

Quantitative trading strategy of gold and bitcoin based on RSI index

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Keywords: RSI, trading strategy selection, Cyclic neural network, XGboost

Abstract: In order to quantify the trading strategy, this paper first uses the cyclic neural network and XGboost model to compare the trend of special currency and gold for reasonable prediction, and then applies RSI, BOL, CR index and mean variance theoretical model to the selection of trading strategies in the field of gold and bitcoin respectively, so that when investing in the face of the price changes of target investment assets in the complex market, It can capture the linear and nonlinear changes of gold and bitcoin price data, accurately and effectively predict the trend of asset price, so as to select the optimal trading strategy to maximize the total income. Therefore, the method proposed in this paper has strong research significance and practical value.

1. Introduction

In order to pursue excess returns, most traders in the market often choose volatile assets as their first choice of trading. Their goal is to maximize the total return within the time period of target operation. There is usually a commission for each transaction, but each transaction will also produce corresponding costs. The costs vary with the types and scale of assets traded. Two of these assets are gold and bitcoin. The daily price of gold comes from the London bullion market and the daily price of bitcoin comes from NASDAQ. Based on the RSI index, this paper establishes a quantitative investment strategy model. For the two investment modes of gold and bitcoin, the model can effectively predict the trend of asset price, so as to select the optimal trading strategy to maximize the return.

2. Data processing

To complete the missing value of gold price, this method uses the idea of weighted average. Because the given data is a time series type of data, it has strong continuity, so it is considered to use the average value to calculate the missing intermediate data. In the type selection of average value, several classical types of methods in calculating return on investment, such as arithmetic average, geometric average and moving weighted average, are considered. Finally, due to the different smoothness of the calculated data, the method of arithmetic average is selected to supplement the data of yellow gold price. The average in mathematics is introduced to predict the missing price data, and the price prediction model of gold is constructed. This can not only intuitively observe the

characteristics of gold price at a single time point, but also learn the nonlinear variation characteristics of gold price between different time points. The description of volatility can effectively reduce the difficulty. In the theoretical analysis, the closing price of historical trading data of gold in short-term (1 day), medium-term (5 days) and long-term (20 days) are selected to verify the effect of this model and this model on the prediction of gold price in different time periods. The empirical analysis results show that the model of calculating the missing price by arithmetic average has significantly improved the accuracy and stability of gold price prediction compared with other models with price prediction effect.

3. Model Establishment and Solution

First, we use the cyclic neural network and the XGboost model to predict the price of bitcoins and gold. The predictions are as follows:

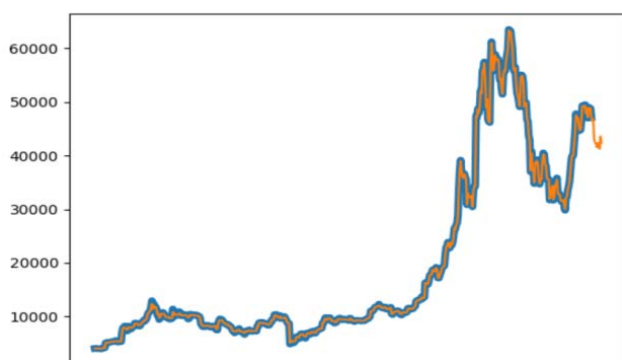


Figure 1: Bitcoin prediction result chart

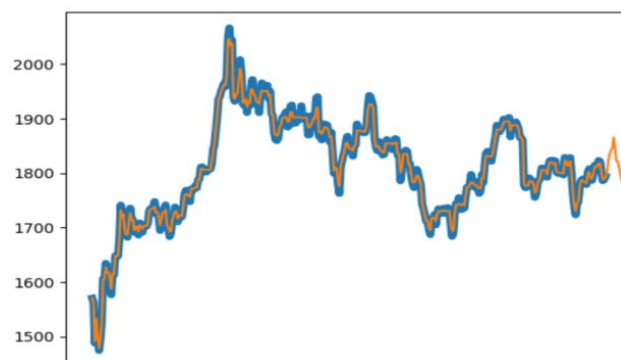


Figure 2: Gold prediction result chart

Table 1: Cyclic neural network model

	MSE	RMSE	MAE	MAPE	R²
training set	5.89	2.043	2.157	0.165	0.999
Test Set	20.845	5.554	3.835	0.21	0.966

Table 2: XGboost model

	MSE	RMSE	MAE	MAPE	R²
training set	8.261	3.043	2.344	0.134	0.98
Test Set	24.845	6.677	3.655	0.25	0.978

It can be seen that the circular neural network and XGboost model are better as prediction models, and the data obtained from this prediction model are used in the following modeling processes

Next, in order to determine the buying and selling points of gold and bitcoin and clarify the trading strategy, we propose a quantitative trading strategy of gold and bitcoin based on RSI index. The strategy constructs the trading points of these two assets based on the absolute price level. In the technical analysis of stocks, there are many ways to predict the future price trend and trend price change, and there are many quantitative trading model strategies, but only a few can be applied to the prices of bitcoin and gold. In order to use the index of predicting stock price to control the trading of the other two assets, we must find some commonalities between them and the inherent preconditions when using the index.

RSI index was first used in futures trading. Later, it was found that the effect of using this index to guide the investment in the stock market is also very good, and the characteristics of this index are

constantly summarized and summarized. Now, RSI has become one of the most widely used technical indicators by investors. The general principle of investment holds that investors' buying and selling behavior is the reflection of the comprehensive results of various factors, and the change of the market ultimately depends on the relationship between supply and demand. According to the principle of supply and demand balance, RSI index evaluates the strength of long and short forces by measuring the percentage of the total increase of stock price in the average of the total change of stock price in a certain period, then prompt the specific operation. For bitcoin, a cryptocurrency, its fixed supply once became an investment method used by investors to avoid inflation and preserve assets. Due to its relatively limited supply, gold has become a typical representative of safe haven assets when the market is in a continuous downturn. Therefore, the prices of these two assets have changed, Part of it depends on people's expectations of its price, just like the stock price, and the other part also depends on the relationship between market supply and demand, which is consistent with the core idea of RSI index.

Overbought and oversold status of RSI index:

(1) When the RSI value is 50, the values of up and down are the same, and the buying force is equal to the selling force;

(2) The larger the RSI value, the greater the degree to which the up value exceeds the down value, and the greater the degree to which the buying heat is greater than the selling heat;

(3) The smaller the RSI value, it can be deduced that the greater the value of down exceeds the value of up, and the greater the selling heat is greater than the buying heat.

The RSI value equal to 80 or 20 is the commonly used characterization of "overbought line" and "oversold line", respectively. RSI of 80 is the critical point of stock overbought, RSI of 20 is the critical point of stock oversold, RSI of 50 is set as the "center line", which indicates that the buying power of stock is equal to the selling power.

When the RSI is greater than 80, the stock appears overbought signal. If the buying power of stocks is too large, the buying power may decrease in the future, so the stock price may fall in the future. Sell stocks at this time and buy stocks after falling in the future, so as to earn the price difference.

When the RSI is less than 20, the stock is oversold. The selling power of stocks is too strong, and the selling power will return to normal in the future. Therefore, the stock price may rise in the future. Investors can buy more stocks at this time and sell them after the price rises in the future.

Using the RSI index theory, we can determine the buying and selling time nodes for gold and bitcoins as follows:

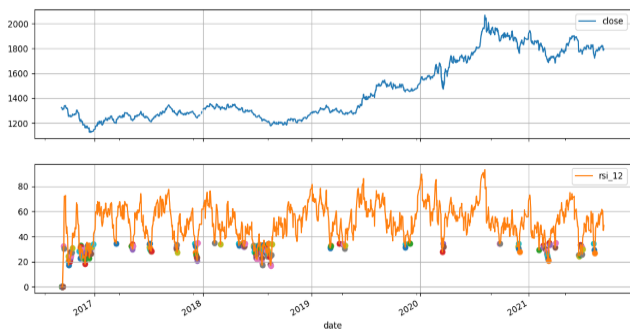


Figure 3: The point to buy gold



Figure 4: The point to sell gold

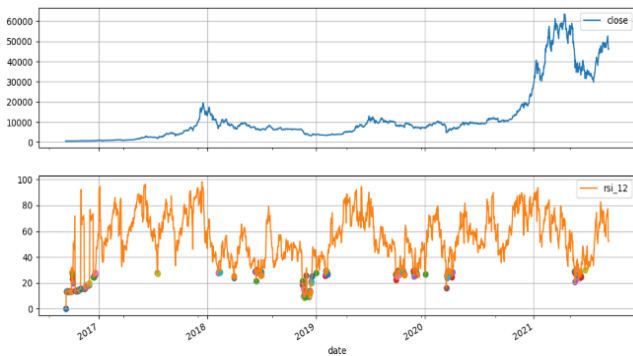


Figure 5: The point to buy bitcoin

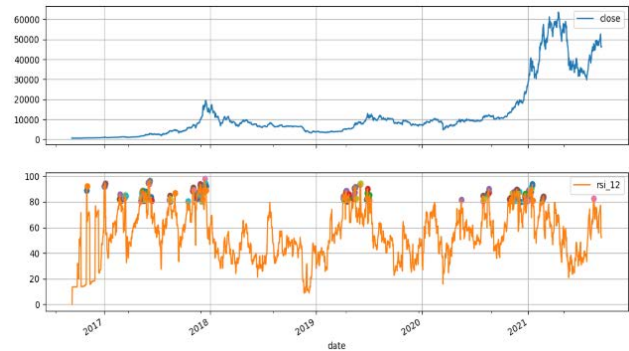


Figure 6: The point to sell bitcoin

4. Conclusion

Firstly, we first establish a cyclic neural network and xgboost model to fit the existing data, and then use this model to predict the future trend of special currency and gold respectively, so as to obtain the prediction data. Next, we combine multiple indicators of RSI, Cr and BOL in quantitative transactions. When $RSI > 80$, it can be considered as a suitable selling point, and when $RSI < 20$, it can be considered as a suitable buying point. Through these indicators, each suitable buying point and selling point in the five-year cycle can be excavated, so as to obtain all buying points and selling points of gold and bitcoin in this time.

However, the currency market is highly volatile. When building a trading strategy model, this paper only considers the benefits and risks. In the future, it also needs to consider the impact of political factors and emergencies.

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