ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

Prediction of Stock Market using Neural Network for Increasing Accuracy

Kaveri Deshmukh[1], Shubhrata Mahajan[2], Bhavana Samel[3], Prof.Chate P.J[4]

Student, Dept. of C.S., BVCOEL, Pune, India[1]

Student, Dept. of C.S., BVCOEL, Pune, India[2]

Student, Dept. of C.S., BVCOEL, Pune, India[3]

Professor, Dept. of C.S., BVCOEL, Pune, India[4]

ABSTRACT: The stock market is the most accepted investing places for users, because of its estimated high profit. In recent times forecasting stock market returns gaining more consideration. The prediction of stock markets is regarded as a demanding task. The way of predicting future value is data analysis, if future stocks prices will increase or decrease. The main purpose of this paper is to predict future stock price using prediction concept. In that concept Parse Records then compute predicted value and that value send to user. Automatically execute operations like purchase and sale shares using Automation concept for that use Naïve Bayes Algorithm. We provide output of Naive Bayes to Kohonens Algorithm for increasing accuracy. By using Kohonens Network Algorithm exact prediction is done. There is Real time Access by Download log forms yahoo finance website as well as store in dataset.

KEYWORDS: Shares, Artificial Neural Network, Naïve Baye's Algorithm, Automation, Prediction, Kohonens Network, Stock Market

I. INTRODUCTION

Now a days user's daily investigate the shares details so it is very time consuming process. So, in order to overcome this process we are going to develop an application to make it easier. We are covering processes like on a daily basis checkout websites and see the information about the shares. Share markets information is handled by stock market. In this system also maintain the details about the Company and users. In this system admin do the registration of the company. Whenever essential admin update the information about company like shares. Admin see the list of company and send messages to all users. User perform two operations like purchase and sale the shares of company. In this system two concepts like automation as well as prediction are used for progress the performance of the system. By using automation user set fix price of share then shares are automatically sale or purchase. And prediction concept is used with Dummy as well as real time prediction. By using dummy prediction we predict the future price of share and by using real time prediction we predict the current share price. For that we use Naïve Bayes and Kohonens algorithm and it give a more proper result.

II. RELATED WORK

K.Senthamarai Kannan, P. Sailapathi Sekar, M. Mohamed Sathik and P. Arumugam," Financial Stock Market Forecast using Data Mining Techniques " Data mining is well founded on the theory that the historic data holds the predicting the future direction. This technology is designed to help investors determine hidden patterns from the historic data that have possible predictive ability. The prediction of stock markets is regarded as a difficult task of financial time series prediction. Data analysis is one way which is use for predicting the stock price if future stocks prices will either increase or decrease. Five methods of analyzing stocks were combined to predict if the day's closing price would increase or decrease. This paper discussed different techniques which are capable to predict with future closing stock price will increase or decrease better than level of significance.

QASEM A. AL-RADAIDEH, ADEL ABU ASSAF, EMAN ALNAGI," Predicting Stock prices using data mining Technique." Forecasting stock return is an important that has attracted researchers' attention for many years. It contains an assumption that fundamental information openly accessible in the earlier period has some predictive relationships to

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

the upcoming stock Returns. The decision will be taken is based on decision tree classifier which is one of the data mining techniques. The CRISP-DM methodology is used for build the system. Ruchi Desai, Snehal Gandhi," Stock Market Prediction Using Data Mining" Data mining is the historic data holds the important memory for predicting the future values. This technology is considered to help investors. That have possible predictive capability in their investment decisions in the market. The prediction of stock markets is regarded as a challenging work of financial time series prediction. Data analysis plays important role for predicting when future stocks prices will either increase or decrease. Also, it investigated a variety of global events and their issues predicting on stock markets. Text mining is come up to for measuring the result of real time reports on stock. It uses various techniques to predict ups as well as downs in the stock market. In this paper shows, the changes of stock trend by analyzing the influence of non-quantifiable information.

G.S. Navale, Nishant Dudhwala, Kunal Jadhav," Prediction of Stock Market using Data Mining and Artificial Intelligence" In the stock market Predicting anything is extremely hard where the relationship among inputs as well as outputs are non-linear in nature. The prediction of stock market values is one of a demanding task of financial time series. Mostly the online applications are use for buying and selling the shares in high amounts these days. The subsequently step of this web application will be not just registering, buying and selling the shares but it will also be predicting the future shares values in the market. We are proposing the system which will learn the database of shares and will give predictions according to it. For prediction mostly ARMA(autoregressive-moving-average) algorithm is used , so that system will be able to give maximum probability predictions for particular shares.

Dr. Debesh Bhowmik," STOCK MARKET VOLATILITY: AN EVALUATION" The paper shows the stock market volatility. High indices of stock market in each aspect of measurement implied less changeability of volatility. Political turmoil or instability has unhelpful impact on stock market. The stock market volatility has the growth rate of a nation i.e. high volatility reduces increase rate. There is causality among them. because stock market volatility brings the forth economic crisis and which has ultimately spill above on growth inversely to additional countries as well. The international trade as well as stock market volatility is unhelpfully related. That volatility reduces the volume of trade and increases current account as well as capital also account deficits.

Vishal Parikh, Parth Shah," Stock Prediction and Automated Trading System" Stock market is a not only challenging ait also difficult task of financial data prediction. Prediction regarding stock market with high accuracy movement yield profit for investors of the stocks. complication of stock market financial data, development of efficient models for prediction is very difficult, and it should be accurate. This expand for prediction of the stock market and to decide whether to purchase or sale the stock using data mining and machine learning techniques. The classification techniques used in these models are naive bayes algorithm and random forest classification. Technical indicators are frequently computed from the stock prices based on time-line data as well as it is used as inputs of the proposed prediction models. Based on the data set, these models are able to generate, purchase or sale signal for stock market as a output. The main objective of this paper is to generate decision as per user's requirements.

SayaliMetkar, Akash Bhagyawant , VrushaliBagul, "Stock Market Prediction and Automation of Sale Purchase Event using History Analysis." This paper provides maintain on the predictive power of online area traffic with the regard to stock prices. By means of the largest dataset to date, straddling 8 years and almost the complete set of stocks, we show a classifier using a set of features with are totally extracted from web traffic data of financial online communities. The classifier is shown to split the predictive power of a baseline classifier based on cost time-series, and to have related performances as the classifier built considering price and traffic features together. The predictive performances are achieved when the information regarding stock capitalization is joined with long-terms, and midterm web traffic levels. In the following part of the paper we show how there exists a group of users whose traffic patterns constantly do better. The result set interesting upcoming works in the justification of novel market indicators for market scrutiny.

III. EXISTING SYSTEM

In the current system of Stock Market there is purchasing and selling of shares of companies. In that stakeholders wants to Daily checkout websites & see the information about the shares[1]. So it is very time consuming process. In

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

current system there is not Automatic system facility provided for users like sale and purchase shares and also predicting future price of shares[11]. The main thing that affects the price is the balance between purchase and sale. If many stakeholders want to purchase a shares the price goes up. If there are more sellers than buyers, the price goes down[20]. This process required lot of time.

Existing system is not user friendly. There is no automatic system facility for purchase or sale shares of company. Because of that there is some loss to the stakeholders. There is no real-time access of data to the stakeholders in existing system. There is no prediction of future price of shares.

IV. PROPOSED SYSTEM

In the current system of Stock Market there is purchasing and selling of shares of companies. In that stakeholders wants to Daily checkout websites & see the information about the shares[1]. So it is very time consuming process. In current system there is not Automatic system facility provided for users like sale and purchase shares and also predicting future price of shares[11]. The main thing that affects the price is the balance between purchase and sale. If many stakeholders want to purchase a shares the price goes up. If there are more sellers than buyers, the price goes down[20]. This process required lot of time.

Existing system is not user friendly. There is no automatic system facility for purchase or sale shares of company. Because of that there is some loss to the stakeholders. There is no real-time access of data to the stakeholders in existing system. There is no prediction of future price of shares.

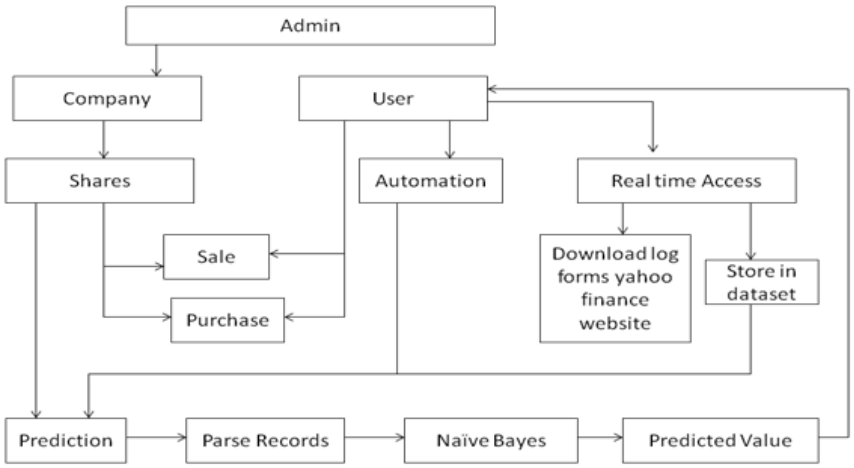


Fig.1. Block Diagram of Stock Market Prediction System

A. *Advantages*

The **benefits** of stock market could include:

- Making it easier for you and other investors - including venture capitalists - to relize their investment. increasing your public profile, and providing reassurance to your customers and suppliers
- creating a market for the company's shares
- Automatically sale or purchase shares using automation concept.
- Predict future price of share by using Dummy prediction concept.
- Predict current shares price by using Real-time prediction concept.
- Reduce stakeholders time.
- The system to be developed will help to find share market value as per stakeholders need.
- System maintain the details about the stakeholder and companies and also easily view all details of company and stakeholder.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

B. *Disadvantages*

- High risk: There is a risk of uncertainty involved in share trading. If a company goes bankrupt and you bought their stock, your stock may be worthless.
- Losses: Investors can face huge losses if the value of shares drop dramatically.
- There is automation concept because of stakeholder don't know that when shares are purchase or sale.

C. *PREDICTION SYSTEM*

The possible market prediction goal can be the future stock price or the volatility of the prices or market trend. In the prediction there are two types like Dummy and Real time prediction used in stock market System. In Dummy prediction we define some rules and predict the future price of shares by calculating average price. In the Real time prediction compulsory use internet and see current price of shares of companies[19].

Figure 2 shows the prediction of the stock market. In stock market system here stakeholder share the personal details with Admin after that admin do registration of stakeholder and company. After that stakeholder login the system and perform the prediction operation. Prediction system: in this system there are two types of predictions are used. Dummy Prediction and Real time prediction. Dummy Prediction: in Dummy prediction stakeholder select date and company name and take decision depend on profit or loss. When there are profit then stakeholder sale shares. And if loss then stakeholder purchase shares. After that send alert to stakeholder and predict the future price (threshold). Real-time Prediction: in real time prediction stakeholder select company name and select date to view current shares price of selected company.

D. *Automation Concept*

In automation stakeholder perform two operations like purchase shares and sale the shares. In this system these operations are perform automatically. When stakeholder Set one fix price to sale the shares, after that system match price of shares& automatically perform sale operation like that purchase operation is also performed. In that Set one fix price to purchase the shares, after that system match price of shares& automatically perform purchase operation.

E. *Benefits of Stock Market System*

The benefits of stock market could include:

1. Making it easier for you and other investors including venture capitalists to realize their investment
2. Increasing your public profile, and providing reassurance to your customers and suppliers
3. Creating a market for the company's shares
4. Automatically sale or purchase shares using automation concept.
5. Predict future price of share by using Dummy prediction concept.
6. Predict current shares price by using Real-time prediction concept.
7. Reduce stakeholder's time.
8. The system to be developed will help to find share market value as per stakeholders need.
9. System maintains the details about the stakeholder and companies and also easily views all details of company and stakeholder.

V. IMPLEMENTATION DETAILS

A. *Naive Bayes Algorithm*

Naive Bayes algorithm is a classification technique which generates Bayesian Networks for a given dataset based on Bayes theorem[12]. It assumes that given dataset contains a particular feature in a class which is unrelated to any other feature. For example, an object is considered to be a because of some features. These features presence may depend on each other or on other features but all of the features presence independently contribute to the probability that this object and that is the reason it is known as "Naïve". Advantages of Naive Bayes algorithm are it is easy to build and useful for very large datasets and even known to outperform highly sophisticated classification techniques.

Following were the important steps to be performed in this algorithm.

1. The given dataset is to be converted into a frequency table.
2. Calculate probabilities of the events and using the probabilities create Likelihood table.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

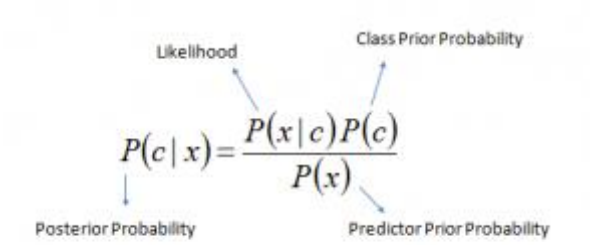
(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

3. Using the Naive Bayesian equation, calculate the posterior probability for all classes.
4. The class with the highest posterior probability is the outcome of prediction.

Bayes theorem provides a way of calculating posterior probability P(c|x) from P(c), P(x) and P(x|c). Look at the equation below:



$$P(c \mid X) = P(x_1 \mid c) \times P(x_2 \mid c) \times \cdots \times P(x_n \mid c) \times P(c)$$

Where,

- The posterior probability of *class* (c, *target*) given *predictor* (x, *attributes*) is $P(c|x)$
- The prior probability of *class* is $P(c)$
- The likelihood which is the probability of *predictor* given *class* is $P(x|c)$
- The prior probability of *predictor* $P(x)$

We give an input of Naive Bayes algorithm to Hybrid Kohonens SOM algorithm for increasing the accuracy of the result.

B. *Kohonen's Neural Networks Algorithm*

The problems of determining the features of predicting share market is overcome using Kohonens Network algorithm. It is Self Organizing Maps algorithm. In artificial neural networks, a hybrid Kohonen self organizing map is a type of self-organizing map (SOM) named for the Finnish professor Teuvo Kohonen, where the network architecture consists of an input layer fully connected to a 2–D SOM or Kohonen layer. The output from the Kohonen layer, which is the winning neuron, feeds into a hidden layer and finally into an output layer. In other words, the Kohonen SOM is the front–end, while the hidden and output layer of a multilayer perceptron is the back–end of the Kohonen SOM. The hybrid Kohonen SOM was first applied to machine vision systems for image classification and recognition. Kohonen SOM has been used in weather prediction and especially in forecasting stock prices, which has made a challenging task considerably easier. It is fast and efficient with less classification error, hence is a better predictor.

The problems of determining the features of predicting share market is overcome using Kohonens Network algorithm. It is Self Organizing Maps algorithm which is unsupervised learning algorithm. In artificial neural networks, a Kohonen's self organizing map is a type of self-organizing map (SOM) named for the Finnish professor Teuvo Kohonen, where the network architecture consists of an input layer fully connected to a 2–D SOM or Kohonen layer[5].

Components of Kohonens Networks:

The self-organization process contain four major components:

1. Initialization: Initialization shows the all the connection shares prices are initialized with given dates.
2. Competition: For each input date, the Kohonen calculate their individual values of a discriminant function which provides the basis for competition. The picky share value with the smallest value of the discriminant function is declared the winner.
3. Cooperation: The winning share price determines the spatial location of a topological neighborhood of excited shares, thereby providing the basis for cooperation among adjacent shares.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

4. Adaptation: The excited shares reduce their individual values of the discriminant function in relation to the input date through suitable adjustment of the associated connection shares, such that the response of the winning share to the following application of a similar input date is improved.

Competitive Process:

If the input space is D dimensional (i.e. there are D input units) we can write the input dates as

x = {xi : i = 1, …, D}

and the connection shares between the input units i and the shares j in the computation layer can be written

wj = {wji : j = 1, …, N; i = 1, …, D}

where N is the total number of shares. We can then define our discriminant function to be the squared Euclidean distance between the input vector (date) x and the shares vector wj for each share j

$$d_j(x) = \sum_{i=1}^{D} (x_i - w_{ji})^2$$

In other words, the share whose shares vector (actual date) comes closest to the input vector(date). In this way the continuous input space can be mapped to the discrete output space of shares by a simple process of competition between the shares.

Cooperative Process:

In neurobiological studies we find that there is lateral interaction within a set of excited shares. When one share fires, its closest neighbors tend to get excited more than those further away. There is a topological neighborhood that decays with distance. We want to define a similar topological neighborhood for the shares in our Kohonen. If Sij is the lateral distance between shares i and j on the grid of shares, we take

$$T_{j,I(x)} = \exp(-S_{j,I(x)}^{2} / 2\sigma^{2})$$

I(x) is the index of the winning share.

size σ of the neighborhood needs to decrease with time. A popular time dependence is an exponential decay: $\sigma(t) = \sigma_0 \exp(-t/\tau_\sigma)$.

Adaptive Process:

In practice, the appropriate shares update equation is

$$\Delta w_{ji} = \eta(t).T_{j,I(x)}(t).(x_i - w_{ji})$$

time (epoch) t dependent learning rate $\eta(t) = \eta_0 \exp(-t/\tau_\eta)$.

Ordering and convergence:

Provided the parameters $(\sigma_0, \tau_{0,} \eta_0, \tau_\eta)$ are selected properly, we can start from an initial state of complete disorder, and the Kohonen algorithm will gradually lead to an organized representation of activation dates drawn from the input space.

There are two specialized phases of this adaptive process:

1. Ordering or self-organizing phase – During which the topological ordering of the shares vectors takes place. Typically this will take as many as 1000 iterations of the SOM algorithm, and careful consideration needs to be given to the choice of neighborhood and learning rate parameters.

2. Convergence phase – During which the feature map is fine tuned and comes to provide an accurate statistical quantification of the input space. Typically the number of iterations in this phase will be at least 500 times the number of shares in the network, and again the parameters must be chosen carefully.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

We have a spatially continuous input space, in which our input vectors live. The aim is to map from this to a low dimensional spatially discrete output space, the topology of which is formed by arranging a set of shares in a grid. Our SOM provides such a nonlinear transformation called a feature map.

Kohonens Algorithm Pseudocode:

1. Initialization – Initialize all share prices wj within date x.
2. Sampling – obtain a sample training input shares x from the input date.
3. Matching – Find the winning Share Prices I(x) with date vector closest to input date.
4. Updating–Calculate Aggregate value of shares within date $\Delta w_{ji} = \eta(t).T_{j,I(x)}(t).(x_i - w_{ji})$ and time (epoch) t dependent learning rate $\eta(t) = \eta_0 \exp(-t/\tau_\eta)$ automatic prediction is done with accurate result.
5. Continuation – Keep returning to step 2 until the share value are changing.

Kohonen SOM [5] has been used not onlyin weather prediction but also especially in forecasting stock prices, which has made a challenging task much easier. It is fast and efficient with less classification error, hence is a better predictor, when compared to Kohonen SOM as well as back-propagation networks.

C. *KOHONEN SOM NETWORK MODEL*

Kohonen SOM, is an unsupervised learning network, it uses a smaller matrix compared to Back-propagation [13]. The matrix is made from 64 columns and 500 data points for training as well as testing. The other 500 data points are used for validation. Last, Neural Works Professional II/PLUS linearly scales the data among [−0.8, 0.8] before training and testing as well as before the validation phase of the data input [22].

Similar to a BPN network, each Kohonen SOM network was trained and tested using different learning rates as well as epochs. The best network was selected using the smallest difference between the training and testing data, which finally classifies the validation data. The motivation for using this criteria was to ensure that the network chosen can predict accurately. Additionally, a poor classification rate signifies over–fitting or over–training problems. The over fit problem arises when the network model starts to 'learn' the noise inherent in the modeling data set, which leads to poor results[24].

VI. EXPERIMENTAL RESULT

A. *Daily stock Prediction Output*

B.

Classification Performance	Network Performance	Accuracy
Best	Kohonen	100%
	Naive Bayes	99%

Table 1. Classification Performance On the Network

Above Table 1 shows that the results show that the classification performance of the Kohonen SOM is the best in predicting stock prices, with Naivy Bayes Algorithm.

C. *Result*

Company name	From date	To date	Naïve bayes Predicted val.	Kohonens algorithm
Infosys	02-Feb-17	24-Feb-17	940.3	99.28
Infosys	01-Mar-17	11-Apr-17	194.93	200.18
TCS	03-Feb-17	17-Mar-17	167.16	172.41

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

TCS	07-Mar-17	10-Apr-17	173.89	201.5
IBM	05-Feb-17	12-Mar-17	159.92	165.17
IBM	01-Mar-17	10-Apr-17	207.66	212.91
Cognizant	02-Feb-17	08-Mar-17	159.18	164.43
Cognizant	07-Mar-17	10-Apr-17	169.56	174.81
Syntel	03-Mar-17	20-Mar-17	157.83	163.08
Syntel	28-Mar-17	10-Apr-17	151.4	156.65

Table 2. prediction using naive bayes and kohonens algorithm.

Above Table 2 shows that the predicted values of shares of companies in that for selected company predict the share price within two dates using naïve bayes and kohonens algorithm.

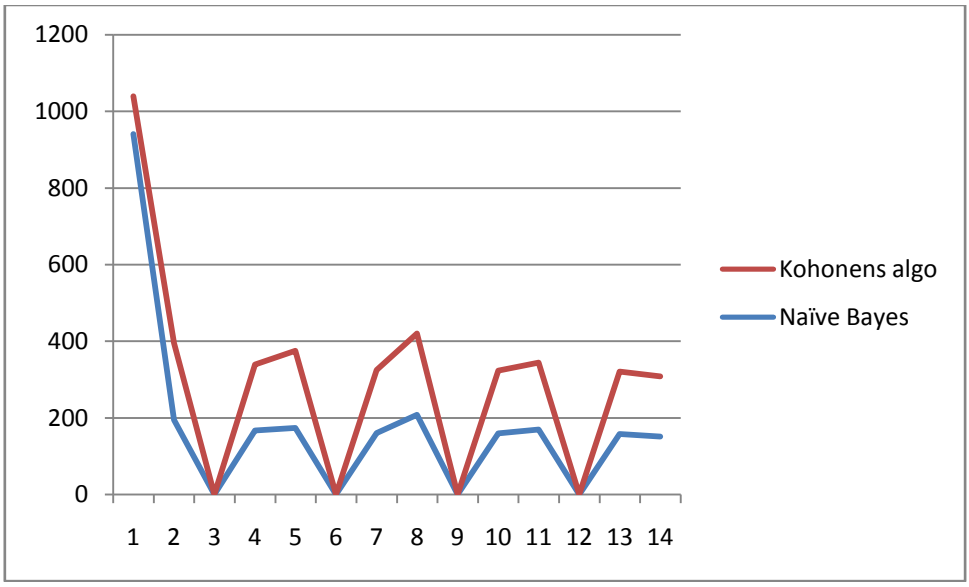


Fig 2. Naive Bayes vs. Kohonens algorithm prediction.

In the above diagram, we will exlain the basic graph of the Naive Bayes vs Kohonen's algorithm. Naive Bayes algorithm is a one of the classification technique based on Bayes Theorem with a supposition of independant along with the predictor. In this paper we use the Kohonen network as a element of one deterministic nonlinear prophecy algorithm

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

VII. CONCLUSION AND FUTURE WORK

The studies tell a high potential of Naïve Bayes Algorithm in predicting the return on investment in the share market. Already, we know the evaluation of the return on in the share market through any one of the traditional techniques. The return on investment in share market is always uncertain as well as ambiguity in nature, so that no traditional techniques will give the accurate or appropriate solution. In stock market we are providing not only Prediction for predict the future value by using naïve bayes algorithm as well as apply automation to automatically done the work of purchase along with sale the shares and give 99% result. By using Kohonen SOM in forecasting stock prices has made such a challenging task considerably easier. It is fast as well as efficient with less classification error, hence, a better predictor compared to Naive Bayes as well as gives a 100% more accurate result. Thus we conclude that the system is automatic system which is very useful for users thus it is very easy for users to handle as well as save time.We will add the security policies to the system for more security.

REFERENCES

1. Farhad Soleimanian Gharehchopogh, Tahmineh Haddadi Bonab, Seyyed Reza Khaze, " *A Linear Regression Approach To Prediction Of Stock Market Trading Volume: A Case Study*", International Journal of Managing Value and Supply Chains, Vol.4, No. 3, September 2013, pp. 25- 31
2. K. S. Ravichandran, P. Thirunavukarasu, R. Nallaswamy, R. Babu, "*Estimation Of Return On Investment In Share Market Through Ann,* " Journal of Theoretical and Applied Information Technology 2005 JATIT, pp 44-54.
3. Ruchi Desai, Prof. Snehal Gandhi," *Stock Market Prediction Using Data Mining*", 2014 IJEDR, pp 2780- 2784
4. Yoosin Kim1, SeungRyul Jeong1, Imran Ghani, "*Text Opinion Mining to Analyze News for Stock Market Prediction*", Int. J. Advance.Soft Comput. Appl., Vol. 6, No. 1, March 2014, pp 1-13
5. John A. Bullinaria,"*Introduction to Neural Networks*," Lecture 16 , 2004
6. A.D. Dongare, R.R. Kharde, Amit D. Kachare, "*Introduction to Artificial Neural Network*, July 2012.
7. G. S. Atsalakis and K. P. Valananis, "*Surveying stock market forecasting techniques - Part II: Soft computing methods,*" April 2009, pp. 5932 - 5941.
8. T. Sener, "Uncorrelated emerging equity markets," March 2008, pp. 1 – 7.
9. P. K. Padhiary and A. P. Mishra, "*Development of improved artificial neural network model for stock market prediction*", March 2011, pp. 1576-1581.
10. B. M. Aleksandra, "*Stock market prediction using technical analysis,*", 2006, pp. 125-146.
11. Nur Aini Rakhmawati, Erma Suryani," *Decision for Buying and Selling Stock with Decision Tree Algorithm*", 2006.
12. Tina R. Patil, Mrs. S. S. Sherekar," *Performance Analysis of Naive Bayes and J48 Classification Algorithm for Data Classification,*" 2007.
13. QASEM A. AL-RADAIDEH, ADEL ABU ASSAF, EMAN ALNAGI," *Predicting Stock prices using data mining Technique*." year 2013,pp.1-8.
14. Ruchi Desai, Snehal Gandhi," *Stock Market Prediction Using Data Mining*", year 2014,pp. 2780-2784.
15. K. Senthamarai Kannan, P. Sailapathi Sekar, M. Mohamed Sathik and P. Arumugam," *Financial Stock Market Forecast using Data Mining Techniques* ",year 2010,pp.1-5
16. G. S. Navale, Nishant Dudhwala, Kunal Jadhav," *Prediction of Stock Market using Data Mining and Artificial Intelligence*", year 2016,pp.9-11
17. Farhad Soleimanian Gharehchopogh ,Tahmineh Haddadi Bonab and Seyyed Reza Khaze, "*Prediction of Stock Market using Data Mining and Artificial Intelligence*" year 2016,pp.9-11.
18. Dr. Debesh Bhowmik," *STOCK MARKET VOLATILITY: AN EVALUATION*",year 2013,pp.1-18
19. Vishal Parikh, Parth Shah," Stock *Prediction and Automated Trading System*", year 2015, pp. 104-111.
20. Sayali Metkar, Akash Bhagyawant, VrushaliBagul, "*Stock Market Prediction and Automation of Sale Purchase Event using History Analysis*.", year 2013,pp. 600-602.
21. Senanu R. Okuboyejo, Daniel O. Adeyoju," *Design and Implementation of a Stock Market Monitoring System: A Case Study of the Nigerian Stock Exchange*",year 2014,pp.34-38.
22. Mark O. Afolabi, Olatoyosi Olude, "Predicting Stock Prices Using a Hybrid Kohonen Self Organizing Map (SOM)", Proceedings of the 40th Hawaii International Conference on System Sciences - 2007.
23. S. Haykin. "*Neural Network: A Comprehensive Foundation."* Prentice Hall, MA, 1999.
24. T. Brabazon. A connectivist approach to index modelling in financing markets. In Proceedings, "*Coil / EvoNet*
25. *Summer School*", University of
26. Limerick, September 2000.
27. J.R. Canada, W.G. Sullivan, and J. A. White. "*Capital Investment Analysis*", For Engineering and Management. Prentice-Hall, 1996.