



Stock market Price Prediction Using Non linear Regression Model

S.Chitradevi¹, K.Kuppusamy²

¹Research Scholar, ²Professor

Department of Computer Science and Engineering, Alagappa University,
Karaikudi-600 003, Tamilnadu, India.

¹divyavasan111@gmail.com, ²kkdiksamy@yahoo.com

Abstract— Nowadays, the companies and organization deals their business in global market. Corporate estimate their economic growth through the stock value of their product. The current capital value of cooperates connects with share market trading. Industrialists analyze their product value of current status and predict the future growth. Economic researches applied various financial data analysis method for predicting the future stock value. Linear regression is one of the common models for predicting and forecasting the stock values. Limitation of regression model is to examine the relationship between two variables. It is not satisfies the multiple independent variable with the dependent variable. For overcoming the limitation, in this paper, non linear regression model applies in to stock market data for increasing the accuracy of prediction. The implementation result shows the prediction value better than linear regression model result.

Keywords— Data mining, Stock market, Non linear regression, prediction.

I. INTRODUCTION

In current decade, the business people expand their market globally. The global market opens the trading in all over world. The growth of business reflects the growth of economic of country and work economic status. All trading process comes under in single platform that is called share market. The share market estimate the stock value of the product based on the current status of the market. The growth of capital value of the company comes to decision through the stock value of their product. The sequential flow of stock prices over a period of time extracted from the National Stock Exchange, are used in building a database and values of variables were extracted from the database to predict the future values of other variables from the use of time series data that employed moving average method. This work find out the way that how to make use of this rich data to predict stock market prices in the banking domain of Indian economy using three banks as a case study. In this paper, the stock market price predicts from the daily activity summary of sharing trading which is released by National Stock Exchange

(NSE). The scope of the work assists the economist for analysing the future of banking sector and giving the support in the decision making in stock market [2]. The predict process reduce the risk in the stock investment. The predicted results assist to manage the company resources and walk on the way to achieve the successful business. Various types of prediction techniques follows in the trading sector [10][11]. The proposed work applies the non linear regression model for predicting the stock price in forthcoming period.

II. RELATED METHODS

The data retrieved from the summary of daily and weekly activities which published by Nigerian Stock Exchange [1]. A predicting model helps to generate the data which exploit to understanding fluctuate of stock market price and that model is designed by non linear regression model, there are several types of model in non linear regression. Polynomial regression well suits to predict the future value of stock market price [5]. A data mining software tool was developed which employed the use of regression analysis through the use of time series data that employed moving average method to predict future stock market prices[8][9].

A. Non Linear Regression Analysis

Non Linear regression is one of the familiar model for predicting the upcoming values of variable based on multiple independent variables' relationship [6][7]. Basically, it assumes there is a curve that approximates the data set, and bases the predict on it.

The general form of non linear regression

$$(x_1, y_1), (x_2, y_2), \dots, (x_n, y_n)$$

Best curve fit

$$y = a_0 + a_1x + \dots + a_mx^m$$

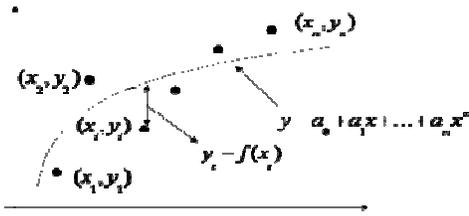


Fig. 1 Non Linear Regression Model

It is also called nonlinear polynomial model. The residual at each data point is given by

$$E_i = y_i - a_0 - a_1x_i - \dots - a_mx_i^m$$

The sum of the square of the residuals then is

$$S_r = \sum_{i=1}^n E_i^2$$

$$= \sum_{i=1}^n (y_i - a_0 - a_1x_i - \dots - a_mx_i^m)^2$$

Fit the data to the polynomial regression model

$$y = a_0 + a_1X + a_2X^2$$

The derivative of the variable obtained from the association between the current stock price, earning per share and percentage earnings ratio(P.E).

X= Percentage earnings ratio

Y= stock market price

Calculate the Percentage earnings ratio in the equation 1.

$$\text{Percentage earning (P.E.) ratio} = \frac{\text{current market price}}{\text{earning per share}} \quad (1)$$

Calculate the Earnings per share (EPS) from the below equation.

$$\text{EPS} = \frac{\text{Net income}}{\text{Total number of capital stock shares}} \quad (2)$$

III. MOVING AVERAGE METHOD

Moving average method assist to show an overall scope of the trends a dataset. It is an average of any subset of numbers. The moving average is widely useful for forecasting future trends [4]. It can be used to calculate any interval of time. For example, if company have sales for ten-year period. The method calculates a 2 year moving average, 5 year moving average and so on. In stock market analysis use this method to calculating a certain period average. It helps to see the trend

of the stock market and forecast the variance of stock market price.

An average refers the “middling” value of a set of numbers. The moving average is exactly the same, but the average is calculated a number of times for number of subsets of data. In this method, the average values calculate through the middle value of the moving average. The execution of averaging the path of curve and reduce the uncertainty values. if the stock price goes low in certain time series , the price value will be fall below the moving average. If the price goes high in particular period, the price value will be up above the moving average.

In this paper, the moving average period sets in to 3 days for calculating P.E ratio for each of the bank. For example, 3 – day average can be calculated from the given data.

The equation shows the calculation of moving average for the day of 16th march 2016

$$\frac{(\text{13th day of March} + \text{14th day of March} + \text{15th day of March})}{3}$$

In following equation show the calculation of moving average for the day of 19th march 2016.

$$\frac{(\text{16th day of March} + \text{17th day of March} + \text{18th day of March})}{3}$$

TABLE I
 THE STOCK PRICE FOR 20 DAYS OF THREE BANKS

Date	Canara Bank	Canara bank P.E ratio
2016-02-19	171.15	99.10413
2016-02-22	167.8	99.22998
2016-02-23	162.65	99.14536
2016-02-24	163.35	99.41334
2016-02-25	160.55	98.85538
2016-02-26	161.25	99.80326
2016-02-29	158.45	98.08202
2016-03-01	165	101.3278
2016-03-02	177.2	100.4279
2016-03-03	178.45	100.6662
2016-03-04	184.3	101.3691
2016-03-08	179.5	98.80704
2016-03-09	180.15	101.142
2016-03-10	180	100.0948
2016-03-11	182.25	101.1454
2016-03-14	185.15	100.3056
2016-03-15	186.6	99.80415
2016-03-16	187.6	101.187



2016-03-17	187.2	99.14912
2016-03-18	190.3	100.875

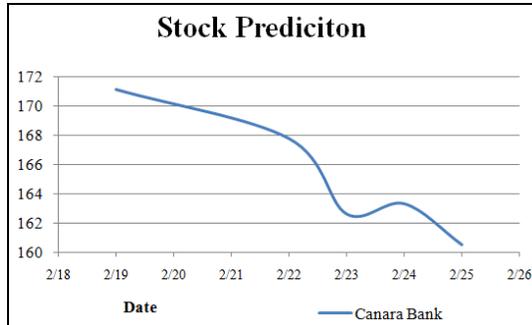


Fig. 2 the flow of stock price from 19/2/2016 to 18/3/2016

IV. IMPLEMENTATION AND RESULTS

Non linear regression model implement in the dataset named as CANBK (canara bank dataset). It consists of historical prices of canara bank stock market price. The dataset has extracted from the Quandl.com website where NSE stock dataset has published. The dataset contains following attributes such as Date, Open, low, high, last, close, total trade, turnover net trading and . The 'close' attributes value they represent current stock market price of the day. For experiment purpose, the stock price value extracted from the dataset for twenty days. The Last twenty day records extracted from the dataset. Earnings per share calculate from the values of turnover and total trade in equation 1. P.E ratio calculates from the values of stock price and Earning per share in the equation 2. Table II shows the stock market price and P.E. ratio value of the canara bank.

Fig 1 shows the fluctuation of stock market price in ten days period. After executing the nonlinear regression model in to the dataset, the table 2 show the predicted value for the 5 days from 20th march 2016 to 24th march 2016. New P.E ratio has calculated by moving average method in the equation 3.

TABLE II
 PREDICTED STOCK VALUE FOR 5 DAYS

Date	Canara Bank	Canara bank P.E ratio
2016-03-20	193.5	100.4037351
2016-03-21	192.4	100.1426311
2016-03-22	193.54	100.4738019
2016-03-23	194.62	100.340056
2016-03-24	195.04	100.4037351

Fig 2 shows the fluctuation of stock market values between next 5 days.

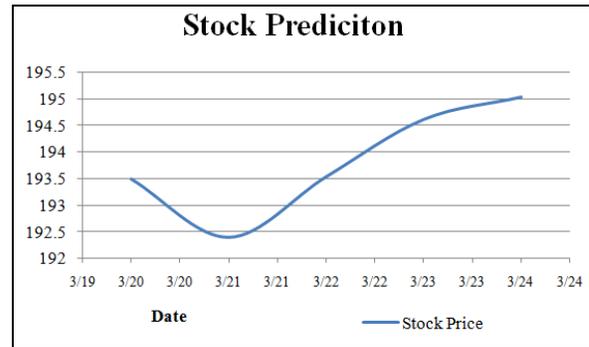


Fig. 3 Graph of Predicted stock price

V. CONCLUSIONS

Prediction model is one of the important for analyzing the scope of information for future trend. A prediction system has been designed that exercise data mining technique to deliver periodically forecasts the stock market prices. In the proposed work, non linear regression model has implemented in to the dataset which has taken from National Stock Exchange of India. The proposed model predicts the stock market price value for next 5 days. And P.E ratio value has been derived from moving average method. The results have been shown in the table and plotted the results in the graph. In future, various types of non linear regression model will be examined and compare the results with other existing models.

REFERENCES

- [1] Avijan Dutta, Gautam Bandopadhyay, Suchismita Sengupta, "Prediction of stock performance in indian stock market using logistic regression", International Journal of Business and Information, Vol 7, No 1 (2012)
- [2] Ravindranath, B. (2003). Decision Support Systems and Data Warehouses. New Delhi: New Age International Limited. ISBN: 81-224-1454-0.
- [3] Kannan, K.S., Sekar, P.S., Sathik, M.M. and Arumugan, P. (2010). Financial Stock Market Forecast using Data Mining Techniques. Hong Kong: Proceedings of International MultiConference of Engineers and Computer Scientist 2010 Vol. I. IMECS 2010. ISBN: 978-988-17012-8-2.
- [4] Adejumo Wahab Adewuyi, Modelling Stock Prices with Exponential Weighted Moving Average (EWMA), Journal of Mathematical Finance, Vol.6 No.1, February 2016
- [5] R. Chicheportiche, J.-P. Bouchaud, A nested factor model for non-linear dependencies in stock returns, Quantitative Finance Volume 15, Issue 11, 2015
- [6] Douglas C. Montgomery, Elizabeth A. Peck, G. Geoffrey Vining, Introduction to Linear Regression Analysis, Wiley Publication 2012, ISBN:978-0-470-54281-1
- [7] Samprit Chatterjee, Ali S. Hadi, Regression Analysis by Example, Wiley Publication, 2012, ISBN:978-0-470-90584-5
- [8] Wuthrich, B., Cho, V., Leung, S., Permunetilleke, D., Sankaran, K., Zhang, J., and Lam, W. (1998). Daily Stock Market Forecast from Textual Web Data.



- [9] K.-R. Müller, J. Smola, et al., Predicting time series with support vector machines, ICANN'97, Lecture Notes in Computer Science pp 999-1004
- [10] S. Goldberger, Best Linear Unbiased Prediction in the Generalized Linear Regression Model, Journal of the American Statistical Association Vol. 57, No. 298 (Jun., 1962), pp. 369-375
- [11] Michel Ballings, Dirk Van den Poel, et al., Evaluating multiple classifiers for stock price direction prediction Volume 42, Issue 20, 15 2015, Pages 7046-7056

