Research on stock price prediction of Kweichow Moutai based on machine learning methods

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Abstract. Kweichow Moutai stock Is the most closely watched stock market in China. This article adopts machine learning method including CNN and SVR models to forecast Kweichow Moutai's stock price. The prediction results of these two methods are further compared by prediction accuracy indicators. The results show that SVR model are more accurate than the CNN model. The Kweichow Moutai stock still have persistent fluctuation and also rising. As far as the forecast results are concerned, the development prospects of Kweichow Moutai are still good. This paper not only provides empirical evidence on how the two prediction models perform, but also provide a reference for investors to make investment strategy on Moutai stock.

Keywords: stock price prediction, machine learning, Kweichow Moutai.

1. Introduction

The first set of question aimed to analysis and forecast the Kweichow Moutai. The stock market itself gets a lot of attention. Many people use stocks to make money. Kweichow Moutai stock is very famous in China and has a relatively good development prospect at present. This paper uses machine learning method to predict the opening and closing price of Kweichow Moutai. If the accuracy of the forecast is very high, it will be of great help to investors' investment decisions. There have been many analyses and predictions about Moutai stock over the year . The purpose of those study is to examine the effects of the LSTM neural network on the employments person stock information of listed alcoholic beverage firms in China forecast for the timing of the liquor stock. The test uses Moutai and Wuliangye Yibin's daily information exchange as the free variable to predict closing costs from March 31, 2002, to March 31, 2022. According to the test, LSTM neural organize demonstrate has a high degree of precision and a consistent impact on cost drift forecast. It offers higher predictive value for firms with lower showcase value of Chinese liquor, which is beneficial for investors to create choices [1].

The Long Short-Term Memory (LSTM) approach is used in Zhang's study to forecast Kweichow Moutai's stock price. In accordance with the peculiarities of stock time series data, LSTM neural networks may fit the stock price fluctuation rule well. The Kweichow Moutai stock price is predicted in this paper, which builds a neural network prediction model from scratch using Python. The neural network prediction model's results demonstrate that the LSTM neural network method can accurately predict the volatility trend of the Kweichow Moutai stock price, with a relatively high prediction accuracy and a small error. It can also, to a certain extent, reflect the volatility trend of the stock price [2]. In order to increase the model's capacity for feature extraction, Chen, Wang and Zhou provide a multi-factor stock prediction approach based on the GA-Transformer model, which combines Transformer model for stock prediction with genetic algorithm (GA) for feature selection. The experimental results demonstrate that in six stock datasets, including China Construction Bank and Kweichow Moutai, the GA-Transformer model beats the traditional stock prediction model [3]. Huang, Yang and Liu conduct a multimodal quantitative investigation of the inclination for emotion in online financial news. A stock price LSTM prediction model incorporating multidimensional emotional aspects and stock trading features is developed. The convolutional neural network is introduced to extract multidimensional emotional features according to news categories. The stock prediction models with and without multi-dimensional affective qualities are then compared using Kweichow Moutai and Vanke A as empirical objects. According to the findings, adding

multidimensional emotion quantification characteristics based on financial news and incorporating stock trading elements can greatly increase the accuracy of stock prediction[4]. In Li's study, the stock price time series are fitted using the random forest, GBDT method, neural network, SVM, and other models. The impact of the final model is determined and shown through analysis of the entire pre-processing, fitting, verification, and parameter adjustment processes of Shanghai A-share Kweichow Moutai. The experimental findings demonstrate that utilizing a gradient lifting random tree (GBDT), the prediction error of stock price fitting is kept to a minimum. The GBDT algorithm is more stable and reliable in this paper's stock price prediction job when compared to random forest and neural network models [5]. To anticipate the stock price of Kweichow Moutai, a genetic BP network-based stock market prediction system model was developed. The simulation results demonstrate that compared to the general BP neural network model, the BP neural network model modified by genetic algorithm can significantly lower the average error of computation and prediction. Because of its great accuracy and practical utility, it is useful for tackling nonlinear issues like stock market prediction[6]. In order to uncover the relationship between financial data and stock price, a paper uses the DuPont analysis method to examine the financial report data for the Kweichow Moutai Company. It then compares the results with the company's stock price and makes a straightforward forecast of the stock price's future trend[7]. The step-up regression model and BP neural network based on the previous day's daily opening price, daily maximum price, daily minimum price, daily closing price, daily number of trading shares, and daily trading amount of stocks as explanatory variables and input layer, and the day's daily opening price as explained variables and output layer, were constructed using the methods of step-up regression and BP neural network, The model forecasts Kweichow Moutai and Vanke stock prices, respectively [8]. Li employs factor analysis to enhance the multiple linear regression technique currently in use to predict the stock price of Kweichow Moutai. Finally, a stock price prediction model appropriate for this stock is implemented by comparing the forecasting impact[9]. Based on the closing price data of Kweichow Moutai stock from 2016 to 2017, the ARMI-GARCH model was established to analyze the complex interaction relationship between the medium and long-term trend and random fluctuations in the theory of time series analysis[10]. Chen et al. compares the conventional one-dimensional convolutional neural network (CNN), Support vector machine regression (SVR), and partial least squares regression (PLS), and find the best model prediction results were obtained by WA-CNN when compared to the aforementioned comparative techniques. The experimental findings further demonstrate that, compared to the conventional CNN, WA-CNN has a faster and steadier rate of convergence for both the training set and the test set loss function. Wa-cn N outperformed the three comparative approaches in model prediction outcomes for training samples that ranged from 20% to 80% of the total[11].

On the basis of the previous research, this paper Using SVR and CNN model to study Moutai stock, this research can not only enrich the existing literature on Moutai stock price prediction in theory, also for investors to understand the value of MOUTAI investment and forecast its stock price provides methodological guidance.

2. Data and Method

2.1. Data

The indicator description is Change Pct-chg Vol Amount Open. The specific indicator and definitions are shown in table 1. The data is available from 2010 to August 2023. The data is from the https://www.tushare.pro/.

As shown in figure 1, there is an increasing trend in the historical closing prices of moutai, the closing prices rising from 100 to 2500 between 2010 and 2021. Despite the closing price's ongoing volatility, there is still a slight upward trend. The rise and fall also grew along with the expansion in trading volume. In addition, at the end of 2015, Kweichow Moutai stock turnover reached a high point before declining. The highest and lowest stock prices increased from 2010 to 2021 after which there was a declining trend with lingering variations.

Table 1. Description of indicators

Indicator	Definition
Change	used to measure the percentage change in price between a price level pertaining to a specific time in the past and the current price of a stock.
Pct-chg	measures the increase or decrease in a value or quantity over time
Vol	the total number of shares of a stock that changed hands during a trading day
Amount	a number of shares of Class A Common Stock that is equal to the Exchange Rate.
Open	the price at which a security first trades upon the opening of an exchange on a trading day

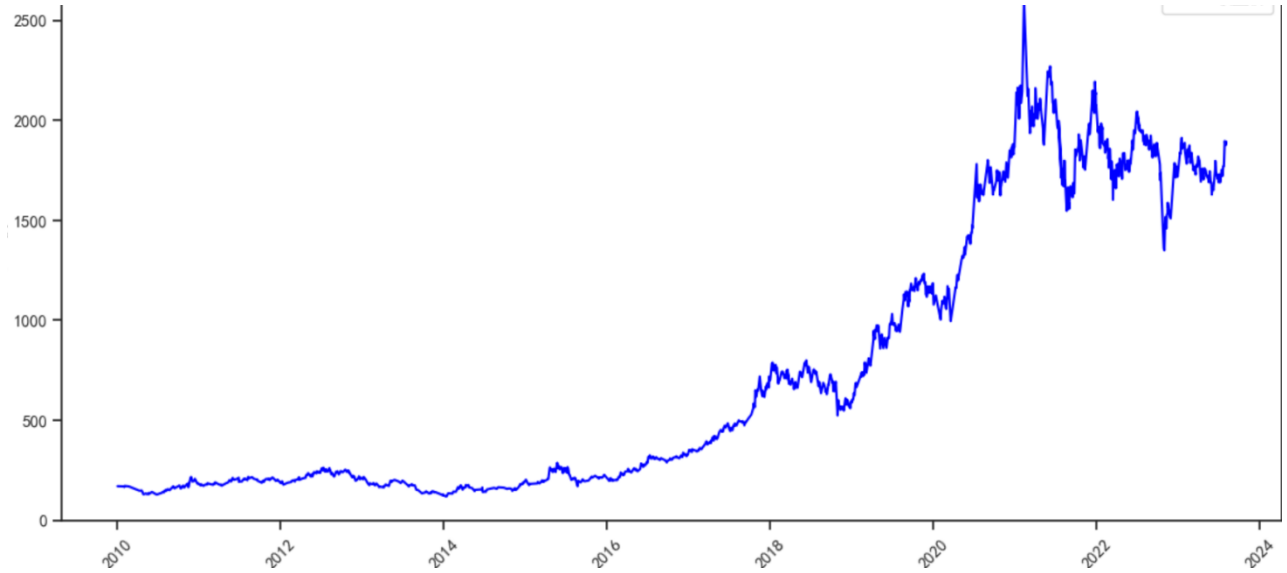


Fig. 1 historical closing prices of moutai

2.2. Method

2.2.1 CNN

A novel fault diagnosis strategy based on Convolutional Neural Network (CNN) was proposed to resolve the Convolutional Neural Network issues of rolling bearing in wind turbine in order to address the issues of weak fault feature, challenging extraction, and low diagnosis efficiency. To mine the deep characteristics of the signal, a convolution layer is introduced before the fully connected layer in the revised CNN model. Additionally, the objective function is changed to include a new L 2 regular term. The Stochastic Gradient Descent network is trained using the batch normalization of convolutional layer data and the Stochastic Gradient Descent with Momentum (SGDM) algorithm in order to increase training speed. An optimization is provided. The super-parameters of the enhanced CNN model are optimized using the Bayesian approach. The flow of the CNN Grid search method based on Bayesian optimization is provided, along with detailed introductions to the upgraded CNN model and the operation concept of the algorithm. Finally, utilizing information from the Case Western Reserve University bearing database, the algorithm's performance is evaluated. It has been demonstrated that the Grid search CNN model has a high diagnostic rate and great generalization capabilities [12].

2.2.2 SVR

Support Vector Regression (SVR) is a machine learning technique that primarily addresses regression issues. It is based on statistical learning theory. Realizing the advantage of the SVM algorithm is predicated on selecting the appropriate parameters, but this is still a challenging task in reality. A heuristic that imitates the social behavior of wild creatures is the swarm intelligence algorithm. It is straightforward, adaptable, and versatile, and it has emerged as a popular area for

nonlinear parameter optimization study. This article analyzes the progress in swarm intelligence-based support vector regression machine parameter optimization research. The system is partitioned after teaching the fundamentals of the support vector regression machine [13].

3. Results and Discussion

In this paper, two methods of CNN and SVR are used to forecast stocks, and the results are shown in the figure 2. Blue line is the actual value, red line is CNN forecast result, Green line is the SVR forecast result. The prediction results of these two methods are further compared. The difference in accuracy between the methods shows that SVR model are more accurate than the CNN model.

According to the forecast, the closing price will continue to fluctuate but there is still a small upward trend. With the increase of trading volume, the rise and fall also continued to increase. Kweichow Moutai stock turnover peaked at the end of 2015 and then decreased. From 2010 to 2021, the highest and lowest stock prices continued to rise, and then there was a downward trend but continued fluctuations.

The stock price is still affected by other factors such as political economy, so the forecast result may not be very accurate, and can not be used as a basis for buying and selling stocks.

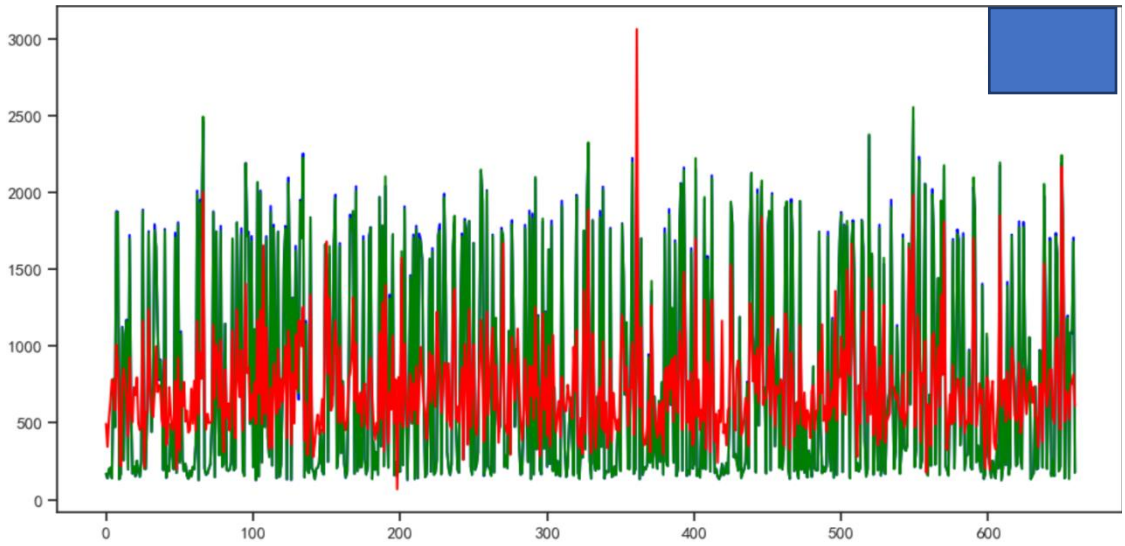


Fig. 2 Closing price prediction fitting curve

However, there are several factors influence the prediction accuracy of the models. First of all, the policy is a big reason. Alcohol is not particularly good for anyone. The government might make a policy to control the production of wine that the Kweichow Moutai stock still have the persistent fluctuation even decreasing. Secondly, with the development of wine ,more and more product about wine take place. With the substitutes appear, like Fenjiu wine from Shanxi ,the Kweichow moutai stock still be influenced .This is the economy effect .

4. Conclusion

In this paper, two methods of CNN and SVR are used to forecast stocks, and the key findings are the closing price will continue to fluctuate but there is still a small upward trend. Furthermore, the SVR model is more precise than the CNN model. It is recommended that investors buy the Moutai stock.

This paper provides empirical evidence on how the two prediction models perform. And the research conclusion of this paper has a basic forecast of the future trend of Moutai stock and can be used as a reference for investors' investment decisions.

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