Intelligence Stock Forecasting Using Neural Network

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Abstract— Future share market price prediction for any company mostly requires the help of AI and data mining techniques. The nature of any company almost depends upon fluctuation in share market. Some people think that buying or selling the stock of company is an act of gambling or any illegal activity but it is not the case instead it helps to us personally and for our countries growth also. However it is now possible to predict the future price by developing the effective pattern using neural network and data mining technique with the help of Back-propagation algorithm. By fetching historical data of any company from yahoo finance server and applying some data mining technique on it we are going to predict the future price.

Index Term— Stock Market Forecasting; Back Propagation Algorithm; Data Mining; Technical Indicator; Neural Network

I. INTRODUCTION

Share market is the only thing in world who keeps fastest flowing of money. Because of only stock market business processing is possible. So we can say that stock market is the only place who is 100% responsible for the growth of respected country. As we know that our country India's financial growth is totally depends on performance of stock market. Almost all the country depends on the stock market for upcoming development of their nation[1]. Any way almost 10 % to 20% of people in developing economy makes interacted themselves in share market with fearing the volatile nature of share market. In this paper we are going to apply data mining technique to the Indian stock market for making the future price prediction. This paper mainly focuses on the shortage that are present in current traditional (i.e. statistical) approach, finally makes use of Back-Propagation algorithm to predict the future price of share market. Again we are applying some technical methods which will help in prediction of share price like moving average, On Balance value, Relative strength index.

II. RELATED WORKS

Currently there are four methods that are used for future price prediction and these are: 1) Technical analysis approach, 2) Fundamental analysis approach, 3) Time series prediction and 4) Machine learning algorithmic methods[2]. All these methods are work on statistical analysis and chartist method. Which will also requires human intervention in the task of future price prediction[1]. Technical analysis approach makes use of historical data of selected share of company. Then fundamental analysis approach finds truth value and compares it with current market condition. In Time series prediction method linear patterns are generated and historical patterns are evaluated. And machine learning algorithm also generates linear and non-linear patterns. In short all the methods are require a human intervention for

prediction of stock market. And all have less accuracy in prediction of stock price[4].

III. SOLUTION AND NEED

SOLUTION: To recover from problems occurring in previous system need arises to develop such a system which provides more accuracy in prediction of stock price and removes the human intervention completely while making sentiment analysis.

NEED: As we know that the nature of share market is so volatile and it fluctuates at any time. So need arises to provide a rigorous training to module so that it can correctly analyze the past data and generates correct output[5].

IV. HYPOTHESIS

By evaluating all the previous methods of future price prediction there is need arises to develop a system for stock market prediction which will totally avoid the human intervention[1]. and provides more accuracy in result than previous methods. So that maximum number of people can invest money in share market. By using this system user can make correct analysis of share price and makes decision of buying or selling the stock.

V. METHODOLOGY

DATA MINING:

In this era large amount of data has been developed by organization and/or by company and this data is directly stored in files, repository or in any storage media. Data Mining, also popularly known as Knowledge Discovery in Databases (KDD), While data mining and knowledge discovery in databases (or KDD) are frequently treated as similar, data mining is actually part of the knowledge discovery process[3]. Instead of only storing the data into storage media extract that stored data and find out appropriate patterns which will help in business inteligence

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and in decision making which will results into getting high performance in future. The following figure shows data mining as a step in an iterative knowledge discovery process[1].
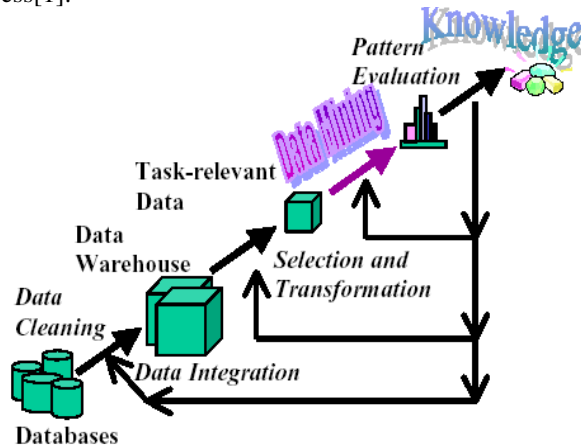

Figure: Data Mining is the core of Knowledge Discovery Process

The data mining in database includes number of steps starting from collection of raw data to final extraction of meaningful information. The data mining process consists of the following steps:

1) Data cleaning: also known as data cleansing. In this step unwanted and noisy data is removed from database.

2) Data integration: In this step multiple database are combined in order to get more information.

3) Data selection: In this step, the data relevant to the analysis is collected and retrieved from the data collection.

4) Data transformation: Data transformation is a step in which all relevant data is transformed into appropriate format.

5) Data mining: it is the important step in which data mining techniques are applied on transformed data to extract patterns potentially useful.

6) Pattern evaluation: in this step, all information is evaluated with compare to the previously stored pattern.

NEURAL NETWORK:

Artificial neural network is a largest network which includes number of execution unit i.e neurons which are connected to each other. Artificial neural network works much similar like working of human brain and makes a decision making faster like human brain. Generally the neural network has a multiple layers which include input layer, output layer and hidden layer. Hopfield network is one of the most useful models of artificial intelligence (Back-propagation algorithm)[2]. Hopfield network constitute the same neuron, which work directly without machine learning function. It is one of the most widely used networks and have minimum error rate than other one. First of all we need to make machine learning algorithm module which provides training to historical data and then it works as expected. If the result produces by system is wrong, then next time through providing learning to system it will have to reduce error rate.

A. Moving average (MA)

It is statistical method used for prediction, which will add all stock price which are taken into consideration and gives us average. By finding average we can find or observe price fluctuation. The main function of Moving Average is to generate the total average cost during some specific period, which will also help in printing curve or graph. Which will also helpful for regression analysis or line analysis. It is based on closing price[6].

Ex. Daily Closing price- 11,12,13,14,15,16,17

To Find MA of day-

1st day- (11+12+13+14+15)/5=13

2nd day- (12+13+14+15+16)/5=14

3rd day- (13+14+15+16+17)/5=15 & so on

B.OnBalanceVolume (OBV)
OBV in stock market denotes the total number of active investor. The OBV will goes to increase if number of buyer and seller will increases. If suppose there is less number of buyer and seller then stock price and volume of trade will rejected. So OBV is nothing but the measurement of rise and fall of stock prices and the volume of stock is the OBV. OBV also represents popularity of company's stock.

C. Increase scope
Increase scope= (Closing price of today's stock – opening price of todays stock) / the stock market opening price of today.
We require to normalize the actual data. The formula for Normalization is:

$$A_{ij}-min(A_j)/max(A_j)-min(A_j)$$

This data were have to normalized in between 0 and 1.

D. Relative Strength Index (RS1)
Relative Strength Index is a kind of indicator which compares the average of closing high and average of closing low price. We can use this method to analyze market condition and future price prediction.
RSI = [avg of increase / (avg of increase + avg of decline)] *100
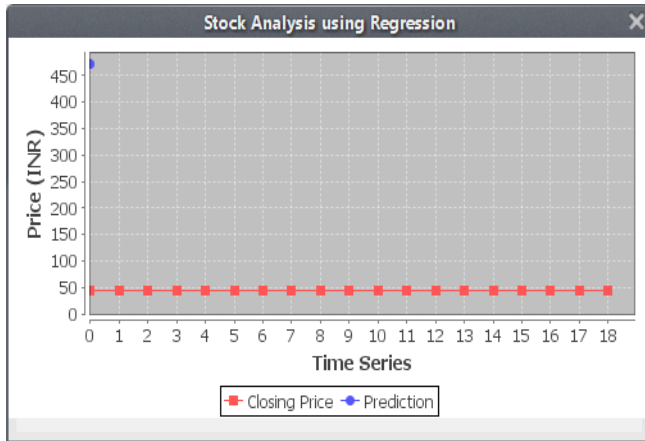
E. Moving Average Convergence/Divergence (MACD)
MACD is basically used for aggregation and separation of slow moving average and fast moving average. From this we can determine the single for user such as buy or sell the stock.

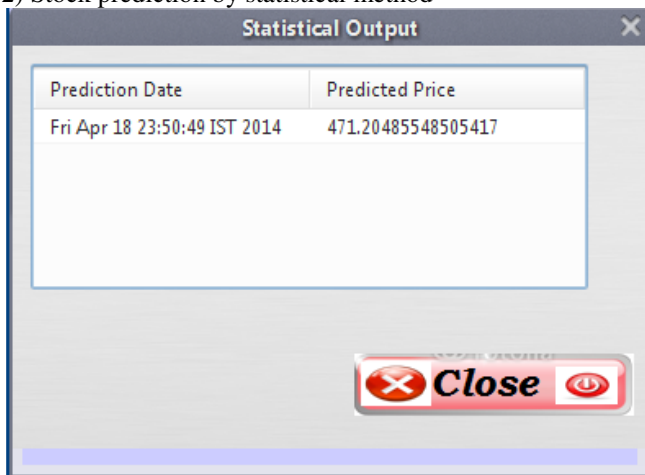*F. Yahoo Finance Server Interface*
It is server which maintains records of all Indian company stock. When company code is sent to server it will generate portfolio and send it on client machine [4]. That portfolio contain information about closing price, opening value, Min-Max value in last 52 weeks etc from this record required information is used and that data is processed and given as input to Neural Network.

VI.   RESULT & DISCUSSION

1) STOCK PREDICTION BY GRAPHICAL METHOD

2) Stock prediction by statistical method

We use to methods to visualize the prediction of stock.

Figure 1 indicates the prediction of stock value using graphical method. This uses javas jfree chart method to implement all the necessary things.

Figure 2 indicates the stock prediction using statistical method which directly shows future upcoming price of stock to user[9].

IMPLEMENTATION OF BACK PROPAGATION ALGORITHM

Back-propagation algorithm is a type of supervised learning algorithm. Initially it requires a study samples and then we can apply the back-propagation algorithm to bias the network and balance the weight of stock value by repeatedly providing training to same module so that it can reduces the error rate of future price prediction. It will provide a guarantee that predicted output value is nearly close to the upcoming price of stock of particular company. While calculating/reducing error rate we are considering 20% of historical data out of 100% and continuously providing training upto 10000 iteration [8].

Following are the steps to implement BP algorithm:

1) Initialize and appoint the connected weight [w] & [v] and threshold value.
2) Calculate the unit output of the output layer & hidden layer of the network from a given pair of input output patterns.
3) Compares the new connection weight & new threshold value.
4) Select the next pair of input patterns and then again train the network repeatedly until output error reaches the training requirements.

VII.   CONCLUSION

As per the discussed works above basically two types of prediction methods are implemented by several researches to generate useful extracts. They are fundamental approaches and technical indicator based approaches. Many researchers adopted technical indicator approaches only. Limited work is done with fundamental approaches which give plenty of opportunity for further research. Since the stock data is highly volatile and unpredictable it needs the intelligence of human for effective prediction. Also it needs rigorous training of old data for analysis. This temperament of stock data makes data mining and AI techniques as suitable once. Back propagation algorithm for training and suitable AI technique applied on some fundamental approaches may render promising results.

VIII.   SCOPE FOR FURTHER RESEARCH

In future this system can be extended for also getting better accuracy than this for prediction of share market price. By developing more technique of technical indication and analysis we can get also more accuracy.

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