



# INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

## Deep Learning Based Model to Forecast the Direction of Stock Exchange Market Using Social Media

Dhyeyaja Sanjay Petkar  
Computer Technology  
Bharati Vidyapeeth's Jawaharlal  
Nehru Institute of Technology  
(Poly), Pune.

Janhavi Sunil Kongari  
Computer Technology  
Bharati Vidyapeeth's Jawaharlal  
Nehru Institute of Technology  
(Poly), Pune.  
Pune, India.

Pranav Ashok Shinde  
Computer Technology  
Bharati Vidyapeeth's Jawaharlal  
Nehru Institute of Technology  
(Poly), Pune.  
Pune, India.

Prof. Suparna Shirish Naik  
Professor, Department of Computer Technology, Bharati Vidyapeeth's Jawaharlal Nehru Institute of Technology,  
Pune, Maharashtra, India.

**Abstract**— A company's stock exchange price isn't just a measure of the present worth of the value of its shares, but an index of its anticipated unborn performance as well. The company is an incorporated organisation with the Regulatory Body and shares trading members are registered with SEBI. Given that stock request statistics are extremely time-specific and generally nonlinear in nature, it's veritably delicate to read unborn stock values. The cast offers details about the present state of the inflow of force values. This will also be used to decide whether to buy or vend the individual shares of the particular stock for consumers. numerous scientists were conducted with different data mining ways to read stock request prices. This paper attempts to read the stock price of companies in the public stock exchange indicator LIX15 using Neural Network technology. For designing and training the models, the once data of the chosen stock will be used. To corroborate the thickness of the model, the goods of the model are used for comparison with factual data.

**Index Terms**—Deep Learning, Recurrent neural network, stock market, prediction.

### I. INTRODUCTION

Over the course of time, one will note that mankind has wanted to eliminate the suffering from his life [1]. The presumption in society is that making more money brings security and luxury, so it is reasonable that there has been a lot of focus paid to trying to predicting the stock rates. Various strategies, hypotheses, and metrics, all with their own properties, have been attempted with differing degrees of effectiveness. Although it was attempted using a number of methods, no one was successful in solving the problem. The field of artificial intelligence researchers and investors alike are expecting that neural networks will help them figure out the underlying principles of consumer behaviour. A stock market is a public venue where shares of stock and derivative securities are exchanged at a given price. This is the type of market in which securities listed on a stock exchange can still trade. The corporation has a governing authority whose shares are traded on the stock exchange [3][4].

It is often referred to as the secondary market because it takes place between two participants and influences the primary market[6]. The Financial Exchange puts the two disparate people together to trade in their securities. Pricing in the stock market is determined by supply and demand. When stocks that are popular fall out of favour rise in price, on the market, but stocks that are being dumped on the market will decrease. Listed companies are described as any organisation that has publicly-filed shares that are traded on the stock exchange. Investors like to make the most money by buying and selling when their shares are at a point when they are both at their maximum. It is, however, very difficult to correctly forecast the future price of a commodity using stock market statistics, which are usually non-time invariant and subject to chaotic, nonlinear trends. Stock market data has grown rapidly connects people from around the globe and has become a challenge to use as a forecasting tool because of the changing technologies of finance and globalisation [7][8].

## A. MOTIVATION

Investors look to profit from equity portfolios by purchasing and selling their holdings at the opportune moment of maximum or minimum potential profit. Unlike traditional, physical statistics, the future price of a stock can be difficult to forecast using stock market information since the stock market is extremely variable and nonlinear. The rapid growth in economic globalisation and the international markets, and emerging information technology are all resulting in new ways to expand the reach of our research[9].

## B. OBJECTIVES

- To build prediction model for the companies listed under LIX15 index of NSE using multilayer perceptron (MLP) Neural Network technique.
- To compare the model with real data for its accuracy. to increase accuracy using deep learning.

## C. PROBLEM STATEMENT

Data related to the stock market fluctuations are incredibly variable, and thus not particularly well suited for long-term forecasting. The result is that users would need to make their short-term decisions based on information obtained in the present in order to expedite transactions in the most efficient manner possible.

## D. SCOPE

- Stock market includes daily activities like sensex calculation, exchange of shares.
- Our prediction system will be useful for new investors to invest in stock market based on the various factors like's stock details and stock prediction.
- Our software will perform very important task into the stock market based on the company's stock values and gives the better prediction result to the investors.

## II. LITERATURE SURVEY

DarmadiKomo et al. algorithmic models to get and price estimates, respectively, each trained on separate sets of data were applied and used the radial basis function (RBF) and multilayer perceptron (MLP) In these tests, actual data from Wall Street Journal (Dow Jones Industrial Average) were used as a reference. The models' proposed Dow Jones index gained a notable level of accuracy, generating index funds that tracked over 80% of the average return on each month. In reality, the results show that the RBF network is much superior to the MLP network.

D. VenugopalSetty et al. There was an in-depth study of the effectiveness of the different approaches of data mining for business results. This is provided for more details on the basics of the Indian stock market, such as how important data mining is to the field of prediction, and other relevant data mining techniques are detailed in the article. In other words, there is an increasing distance between stronger storage and more efficient retrieval systems. There is a whole new order of discovery which should be put in place to use to enhance end-user information layout and resolution that would be necessary.

Dase R.K. et al. expanded his expertise by conducting a literature review on the use of neural networks for stock prediction They found that the results of their investigation showed that with time series analysis it was not possible to reliably predict indexes, however it seems that an artificial neural network may be sufficient for this purpose. Neural networks are capable of using an impressive amount of knowledge from vast amounts of data. Based on the previous research, they find that an Artificial Network model of the market is effective in forecasting the world's financial markets. They argued, with evidence that this is a novel area of application for Artificial Neural Networks and that there are strong expectations for their application in accurate stock market index analysis.

Akhter Mohiudd et al., In his study, he used a neural network-based approach to forecasting stock price fluctuations. a neural network was employed to allow an estimation of possible stock returns a variety of different approaches have been used to test the potential of the indicator to deliver incorrect results In actual, controlled experiments, real data from the National Stock Exchange of India (NSE) was used to test the accuracy of this process This data, from the 02/started up on 2nd January, 2007 to the 03rd March 2010: TCS, Wipro, Axis Bank, Maruth and Tata Steel. Neural PERSISTEMBLE was in his opinion did not meet the norm but he also advanced new neural system design and training strategies to minimise the error in potential predictions.

D. Ashok kumar et al. General ideas about time series were addressed, a need for market indexes, the implications of applying an ANN to time series, and a review of previous work was conducted to explore models using neural networks for time series forecasting. NIFICS performs between the stock market index (MIDCAP) and neural network market model (BSE). In the results, the finding shows that the score is somewhat above average. According to the outcome of their research, the best performance is obtained with an optimum weighting factor of 0.28, with a momentum of 0.5, and a best epoch of 2960. The model achieved a lower-than-predicted fit in the industry, and could be applied to any kind of stock results.

AdityaNawani et al. The comparison of data mining techniques and market forecasting methods can be explored to use in developing a trading firm’s market capitalization models. their thesis investigates how neural networks are employed along with the Graphical User Interface for the MATLAB Graphical Digital Toolbox to achieve findings that are trustworthy. When the qualified method is applied, it can be used to make forecasts about the parameters involved in the supply and demand in a given sector.

### III. PROPOSED SYSTEM

At first stage, a detailed literature study would be conducted on the stock prediction algorithm and data classification methods; and to know their advantages and disadvantages. Literature study will lead us towards refining the structure of the proposed security solution design to overcome the shortcomings of the existing schemes, while keeping their advantages interact in order to build a robust system. Afterwards, the proposed solution will be implemented with all essential input and output parameters. Then the implementation will undergo a thorough performance analysis and detailed comparison with the existing models.

#### A. Architecture

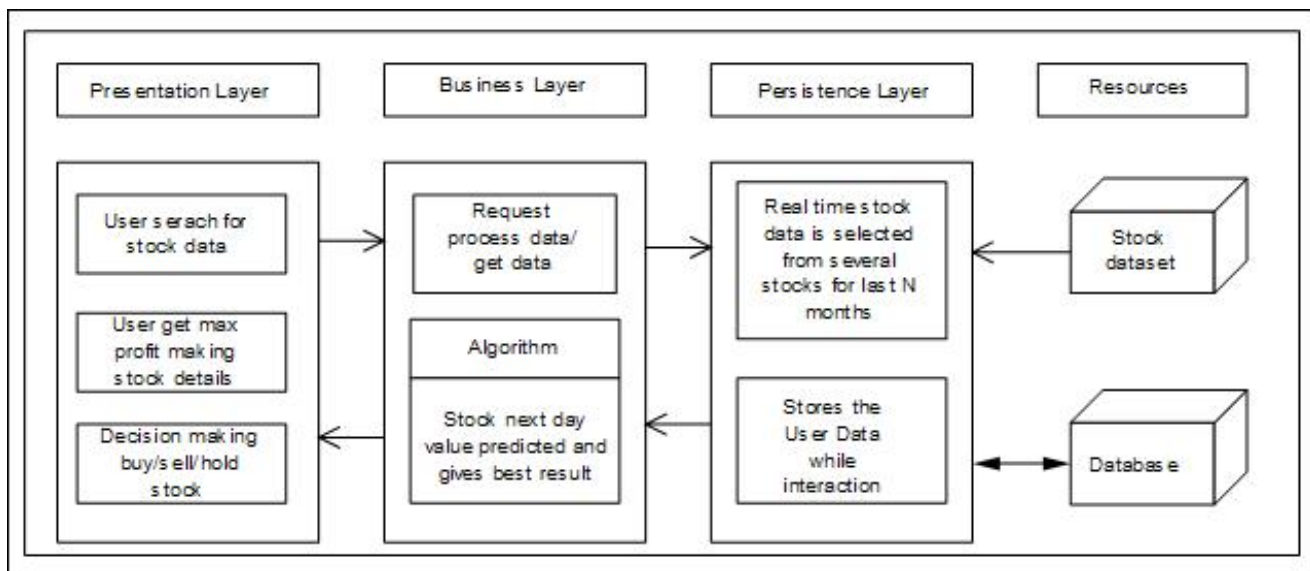


Fig. 1. Proposed System Architecture

#### B. Algorithm

##### Recurrent Neural Network(RNN)

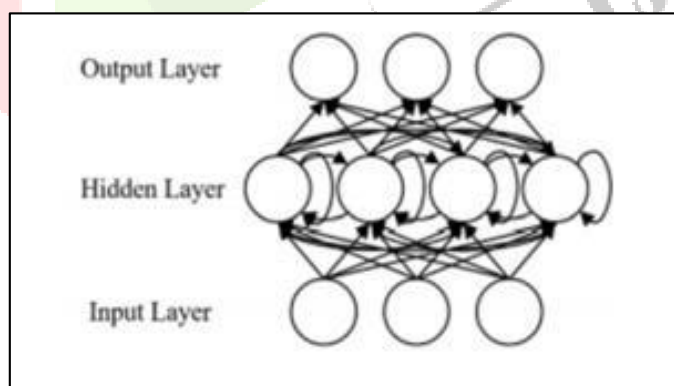


Fig. 2. Recurrent Neural Network

As shown in Fig. , for a RNN, let our input  $x$  be a sequence whose length is  $T$ ,  $x = x_1, x_2, \dots, x_T$ , and each item  $x_t$  is a feature vector. At time step  $t$ , given the previous hidden layer state  $h_{t-1}$ , the current hidden layer state  $h_t$  and the output layer state  $y_t$  can be calculated by,

$$h_t = o_h(w_h x_t + U_h h_{t-1} + b_h)$$

$$y_t = o_y(w_y h_t + b_y)$$

where  $W_h$  and  $W_y$  denote the input-to-hidden and hidden-to-output weight matrices, respectively,  $U_h$  is the matrix of the recurrent weights between the hidden layer and itself at two adjacent time steps,  $b_h$  and  $b_y$  are the biases, and  $h$  and  $y$  denote the activation functions.

At each time step, the input is propagated in a standard feed forward fashion, and then, a learning rule is applied. The back connections lead to the result that the context units always maintain a copy of the previous values of the hidden units (since they propagate over the connections before the learning rule is applied). Thus, the network can maintain a state, allowing it to perform such tasks as sequence prediction that are beyond the power of standard multilayer perceptron.

Formula for calculating current state:

$$h_t = (h_{t-1}; x_t)$$

where,

$h_t$ =current state

$h_{t-1}$ =Previous state

$x_t$ = Input state

Formula for applying Activation function:

$$h_t = \text{activation}(w_{hh}h_{t-1} + w_{hx}x_t)$$

where,

$w_{hh}$ = Weight at recurrent neuron  $w_{hx}$ = Weight at input neuron

Formula for calculating output:

$$y_t = w_{hy}h_t$$

where,

$y_t$ =Output

$w_{hy}$ =Weight at output layer

### C. Mathematical Model

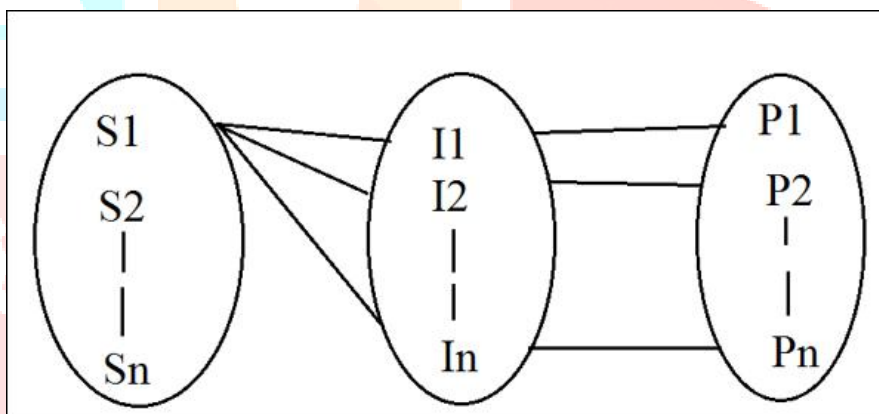


Fig. 3. Mapping Diagram

S1-Sn=Available Stocks

I1-In=Stock indicators

P1- Pn=Predictions of Stocks

$$S = s; e; X; Y;$$

S = Set of system

s = Start of the program

X = Input of the program

$$X= S1-Sn$$

Where,

S=Available Stocks

Y = Output of the program

$$Y = P1-Pn$$

Where,

e = End of the program = y interception

$$y=m x+ c$$

where, m=slope of graph

c= y- interception of graph

$$m = (n \times y) \quad x: y = (n \times x^2) \quad (x)^2$$

where,

y= current market price

x=percentage earnings ratio

n=total number of occurrence

Percentage Earning Ratio = (current market price)/(earning per share) = Failures and Success conditions:

#### D. Space Complexity

The space complexity depends on Presentation and visualization of discovered patterns. More the storage of data more is the space complexity.

#### E. Time Complexity

Check No. of patterns or file available in the datasets= n

If  $(n \geq 1)$  then retrieving of information can be time consuming.

So the time complexity of this algorithm is  $O(n^2)$ .

Above mathematical model is NP-Complete

### IV. RESULTS AND ANALYSIS

Experimental evaluation is done to compare the results for evaluating the performance. The experimental result evaluation, we have notation as follows:

TP: True positive (correctly predicted number of instance)

FP: False positive (incorrectly predicted number of instance), TN: True negative (correctly predicted the number of instances as not required)

FN false negative (incorrectly predicted the number of instances as not required),

On the basis of this parameter, we can calculate four measurements

$$\text{Accuracy} = \frac{(TP+TN)}{(TP+FP+TN+FN)}$$

$$\text{Precision} = \frac{TP}{(TP+FP)}$$

$$\text{Recall} = \frac{TP}{(TP+FN)}$$

$$\text{F1-Measure} = \frac{2 \times \text{Precision} \times \text{Recall}}{\text{Precision} + \text{Recall}}$$



Fig. 4. Classification Performance



### V. RESULTS

#### Stock Dataset

| ID | Open Price | High Price | Low Price | Close Price | Shares Traded | Turn Over(Rs.Cr) |
|----|------------|------------|-----------|-------------|---------------|------------------|
| 1  | 11341      | 11613.6    | 11328.95  | 11458.8     | 62106177      | 3723.55          |
| 2  | 11456.4    | 11482.85   | 11285.05  | 11311.15    | 80699604      | 3753.34          |
| 3  | 11083.05   | 11443      | 11074.5   | 11418.55    | 73582496      | 4747.53          |
| 4  | 10967.8    | 11035.1    | 10950.2   | 11024.45    | 26846567      | 1145.19          |
| 5  | 10851.55   | 10964.45   | 10825.65  | 10947.15    | 40579622      | 1396.84          |
| 6  | 10781.1    | 10866.65   | 10726.65  | 10846.2     | 32830422      | 1361.7           |
| 7  | 10660.75   | 10754.55   | 10641.7   | 10746.1     | 31080138      | 1410.38          |
| 8  | 10734.25   | 10787.4    | 10613.5   | 10648.75    | 37754805      | 1585.93          |
| 9  | 10742.25   | 10760.4    | 10671.85  | 10728.85    | 45700121      | 1865.24          |
| 10 | 10715.45   | 10720.85   | 10622.85  | 10704.7     | 31760856      | 1044.95          |
| 11 | 10771.25   | 10774.35   | 10662.9   | 10676.75    | 45023778      | 1472.13          |
| 12 | 10738      | 10789.1    | 10719     | 10726.05    | 37579618      | 1269.93          |
| 13 | 10725.3    | 10792.95   | 10673.1   | 10722.6     | 38410347      | 1374.86          |
| 14 | 10786.05   | 10812      | 10669.5   | 10692.1     | 42108089      | 1496.37          |
| 15 | 10760.75   | 10812.55   | 10729.75  | 10783.05    | 29498245      | 1041.86          |
| 16 | 10773.85   | 10817.9    | 10683.6   | 10708.1     | 28962045      | 1144.46          |
| 17 | 10762.7    | 10827.35   | 10732.35  | 10756.45    | 38115371      | 1294.49          |
| 18 | 10703.5    | 10762.4    | 10652.5   | 10742.4     | 47012362      | 1576.26          |
| 19 | 10821.45   | 10831.55   | 10650.8   | 10674.15    | 96097948      | 2985.59          |
| 20 | 10731.45   | 10778.45   | 10681.6   | 10765.7     | 26570089      | 1046.94          |

#### Select Company for Stock Prediction

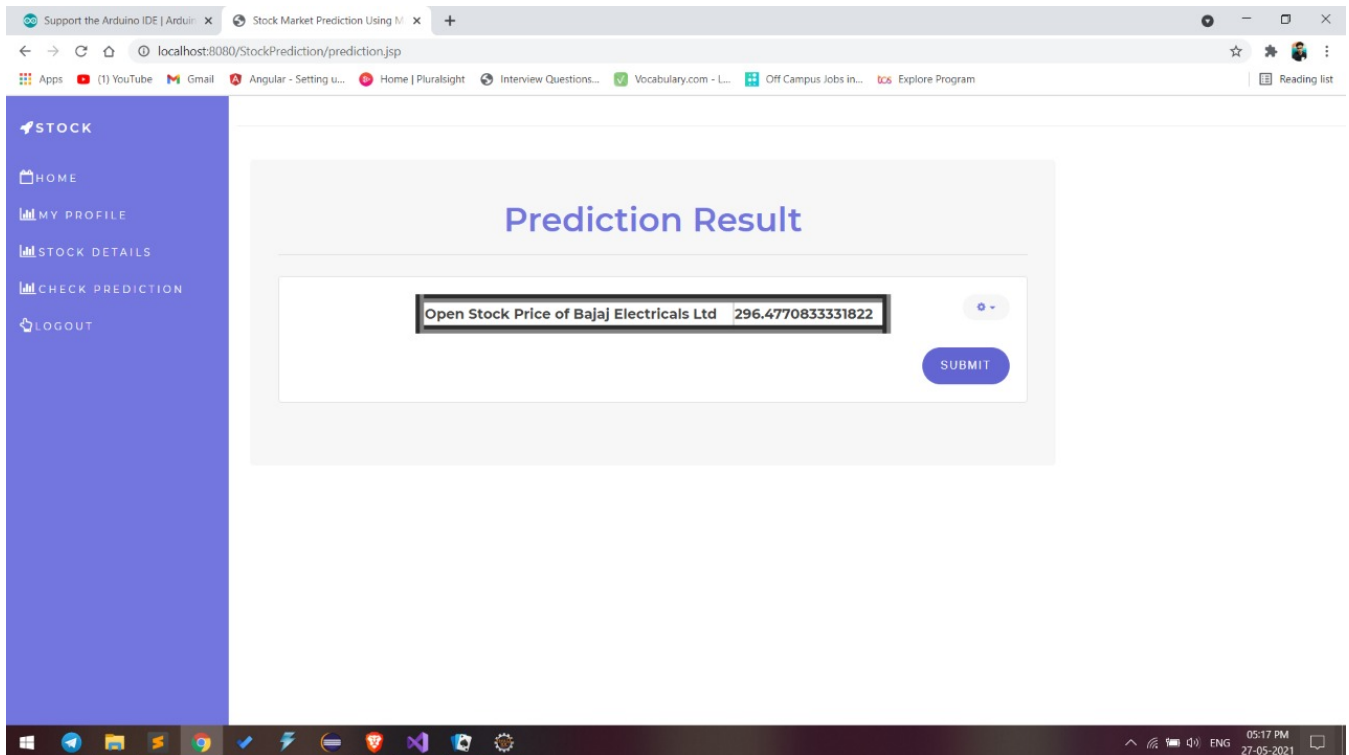
User Login

Select Company

Bajaj Electricals Ltd

SUBMIT

## Stock Prediction Results



## VI. CONCLUSION

Investors are very popular with forecasting the stock price because investors want to know their return on their investments. Technical analysts and traders historically used stock market forecasts on the basis of past rates, amounts, price dynamics and fundamental trends. The forecast of stock prices is now very high Not just the financial state but also the complex when equity markets are impacted Nation economics, political environment and natural disasters, etc. Back on the financial exchange In nature, the standard methods also can not be predicted accurately. Study in this field has been carried out and advanced intelligent techniques from pure mathematical models and many financial exchange platforms at stock prices have introduced expert systems for neural network a forecast. The future stock price is predicted by the automotive regressive model. We are really common with the model. Investigate quite precisely the estimation of stock prices. This process of forecasting investment returns would help financially In such unpredictable situations, institutions and share brokers will forecast the future price.

## VII. REFERENCES

- [1] DarmadiKomo, Chein-I Chang, Hanseok KO, "Neural Network Tech-nology for Stock Market Index Prediction", International Symposium onSpeech, Image Processing and Neural Networks, 13-16 April 1994
- [2] D. VenugopalSetty, T.M.Rangaswamy and K.N.Subramanya, "A Re-view on Data Mining Applications to the Performance of Stock Mar-ket",International Journal of Computer Applications, (0975 – 8887) Volume 1 – No. 3, 2010
- [3] Dase R.K. and Pawar D.D., "Application of Artificial Neural Network for stock market predictions: A review of literature", InternationalJournal of Machine Intelligence, ISSN: 0975–2927, Volume 2, Issue 2, pp-14-17, 2010
- [4] AkhterMohiuddin Rather, "A prediction based approach for stock returns using autoregressive neural networks", IEEE, 978-1-4673-0126-8,2011
- [5] D. Ashok kumar and S. Murugan, "Performance Analysis of Indian Stock Market Index using Neural Network Time Series Model",International Conference on Pattern Recognition, Informatics and Mobile Engineering (PRIME), IEEE, 978-1-4673-5845-3, 2013
- [6] AdityaNawani, Himanshu Gupta, Narina Thakur, "Prediction of Market Capital for Trading Firms through Data Mining Techniques",International Journal of Computer Applications (0975 – 8887) Volume 70– No.18, May 2013
- [7] Chi Kin Chow, Tong Lee, "Construction of multi-layer feed forward binary neural network by a genetic algorithm Neural Networks", IJC-NNProceedings of the 2002 International Joint Conference, Honolulu, HI, USA, 2002
- [8] Cao Q, Leggio KB, SchniederjansMj., "A comparison between Fama French's model and artificial neural network s in predicting the Chinese stock market", Computers Operations Research, Vol. 32, pp. 2499-2512, 2005
- [9] SatyajitDhar, Tuhin Mukherjee, Arnab Kumar Ghoshal, "Performance Evaluation of Neural Network Approach in Financial Prediction:Evidence from Indian Market", Proceedings of the International Conference on Communication and Computational Intelligence, pp.597-602, 2010