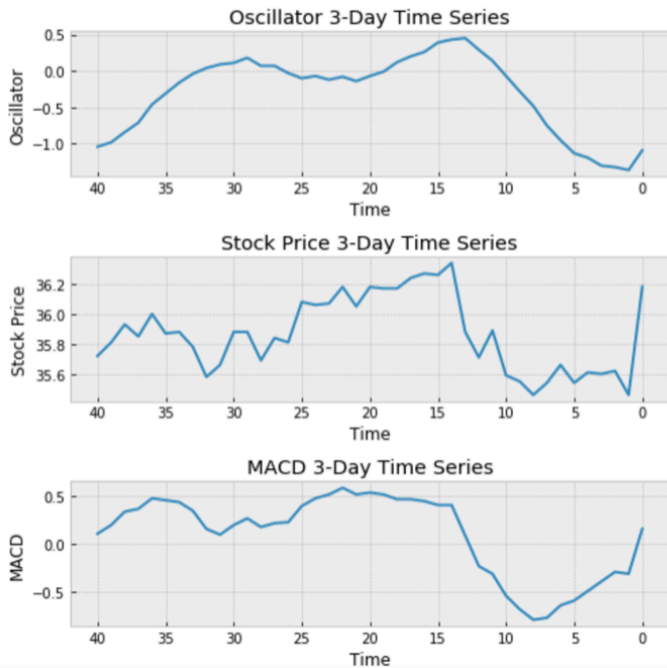
Model Rating: Excellent
Log Prob: inf
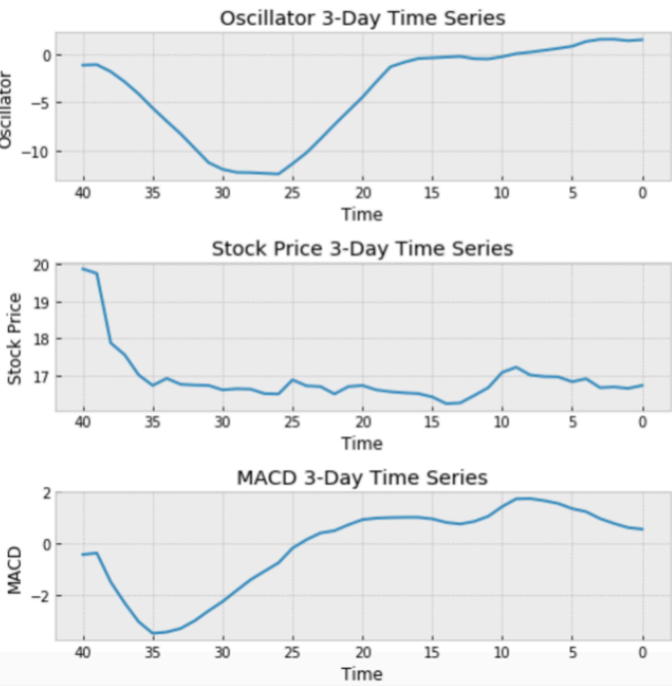Actual Return: 1.13

Model Rating: Great
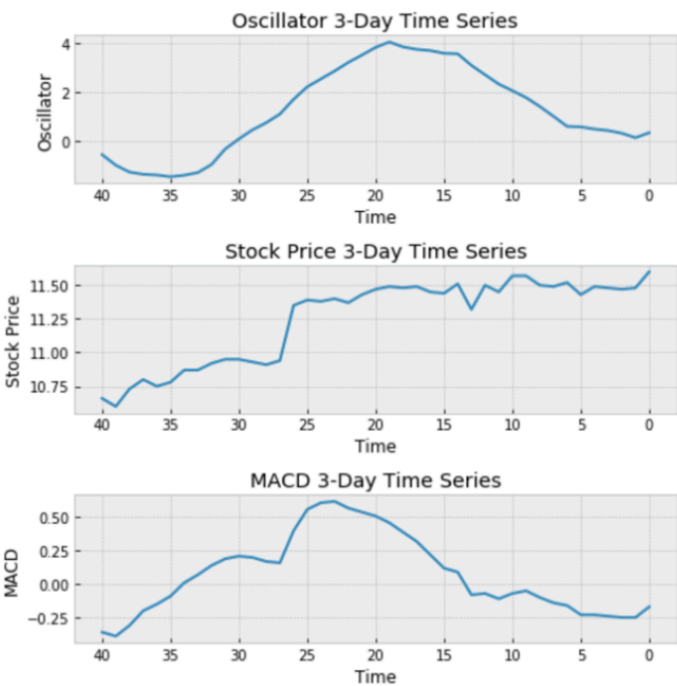Log Prob: 2.3025850929940455
Actual Return: 0.91
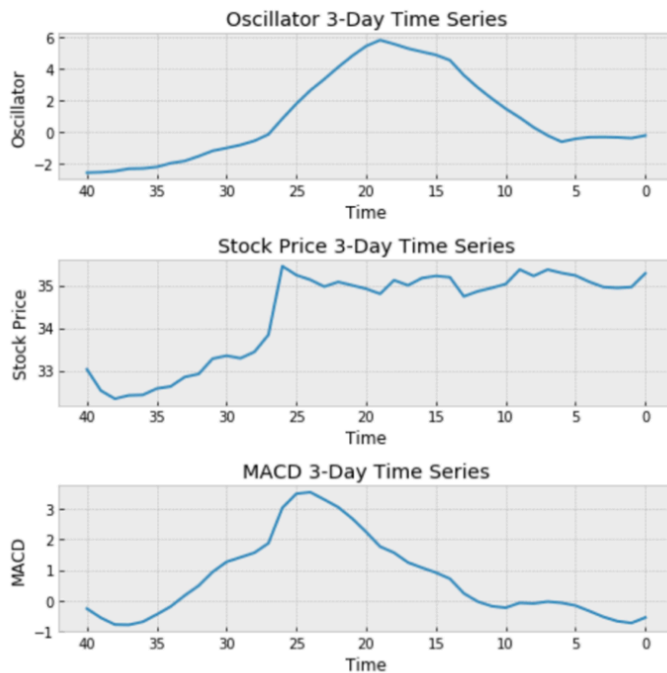
Model Rating: Great
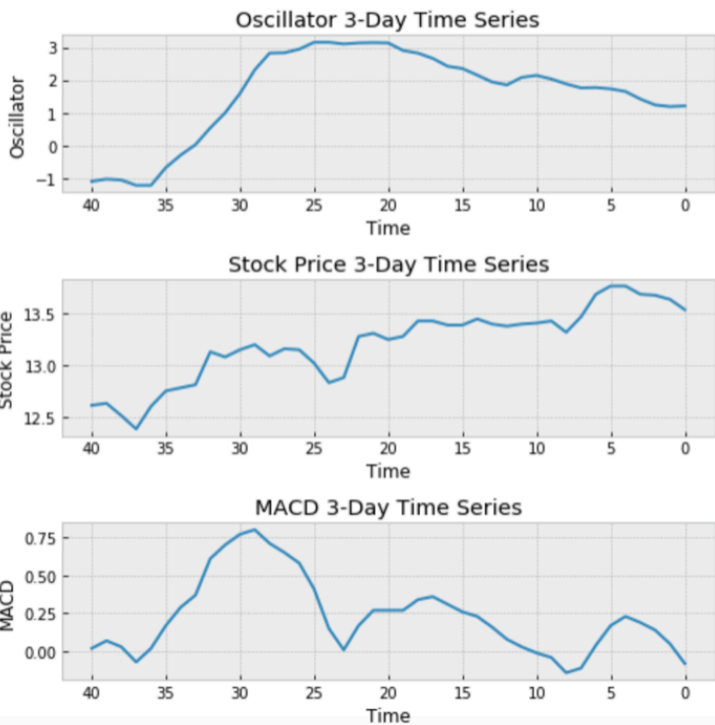Log Prob: 2.3025850929940455
Actual Return: 0.41

Model Rating: Good
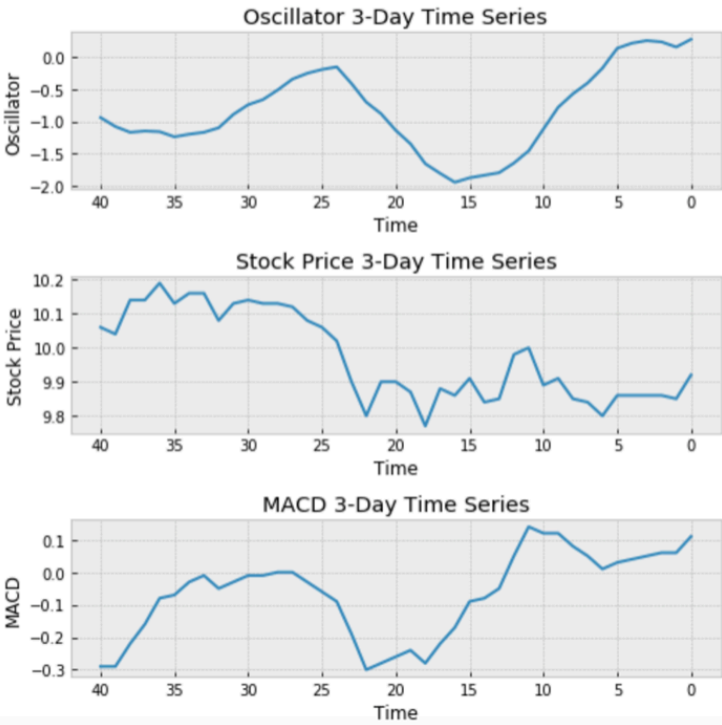Log Prob: 1.6094379124341003
Actual Return: 0.12

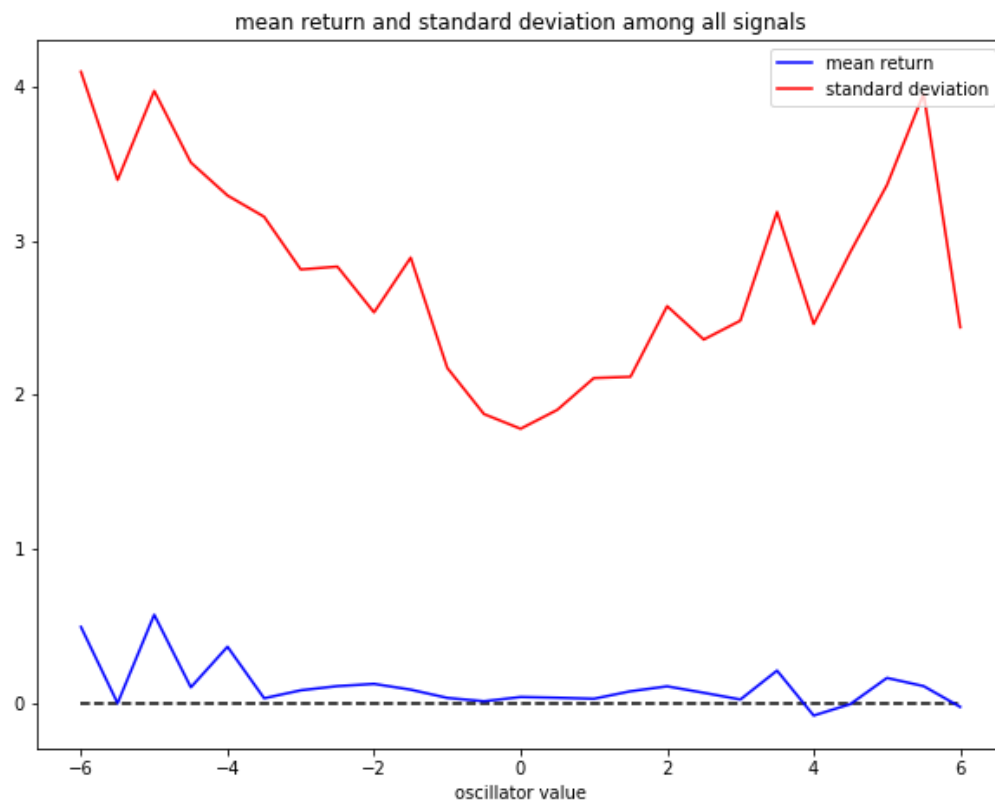Model Rating: Good
Log Prob: 1.6094379124341003
Actual Return: 0.17

Model Rating: Average
Log Prob: 0.916290731874155
Actual Return: -1.7

Model Rating: Average
Log Prob: 0.35667494393873245
Actual Return: -0.91

3. Oscillator Value Analysis

Observations:

- On average, we would generate positive return from signals with oscillator values at (-6, -4) level.
- However, the associated standard deviation is huge. It means there is a lot of uncertainty. If we go after only some of the signals, we may end up losing money.

Comparison Between Stocks

mean return and standard deviation across different stocks
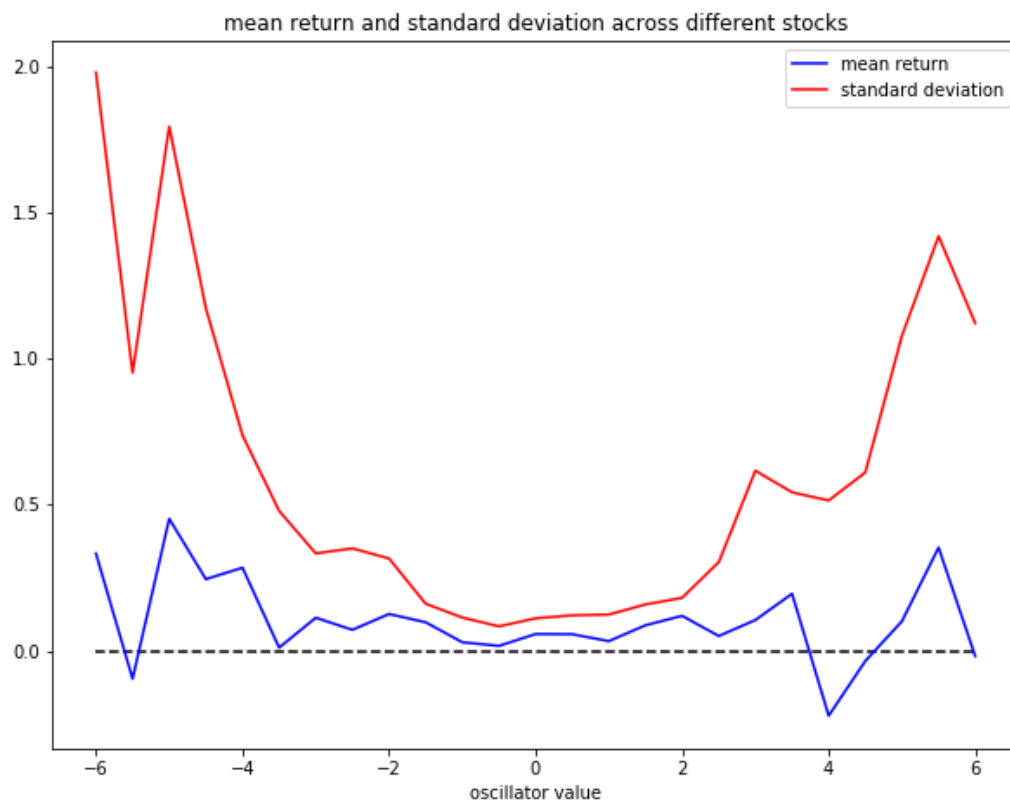
Observations:

- When oscillator values are below -2 or above +3, the standard deviation is big, which means, investing at these oscillator levels, returns from different stocks are quite different.
- When oscillator values are between -2 and above +3, returns from different stocks tend to be the same (close to 0).

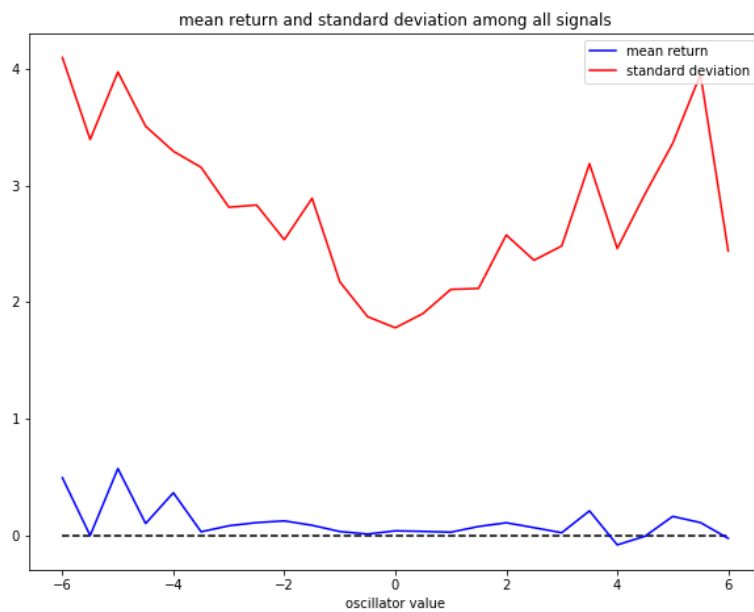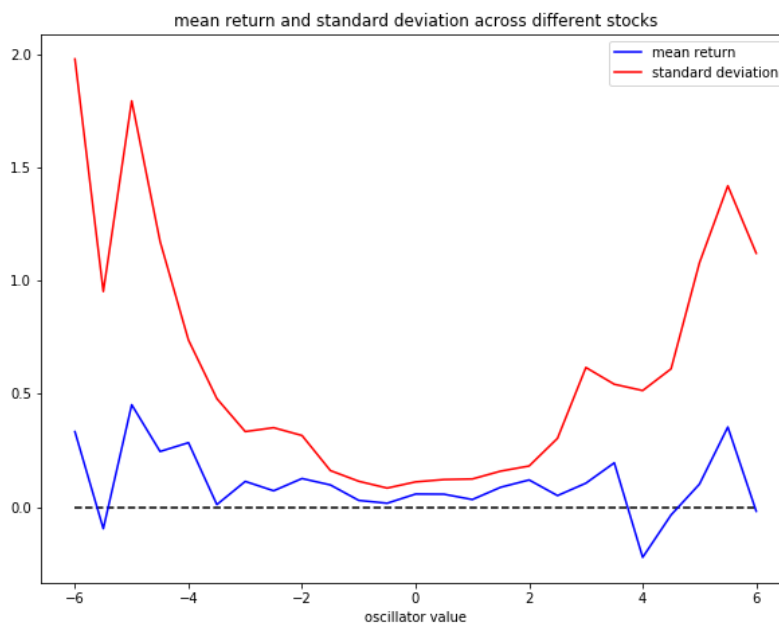## Figure 3a. Mean Return & Standard Deviation Among All Signals

Figure 3b. Mean Return & Standard Deviation Across Different Stocks

4. Challenges:
- ~~Imbalance dataset~~
- The same model applied on sell data doesn't work as well as the buy model

5. Next Steps:
- Break down the trade-class into finer groups
- Fine tuning the model (i.e. hyperparameters)