Machine Learning In Stock Price Trend Forecasting

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Abstract: Stock market or Share market is one of the most complicated and sophisticated way to do business. Small ownerships, brokerage corporations, banking sector, all depend on this very body to make revenue and divide risks; a very complicated model. However, this paper proposes to use machine learning algorithm to predict the future stock price for exchange by using open source libraries and preexisting algorithms to help make this unpredictable format of business a little more predictable. We shall see how this simple implementation will bring acceptable results. The outcome is completely based on numbers and assumes a lot of axioms that may or may not follow in the real world so as the time of prediction.

1. INTRODUCTION

In the finance world stock trading is one of the most important activities, Stock market prediction is an act of trying to determine the future value of a stock. The technical and fundamental or the time series analysis is used by the most of the stockbrokers while making the stock predictions. The trend in a stock market prediction is not a new thing and yet this issue is kept being discussed by various organizations. There are two types to analyze stocks which investors perform before investing in a stock, first is the fundamental analysis, in this analysis investors look at the intrinsic value of stocks, and performance of the industry, economy, political climate etc. to decide that whether to invest or not. On the another side, the technical analysis it is an evolution of stocks by the means of studying the statistics generated by market activity, such as past prices and volumes.

Here, the Machine Learning (ML) approach is used to prredict the future trend of a particular company, that will be trained from the available stocks data and gain intelligence and then uses the acquired knowledge for an accurate prediction. Machine learning technique used here is called Support Vector Regression (SVR) and Linear Regression to predict stock prices for the large and small capitalizations ,employing prices with both daily and monthly time series.

The main purpose of the prediction is to reduce uncertainty associated to investment decision making. In the existing prediction called the dummy prediction, they have define some set of rules and predict the future price of shares by calculating the average price. However in the real time system, develop a financial data predictor program in which there will be a dataset storing all historical stock prices and data will be treated as training sets for the program and for the prediction compulsory internet is used to retrieve the data set and get the current price of shares of the company.

Literature Survey

In Stock Market Prediction, the aim is to predict the future value of the financial stocks of a company. The recent trend in stock market prediction technologies is the use of machine learning which makes predictions based on the values of current stock market indices by training on their previous values. Machine learning itself employs different models to make prediction easier and authentic. The paper focuses on the use of Regression and LSTM based Machine learning to predict stock values. Factors considered are open, close, low, high and volume.

Machine learning and artificial intelligence techniques are being used in conjunction with data mining to solve a plethora of real world problems. These techniques have proven to be highly effective, yielding maximum accuracy with minimal monetary investment and also saving huge amounts of time. To add to their annual income, nowadays, people have started looking at stock investments as a lucrative option. With expert guidance and intelligent planning, we can almost double our annual revenue through stock returns. That said, stock investment still remains a risky proposition for the uninitiated. Exorbitant wages of the investment experts coupled with a general ignorance pertaining to the financial matters among the public, deters many from trading in stocks. The fear of losses also acts as a deterrent to many. These facts propelled us to harness the power of machine learning to predict the movement of stocks. Using

sentiment analysis on the tweets collected using the Twitter API and also the closing values of various stocks, we seek to build a system that forecasts the stock price movement of various companies. Such a prediction would greatly help a potential stock investor in taking informed decisions which would directly contribute to his profits.

T. Mankar [2] proposes a Machine learning and artificial intelligence techniques that are being used in conjunction with data mining to solve the real world problems. These techniques have proven to be highly effective, yielding maximum accuracy with minimal monetary investment and also saving huge amounts of time. Nowadays, people have started looking at stock investments as a lucrative option. With expert guidance and intelligent planning, stock investment still remains a risky proposition for the uninitiated. Exorbitant wages of the investment experts coupled with a general ignorance pertaining to the financial matters among the public, deters many from trading in stocks. The fear of losses also acts as a deterrent to many. These facts propelled us to harness the power of machine learning to predict the movement of stocks. Using sentiment analysis on the tweets collected using the Twitter API and also the closing values of various stocks, we seek to build a system that forecasts the stock price movement of various companies. Such a prediction would greatly help a potential stock investor in taking informed decisions which would directly contribute to his profits.

P. Somani [3] proposed an intelligent stock prediction model would thus be desirable. So here, Neural Network, Hidden Markov Model and Support Vector Machine used to predict the stock market fluctuation. Neural networks and SVM are identified to be the leading machine learning techniques in stock market prediction area. Also, a model for predicting stock market using HMM is presented. Traditional techniques lack in covering stock price fluctuations and so new approaches have been developed for analysis of stock price variations. Markov Model is one such recent approach promising better results. Hidden Markov Model is a predictive model proposed to provide better accuracy and a comparison of the existing techniques is also done.

Proposed Scheme

Predicting how the stock market will perform is one of the most difficult things to do, so there are many factors involved in the prediction – physical factors vs. physhological, rational and irrational behaviour, etc . A new prediction algorithm that exploits the temporal correlation among global stock markets and various financial products to predict the next- day stock trend with the aid of SVM. Machine learning, a well-established algorithm in a wide range of applications, has been extensively applied for its potentials in prediction of financial markets. Popular algorithms, including support vector regression(SVR) and linear regression, have been reported to be quite effective in tracing the stock market and help maximizing the profit of stock option purchase.

Feature Selection

Feature selection is based on multilayer perceptron (MLP) is a class of feedforward artificial neural network. A MLP consists of at least three layers of nodes: an input layer, a hidden layer and an output layer. Except for the input nodes, each node is a neuron that uses a nonlinear activation function. MLP utilizes a supervised learning technique called backpropagation for training. Its multiple layers and non-linear activation distinguish MLP from a linear perceptron. It can distinguish data that is not linearly separable.

Model creation Module

For predicting the stock market ,Machine learning techniques like SVR and Linear Regression is used.

Linear Regression

The most basic machine learning algorithm that can be implemented on this data is linear regression. The linear regression model returns an equation that determines the relationship between the independent variables(x) and the dependent variable(y).

System Analysis

Compared to stock trend, the exact increment in stock index may provide more information for investment strategy. This means the classification problem now evolves to a regression problem. For finding the performance of this model, square root of mean square error (RMSE) is used as a criteria, which is defined as the standard deviation of the residuals (prediction errors). Residuals are a measure of how far from the regression line data points are; RMSE is a measure of how spread out these residuals are. In other words, it tells you how concentrated the data is around the line of best fit.
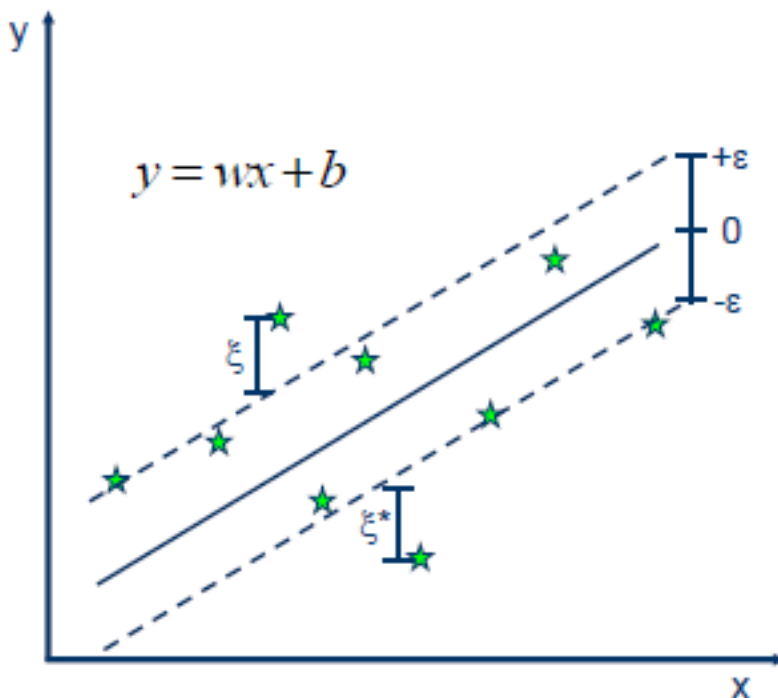
Figure 1: SVR Graph

Conclusion

Stock Market Prediction , a system used to predict the future trend of a particular company. Here, the data is collected from different global financial markets with machine learning algorithms in order to predict the stock index movements which contains the different attributes. Selecting algorithm is mainly depend on the dataset therfore SVM algorithm is taken here , it works based on the large dataset value ie (historical data) which contains bundle of datas which is collected from internet. Also, SVM does not give a problem of over fitting. Various machine learning based models are proposed for predicting the daily trend of Market stocks. Numerical results suggest the high efficiency. The model generates higher profit compared to the other machine learning techniques. Support vector regression and linear regression are very good at predicting Market Fluctuations if trained with sufficient amount of data. The results are very accurate and the error rate is minimal. The proposed system with SVR based prediction method the system's error rate is close to not more than 10% which implies a very high 90 % prediction accuracy.

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