

# Fintech Final Project Report

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January 9, 2019

## 1 Base line method

I use MA as my base line method, just like hw4. The reason is that MA can get a good performance with just a simple code and low time cost. Therefore, I choose it as my base line method because of its convenience and well performance.

**parameters:**

$\alpha = 0$ ,  $\beta = 19$ , window size = 64

## 2 Refine

To improve the performance of MA, I use the followings as my refining methods. All parameters of these methods are searched by brute force search.

### 2.1 MA with weight

I adjust weight when calculating MA. I think that the prices should not be summed by the same weight. Exactly, I think the prices near current days should have higher weight, and vice versa. As a result, I design a weight which is from 1 to  $n$  with  $n$  = previous days, and use it in calculating MA. This method can improve MA with little performance enhancement.

**parameters:**

from 1 to  $n$ ,  $n$  is the number of days of data

## 2.2 Continuous rising or declining

Second method is to detect the continuous stock rising or declining days. The reason is that continuous rising is often followed by declining, and continuous declining is often followed by rising as well. Therefore, I adjust this method to my strategy, and combine it with weighted MA. This can help detect some special case in stock market.

**parameters:**

continuous 3 days as threshold

## 2.3 RSI

Third method is using the RSI as a technical indicator. RSI can help stable the whole program, improve the accuracy of the time to buy or sell, and only cost very little time. As a result, I combine it with all the other methods with a form like: (all the other methods) and RSI. I use RSI to stable and fine tune all the other indicators in order to double check the decision of the other methods, and hope to get a better result. The use of RSI is very similar to validation.

**parameters:**

20 as the number of evaluate days, low threshold = 0.6, high threshold = 0.7

## 2.4 Threshold

The forth method I use is threshold. That is, if current price is lower than MA with a threshold  $T$ , then it means that the stock may rises again and it is a good time to buy it. Otherwise, if the price is higher than MA with a threshold, then it is the time to sell the stock because the price may go down in the future. In addition, this method is contained by RSI as well, so it is not easy to be confused by some noise signal.

**parameters:**

threshold  $T = 30$

## 2.5 Polynomial regression

The last method I use in my program is polynomial regression. I use open price and close price in days of window size as input training data, and the MA value of the next day of these days in the window size as label. Then, use a polynomial regression with data above to get a prediction model. With it, I can predict the MA value of the current day, which originally must til the next day can be calculated, based on the price record in the given data. Finally, put a threshold again to decide buying or selling. If current price is higher than the predicted MA with the amount of threshold value, it means that it is a good time to sell all the stock. Otherwise, if current price is lower than the predicted MA with the amount of threshold value, it means that it is a good time to buy the stock. With this model, the program can exactly know that today is a good day to buy, sell, or hold the stock.

**parameters:**

window size = 64, polynomial feature number = 2, threshold = 50

## 3 Conclusion

To sum up, my program structure is like: ((weighted MA or continuous days or threshold or polynomial regression) and RSI). RSI plays an important role in my program. It stables my program and the result of every method should take the result of RSI into consideration. In my training result, this program can get a return rate up to 1.9 percentage, which is better than just using MA. The reason that I do not use any complex machine learning based model is that my method is easy to complement, straight forward, and low time and hardware cost. It can run in a vary small device such as embedding system as well. It does not need to consider the case of over fitting, and does not need too much time to train to find the best parameters. In the end, I still think the traditional indicators have its place in the future Fintech domain. They are the products of human learning, and the products of social experience for a long period of time. Try to combine them with the technology in the future is a good direction to go.