

Stock Price Prediction Using Regression And Artificial Neural Network

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ABSTRACT

Stock markets are highly volatile and play a vital role in terms of contribution to the economy. Most stockbrokers use feedbacks within their community as well as trends of stocks to advice clients. This paper aims to explore the rereach and developement in stock market prediction applications implementations using regression analysis and artificial neural networks. The algorithm was implemented on a 210 days data of a particular stock and 30 days testing data. This system presents two approaches to analyze the data from stock market. One of them is regression analysis of data from widely available stock market records to predict future stock prices. The other approach is artificial neural network method. The proposed system will make use of neural networks with back propagation for parallel and distributed computing and regression analysis to prevent system failure in case of sudden fluctuation in the stock price due to uprecedented events such as natural calamity,scams, etc . The use of back propagation ensures that error is reduced and accuracy is improved.The system does not guarantee a greater accuracy however, it certainly prevents the system from failing by using regression analysis for irregular inputs.

Keyword:- Prediction methods, Stock markets, Mean Square Error, Data warehouses, regression analysis, stock price, Neural Network.

1. INTRODUCTION

From the earliest starting point of time it has been man's shared objective to make his life simpler. The overall idea in the public eye is that riches brings solace and extravagance, so it is not shocking that there has been so much work done on approaches to foresee the business sectors. Different specialized, principal, and measurable pointers have been proposed and utilized with shifting outcomes. Be that as it may, nobody method or blend of procedures has been sufficiently effective. With advancement in field of neural networks many researches are trying their best to unravel the hidden trends and patterns in the stock market. A stock market is a public market for the trading of company stock and derivatives at an agreed price; these are securities listed on a stock exchange as well as those only traded privately. It is an organized set-up and members trading in stocks are registered with a regulatory body SEBI.

Share market sets prices according to supply and demand. Stocks that are in demand will increase their price, whereas as stocks that are being heavily sold will decrease their price. Companies that are permitted to be traded in this market place are called "listed companies". Investors in stock market need to augment their profits by purchasing or offering their investments at a suitable time. Since stock market information are very time-variation and are regularly in a nonlinear example, anticipating the future cost of a stock is exceptionally testing. With the expansion of monetary globalization and advancement of data innovation, investigating stock market information for anticipating the eventual fate of the stock has turned out to be progressively testing. The most reliable way to

forecast the future is to try to understand the present but the amount of data available nowadays is huge and generally beyond human comprehension. Data analysis comes handy to solve this problem. Data analysis can be used to better understand the present scenario of the Stock market so as to understand and try to create a better future scope for investment.

There are many related literatures use neural network to deal with stock price prediction in domestic, such as [1],[2] except these excellent papers, most of the others choosing variables arbitrary and some of them had no economics logic. With Data analysis, we can add a degree of certainty to the unpredictable and volatile nature of stock prices. This certainty can go a long way to ensure that losses are minimized and profits are maximized. Though the predictions can never be fully accurate even a minute increase in accuracy of prediction can help a lot in terms of profitability.

2. Algorithms Used:

Anticipating stock price or financial markets has been one of the greatest difficulties to the AI people community. Various technical, fundamental, and statistical indicators have been proposed and used with varying results. Be that as it may, none of these techniques or combination of strategies has been sufficiently fruitful. The target of determining examination has been to a great extent past the ability of traditional AI research which has predominantly centered on developing intelligent frameworks that should copy human intelligence. By its tendency the stock market system is for the most part mind boggling (non-straight) and unstable.

2.1 Regression Analysis:

In statistical modeling, regression analysis is a statistical process for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between dependent variable and one or more independent variables (or 'predictors'). It helps to understand changes in dependent variable when any one of the independent variables is varied and other independent variables are unchanged. Efficiency of these algorithms can be enhanced by standardizing the data which is shown in [3], where all the real values get converted into ordinal values.

Regression analysis is a branch of Machine learning and it has been widely used in the field of artificial intelligence for prediction and forecasting. Regression analysis is also used to understand which among the independent variables are related to the dependent variable, and to explore the forms of these relationships.

$$Y = \beta_0 + \beta_1 x + \epsilon$$

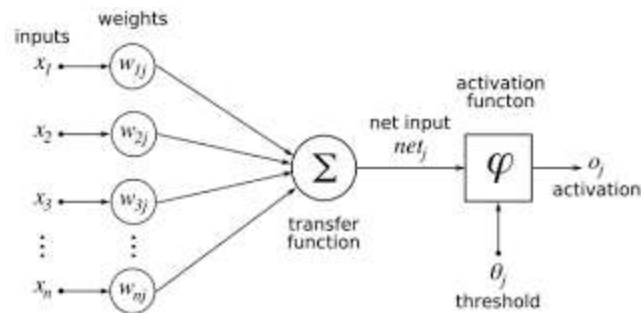
Above formula is the simplest linear regression formula. But we rarely get such a dataset and most of the times the line needs to be fitted by calculating least squares. Its formula is given below:

$$\hat{\beta}_1 = \frac{\sum_{i=1}^n y_i x_i - \frac{(\sum_{i=1}^n y_i)(\sum_{i=1}^n x_i)}{n}}{\sum_{i=1}^n (x_i - \bar{x})^2}$$

$$\hat{\beta}_0 = \bar{y} - \hat{\beta}_1 \bar{x}$$

2.2 Neural Network:

A neural network is a circuit composed of a very large number of simple processing elements that are neutrally based. Each element operates only on local information.



The artificial neuron given in this figure has N input, denoted as x_1, x_2, \dots, x_N . Each line connecting these inputs to the neuron is assigned a weight, which are denoted as w_1, w_2, \dots, w_N respectively. The threshold in artificial neuron is usually represented by θ and the activation corresponding to the graded potential is given by the formula:

$$a = \sum_{j=1}^N w_j u_j + \theta$$

The artificial neural network we train for the prediction of image and stock data has an arbitrary number of hidden layers, and arbitrary number of hidden nodes in each layer, both of which the user decides during run-time.

3. CONCLUSIONS

The proposed model use regression analysis as a data mining technique and develops a system for exploiting time series data in financial institution. A prediction system has been built that uses principles and techniques of data mining on time series data for identifying and predicting patterns in present day stock markets. The use of back propagation in neural network enables us to reduce errors and improve accuracy of the system. It can be very useful for the investors to use this to gain maximum profit. As future scope of stock market is limitless, the demand for its data analysis will be ever increasing. By changing only the training data, the proposed system can be used for any stock markets of other countries. With few alterations, the system can be used for various purposes such as predicting prices of commodities like gold, predicting the fuel consumption of a vehicle as well as monitoring health of a patient.

4. REFERENCES

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