

# Time Series based Accuracy Stock Market Forecasting using Artificial Neural Network

Rupinder kaur<sup>1</sup>, Ms. Vidhu Kiran<sup>2</sup>

M.Tech, CSE, JCDV, Sirsa, India<sup>1</sup>

Asst Professor (CSE), JCDM College of Engineering, Sirsa, India<sup>2</sup>

**Abstract:** Forecasting accuracy is the most important factor in selecting any forecasting methods. Research efforts in improving the accuracy of forecasting models are increasing since the last decade. The appropriate stock selections those are suitable for investment is a difficult task. The key factor for each investor is to earn maximum profits on their investments. In stock market two opposite teams are involves in any type of transaction in which they exchange stocks from buyer to seller. Patterns of the stock market are of non uniform nature. Holding and vending of shares in stock market is done by the consideration of some decision making algorithms. 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. So to produce the consistent and accurate results, there is need to produce the new modified algorithm. This new enhanced and modified algorithm produces the predictions in timely manner with appropriate accuracy.

**Keywords:** Neural Network, Forecasting, Stock Market, Time Series, Data Mining.

## I. INTRODUCTION

### Data Mining

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 tools helps the organizations to make knowledge driven decisions by predicting future trends and behaviour. Now a day, data mining techniques are used by many companies with consumer focus in retail, finance, communication, and marketing companies. 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.

Data mining is a part of knowledge discovery process in database. Knowledge discovery in databases and data mining are sometimes used as synonyms. It deals with mining hierarchy which involves text mining as well as web mining.

Thus, in this hierarchy, firstly knowledge discovery in database is placed then data mining is placed and then text mining is placed. It is a process of extracting useful knowledge and interesting patterns from vast data. Hence data mining is the process of obtaining information or identifying patterns from repositories.

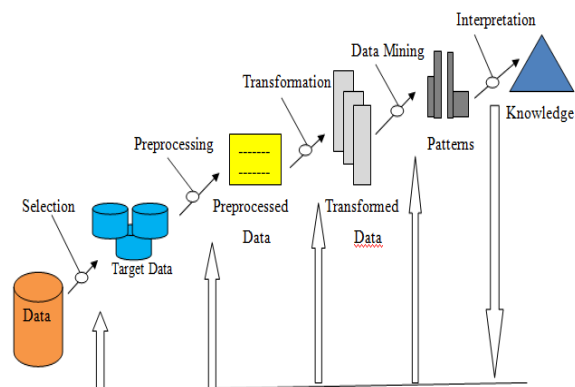


Figure 1: Data Mining

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.

**Stock Market**

A stock market is a combination of buyers and sellers of shares and which act as safeties listed on a stock exchange as well as those which could be traded privately. A stock market index is termed as a method of measuring a stock market as a whole. The important type of market index is the broad-market index which consists of the huge liquid stocks of the country. In most of the countries, there exist a one major index which dominates benchmarking, index derivatives, index funds and research applications. Additionally other particular indices frequently find interesting applications. In country like India, we can see various situations where a devoted industry fund uses an industry index as a benchmark. In country like India, ownership groups of clear categories exist as it becomes appealing to monitor the performance of classes of companies sorted by tenure group.

The stock market prediction can be viewed as an artificial intelligence problem in the field of data mining. For prediction of future stock trend, various investment strategies can be study, create and analysis by using data mining techniques.

Following are the variables used in stock market:

Table 1: Stock Variables

Variable	Description
Price	Stock's Current Price
Opening Price	Stock's Opening Price for a specific trading day
Closing Price	Stock's Closing Price for a specific trading day
Volume	Volume of Stock transactions (buy/sell)
Change	Difference between Opening and Closing stock value
Change (Percentage)	Opening and Closing stock value difference Percentile

Firstly, data mining methods will be used for analyzing the historical price of stocks and obtain useful knowledge by calculating values of financial indicators. Then the classification of transformed data is done by using decision tress obtained through application of Artificial Intelligence strategies. At last, decision trees assessed and evaluated, which provides total profit and accuracy rates associated to capital gains.

**Data Mining Role in stock market**

Forecasting of stock market involves finding market trends, designing investment approaches, recognizing the best time when to purchase the stocks and what stocks to purchase. There are so many researchers who try to predict stock prices by using statistical and machine learning methods. But those methods lacks behind because of prejudiced decisions of humans on stock market based on day to day mind set of human behavior. We can determine

hidden patterns can by applying data mining techniques in an appropriate manner which was not possible by traditional approaches. We can obtain future price prediction with higher level of accuracy by applying business intelligence with data mining techniques. The vast amount of data generated by stock markets forces the researchers to apply data mining techniques to make investment decisions. Following are the challenges of stock market which we can effectively address by using mining techniques:

1. Prediction of future stock price
2. Development of efficient methods for predicting patterns and future trends.
3. Optimal utilization of capital resources of investors.
4. Boost up the country economy.
5. Maintenance of market stability.
6. Increase transparency in the market.
7. Protection of investors and investments.

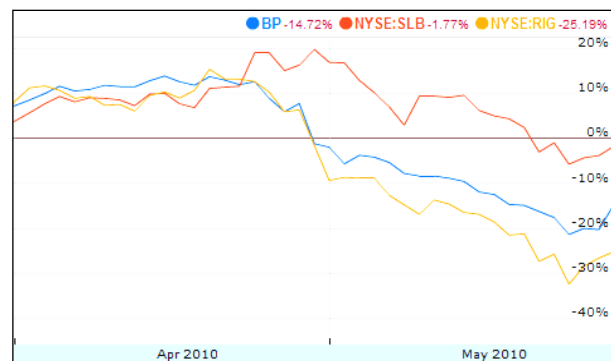


Figure 2: Stock Prediction

**II. LITERATURE REVIEW**

The different authors have been studied and research in Forecasting. Few of their work have been explained in this section.

Forecasting of stock market is not an easy task, mainly because of dynamic behaviour 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 behaviour 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 [1].

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 analyse 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 [2].

In this paper author has been integrated the knowledge about Forecasting and Stock Predicting using data mining techniques. 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 [3].

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. The authors have confirmed the effectiveness of the proposed model by testing it on stock price prediction of two companies and in the research it is found that the proposed model can provide better performance for stock market price prediction than ANFIS and traditional recurrent type ANFIS networks. [4]

Stock market and variables of stock markets are explained. Stock market is affected by many political and economic factors. The significant triumphant foretelling of stock market achieved superlative results with smallest amount of input data. To obtain accurate forecast, determining relevant factors is a complex mission and for this continuous analysis of preceding trend of stock market is obligatory. Moreover, the activities of stock market are gauged and estimated in order to obtain relevant information for guiding the investors regarding when to invest in market. It is going to help the investor in gaining profit all the way through his investment in stock market. They studies huge number of possessions from organization reports, research papers, internet and other sources [5].

### III.OBJECTIVES

The time series prediction method will be implemented to improve the accuracy. There are number of algorithms for prediction. The main objective is to analyse the historical data available on stocks with accuracy using time series prediction technique with neural network as one of the classification methods of data mining in order to help investors to know when to buy new stocks or to sell their stocks. Analysing stock price data over several years may involve a few hundreds or thousands of records, but these must be selected from millions.

1. To analyse of Existing Prediction Technique.
2. To identify the issues in the existing method.
3. To collect the Historical Stock Data.
4. Research on Performance Parameters for lead to the accuracy.
5. To identify the improvement Factor and apply using Neural Network.
6. Implement Neural Network Technique on Real time Stock Data in any programming Language.
7. To analyse the results and plot graphs. /

### Problem Statement

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. There are different algorithms used for forecasting the data but accuracy is not up to. The accurate results will lead the company to the safe level. Growth prospects are related to the current economic environment. The Neural Network field can solve the problems.

### IV.PROPOSED METHODOLOGY

The proposed approach used is basically the alteration and conversion of the previously used Time Series Neural Network algorithm into a new refined and enlightened algorithm for the stock Rate Prediction.

1. Study of existing Forecasting Methods/Techniques.
2. Identify and analyze the benefits of forecasting technique.
3. Research on the real time issues of prediction.
4. Choose the reliable technique to improve the accuracy.
5. Flow Development of new research and its Implementation in any of the language for making it understandable steps.
6. Analyze the results.
7. Source of Research will be internet, Web Sites and Journals.

### V. CONCLUSION AND FUTURE WORK

In this paper, we have been proposed the stock rate prediction steps and techniques which can be used for forecast the stock price based on time series and neural network.

The implementation part will be covered in the next paper, which will demonstrate the real working of proposed algorithm.

**REFERENCES**

- [1] Dong, Guanqun, Kamaladdin Fataliyev, and Lipo Wang. "One-step and multi-step ahead stock prediction using back propagation neural networks." *Information, Communications and Signal Processing (ICICS) 2013 9th International Conference on*. IEEE, 2013.
- [2] 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.
- [3] 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.
- [4] Mahmud, Mohammad Sultan, and PhayungMeesad. "Time series stock price prediction using recurrent error based neuro-fuzzy system with momentum." *Electrical Engineering Congress (iEECON), 2014 International*. IEEE, 2014.
- [5] Agrawal, J. G., V. S. Chourasia, and A. K. Mitra. "State-of-the-art in stock prediction techniques." *International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering* 2 (2013): 1360-1366.