Stock Market Prediction and Simulation Using Machine Learning

Shubham Bavaskar [1], Ajinkya Jadhav [2], Aditya Jadhav [3], Ameya Mahajani [4], Prof. Sonali Lunawat [5]

[1,2,3,4,5]*Computer Engineering, Pimpri Chinchwad College of Engineering and Research, Ravet, Pune University*

Abstract:

This paper states that the problem statement of stock price prediction based on most renowned algorithm. The prediction of stock market guidance may serve as a recommendation tool for short term investors and as an early financial risk handler tool for long term shareholders. Forecasting accuracy is the most important factor in selecting any forecasting methods. Research efforts in reducing the error factor of prediction models are increasing nowadays. The proper share selections those are suitable for investment is a very difficult task. The most important motive for each investor is to maximize their profits on their investments. In Stock Market Prediction and Simulation, the aim is to predict the future value of the financial stocks of a company and perform simulation for helping beginners. The stock market forecasting can be performed by training our prediction model using machine learning algorithms, stock market indicators and past values. In simulation system will help beginner by displaying and updating the predicted data with the help of graphics. Feature of artificial currency is also included in our system. With the help of artificial currency, beginners can try Stock Market without taking risk.

Keywords: Stock market, Price Trends, Stock Price Prediction, Machine Learning.

I. INTRODUCTION

In recent era stock market is in boom, and craze of stock market is emerging day to day in humans. In stock market a person trades stock, makes investment and earn their living or some profit when a particular company sell's a part of itself on this platform i.e. stock market. Stock market is a potential investment scheme if one has enough knowledge and does trading wisely. But as we all know the prices and liquidity of this platform is very variable or we can say is filled with ups and downs and to help us with this unpredictable platform, we make use of our technology. To predict such platform is a difficult task but, still can be predicted by careful analysis of historic datasets. This is where Machine Learning comes into picture. It is one of the easiest ways to do such kind of predictions. It predicts market values which are close enough to real values, which in turn increases accuracy. Researchers use machine learning for such predictions because of its efficiency and accuracy. Here dataset plays the most important role because even the slightest change in the dataset can perpetuate massive changes in the output of the prediction. Dataset has five attributes: open, close, low, high and volume. Low, high, open and close is the bid prices for the stock at different time intervals. Volume is the total number of stocks that are passed from one owner to another. The prediction model generated is then tested using the test data. Finally, the graphs for the prices with date of actual and predicted price are plotted using the model constructed.

II. LITERATURE SURVEY

1. Stock market prediction using machine learning techniques

Author: M. Usmani, S. H. Adil, K. Raza and S. S. A. Ali

Description:

In this paper author presents, prediction model uses various attributes as input and performance of different algorithms namely, Foreign Exchange rate, Simple Moving Average, Single Layer Perception, Multi-Layer Perception, etc. is compared separately. Multi-Layer Perception algorithm displays best performance against the rest

**2. REGRESSION TECHNIQUES FOR THE PREDICTION OF STOCK PRICE TREND**

Author: H.L Siew amd M.J. Nordin

Description:

In this paper author presents, the regression techniques can be used for prediction stock prices. Normal data-set including different data types are converted into standard ordinal data types which provide a basis for the regression techniques to process data.

III.   PROPOSED SYSTEM

Here we have proposed a well-organized system that predicts the future stock rate based on past various input. System works based on most rated and wisely used algorithm in market. Our system consists of two main modules. First includes the backend module which does the various permutations on input data set using algorithms and provides the output as the predicted value of stock. Second module generates the graph of predicted value and current stock price. The model utilizes the gradient descent linear regression algorithm for predicting correct values by minimizing the error function as given in Fig.1. Linear Regression as governed by the above equation is performed on the data and then the relevant predictions are made. The R-square confidence test was used to determine the confidence score and the predictions were plotted to show the results of the stock market prices vs. time.
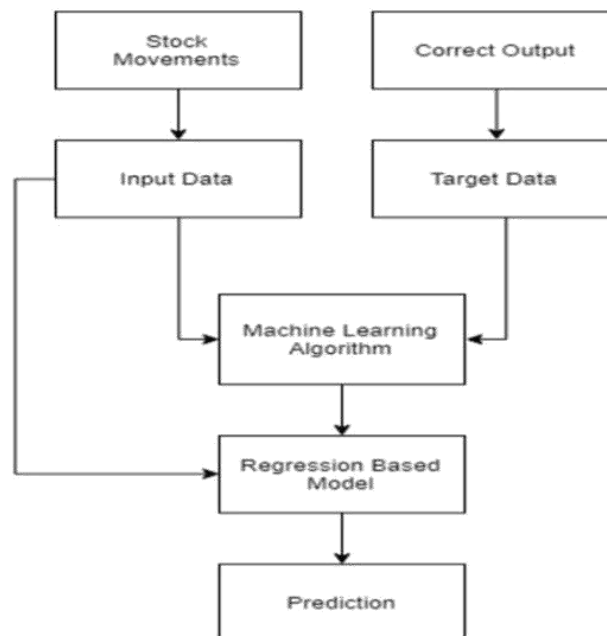

Fig 1.Flow Chart for Regression Based Model

Below is the algorithm used in our system.

1) *First algorithm used is: Long Short-Term Memory (LSTM) Architecture: -*

LSTM is that the advanced version of Recurrent-Neural Networks (RNN) where the data belonging to previous state persists. This means that the interval of knowledge is comparatively smaller than that to LSTM. Architecture of LSTM is composed of a cell which is known as memory part of LSTM unit and three regulators also known as gates which control flow of information inside LSTM unit: an input gate, an output gate and a forget gate. A cell is responsible for keeping track of dependencies between the elements in the input sequence.
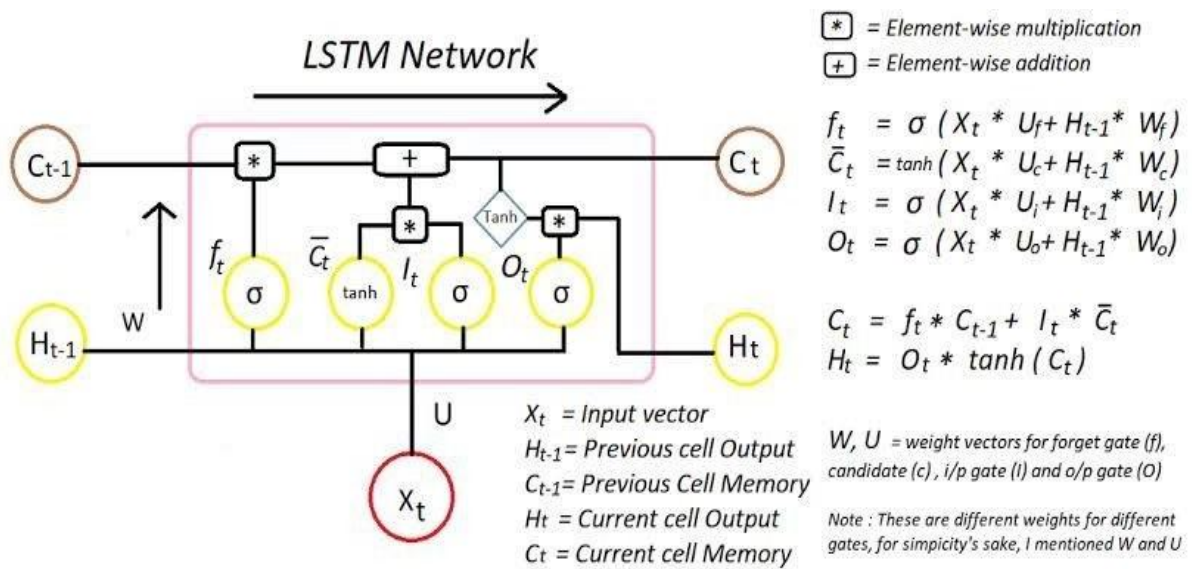
Fig. 2 Mathematical Model of LSTM Network

2) *Second Algorithm used is : Long Short-Term Memory (LSTM) Network Based Model*

The main purpose behind using this model available market prediction is that the predictions depends on large amounts of knowledge and are generally captivated with the long-term history of the market. So, LSTM controls error by giving a help to the RNNs through keeping information for older stages making the prediction more accurate than before. Thus, proving itself the maximum amount more reliable compared to other methods.

According to the architecture of proposed system the user will select the interested share. After the share is selected the daily graph of the stock price of the share will be displayed. Every day the graph will be displayed when the stock market opens. The system will update the graph after a certain time interval depending on the current trend of the market. The graph will be calculated in real time using certain indicators.

3) *Adam Optimizer:*

Optimizers are algorithms or methods used to change the attributes of neural network such a weights and learning rate in order to reduce loses which will affect building of machine learning model. Adam optimizer is used in building stock market prediction model. The Adam Optimizer is made from combining advantages of two other extensions of stochastic gradient descent specifically: AdaGrad and RMSProp. AdaGrad (Adaptive Gradient Algorithm) maintains the per-parameter learning rate that improves performance. RMSProp (Root Mean Square Propagation) also maintains per-parameter learning rate that are based on the average of recent magnitudes of gradient for the weight. Adam combines the benefits of both AdaGrad and RMSProp which helps in optimizing LSTM neural network

IV. APPLICATIONS

- For individual users.
- Commercial firms.
- Stock market Broker.

V. CONCLUSION

This paper was an attempt to determine the future prices of the stocks of a company with greater accuracy and reliability using machine learning techniques. Application of novel LSTM Model helps determining the stock prices. LSTM based model shows better accuracy of prediction and efficiency. Machine learning techniques can be used get results that are quite promising and has led to the conclusion that it is possible to predict stock market with more accuracy.

VI. REFERENCES

[1] M. Usmani, S. H. Adil, K. Raza and S. S. A. Ali, "Stock market prediction using machine learning techniques," 2016 3rd International Conference on Computer and Information Sciences (ICCOINS), Kuala Lumpur, 2016, pp. 322-327.

[2] K. Raza, "Prediction of Stock Market performance by using machine learning techniques," 2017 International Conference on Innovations in Electrical Engineering and Computational Technologies (ICIEECT), Karachi, 2017, pp. 1-1.

[3] H. Gunduz, Z. Cataltepe and Y. Yaslan, "Stock market direction prediction using deep neural networks," 2017 25th Signal Processing and Communications Applications Conference (SIU), Antalya, 2017, pp. 1-4.

[4] M. Billah, S. Waheed and A. Hanifa, "Stock market prediction using an improved training algorithm of neural network," 2016 2nd International Conference on Electrical, Computer & Telecommunication Engineering (ICECTE), Rajshahi, 2016, pp. 1-4.

[5] H. L. Siew and M. J. Nordin, "Regression techniques for the prediction of stock price trend," 2012 International Conference on Statistics in Science, Business and Engineering (ICSSBE), Langkawi, 2012, pp. 15.

[6] K. V. Sujatha and S. M. Sundaram, "Stock index prediction using regression and neural network models under non normal conditions," INTERACT-2010, Chennai, 2010, pp. 59-63.