ISSN 2395-1621



Stock Price Prediction Using LSTM on Indian share market

Nikhil Sawalkar, Aakash Kadam, Mohit Patil, Onkar Jadhav

nikhil99sawalkar@gmail.com

Department information Technology

Dy Patil College of Engineering, Ambi, Pune.

ABSTRACT

Stock market prediction is one of the most difficult tasks in the field of accounting. There are many factors involved in forecasting - physical factors against behavior, rational and irrational, investor sentiments, market rumors. All these factors include making stock prices more flexible and making it more difficult to predict with a high degree of accuracy. We are investigating data analysis as a game changer for this domain. As with effective market theory where all company-related information and stock market events are readily available to all market participants / investors, then the results of those events are already embedded in the stock price. Therefore, it is said that only the price of a historical site holds the impact of all other market events and can be hired to predict its future movement. Therefore, we consider past stock prices as the final expression of all influential factors using Machine Learning (ML) techniques in historical stock price data to consider future trends. ML techniques have the ability to detect patterns and details that we have not seen before, and these can be used to make accurate predictions. We propose a framework that uses the LSTM (Long-Term Memory) model and an algorithm to calculate corporate growth to analyze and predict future corporate growth.

Keywords: LSTM, CNN, ML, DL, Trade Open, Trade Close, Trade Low, Trade High

I. INTRODUCTION

Data analysis have been used in all business for data-driven decision making. In share market, there are many factors that drive the share price, and the pattern of the change of price is not regular. This is why it is tough to take a robust decision on future price. Artificial Neural Network (ANN) has the capability to learn from the past data and make the decision over future. Deep learning networks such as Convolutional Neural Network (CNN), Recurrent Neural Network (RNN) etc. works great with multivariate time series data. We train our model from the past stock data and calculate the future price of that stock. This future price use to calculate the future growth of a company. Moreover, we found a future growth curve from different companies. Thus, we can analyze and investigate the similarity of one company's future curve over another. Stock price of a listed company in a stock exchange varies every time an order is placed for sell or buy and a transaction completes. An exchange collects all sell bids with expected price per stock (normally it is more than the price paid while bought by the

investor) and all buy bids with or without a price limit (normally an investor expects the future price of the stock will be more than the current price he is paying now) and a buy- sell transaction is committed when both bids have a match i.e. selling bid price is same with buying bid price of some buy-bid Fama in 1970 [1] proposed efficient market hypothesis which says that in an efficient market (where all events are known to all stakeholders as an when it happens) the effect all market events are already incorporated in stock prices hence it is not possible to predict using past events or prices.

The stock price of a company depends on many intrinsic as well as extrinsic attributes. Macro-economic conditions too play an important role in growth or decline of a sector as a whole. Some of the intrinsic factors could be company's net profit, liabilities, demand stability, competition in market, technically advanced assembly line, surplus cash for adverse situations, stakes in raw material supplier and finished product distributors etc. Those factors that are beyond the control of the company such as crude oil price,

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ARTICLE INFO

Article History

Received: 10th May 2022 Received in revised form : 10th May 2022 Accepted : 13th May 2022 **Published online :** 14th May 2022 www.ierjournal.org

dollar exchange rate, political stability, government policy decision etc. come under extrinsic attribute. Many researchers have tried using the historical stock prices as the basis for time series analysis to forecast future stock prices. Many different statistical models were applied since long like moving average (MA), autoregression (AR), weighted moving average, ARIMA, CARIMA etc. Later some non linear models were also tried like GARCH. Recently different neural network models, evolutionary algorithms were being applied for stock prediction with success. Deep neural networks like CNN, RNN are also used with different parameter settings and features. In this paper we shall explore a special type of RNN known as LSTM to predict future company growth based on past stock prices.

II. PROBLEM STATEMENT

The stock market appears in the news every day. You hear about it every time it reaches a new high or a new low. The rate of investment and business opportunities in the Stock market can increase if an efficient algorithm could be devised to predict the short-term price of an individual stock. Previous methods of stock predictions involve the use of Artificial Neural Networks and Convolution Neural Networks which has an error loss at an average of 20%.

In this report, we will see if there is a possibility of devising a model using Recurrent Neural Network which will predict stock price with a less percentage of error. And if the answer turns to be YES, we will also see how reliable and efficient this model will be.

III. LITERATURE SURVEY

Stock price prediction can be predicted using AI and machine learning models in machine learning fields. Using the SVM model for stock price prediction. SVM is one of the machine learning algorithms which works on classification algorithms. It is used to get a new text as an output. Applying Multiple Linear Regression with Interactions to predict the trend in stock prices which is used to predict stock prices, said that the stock values are changes random and the past price values are not dependent on current values. EMH is different from the Random walk hypothesis but the EMH works mainly on Short term patterns for predicting stock prices.

Manh Ha Duong Boris's Siliverstovs, search the abstraction between equity prices and combined finances in Key Eu nations like UK and Germany. Acceleration in Eu nations investments is apt to results successful even Stronger correlation between the different Eu nations and equity prices. This operation may also lead to a merge in financial development between EU nations, if advancements in stock markets affect real financial instruments, such as investing and Consuming. Tests the weak-form market efficiency of CIVETS over the period 2002-2012. The random walk hypothesis process is used in CIVETS. In an efficient stock market, the equity values must follow a random walk hypothesis, when it comes to the future price, the values are changing randomly and unpredictable. Everyday returns for rising and improved markets have been tested for random walks.

LSTM algorithm consists of a Recurrent Neural network to encode data. The algorithm inputs are economic news headings infusion From Bloomberg and Reuters. Long Short- term Memory with embedded layer and the LSTM with the automatic encoder in the stock market for predicting stock values. The Xiongwen Pang et al [4]. Used an automatic encoder and embedded layer to vectorizing the values by using LSTM layers. Correlation coefficients in stocks are selected randomly and predicted using ARIMA and the neural network approach. In this RNN and LSTM algorithms are implemented.

Recently, Pranab Bhat, 2020 used convolution neural networks for predicting stock values, in this model learning is finished by computing the mean square blunder for each consequent perception and a model is picked that has the least mistake and high prescient power. In this paper, they are utilizing CNN for anticipating stocks and incentives for the following day. Mohammad Mekayel Anik et al, 2020, implemented a linear regression algorithm for future stock price prediction. In this they achieved their goals in predicting accuracy of the model is very good and it might be used for predicting stock values.

The LMS filter is a type of adaptive filter which is used for solving linear problems. The idea of the filter is to find the filter coefficients and to minimize a system by reducing the least mean square of the error value. They used a hybrid model for predicting the stock values by using deep learning and ML methodologies and they built a model using deep regression based on CNN. Here they used CNN for parameters, thereby increase the no of loops will stabilize the validation loss. They also tested using DL and a hybrid ML algorithm for stock price prediction.

Vivek Rajput and Sarika Bobde used sentiment analysis from online posts or multimedia and data mining is used. In sentiment analysis, they are trying to get emotion either positive or negative based on the textual information available on social networks. sentiment analysis for predicting the stock market to get more accurate and efficient results.





Description:

Data Selection: The first step is to select data for an organization and split the data into training and testing. we have used 75% for training and 25% for testing purposes.

Pre-processing of data: In pre-processing, we are selecting attributes required for the algorithm and the remaining attributes are neglected. The selected attributes are Trade Open, Trade High, Trade Low, Trade Close, Trade Volume. In pre-processing, we are using normalization to get values in a particular range.

Prediction using LSTM: In this system, we are using the LSTM algorithm for predicting stock values. Initially, the training data is passed through the system and train the model. Then in the testing phase, the predicted values are compared with the actual values.

Evaluation: In the evaluation phase we are calculating the Accuracy, Mean Square Error(MSE) and Root Mean Square Error (RMSE) values for comparison.



V. RESULT

Fig 2. Google Graph

epochs	Accuracy	MSE	RMSE
10	93.00717	207.6578	14.41034
20	94.01166	156.3873	12.50549
30	95.64188	105.3248	10.26279
40	95.59026	99.17409	9.958619
50	96.99466	62.24641	7.88964

Table 1. Google Epochs

In the results, as we have shown in Fig 2, the graph shows Trade Close value for the Google dataset. In this graph, blue line indicates the training data and the yellow colour shown is the predicted values from the test data. Table 1 shows the accuracy, MSE and RMSE values for no of iterations (epochs).



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epochs	Accuracy	MSE	RMSE
10	96.25328	4839.5690	69.56701
20	97.63884	2653.1278	51.50852
30	98.19937	1650.3337	40.62430
40	98.13571	1616.9295	40.21106
50	98.37254	1361.8098	36.90270

Table 2. Reliance Epochs

Above graph Fig 3 shows Trade Close value for the Reliance dataset and table 2 shows the MSE, RMSE and accuracy values for the Reliance dataset.

VI. CONCLUSION

In this paper, we analyze the growth of companies in different sectors and try to find out what is the best time to predict the future price of the stock. Therefore, it is an important conclusion that companies in a particular sector have the same dependency as well as the same growth rate. The prediction may be more accurate if the model trains with many data sets.

Moreover, in the case of different stock forecasts, there may be little scope for specific business analysis. We can study different patterns of stock prices in different regions and analyze graphs with more different time periods to better tune the accuracy. This framework helps extensively in market analysis and forecasting the growth of different companies over different time periods. Incorporating other parameters (e.g. investor sentiment, election results, geopolitical stability) that are not directly related to the closing price may improve the accuracy of the forecast.

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