# Gold or BTC:The Best Trading Strategy

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Introduction

Financial Management has always been a topic of concern. How to develop a suitable trade strategy is a very delicate matter.In 1952, Markowit[1] introduced the portfolio theory, which transformed the qualitative analysis of return and risk into quantitative analysis, and was of transitional significance. After that, people started trading strategies based on quantitative analysis in a very diverse way. At the same time, gold and bitcoin, two very common investment options in today's market, are chosen by different people in different ways due to their different characteristics. Based on quantitative analysis, it is very meaningful to provide investors with more valuable and personalized references in a complex financial market.

Now, let's have a discussion on trade strategies based on a real situation, assuming that today is September 11, 2016 and we have $1,000 as initial capital to solve for the best trade strategy when we reach September 10, 2021.
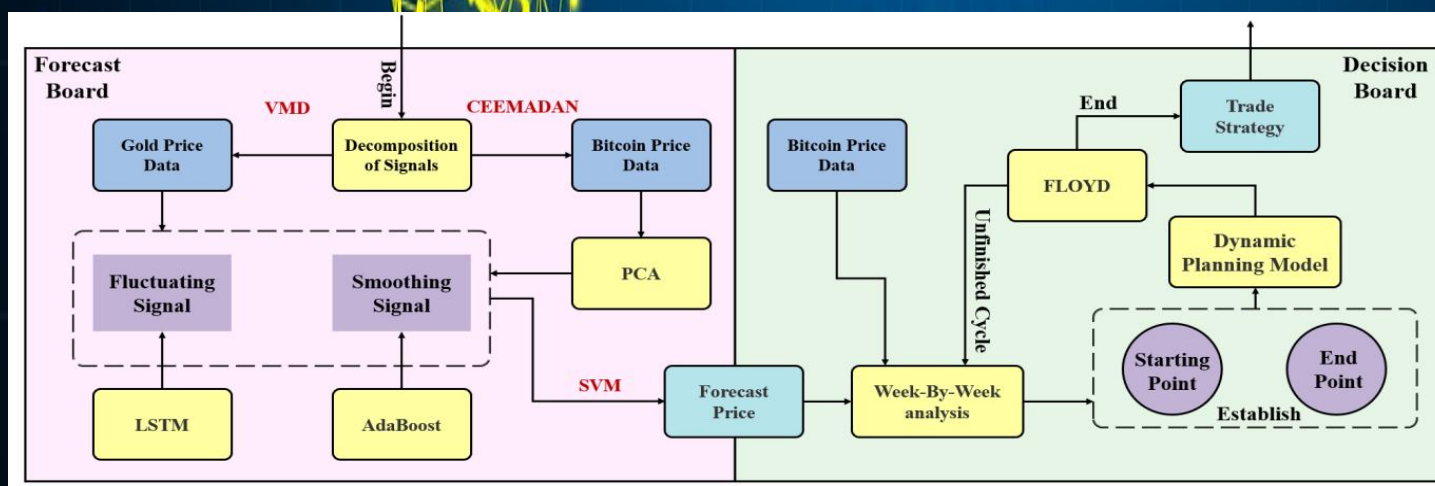
Price Forecasting Model

For the prediction of gold, after filling in the missing data, we use the VMD algorithm to decompose it into signals in order to make more effective use of the price curve shown by the data given in the question. For the fluctuating data in the decomposed signal, we use the LSTM algorithm to predict the signal data for the next week in real time based on its long and short-term network learning characteristics; We use the AdaBoost algorithm to predict the next week's signal data in real time based on its adaptive learning characteristics for the smoothed data in the decomposed signal. After getting the predicted signal data for all the decomposed signals, we use the SVM algorithm for signal reconstruction to get the gold price prediction data. The results are detailed in Figure 7. While Bitcoin is different from gold, due to its stronger overall volatility, we first decompose its signal into 11 segments by using CEEMADAN, and then we use the PCA algorithm to pick out 4 of the main components. After this, we used the same LSTM-AdaBoost-SVM model for prediction.
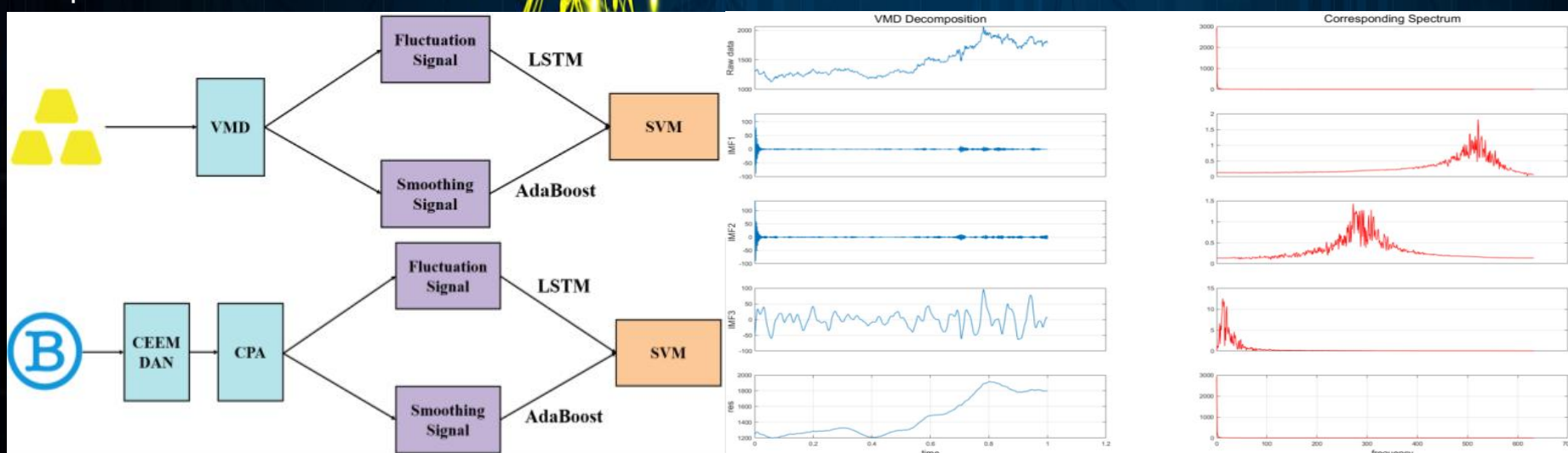
Trade Decision Planning Model

After obtaining the forecast data, we build the optimal investment dynamic planning problem based on the weekly price forecast results and the trading rules, taking a certain asset on the first day of each week as the starting point and a certain asset on the last day of each week as the end point. Then, we use Floyd algorithm to find the maximum profit route from a certain starting point to a certain end point, and loop through the starting point and end point to find the best weekly investment route when the starting point is gold, dollar and bitcoin, respectively. Further, we perform a weekly loop of the algorithm to find the daily optimal trading strategy from September 11, 2016 to September 11, 2021. Our assets went from an initial $1,000 to $52,048 with an annual profit margin of 219.58%.

Finally, we improved and extended the existing model for the existing model by introducing more realistic parameters to measure the asset maximum as the objective function and the risk as the constraint constraint to build the Measure-VaR multi-stage portfolio model and solve it by using the PSO algorithm , the theoretical results is good.
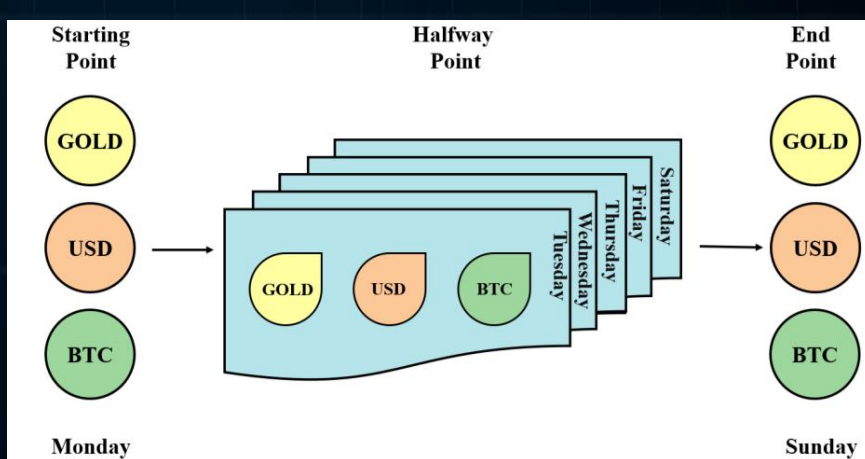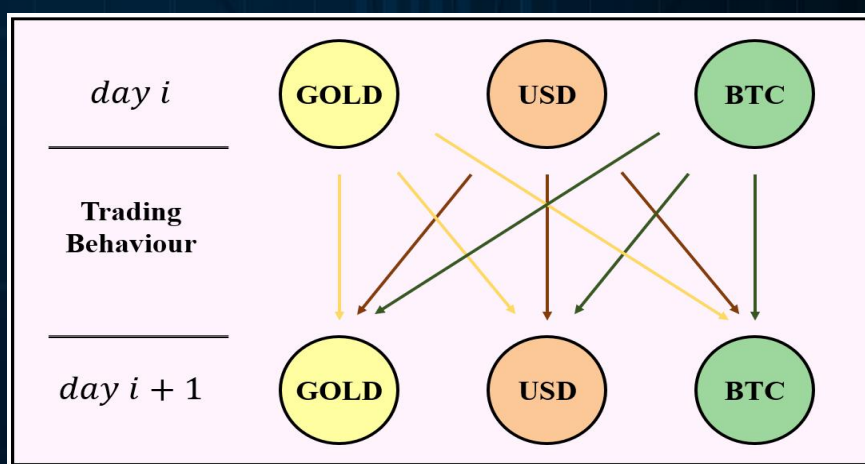

Table 3 Investor Behaviour Analysis Form

Day i	G			U			B		
Day i+1	G	U	B	G	U	B	G	U	B
Value (normal)	p_{gi}	$p_{gi} \cdot c_g$	$p_{gi} \cdot c_g \cdot c_b$	c_g	1	c_b	$p_{bi} \cdot c_g \cdot c_b$	$p_{bi} \cdot c_b$	p_{bi}
Value (GCD)	1	/	/	/	1	c_b	/	$p_{bi} \cdot c_b$	p_{bi}