

The Background Study for *Stock Market Prediction*

In the past decades, there is an increasing interest in predicting markets among economists, policymakers, academics and market makers. This field is having too much attention for the researchers. There are many studies to improve the learning algorithm to predict the stock price. The literature contains studies with different machine learning algorithms such as ANN (artificial neural networks) with different feature selection. This study generated a new algorithm on predicting the stock markets

Objectives and Motivations for the paper:

In overall, the value of a stock is given by its listing on the stock exchange and the volume of its transactions. The more a share is exchanged, the more it is worthy, and conversely, if a share is put into a transaction in a low volume, it is not so relevant for some merchants and by default, its value sinks or reduces. This awareness of the market can make profits or losses, depending on the ability to predict future values, which is the main concern of the research. Therefore, the problem converts the given stock market history. An appearance that has attracted researchers in predicting the values of the assets. So, the researchers try a wave of algorithms in Artificial Intelligence, namely Machine Learning, decided to tackle the problem explained above. The researchers rise three basic question as sub-issues in this study:

- 1) How to determine what features are optimal?
- 2) How is the problem defined as?
- 3) How to connect algorithms to optimize the efficiency of prediction

The Researchers marched forward with this question to find a solution.

Methodology:

In this study the researchers worked with quantitative data. The stock market goods price has been the research data here. They acquired the data set from Bloomberg which is a platform for trading stocks. Because of the high range of domains of trading the study was directed on a volatile and fast domain, the foreign exchange market. After taking the data they go through some experiment like hit ratio, Rate of Recognition, Accuracy, Relevant Rate of Recognition with the data. It is kind of obvious that the data should be numerical for stock market research.

Contribution of the work:

The foreign exchange stock market EURO-CHF practicing the two algorithms has been explained in this paper. For the implementation of the PCASVM algorithm, which has a slightly increased the Rate of Recognition, ROR, that counts the overlapping buying or selling points, is 68% meaning that only this amount of decisions is going to generate profit.

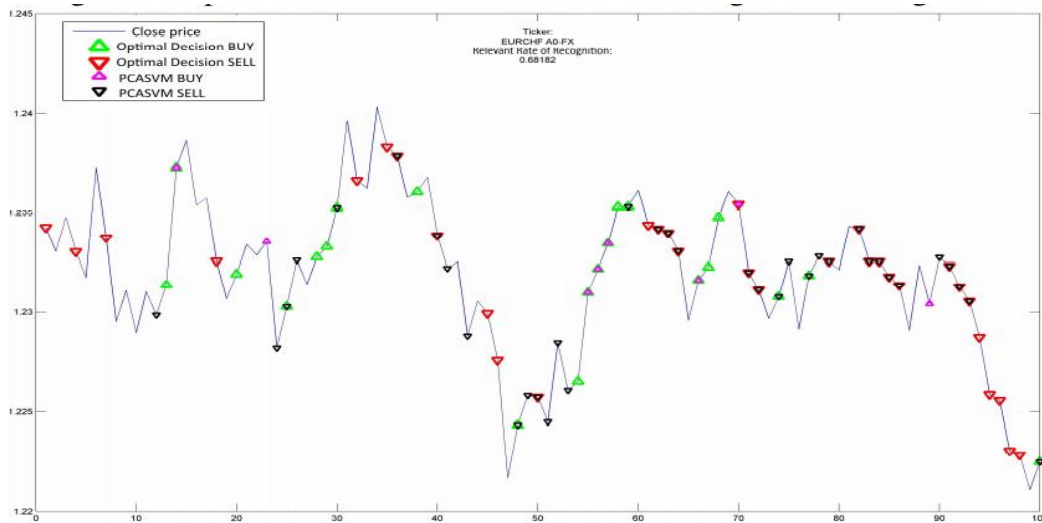


Fig. 2. Graphical result for one stock market using PCASVM algorithm

This research formed a new algorithm for predicting the stock markets. There are different methods of predicting signs through machine learning algorithms and numerical methods. PCASVM was implemented to both eliminate the false predictions and to determine what features are important. In my opinion, the answer to the main problem and sub-issues is more dynamic and shows encouraging results for a real prediction using recent stocks data.

Lacking of the work:

This research does have some achievement and also some limitations. The problem lies with the regression algorithms. In general, they tend to have a sample delay. In a market where time and accuracy are very important to be efficient, a small delay is not allowed as a viable error. It can be a serious issue. So, the SVR algorithm can be used just as a filter to reduce the wrong buy and sell signs and having an estimated idea of how big is the difference from one day to another.

From this study I did learn some fact that I haven't know before. I have introduced with some algorithms which I can implement in my stock market analysis project. I have known about AR models (Autoregressive), ARIMA (autoregressive integrated moving average), CBR (Case-Based Reasoning), ANN (Artificial Neural Networks), GA (Genetic Algorithm), SVM (Support Vector Machines), SVR(Support Vector Regression) , PCA (Principal component analysis) from this study, I can get help in my project from this machine learning algorithms.

The Background Study for *Research on Stock Price Prediction Method Based on Convolutional Neural Network*

Predicting stock prices is a major objective in the financial world since a fairly accurate prediction has the possibility to produce high financial benefits and plant against market risks. With the rapid growth of the Internet and computing technologies, the frequency for performing operations on the stock market had increased to fractions of seconds. In this paper, the researchers propose a stock price prediction model based on a convolution neural network, which has obvious self-flexibility and self-learning ability. Merging the characteristics of CNN (Convolution Neural Network) and the Thai stock market, the data set is trained and tested after pretreatment.

Objectives and Motivations for the paper:

Several classifications in stock prediction area can be classified into two combinations. The first group includes algorithms try to improve the performance of prediction by enhancing the prediction models, while the second class of algorithms focuses on improving the highlights based on which the prediction is made. In the first class of the algorithms that focus on the prediction models, a variety of tools have been used, including Artificial Neural Networks (ANN), naive Bayes, SVM and random forests. The most popular tool for financial prediction seems to be ANN. Deep ANNs, that are basically neural networks with more than one hidden layer, among the first deep methods used in the domain. So, the researchers try to summarize the explained papers in terms of initial feature set, feature extraction algorithm and prediction method. As can be seen, there is a trend toward deep learning models in recent publications, due to the capability of these algorithms in automatic feature removal from raw data. They used the CNN here to gain high accuracy.

Methodology:

In this research the researchers worked with quantitative numerical data. The stock market goods price has been the research data here. They acquired the data set from Thailand stock exchange. Deep learning methods have been shown to be able to gradually construct useful complex features from raw data or simpler features. Since the behavior of stock markets is complex, nonlinear and noisy, it seems that extracting features that are informative enough for making predictions is a core challenge. They used CNN here with some layer which is convolutional layer, pooling layer, fully connected layer. This layer used for trained the data.

Contribution of the work:

As we know stock price prediction is an important issue in the financial world, it contributes to the development of effective strategies for stock exchange transactions. The results show that the model based on CNN can effectively identify the changing trend of stock price and predict it which can provide a valuable reference for a stock price forecast. The prediction accuracy is high, and it is worth further promotion in the financial field. the main strength of this study would be the CNN stock price forecasting method has high accuracy and high application value.

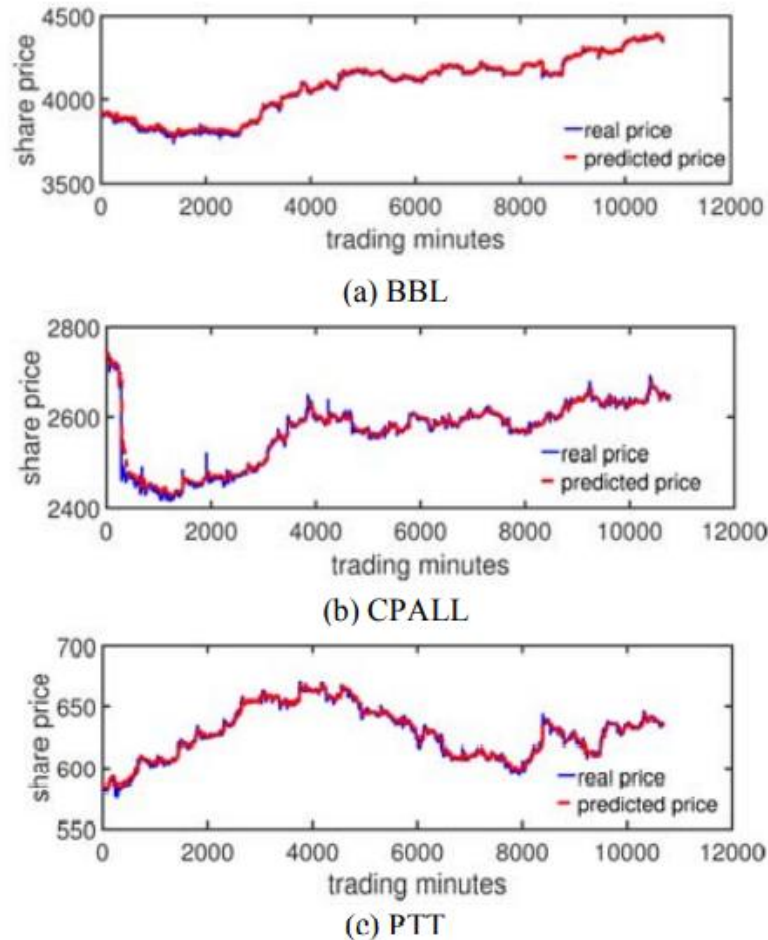


Figure 4. Predicted results vs actual stock price

In the figure above shows the predicted results vs actual stock price which is very impressive because of the accuracy rate. In this study the researchers maintained a healthy rate of accuracy.

Lacking of the work:

This study does have some success and also some limitations. In data pre-processing area the data set seems irrelevant. In general, they tend to have a sample delay also. The dataset available to learn and evaluate the performance of the implemented system includes daily historical prices available for the stocks which are very limited. They used a little number of data here which is also a limitation.

From this research, I did acquire some point which I can use in my project. I have introduced with some algorithms which I can implement in my stock market analysis project. I have known about Convolutional neural network. Convolutional neural network (CNN) is a type of feedforward artificial neural network in which the connectivity pattern between its neurons is inspired by the organization of the animal visual cortex, whose individual neurons are arranged in such a way that they respond to overlapping regions tiling the visual field. Well from this study, I can get assistant in my project by applying CNN.