ICEST-2K24 [International Conference on Engineering, Science and Technology]
In Association with
International Journal of Scientific Research in Science, Engineering and Technology
Print ISSN - 2395-1990 | Online ISSN : 2394-4099 (www.ijsrset.com)

Stock Market Analysis and Prediction Using Python

Mahesh M. Zade, Shraddha M. Borate, Akshada N. Kawade
Assistant Professor, E & TC Engineering Department, S. B. Patil College of Engineering, Indapur, Maharashtra, India

ABSTRACT
It is imperative to perform stock research and forecast before to engaging in any trading activity on the stock market. Because of the complexity of data and the financial market environment, this task is extremely difficult. With the introduction of new deep learning and machine learning technologies. It is more accurate and simpler to analyze long-term trends and substantial amounts of previously created historical data. For tasks like stock market analysis and prediction in Python utilizing the LSMT and Logistic Regression technique, this paper offers a machine learning and deep learning-based perspective and methodology.
The approach can be utilized by investors, financial analysts, and researchers to evaluate and predict stock market movements, and overall, this work makes a significant contribution to the field of stock market analysis and prediction.
Keywords: Logistic Regression, machine learning, deep learning, LSMT and LR algorithm, financial analysts.

I. INTRODUCTION

Accurately analysing and forecasting the behaviour of the stock market is difficult because it is inherently complicated and unpredictable. However, deep learning algorithms have advanced to the point that it is now able to evaluate enormous amounts of historical data and forecast future patterns with high accuracy. In numerous areas, including stock market research and prediction, deep learning approaches like neural networks have demonstrated encouraging outcomes. The Python LSMT and Logistic Regression technique is a widely used tool for creating deep learning-based algorithms, which makes it a perfect option for trend analysis and prediction in the stock market.
The financial industry has been paying a lot of attention to deep learning techniques lately because of their capacity to make precise predictions about market patterns and stock prices. These methods can uncover underlying patterns and correlations that conventional statistical models might miss by analysing vast amounts of historical data, including technical indicators and news sentiment analysis.
The suggested method entails preprocessing the historical data and applying the Logistic Regression and LSMT algorithms to train a neural network. To discover the underlying patterns and relationships, the model is trained using a vast dataset of historical stock market data and sentiment analysis from news sources. The trained model is then applied to stock market analysis and future stock price prediction.
The outcomes show that the suggested strategy works better than the conventional statistical and machine learning models, obtaining greater accuracy and better prediction performance. Insights into the fundamental

patterns and trends in the stock market are also provided by the suggested method, enabling investors to make wise choices.

II. LITERATURE REVIEW

Numerous research on the analysis and prediction of the stock market have been carried out throughout the years utilizing a variety of methodologies, including statistical models, machine learning algorithms, and deep learning techniques. An overview of the fundamentals of analysis and prediction in the stock market field is provided in this article.

The LSTM is a kind of RNN, or recurrent neural network that is particularly good at identifying long-term patterns and sequential dependencies in time series data. It's a good fit for evaluating stock market data because of its long-term processing and memory capacity. The memory cells that make up LSTM networks are able to selectively remember or forget information by maintaining a cell state. LSTMs can utilize trends in previous stock prices and trade volumes and grasp temporal dependencies thanks to this design. For binary classification problems, the traditional statistical method known as logistic regression is employed. Treating stock prediction as a classification problem has allowed it to be successfully used, even though it may appear less sophisticated than deep learning models like LSTMs. Given this, the algorithm aims to forecast.

Deep learning methods have drawn a lot of interest recently in the research and forecasting of stock market movements. One kind of deep learning technology that has demonstrated promising results in capturing the intricate patterns and nonlinear correlations found in stock market data is neural networks.

For stock prediction, the LSTM and Logistic Regression algorithms have unique benefits and drawbacks. Because LSTMs are excellent at learning intricate patterns and understanding temporal connections, they are a good fit for evaluating historical stock data. Conversely, Logistic Regression offers interpretability, computing economy, and simplicity, which makes it a desirable option for limited training and linear relationships.

As a whole, the analysis and prediction of the stock market using deep learning methods like neural networks has demonstrated encouraging outcomes. Building on these earlier works, the suggested method in this paper uses a deep learning-based strategy for stock market analysis and prediction that uses Python LSMT and the Logistic Regression algorithm.

III.PROPOSED WORK

Creating a deep learning-based strategy for stock market analysis and forecasting is the goal of the proposed effort.

- Preprocessing the data: The first stage involves preprocessing the news sentiment analysis and historical stock market data. This includes ensuring that the data is clean, free of outliers, and normalized so that the neural network can learn efficiently.
- Neural network architecture: Creating the neural network architecture is the second stage. A multilayer feed forward neural network will be used in the suggested method. Through experimentation, the number of layers and neurons in each layer will be ascertained.
- Model training: Using the preprocessed data, the neural network is trained in the third stage. To reduce the prediction error, the neural network's weights and biases will be adjusted during the training process. Adam will be the optimizer utilized in the back propagation algorithm-based training procedure.

- Prediction: Utilizing the trained neural network, the last stage involves stock market analysis and future stock price prediction. Metrics like mean absolute error (MAE) and mean squared error (MSE) will be used to assess the prediction performance.

The proposed work will be evaluated using real-world datasets from the stock market. The datasets will include historical stock market data and news sentiment analysis data.

The purpose of the proposed effort is to offer precise forecasts of future stock values as well as insights into the underlying patterns and trends in the stock market. Financial experts and investors alike can utilize the suggested method to make well-informed investment choices. It can also be applied as a stock market risk management tool.

The work that is being suggested is creating a deep learning method for stock market analysis and prediction that utilizes the Python LSMT and Logistic Regression methodology. The procedure entails preprocessing the data, creating the neural network architecture, training the model, and making predictions.

The suggested research will be assessed with real-world datasets and contrasted with machine learning algorithms and conventional statistical models. In addition to being useful for risk management and investing decision-making, the suggested method can offer insights into the underlying trends and patterns in the stock market.

IV. RESULT

Predicting future stock values using historical data is known as stock prediction. Stock prediction can be done using a variety of different algorithms. LR (Linear Regression) and LSTM (Long Short-Term Memory) are two of the most used algorithms.

Recurrent neural networks, such as LSTM, are excellent for handling time series data. Even with gaps in the data, it can be trained to forecast future values based on historical values. In addition, LR is a less complex method that forecasts future values by assuming a linear relationship between historical data and projected values.

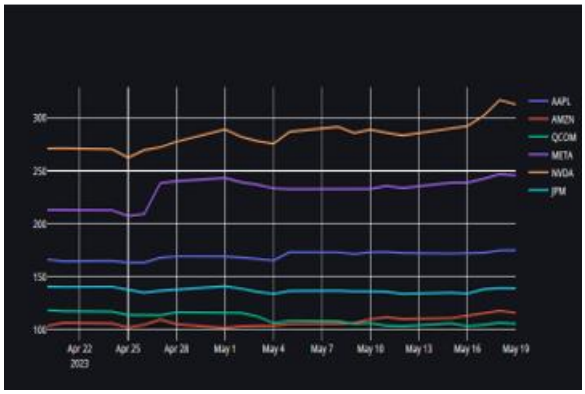

Figure1:

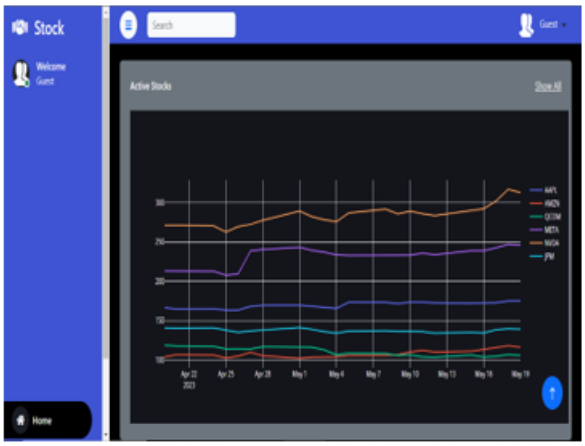

Figure 2:

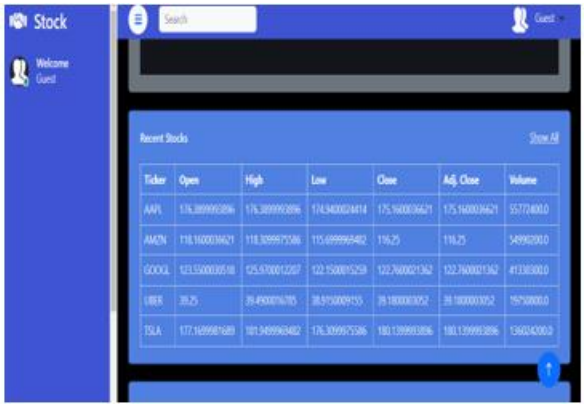

Figure3: A sample line graph using

The LSTM and LR algorithms will be used in this research to forecast the stock price of a certain stock. To train the models, historical data will be used. Initially, the LSTM model will be trained. Stock price data will be used to train the LSTM model sequentially. The stock price for the following day will then be predicted by the algorithm.

After that, we'll train the LR model. A dataset of stock prices and the closing prices that correspond to them will be used to train the LR model. After that, the model will be utilized to forecast the closing price for the following day.

According to the project's findings, stock prices can be somewhat accurately predicted using the LSTM and LR algorithms. But further study is required to raise the stock prediction models' level of accuracy. Creating new algorithms or utilizing more advanced data analysis methods may be the main goals of this study.

V. CONCLUSION

In this research, we have introduced a deep learning-based method for stock market analysis and prediction that uses the logistic regression algorithm and Python LSMT. Preparing the data, creating the neural network architecture, training the model, and making predictions were all involved. Real-world datasets were used to assess the performance of the suggested method, and it was contrasted with machine learning algorithms and conventional statistical models.

Many investigations into the various facets of logistic regression have been conducted over time. These investigations have covered its theoretical underpinnings, algorithmic advancements, applications in other fields, and contrasts with alternative classification techniques. Key discoveries and developments in the field of logistic regression are to be distilled and synthesized in this overview of the literature.

The literature review concludes by showing that logistic regression is still a frequently studied and used technique in the classification domain. The research covered in this review shed light on the theoretical underpinnings, methodological developments, practical uses, and comparisons with alternative algorithms. Numerous fields, including sentiment analysis, medical diagnosis, and customer churn prediction, have shown the value of logistic regression. Logistic regression is a useful tool in many real-world circumstances because it is interpretable and practical, even though it may not be able to handle complex non-linear interactions. To attain even greater performance and interpretability, future research may investigate hybrid models that combine the advantages of logistic regression with other techniques.

In conclusion, the suggested strategy can be utilized to control risk and make informed investing decisions in addition to offering precise projections of future stock prices.

VI. FUTURE SCOPE

- Including external factors: We solely used historical stock market data and news sentiment research data in the suggested methodology. The neural network can train and become more accurate at making predictions by incorporating more external inputs, such as geopolitical events, sentiment on social media, and macroeconomic data.
- Investigating alternative deep learning architectures: For the analysis and prediction of the stock market in this work, we employed a feed forward neural network. Convolutional and recurrent neural networks are two other deep learning architectures that might be investigated for this purpose. These architectural designs might be more appropriate for simulating the geographical and temporal interdependence found in stock market data.
- Ensemble methods: Ensemble methods, such as bagging and boosting, can be used to combine multiple models to improve the prediction accuracy. In this approach, multiple neural networks can be trained with different initializations and training sets and their predictions can be combined to improve the overall prediction accuracy.
- Online learning: Since the suggested method uses batch learning, all of the data must be provided at once. Real-world situations, however, can see a constant influx of fresh data. The neural network parameters can be continuously updated as new data comes in using online learning techniques.

VII. REFERENCES

[1]. H. Isah, "Social Data Mining for Crime Intelligence: Contributions to Social Data. Quality Assessment and Prediction Methods," University of Bradford, 2017.

[2]. P. Wei and N. Wang, "Wikipedia and stock return: Wikipedia usage pattern helps to predict the individual stock movement," in Proceedings of the 25th International Conference Companion on World Wide Web, 2016, pp. 591-594: International World Wide Web Conferences Steering Committee.

[3]. E. Chong, C. Han, and F. C. Park, "Deep learning networks for stock market analysis and prediction: Methodology, data representations, and case studies," Expert Systems with Applications, vol. 83, pp. 187-205, 2017.

[4]. J. Zhang, S. Cui, Y. Xu, Q. Li, and T. Li, "A novel data-driven stock price trend prediction system," Expert Systems with Applications, vol. 97, pp. 60-69, 2018.

[5]. L. S. Malagrino, N. T. Roman, and A. M. Monteiro, "Forecasting stock market index daily direction: A Bayesia Network approach," Expert Systems with APplications, vol. 105, pp. 11-22, 2018.

[6]. M. B. Patel and S. R. Yalamalle, “Stock Price Prediction Using Artificial Neural Network” International Journal of Innovative Research in Science, Engineering and Technology, vol. 3, pp.13755- 13762, June 2014.

[7]. Jie Wang, Jun Wang, Wen Fang. Financial Time Series Prediction Using Elman Recurrent Random Neural Networks [J]. Computational Intelligence Neuroscience, 20162016(12):1-14.