



NIFTY MARKET FORECASTING BASED ON HISTORICAL DATA USING ANN IN MATLAB

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ABSTRACT

Data Mining is the process of extraction useful information from the large database or collections of dataset. Prediction or Forecasting is the term used for extract the hidden information which is based on the historical data. Forecasting uses the tools and techniques along with the parameters for generate the accurate result. This research work is the concept of data mining and will be perform the data forecasting. The concept of neural network will be used of the nifty historical data. The Nifty market has been developed widely in scope and surmounted in a manner which was never thought. The stock exchange depends on the total gain or loss in the subsidization. Even the investors think that the stock market is inconstant and untrustworthy. Data mining process which condenses the meaningful and understandable data from various sources of data like databases, texts, and internet. Forecasting method will be used to enhance the accuracy. The research work has been implemented on the real data of Nifty Data in MATLAB Simulation Tool based on historical data and shows the less Mean Squared Error which approaches to the accuracy and difference between real data and predicted value is less and accuracy has been computed in terms of MSE. The Research work is much efficient as compare to the traditional Methods.

Keywords: Artificial Intelligence, Decision Tree, Data Mining, Neural Networks , Pattern Evaluation

I. INTRODUCTION

Data Mining

Data Mining is the process of extraction useful information from the large database or collections of dataset. Prediction or Forecasting is the term used for extract the hidden information which is based on the historical data. Forecasting uses the tools and techniques along with the parameters for generate the accurate result. Data mining process which condenses the meaningful and understandable data from various sources of data like databases, texts, and internet. Forecasting method will be used to enhance the accuracy. The research work has been implemented on the real data of Nifty Data in MATLAB Simulation Tool based on historical data and shows the less Mean Squared Error which approaches to the accuracy and difference between real data and

predicted value is less and accuracy has been computed in terms of MSE. The Research work is much efficient as compare to the traditional Methods.

In 21st century, every day a vast amount of data is being generated in different fields. This data can be in any form such as text, image, audio, video etc. So extraction of meaningful information from large amount of data is difficult. As data is being generated and stored in different formats so we need a specific process to analyze this data and to take proper action on it .So this technology has generated a new chance for exploiting the information from the databases. A process of obtaining information from huge amount of data by using various mining techniques such as statistics, artificial intelligence, neural networks and decision tree is known as data mining.

It is a powerful technology which helps the organizations to emphasis on useful information in their data ware houses. The aim of data mining process is to obtain information from large data sets and transform it into understandable format for future use. Data mining consists of following steps: - Firstly it extracts data, transform it, and load transaction data into the data warehouse system. Then data is stored in a database system. Then, data is analyzed by using application software. Finally it represents the data in a useful format, such as bar charts, tables or graphs.

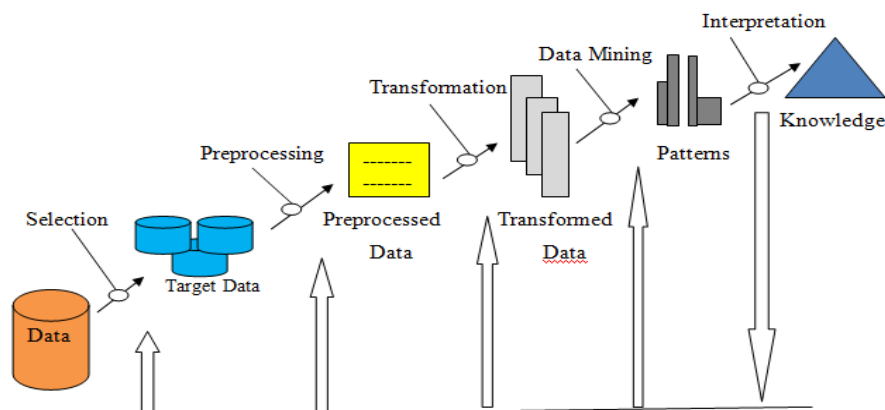


Figure 1: data mining

Steps of data mining in knowledge discovery process are:

1. Cleaning of data - Process of removing inconsistent and noisy data.
2. Integration of data- Process of combining data from multiple data sources.
3. Selection of data- Process of retrieving relevant data from database for analyzing.
4. Transformation of data- Process of transforming data into appropriate format for mining.
5. Mining of data- Process of extracting patterns from data by using intelligent methods.
6. Pattern evaluation- Process of identifying interesting patterns.
7. Knowledge presentation- Process of representing extracted knowledge to end user by using various visualization and knowledge representation techniques.



There are so many problems and pitfalls in data mining systems. System giving precise and fast results on small training sets, may behave entirely diverse when applied to a larger database. The data mining system works perfect for consistent data but performance eventually reduces with inclusion of little noisy data. So challenges of data mining systems are:

- Inconsistent and Noisy Data
- Difficult Training Set
- Dynamic Databases
- Large Databases
- Security and Privacy issues

Assumptions of fundamental analysis

- Present and future stock value depends on stock's intrinsic value and it helps in predicting the investment return.
- 90% of investors are commonsensical in investigating the detail of investments

Advantages of fundamental analysis

1. It is an organized approach and it has the capability to forecast the diversity before they presented on the charts.
2. It is a superior method for long-term constancy and growth.

Disadvantages of fundamental analysis

1. To make all the knowledge official for the purpose of computerization becomes very difficult and justification of this knowledge is subjective.
2. It becomes difficult to predict the stock rate in less time using fundamental analysis.

III. LITERATURE SURVEY

[1] Nitin Merh, Vinod P. Saxena and Kamal Raj Pardasani” A COMPARISON BETWEEN HYBRID APPROACHES OF ANN AND ARIMA FOR INDIAN STOCK TREND FORECASTING”, 2010

In this paper an attempt is made to develop hybrid models of three layer feed forward back propagation artificial neural network (ANN) and autoregressive integrated moving average (ARIMA) for forecasting the future index value and trend of Indian stock market viz. SENSEX, BSE IT, BSE Oil & Gas, BSE 100 and S& P CNX Nifty. Simulations have been done using prices of daily open, high, low and close of SENSEX, BSE IT, BSE Oil & Gas, BSE 100 and S& P CNX Nifty. These are chosen as input data values and output is the forecasted closing price of SENSEX, BSE IT, BSE Oil & Gas, BSE 100 and S& P CNX Nifty for the next day and future trend. Simulation results of hybrid models are compared with results of ANN based models and ARIMA based models. Convergence and performance of models have been evaluated on the basis of the simulation results done on MATLAB®6.1 and SPSS®13.0.



[2] Dong, Guanqun, Kamaladdin Fataliyev, and Lipo Wang. "One-step and multi-step ahead stock prediction using backpropagation neural networks." Information, Communications and Signal Processing (ICICS) 2013 9th International Conference on. IEEE, 2013.

Forecasting of stock market is not an easy task, mainly because of dynamic behavior of the stock price movement in short time period. Many techniques are being used for stock price forecasting. Now days, neural networks (NNs) have become one of the important techniques. The behavior of stock price movement is highly unpredictable. It is quite impossible to model with a pure mathematical function. Moreover, a large set of factors is required to explain a specific stock. These two factors are the most important motivations for the neural network approach in stock prediction. In this paper, they first propose the improved One-Step ahead prediction system and compare its performance with original forecasting technique. . Then, they explored a difficult multi-step prediction problem and improve multi-step prediction system by using recursive algorithm. Then performances of One-step and Multi-step systems are compared on the basis of accuracy. They have taken hit ratio as a performance measure. Hit ratio indicates how often neural network gives right prediction in terms of direction of price movement.

[3] Khirbat, Gitansh, Rahul Gupta, and Sanjay Singh."Optimal Neural Network Architecture for Stock Market Forecasting." Communication Systems and Network Technologies (CSNT), 2013 International Conference on.IEEE, 2013.

Prediction of stocks accurately has always attracted the market analysts. The forecasting of stocks is done by using trading constraints and Price ratio. With the advancement of Artificial Neural Networks, it becomes possible to analyze a data set in temporal domain. The use of Time Series Forecasting enables us to predict the value of an entity in the future based on the past outputs.

By using feed-forward back propagation neural network, the present best fit solution for stock market forecasting produces a forecast result with 58% accuracy. In this paper, we have used the data set containing financial stock price as a time series data. This time series data is forecasted by feeding it to a multi-layer back propagation neural network. This paper considers factors like Earnings per Share (EPS) and public confidence. They have introduces an empirically defined neural network architecture of the form which gives an optimal structure for predicting the future value of a stock by inferring the near future value by the present value comparisons. The results obtained after the training and testing of the financial data are very favorable.

[4] AL-RADAIDEH, QASEM A., AA ASSAF, and EMAN ALNAGI. "PREDICTING STOCK PRICES USING DATA MINING TECHNIQUES." The International Arab Conference on Information Technology (ACIT'2013). 2013.

In this paper author has been integrated the knowledge about Forecasting and Stock Predicting using data mining techniques. Forecasting of share market is a significant issue in field of finance which appealed researcher's attention from very long time. It comprises a hypothesis that preceding stock knowledge has some foretelling associations to the future value of stock returns. It helps the investors to opt the best timing to buy or sell stocks on the basis of knowledge obtained from preceding data of stock market. The decision will be on the basis of decision tree classifier which is a data mining technique.



In this paper, projected model uses CRISP data mining technique which is used over preceding data of three foremost companies comes under Amman Stock Exchange (ASE). Their proposal create decision rules which gives recommendations to investors regarding buying or selling stocks by using the decision tree classifier on historical stock prices. This projected model helps the investors to take the correct decision while selling or buying stocks based on analysis of historical stock prices. The results obtained for this projected model were not ideal for the reason that some factors were not concerned such as political proceedings impact on market, local and global economic conditions of country, and investor's hope from the influenced stock market.

[5] Guanqun Dong, Kamaladdin Fataliyev, Lipo Wang One-Step and Multi-Step Ahead Stock Prediction Using Back propagation Neural Networks “, IEEE, 2013

Forecasting stock price with traditional time series methods has proven to be difficult. An artificial neural network is probably more suitable for this task, since no assumption of a mathematical model has to be made prior to the forecasting process. Furthermore, a neural network has the ability to extract the main influential factors from large sets of data, which is often required for a successful stock prediction task. In this paper, they explore one-step ahead and multi-step ahead predictions and compare with previous work.

[6] Mahmud, Mohammad Sultan, and PhayungMeasad. "Time series stock price prediction using recurrent error based neuro-fuzzy system with momentum."Electrical Engineering Congress (iEECON), 2014 International.IEEE, 2014.

In this paper they proposed a new approach for stock market price prediction using recurrent error based neuro-fuzzy system with momentum (RENFSM).They say that stock market analysis is essential not only for making profit or avoiding big losses, but also to identify the direction of the market. The direction point of the market has major effects on capital investment, other business issues and socio-economical level of the country.

IV. OBJECTIVES OF RESEARCH WORK

This research will examines and analyzes the use of neural networks as a forecasting tool. The NN (Neural Network) ability to predict future trends of Nifty Market. The accuracy need to be compared against a traditional forecasting method. The Timer series prediction method will be used to improve the efficiency and accuracy of prediction. While only briefly discussing neural network theory, this research determines the feasibility and practicality of using neural networks as a forecasting tool for the individual investor. Main Objective of work is to development of a Time-Series neural network that achieved a highest percent probability of predicting a market rise and market drop as compare to existing methods. It was concluded that neural networks do have the capability to forecast financial markets and, if properly trained, the individual investor could benefit from the use of this forecasting tool.

1. To collect the Historical Stock Data and identify the issues and analyze Existing Prediction Technique and implement the research work on Performance Parameters for lead to the accuracy.
2. To identify the improvement Factor and apply using Neural Network.
3. Implement Neural Network Technique on Real time Nifty Data in any programming Language.
4. To analyze the results and plot graphs.



V. PROBLEM FORMULATION AND METHODOLOGY

Today, the grand challenge of using a database is to generate useful rules from raw data in a database for users to make decisions, and these rules may be hidden deeply in the raw data of the database. The problem with predicting stock prices is that the volume of data is too large and huge. There is need of classification approach on the historical data available to try to help the investors to build their decision on whether to buy or sell that stock in order to achieve profit. Fundamental analysis involves analysis of a company’s performance and profitability to determine its share price. By studying the overall economic conditions, the company’s competition, and other factors, it is possible to determine expected returns and the intrinsic value of shares. This type of analysis assumes that a share’s current (and future) price depends on its intrinsic value and anticipated return on investment.

VI. RESULTS & DISCUSSIONS

In this chapter for the implementation of the research work a new algorithm has been proposed. This proposed algorithm when applied on the collected data produces the more accurate results. The collected input data is then used by the proposed algorithm and the method of research to complete the implementation of research work.

6.1 Input Data

The input data which is collected is shown in table

Table 1: Collected input data

	A	B	C	D	E	F	G
1	Date	Open	High	Low	Close	Volume	Adj Close
2	01/04/2011	2796.67	2802.63	2779.71	2789.6	2.09E+09	2789.6
3	31/03/2011	2774.23	2783.98	2769.52	2781.07	1.9E+09	2781.07
4	30/03/2011	2772.36	2779.95	2763.77	2776.79	1.82E+09	2776.79
5	29/03/2011	2727.83	2756.89	2720.19	2756.89	1.63E+09	2756.89
6	28/03/2011	2752.33	2754.63	2730.68	2730.68	1.67E+09	2730.68
7	25/03/2011	2746.34	2762.55	2740.17	2743.06	1.05E+08	2743.06
8	24/03/2011	2715.88	2740.39	2703.42	2736.42	1.95E+09	2736.42
9	23/03/2011	2677.56	2704.3	2660.17	2698.3	1.77E+09	2698.3
10	22/03/2011	2692.13	2695.46	2679.41	2683.87	1.66E+09	2683.87
11	21/03/2011	2675.47	2699.7	2674.99	2692.09	1.75E+09	2692.09
12	18/03/2011	2665.54	2665.56	2639.76	2643.67	1.99E+09	2643.67
13	17/03/2011	2656.08	2660.5	2634.17	2636.05	1.99E+09	2636.05
14	16/03/2011	2652.92	2669.27	2603.5	2616.82	2.6E+09	2616.82
15	15/03/2011	2619.4	2680.57	2618.5	2667.33	2.36E+09	2667.33
16	14/03/2011	2695.66	2715.22	2682.09	2700.97	1.78E+09	2700.97
17	11/03/2011	2689.65	2724.61	2689.41	2715.61	3.86E+09	2715.61
18	10/03/2011	2719.29	2721.21	2695.08	2701.02	2E+09	2701.02
19	09/03/2011	2756.34	2761.77	2737.68	2751.72	2E+09	2751.72
20	08/03/2011	2745.23	2775.41	2729.85	2765.77	1.84E+09	2765.77
21	07/03/2011	2793.19	2794.82	2724.51	2745.63	2.19E+09	2745.63
22	04/03/2011	2797.64	2798.07	2768.12	2784.67	1.9E+09	2784.67
23	03/03/2011	2774.48	2802.32	2774.48	2798.74	1.99E+09	2798.74
24	02/03/2011	2735.05	2763.95	2734.08	2748.07	1.99E+09	2748.07
25	01/03/2011	2791.08	2791.23	2730.72	2737.41	2.21E+09	2737.41

6.2 Actual and Predicted Results

Graphs showing accuracy have been generated. This section shows the actual and predicted data. The Actual and desired output has been shown in this figure.

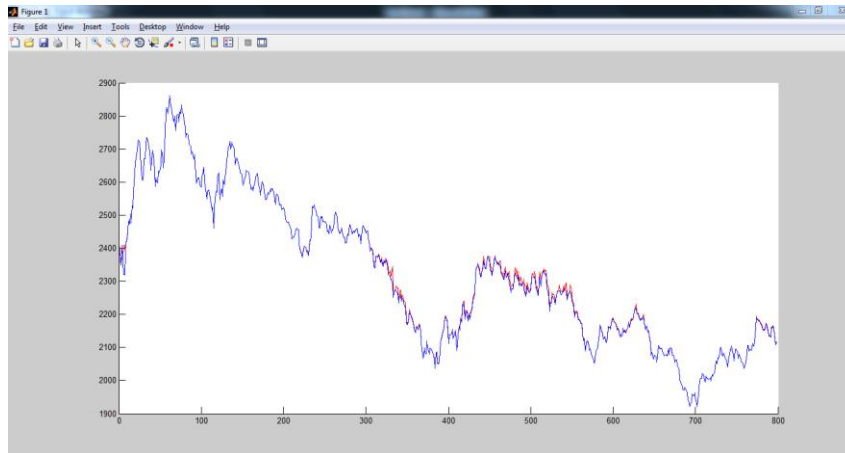


Figure 2: actual and predicted results

The Mean Squared Error has been shown in the diagram.

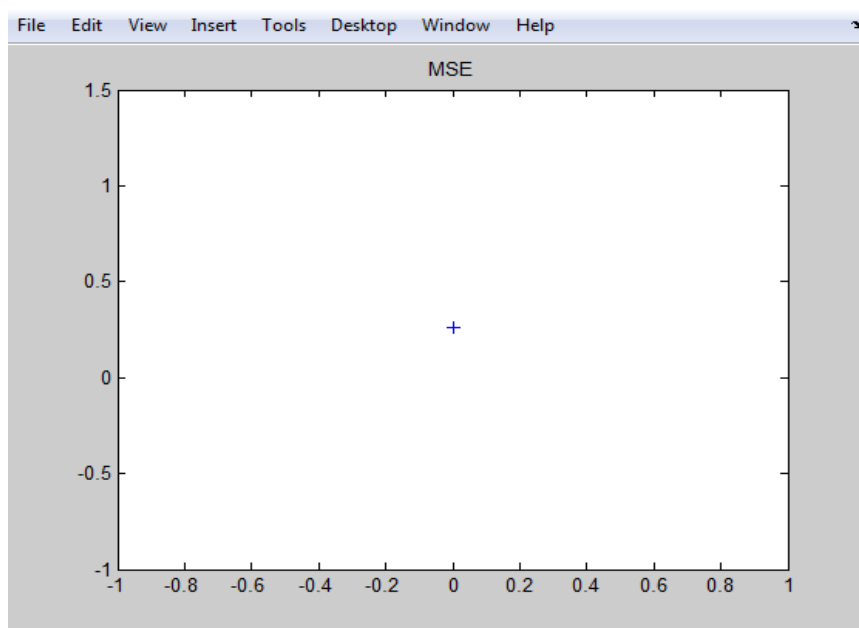


Figure3 mean squared error

The Final Error is 0.0799 and simulation has been shown in the figure which shows the accuracy of the proposed Work.



VII. CONCLUSION

Nifty market basically forecasts the outcome and achievement of the economy. It directly affects the overall wealth of the nation. Stock market enhances the community savings. It also raises the value of the assets. Accurate predictions of stock market help in managing the wealth or frugality of the nation. Many different techniques have been used to predict the stock market accurately but still we are not able to forecast the market accurately.

Our proposed model forecast more accurate results as compared to the existing forecasting tools. We make use of the time series forecasting methods. Also the neural network is trained efficiently so that it can help the future investors to get the knowledge about the future outcomes of total gains of losses. So, we conclude that we have successfully implemented our proposed work for the research and we have produced the efficient, effective and accurate results for the prediction. The results are successfully plotted with the help of graphs and proper process of estimation and prediction is successfully implemented.

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