A Novel Approach in Analyzing Market by Boundary Evaluation

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Abstract: A prominent factor that impacts the country's current economy requires continuous analysis and observation of OTC market. Diverse techniques are implemented by investors all over the world to identify the market trend. The main factor that influences the trend is the accuracy of the stock price in the following period, to make a good investment. There are various forecasting methods that were tried and tested to get the accurate value. The important aspect for every investor is to get high returns on their investments. Various techniques are used to predict stocks in which technical and fundamental analysis are one among them. This paper is explaining algorithms to analyze and predict future stock market trend using boundary value analysis. Random Forest Regression technique was found to be more accurate than Long Short Term Memory Networks, Support Vector Machine techniques. The results will be used to analyze the stock prices and their prediction in depth in future research efforts.

Keywords: *Predict, Random Forest, LSTM, SVM, Regression*

I. INTRODUCTION:

The stock market around the world is highly fluctuating and always volatile. It is a challenging decision for the investors to invest in shares or to sell their shares. Investors around the world use numerous techniques to understand and analyze the share value. Every time the investor invests in the market, huge risk and money is put at stake. In order to analyze stock market trend, various prediction algorithms and models have been proposed. Forecasting is a method that generates a set of output with a input in the form of variables. The variables are usually historical data from various market values. Basically, forecasting is done based on the past data to guess the future data. The past data for analysis is taken from stock market databases available online. LSTM, RF, SVM techniques have been used in this research paper to predict and analyze the stock market price. Neural networks are more popular and used to perform such task. Forecasting using neural network is the best mechanism to find approximation of mapping between the input and output through training. Later to predict the future market value trained neural network can be used. A special case in neural networks named LSTM networks is used in this paper. Random Forest and Support Vector are used for forecasting the market prices. The analysis

and prediction of market values is broadly categorized into fundamental and technical analysis. The corpus required for the analysis was taken from various web resources such as yahoo finance, money control and nifty stock data. The analysis is performed in three phases being collecting fundamental and technical data from the internet, simulating trading strategies, evaluating and visualizing trading strategies.

II. RELATED WORK:

Data is huge; these days we are seeing a rapid-explosion of stock quotes and textual-data. They are provided from all different-sources. Forecasting market trend is important since the basic management process that includes going from the vendor raw-materials to finished goods into the hands of the customer consumes a lot of time. Many of the firms do not wait for the market to elevate and then give a reaction. Instead, they make-up their mind and plan accordingly to future demand so-that they can react spontaneously to customer's order as they arrive. Generally, demand forecasts-lead to good-ops-and great-levels of customer satisfaction, while bad forecast will definitely-lead to costly ops and worst-levels of customer satisfaction. As a simple rule, when we see the future, the more blurry our vision will become distant forecasts will be inaccurate that short-range forecasts. In this paper, we-are trying to review the possibility to apply two-known techniques which is neural-network and data-mining in stock market prediction. Extracting useful information from a huge amount of data set and data mining is also able to predict future trends and behaviors through neural network. Combining these methods could make the prediction much suitable and reliable. A key factor for predicting market trend is neural networks as they are trained in nonlinear-mappings between inputs and outputs. It might be possible to perform better than conventional methods and other computer based methods with the neural-networks ability to learn-nonlinear, chaotic-systems. Basically, the main objective of this paper is to collect stock market trend for previous years and then accordingly predict the results for the predicting what would happen in future. So, for we are going to use two of the well-known techniques neural network and data mining for market trend prediction. Extracting refined data from a huge amount of data set and mining that data to predict future trends and behaviors through neural network. Hence, combining both these techniques could make the prediction more suitable and much more reliable. As far as the solutions for the above problems, the answer depends on which way the forecast is used for. So the

procedures that we will be using have proven to be very applicable to the task of forecasting product demand in a logistics system. Many techniques, which can prove useful for forecasting-problems, have shown to be inadequate to the task of demand forecasting in logistics systems. The rich variety of on-line information and news make it an attractive resource from which one can get data. Stock market predictions can be aided by data mining and analysis of such financial information. Numerical stock quotes collected from yahoo finance and reuters.com are available in organized manner but we have to apply some techniques to parse textual news information about Indian stock market is collected from websites released daily.

III.PROPOSED SYSTEM

The main objective of this work is to optimize the inputs of Random forest classifier to give an efficient result by genetic algorithm. The model has five steps such as Corpus preparation, preprocessing the data, training, testing and accuracy calculation. The first step involves collecting the data from various sources like yahoo finance, nifty stock exchange and also handling missing and normalizing the values in accordance with [20]. The scenario is illustrated in Fig 3.1. The data is subjected to be preprocessed and normalized and is divided into a training set and a test/ validation set, the splitting is based upon the percentage split. The training set is given to the algorithm which it decomposes into two classes such as positive and negative, the main parameters of random forest are K-values, N-trees and M-tree, the RF classifier generates number of trees, these N-trees and M-tree values are decomposed by class decomposition and the test/validation set is given to the fit random forest classifier and finally the optimized random forest is obtained.
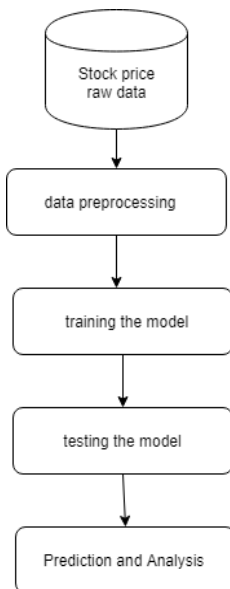

Fig: 3.1: Architecture of the system

IV. COMPARATIVE ANALYSIS OF ALGORITHMS

The market prediction by boundary analysis is solved by naturally extending the regular binary classification for some algorithms such as neural networks, support vector machine,
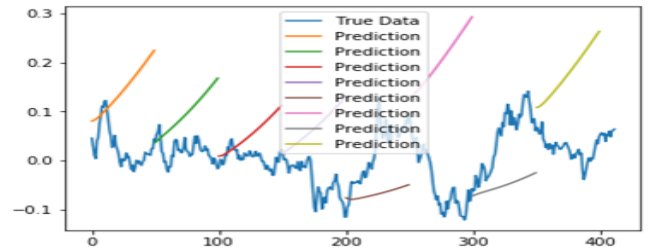
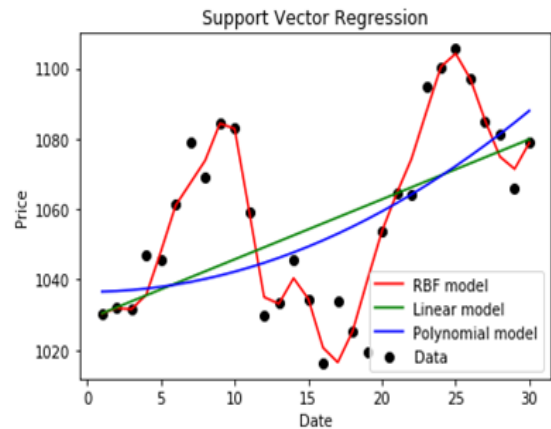decision trees, deep neural networks, k-Nearest Neighbor, Naive Bayes. In our paper analysis is done by long short term networks as shown in Fig 4.1,support vector machine by regression is shown in Fig 4.2.A comparison is made among SVR_RBF,SVR_LIN and SVR_POLY is shown in Fig 4.3 and finally,RF regressor plot and metrics are shown in Fig 4.4 and Fig 4.5 respectively.

Fig 4.1: Results with LSTM

Fig 4.2: Results with SVR

	SVR_R BF	SVR_LI N	SVR_P OLY
Accuracy	99.63%	98.25%	98.28%
mean_sq uared_er ror	43.610	532.028	508.922
explaine d_varian ce_score	0.935	0.222	0.263
mean_ab solute_er ror	3.835	18.570	18.266
r2_score	0.934	0.206	0.241
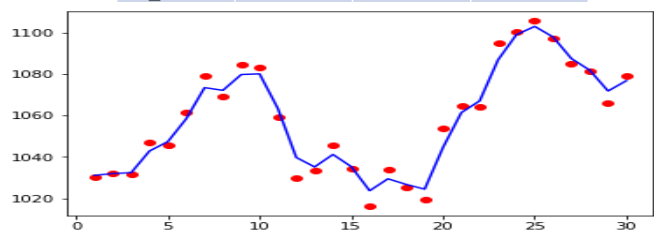
Fig 4.4: RFR Plot

Accuracy:	99.67 %.
mean_squared_error	18.922044308078828
explained_variance_score	0.971851860916952
mean_absolute_error	3.5186849999993757
r2_score	0.9717851275651923

Fig 4.5: RFR Metrics

There are number of methods to measure the performance of systems. In which, often we compute errors by Root mean squared error and relative absolute error. In order to evaluate the performance of the market price, four different measures have been calculated. They are accuracy, mean absolute error (MAE), mean squared error (MSE), root mean square score (R^2), explained variance score (EVS). These measures are used to evaluate the rate of error in the market price.MAE is a quantity used to measure closeness of predictions to the eventual outcomes. Root mean squared error is most popular method which evaluates the performance of any system. RMSE is another frequently used measure which differentiates between predicted and the actual values. The sample data has been tested on Windows 10 operating system. We have used Anaconda Python Distribution tool for preprocessing and evaluation of the stock. From this analysis, it is found that the most accurate prediction results have shown in the above figure 4.4. By comparing ,it is found that the random forest regression is the best suited method for predicting the stock prices.

V. CONCLUSION:

Boundary evaluation of the Stock market prediction has at all times been tough work for analysts. Thus, we attempt to make use of vast corpus data to forecast the stock market indices. we joined both techniques of textual mining and numeric time series analysis the accuracy in predictions can be achieved. Neural network is qualified to predict market upcoming trends. Financial analysts, investors can use this prediction model to take trading decision by observing market behavior. In this paper, we have analyzed and applied through different algorithms. By using performance metrics we have compared these algorithms, and found that Random Forest Regressor is best to predict future stock price more accurately than the others. This analysis is used to reduce the percentage of error in prediction. In a highly volatile trend that can be found in Indian Market the performance levels of the various functions studied in the paper are highly efficient. We believe that this paper gives a promising direction to the study of market predictions and their performance measures. More work on refining noisy data will definitely produce better results. Enhancing in the preprocessor unit of this system will help in refining and normalizing data that gives more accurate results in stock market. By integrating fundamental analysis to technical analysis we can elevate the accuracy. This will be helpful in other researches like sentiment analysis, sarcasm detection by web feeds.

VI. REFERENCES

[1] Abhyankar, A., Copeland, L. S., & Wong, W. (1997). "Uncovering nonlinear structure in real-time stock-market indexes: The S&P 500, the DAX, the Nikkei 225, and the FTSE-100". Journal of Business & Economic Statistics, 15, 1–14.

[2] Achelis, S.B., Technical analysis from A to Z, IL: Probus Publishing, Chicago, 1995.

[3] Aiken, M. and M. Bsat. "Forecasting Market Trends with Neural Networks." Information Systems Management 16 (4), 1999, 42-48.

[4] Atiya, A. F, E1-Shoura, S. M, Shaheen, S. I and El-Sherif, M. S. "A comparison between neural network forecasting techniques case study: river flow forecasting," in IEEE Transaction Neural Networks pp. 402-409, 10-2, 1999.

[5] Brock,.W, Lakonishok.,J, and Lebaron,B, "Simple technical trading rules and the stochastic properties of stock returns", Journal of Finance, vol. 47, 1992, pp. 1731-1764.

[6] Carlson, W. L., Thorne, B., "Applied statistical methods", published by Prentice Hall, Inc., 1997.

[7] Chang, P.C., Wang, Y. W. and W. N. Yang. "An Investigation of the Hybrid Forecasting Models for Stock Price Variation in Taiwan." Journal of the Chinese Institute of Industrial Engineering, 21(4), 2004, pp.358-368.

[8] Chi, S. C., H. P. Chen, and C. H. Cheng. A Forecasting Approach for Stock Index Future Using Grey Theory and Neural Networks. IEEE International Joint Conference on Neural Networks, (1999), 3850-3855.

[9] Colby, R.W., (2003). The Encyclopedia of Technical Market Indicators. New York: McGraw-Hill.

[10] http://www.nseindia.com/content/equities/scripvol/datafiles/01-01-2007-TO-12-10-2011INFYALLN.csv accessed on 12/10/2011.

[11] National Stock Exchange of India, http://www.nseindia.com/content/us/fact2011_sec1.pdf

[12] Kimoto, T., and K. Asakawa Stock market prediction system with modular neural network. IEEE International Joint Conference on Neural Network, (1990).1-6. [13] Lee, J. W. Stock Price Prediction Using Reinforcement Learning. IEEE International Joint Conference on Neural Networks, (2001). 690-695.

[14] Mizuno, H., Kosaka, M., Yajima, H. and Komoda N., "Application of Neural Network to Technical Analysis of Stock Market Prediction", Studies in Informatic and Control, 1998, Vol.7, No.3, pp.111-120.

[15] Murphy, J.J. Technical analysis of the Futures Markets: A Comprehensive Guide to Trading Methods and Applications, Prentice-Hall, New York, 1986.

[16] Murphy, J.J. Technical analysis of the financial markets, Prentice-Hall, New York, 1999.

[17] Pan, H.P. "A joint review of technical and quantitative analysis of the financial markets towards a unified science of intelligent finance". Proc. 2003 Hawaii International Conference on Statistics and Related Fields, June 5-9, Hawaii, USA, 2003.

[18] Refenes, AN, Burgess, N and Bentz, Y. "Neural Networks in Financial Engineering: A study in methodology," in IEEE Trans on Neural Networks, pp. 1222-1267, 8(6), 1997.

[19] Refenes, Zapranis, and Francis, (1994) Journal of Neural Networks, "Stock Performance Modeling Using Neural Networks: A Comparative Study with Regression Models," Vol. 7, No. 2, 375-388.

[20] Steven B. Achelis "Technical Analysis from A-To-Z," 1st

Ed. Vision Books, NewDelhi, 2006.

[21] Swales, G.S. and Yoon, Y.: "Applying artificial neural networks to investment analysis". Financial Analysts Journal, 1992, 48(5).

[22] Voelker.D, Orton.P, Adams.S, "Statistics", Published by Wiley, 2001.