Stock Market Trend Prediction Using KNN Algorithm

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Abstract

Stock prediction has always been a challenging problem for statistics experts and finance. The main reason behind this prediction is buying stocks that are likely to increase in price and then selling stocks that are probably to fall. Generally, there are two ways for stock market prediction. Fundamental analysis is one of them and relies on a company's technique and fundamental information. In this paper author is evaluating performance of KNN(KNearest Neighbor) supervised machine learning algorithm. 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 other financial instrument traded on a financial exchange. The programming language is used to predict the stock market using machine learning is Python. In this paper we propose a Machine Learning (ML) approach that will be trained from the available stocks data and gain intelligence and then uses the acquired knowledge for an accurate prediction. In this context this study uses a machine learning technique called KNearest Neighbor to predict stock prices for the large and small capitalizations and in the three different markets, employing prices with both daily and up-to-the-minute frequencies.

INTRODUCTION:

Problem Statement

Stock market movement has always been ambiguous for investors because of various influential factors. This study aims to significantly reduce the risk of trend prediction with machine learning and deep learning algorithms. Stock Market prediction remains a secretive and empirical art. Few people, if any, are willing to share what successful strategies they have. A chief goal of this project is to add to the academic understanding of stock market prediction. The hope is that with a greater understanding of how the market moves, investors will be better equipped to prevent another financial crisis. So we have choosen this statement to find the accurate value of the future stock. The project will evaluate some existing strategies from a rigorous scientific perspective and provide a quantitative evaluation of new strategies.

OBJECTIVE:

My goal is to find correlation between some features I can measure about the

company and the stock price. An intelligent investor might have observed, however, that the stock price is not exactly related to business performance. Instead, it can be influenced by numerous factors such as large and small economic events, public perception, expectation of change, new trends in products, new trends in consumer behaviour and many others. This leaves me in a room full of noise and statistical biases due to the existence of factors I cannot measure. Staying true to my objective, I am going to leave this notoriously strong opponent, stock price prediction, in sight for the time being and focus on predicting the area where I have more control — next year's income. I will come back to predicting the stock price once I establish a solid foundation in my understanding of what drives the market. tion Using KNN Algorithm Next year's income is a simpler problem to tackle because it has direct relationship with companies' fundamentals. It is a good place to start to get familiar with the data and see whether financial information has any predictive power when it comes to anticipating financial performance. Entire companies rise and fall daily based on the behaviour of the market. Should an investor be able to accurately predict market movements, it offers a tantalizing promises of wealth and influence.

IMPLEMENTATION:

In our research, we use Torch7 framework to build and train our model. Torch7 is a numeric computing framework and machine learning library based on Lua . The reason why we chose Torch7 is it has three considerable advantages: fast, easy to build and train neural networks and capability to be extended. CUDA is a parallel computing platform and application programming interface (API) model invented by NVIDIA. It enhances computing performance by using CUDA enabled graphics processing unit (GPU). Over the last decade, GPUs have accelerated applications in various fields (e.g. Bioinformatics , Graph and Tree Traversal). Training a Recurrent Neural Network is time consuming since its complex internal structure. CMRCET B. Tech (IT) Page No 6 Stock Market Trend Prediction Using KNN Algorithm Even though we use relatively small training sample set (3,000 samples), traditional CPU computing cost too much time than we expect. In our research, with implementation of CUDA computing, the training and tuning process have been significantly accelerated.Dataset ―Financial forecasting is an example of signal processing problem which is challenging due to high noise, small sample size, non-stationarity, and non-linearity‖. To overcome these difficulties, we optimize the input data under two

principles: increasing the sample size within a short real time range; augment number of features. We randomly choose six stocks from different industry: Black Rock, Inc.(BLK), Alphabet, Inc.(GOOGL), QUALCOMM, Inc.(QCOM), Exxon Mobil Corp.(XOM), International Business Machines Corp.(IBM), and JPMorgan Chase & Co. (JPM). Among those, BLK belongs to asset management industry; GOOGL and IBM are from information technology industry; QCOM is in communication equipment industry; XOM belongs to energy industry; and JPM is from banking industry. We use hourly historical stock data from 07/08/2013 to 05/11/2015 (9:30 a.m. to 16:00 p.m. Eastern Time) from IQFeed.net. The data size of each is stock is 3,703, and the first 300 samples and last 3 samples are used as past stock information as features and prediction target respectively. The size of training set is 3,000 and size of testing set is 400. To optimize input data, we create 369 features with target stock data, stock index data and competitor stock data. Stock index data is the value of a category of the stock market, it is calculated by the weighted average of selected stock's price. In our research, we use NASDAQ and S&P 500 index. Two competitors are chosen for each target stock according to finance.yahoo.com. In certain applications such as, speech

recognition, handwriting recognition or predictions as in our research; classification or prediction results at time t can be more accurate if one can account for what has been passed through the system earlier times.
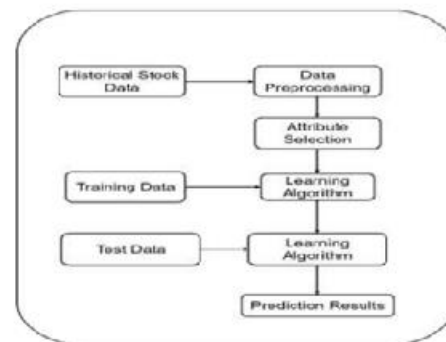

Fig.1: Linear regression prediction flow chart

PROPOSED SYSTEM:

Objective of Proposed Model:

The main reason behind this prediction is buying stocks that are likely to increase in price and then selling stocks that are probably to fall. Entire companies rise and fall daily based on the behaviour of the market. Should an investor be able to accurately predict market movements, it offers a tantalizing promises of wealth and influence. It is no wonder then that the Stock Market and its associated challenges find their way into the public imagination every time it misbehaves. As we are using a supervised learning algorithm called KNN algorithm. It is a very efficient algorithm. It is robust when we give huge amount of noisy data. By using this

algorithm we get the more accuracy in the prediction of stock market trend. The main objective of our model is to give more accurate prediction. The hope is that with a greater understanding of how the market moves, investors will be better equipped to prevent another financial crisis. So we have choosen this statement to find the accurate value of the future stock. The project will evaluate some existing strategies from a rigorous scientific perspective and provide a quantitative evaluation of new strategies.

Advantages Of Proposed System:

- Stock Price Prediction using machine learning helps you discover the future value of company stock and other financial assets traded on an exchange.

- The entire idea of predicting stock prices is to gain significant profits.

- For predicting next day change in the stock value, KNN is very powerful in numeric prediction problems because it can process relation between the numeric data.

- The major advantage of this method is that it is high in interpretability as the user can know which factor influences the price of stock more and by how much.

KNN – K Nearest Neighbour:

- K-Nearest Neighbour is one of the simplest Machine Learning algorithms based on Supervised Learning technique.

- K-NN algorithm assumes the similarity between the new case/data and available cases and put the new case into the category that is most similar to the available categories. K-NN algorithm stores all the available data and classifies a new data point based on the similarity. This means when new data appears then it can be easily classified into a well suite category by using K- NN algorithm.

- K-NN algorithm can be used for Regression as well as for Classification but mostly it is used for the Classification problems.
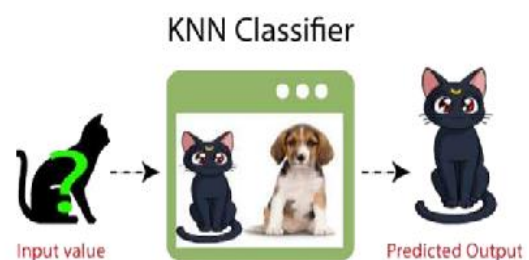

Fig.2: KNN Classifier

RESULTS :

Comparison of Existing Solutions Amazon, the monthly mean, and quarterly mean were calculated for both the actual price and the predicted price of AMZN for the year 2017. In order to make the first

comparison between the predicted data and the actual data, the following bar chart plots are produced.
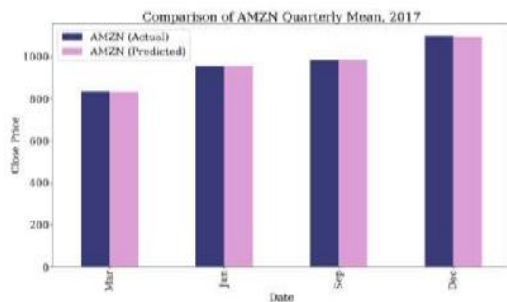

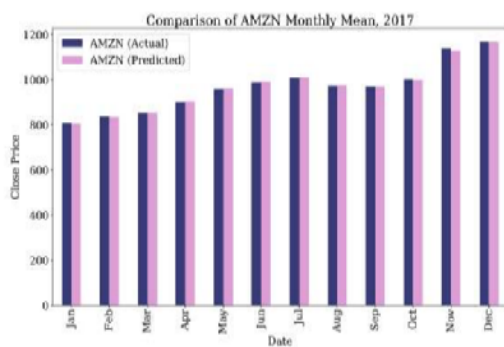Fig3: Comparison of AMZN Quarterly Mean

Fig4: Comparison of AMZN Monthly Mean

CONCLUSION:

In this paper, we proposed by comparing all of these algorithm values by percentage and depicted in the table and also represented in the graphical format we got the highest value for KNN algorithm which is the best algorithm for our purpose work and will be the best fit for prediction purpose. We implemented Random forest, Linear regression, and KNearest Neighbor algorithms which are supervised algorithms. We have implemented all three algorithms which have been functional for the stock prediction, as we have calculated

the result for all different algorithms, we got to know that K-NN algorithms are the best and more suitable for prediction purpose. Entire companies rise and fall daily based on the behaviour of the market. Should an investor be able to accurately predict market movements, it offers a tantalizing promises of wealth and influence. It is no wonder then that the Stock Market and its associated challenges find their way into the public imagination every time it misbehaves. The aim of this research is to improve the statistical fitness of the proposed model to overcome a KNN problem due to its computation approach. We have compared a KNN model with four standard algorithms on the problem of predicting the stock price trends. Our results showed that the proposed KNN model leads to significantly better results compared to the other classification algorithms. It is simple to implement. It is robust to the noisy training data. It can be more effective if the training data is large. Compare to various machine learning algorithms, KNN algorithm given us more accurate results.

FUTURE ENHANCEMENT:

In future we can implement this for the accurate prediction of stock value. Where as we can use various machine learning algorithms for the future enhancement of this project. By predicting the accurate stock value no one will loose the money in

which they have invested. By this project we don't need of any traders or predictors to be followed.

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