Basic EDA

Figure 1. Time Series of Oscillator, Stock Price and MACD under Buy-EARN Condition
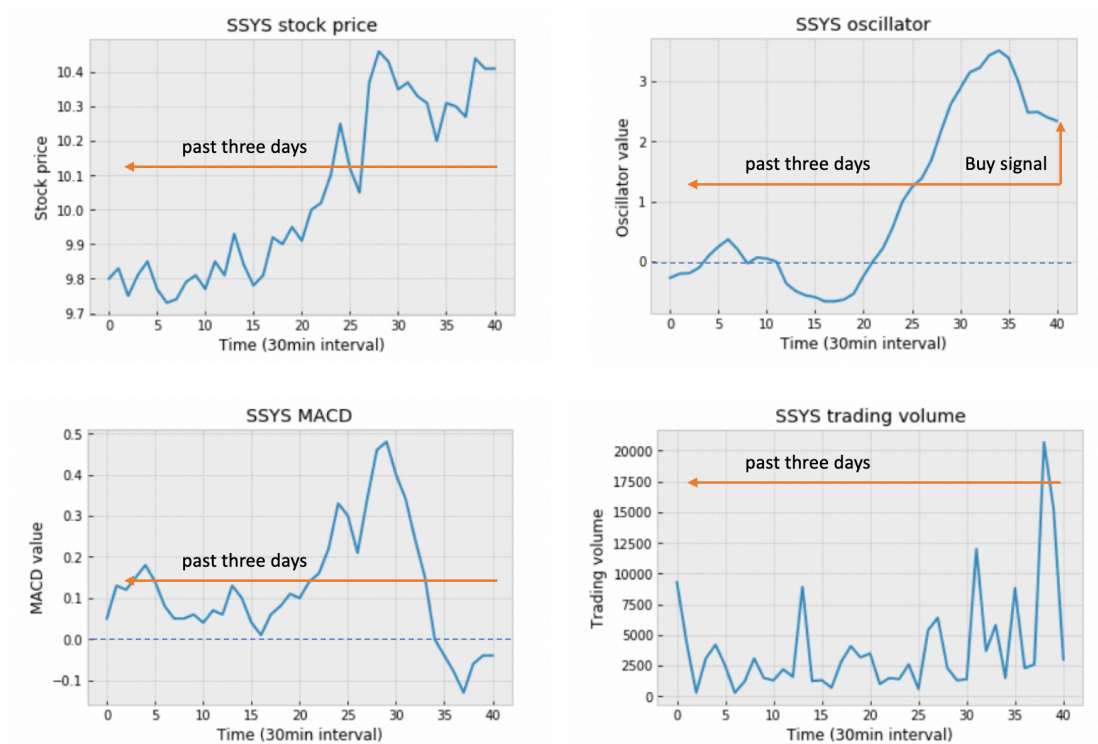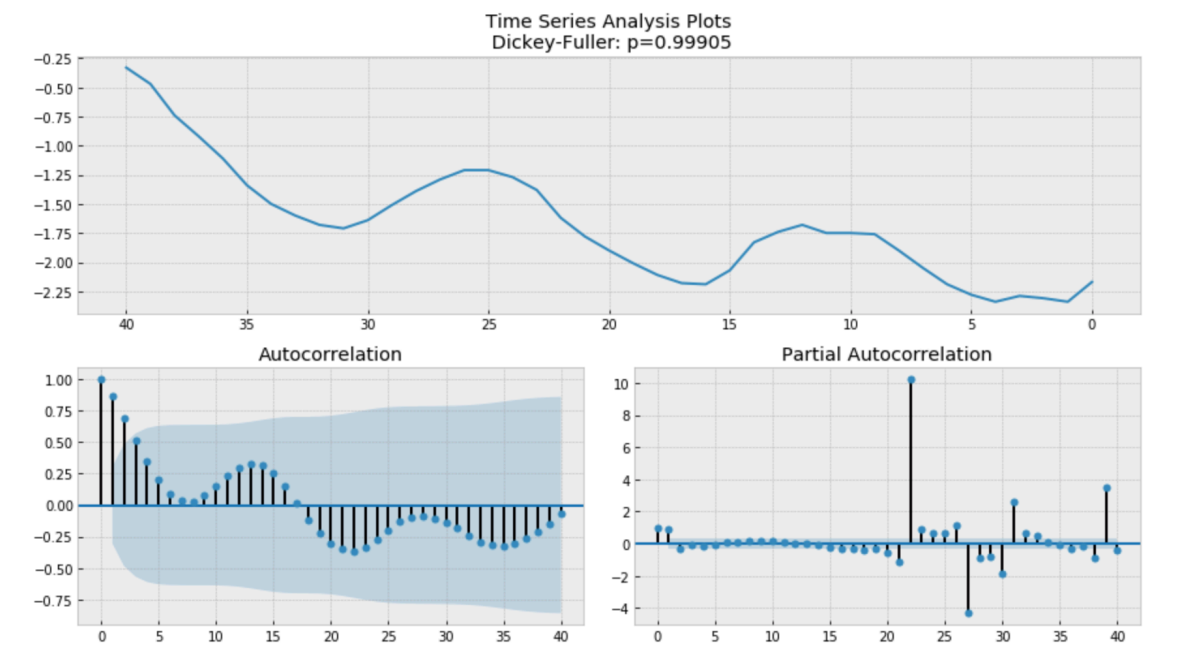

Figure 1b. Time Series Analysis of a Buy-Earn Oscillator Data

Analysis Based on Statement

Statement 1. Predictions are usually good when Oscillator looks like a smooth sine wave

1. **FFT**
2. **Smoothness analysis**
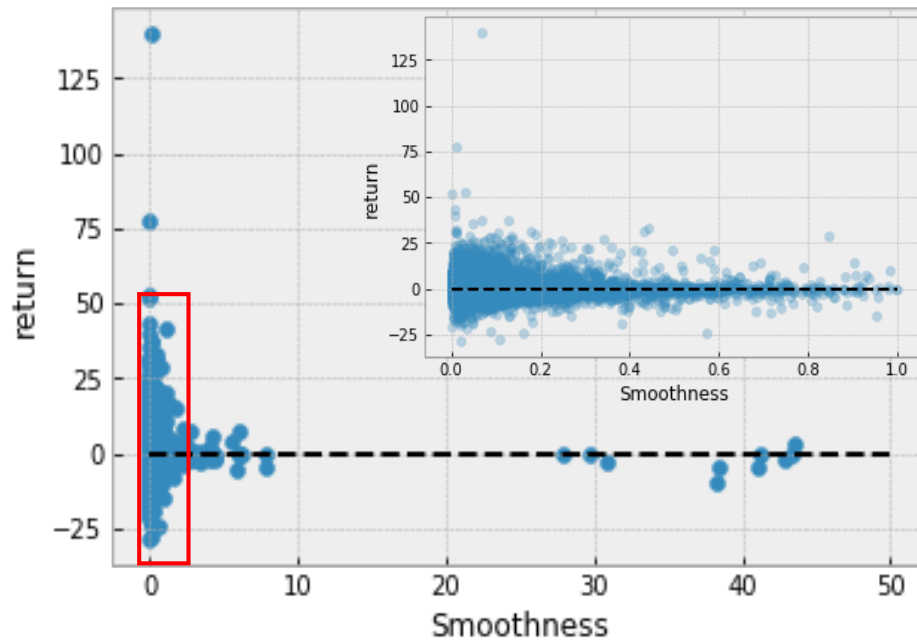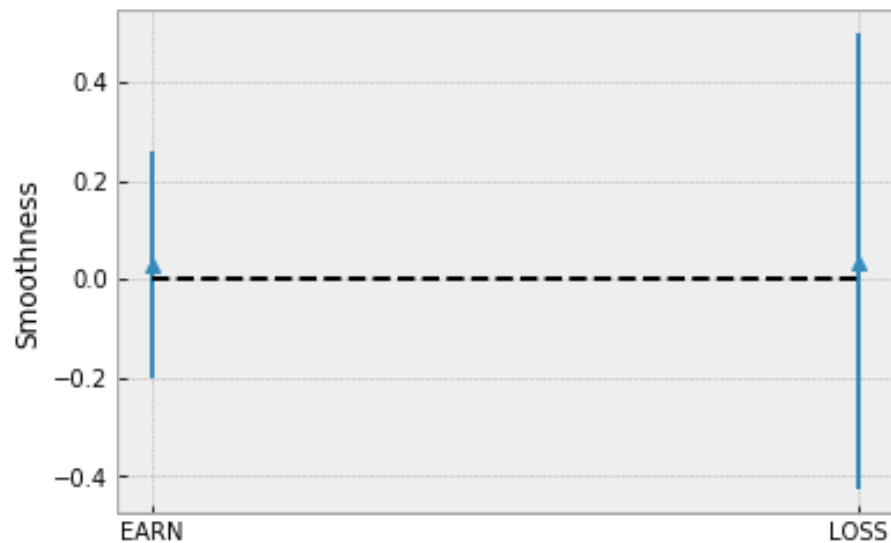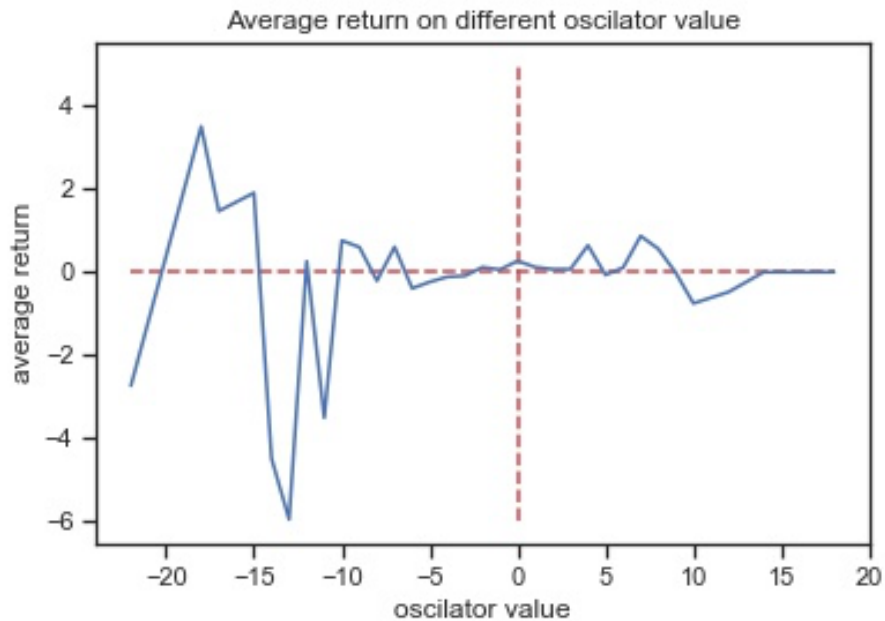
Figure 2a-1. Return value vs. Smoothness

Figure 2a-2. EARN and LOSS vs. Smoothness

3. Curvature (skewness and kurtosis?)

Statement 2. Extreme OSC values usually have not much predictabilities
Figure 2b-1. Average Returns on a Stock's Oscillator Data (SSYS)

Average return on different oscilator value

Statement 3. Crossovers of MACD generally identify good trading signals
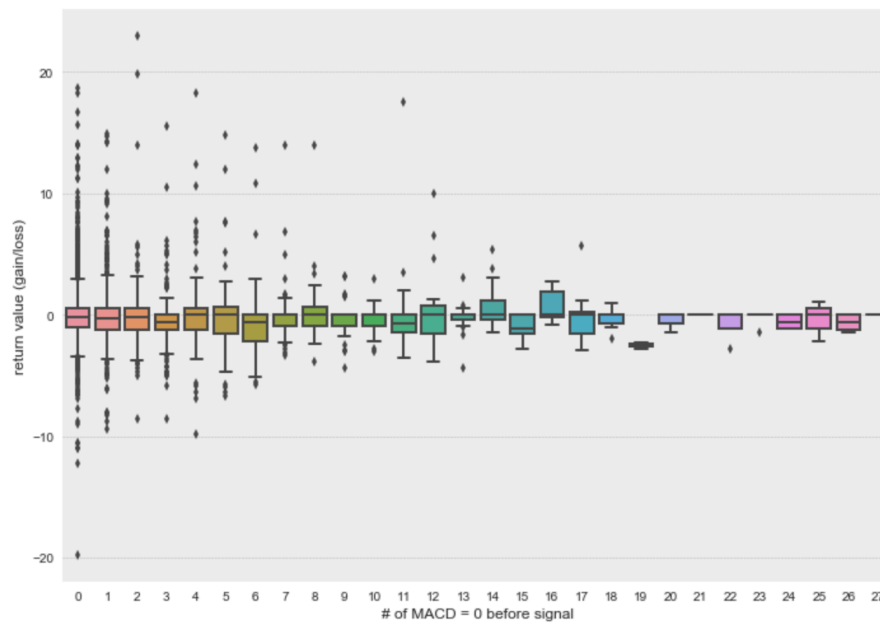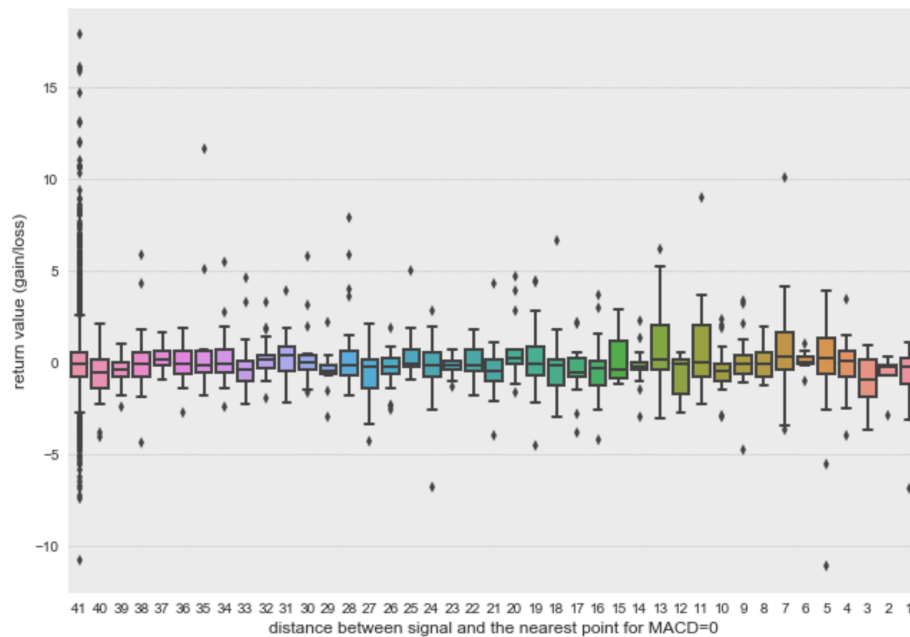Figure 1d-1. Average Returns vs. # of MACD=0 in the past three days

Figure 1d-2. Average Returns vs. distance to the nearest point with MACD=0

Machine learning

	Train Accuracy	Test Accuracy	Test Precision	Training Time(s)
Random Forest	0.6561	0.6356	0.4321	0.1225
Logistic Regression	0.9998	0.6144	0.3989	1.0525
SVM	0.8128	0.6155	0.4123	2.3897

Challenges:
- ~~Correlation between our source data;~~
- ~~The trade-off between sensitivity and consistency;~~
- Using loss function focusing on precision.

Our next step:
- Cross validation for different model comparing (model based on different features, training dataset, and algorithm);
- Modify the loss function: cost-sensitive training;
- Neural Network might be required.