STOCK MARKET PREDICTION SYSTEM USING MACHINE LEARNING APPROACH

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ABSTRACT

This document presents a web application for predicting the best outcome of the stock market prices for different companies and its users who like trading and love to invest in stocks. A Back-propagation neural network is used along with an artificial neural network to determine the parameters and to obtain high accuracy in prediction. In, this document we are going to represent a more suitable method to predict the stock movement with higher accuracy.

The most essential thing is the data-set for the prediction of stock prices hence it is our basic requirement and so we are using the previous data-set of the stock market prices. Hence, our admin can upload stock price history. It also focuses on data pre-processing. Secondly, after pre-processing the data, the system reads stock price history and gives input to the Back-propagation algorithm. Back-propagation gives output as the final predicted rate comes.

The system can get the output of the prediction list of stock price and graph of prediction table like that user can view the final predicted result.

KEYWORDS: Neural Network Back-Propagation; Gradient Descent; Prediction; Stock

INTRODUCTION

In recent years the stock market has played a major role in creating an event for people all around the globe to cooperate and participate in economic activities, especially investing in the stock market. Different types of stock trading are available. Risks are involved in trading but if the company is able to generate huge profits then the investor will also earn huge profits.   Benefits and risk runs hand in hand with each other. So the current movements of the stock market are predicted based on yesterday's stock price or previous history of the stock market.

 Economic conditions such as monetary policy indicated by the amount of money in circulation, interest rates, fiscal policy, or taxes plays a vital role in stock price movements. The stock market keeps on fluctuating and so is the performance of the stock, which became one of the factors of consideration to determine the preferred stock investors. A few years ago linear regression, time-series analysis, and chaos theory methods are used for predicting the movements in the stock market. There are still some errors in the prediction when these techniques are used. Therefore, for predictions machine learning methods such as neural networks and fuzzy system has been used for predicting the movements of the stock market and to find the solution of the problem.

REVIEW OF LITERATURE

Risul Islam Rasel, Nasrin Sultana and Nasimul Hasan[1] researched on "Financial instability analysis using ANN and feature selection technique: Application to stock market price prediction". In this research they have shown that the ANN model is better than other SVM or LR models. Accuracy can be increased by using multiple attributes. Some disadvantages are overfitting problems that may occur and the time required for prediction is more than the other models.

CHAN Man-Chung, WONG Chi-Cheong and LAM Chi-Chung[2] researched on "Financial Time Series Forecasting by Neural Network Using Conjugate Gradient Learning Algorithm and Multiple Linear Regression Weight Initialization". They had used two learning algorithms and a two-weight initialization method for comparison. Prediction of the stock market can be done with both the algorithm and initialization method and conjugate gradient learning with multiple linear regression weight initialization method is used to enhance the performance of the back-propagation .

Amin Mughaddam[3] proposed " Stock market index prediction using artificial neural network". In this paper the author has used (ANN) for forecasting the daily stock exchange rates. 80% of data has been used for training and remaining the 20% is used for testing. The author has used a back-propagation algorithm to train his data.

M. Hashem **Pesaran[4]** evaluated the potency of the use of parameters such as the average movement of the closing price, the momentum of closing prices on the capital market in Turkey. The author has used Artificial Neural Network to explain the parallel relationship between industrial implication and stock price. Harmony Search approach (HS) and Genetics Algorithm are used as the most effective selection approach in technical indicators.

Akhter Mohiuddin Rather[5] researched on "Recurrent neural network and a hybrid model for prediction of stock returns". The author has used a hybrid model that consists of linear models like the autoregressive moving average model and exponential smoothing model and a non-linear model that is a recurrent neural network. A new regression model is used to generate training data for a recurrent neural network. Highly optimized predictions are produced by recurrent neural networks as compared to linear models.

Wei Shen[6] worked on the "RBF and Artificial Fish Swarm Algorithm for short-term forecast of stock indices". To forecast the stock in Shanghai Stock Exchange the author has used (RBFNN) to train the data. They have used the Artificial Fish Swarm Algorithm (AFSA) to optimize RBF, mainly in parameter selection. By using these algorithm the result is more ideal in the short term forecast of stock indices.

To prove that the results of an Artificial Neural Network(ANN) are better and accurate than the Support Vector Machine(SVM) contingent literature survey is done on the results of SVM and ANN. Some of the disadvantages found are if an attribute is not having a clear relationship is supplied as attributes then the percentage of accuracy is dropped.

PROBLEM STATEMENT

Stock market prediction is an exhausting task as a lot of data is involved in and so is the number of users. Sometimes to earn more profits the broker tends to mislead the investor in the wrong investment. The stock market is dynamic in nature and the stock price keeps on fluctuating. Therefore, to solve this kind of problem we are going to use a back-propagation neural network with an artificial neural network to overcome these difficulties and to get more accurate and precise results to gain more profits. The inputs are provided to the back-propagation neural network which provides the output after analyzing the data. For solving this kind of financial problem the relationship between the input and output is very complex so that's why we have used ANN for solving or predicting the stock price. An artificial neural network model a computer model whose architecture essentially mimics the learning capability of the human brain. The processing element of an artificial neural network resembles the biological structure of the neuron and the internal operation of the human brain.
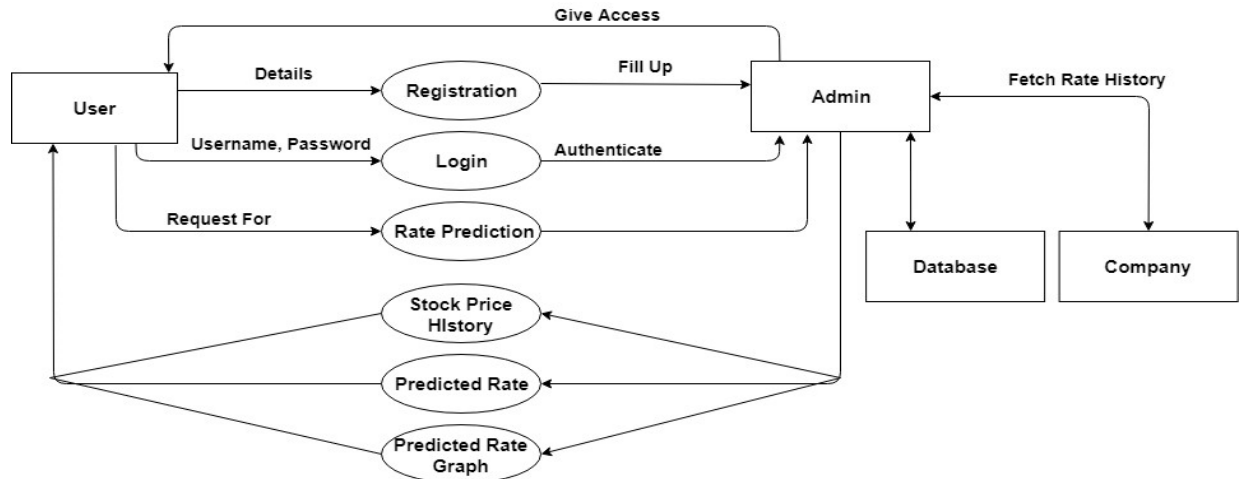
PROPOSED SYSYTEM

Figure 1: System architecture

FUNCTIONALITY AT ADMIN SIDE:

Admin can upload the stock price history of a particular company which is required by the user

1. Open Price.
2. Close Price.
3. Highest Price.
4. Lowest Price.
5. It can fetch the rate history of a company.
6. It provides stock price history, predicted rate, and predicted rate graph to the user.

FUNCTIONALITY AT USER SIDE:

1. Registration.
2. Login with login name and password from the user option.
3. Reset password.
4. Request for rate prediction of a particular company.
5. Can view the stock prediction of some particular company.

MATHEMATICAL MODEL

Let S be the system;
S = {I, O, F, DD, NDD, Success, Failure}

I = Input to the system
I = {username, password, registration, login, request for stock price history}

O = Output of the system
O = {add system, view user request, upload stock price history of company, view open price, view close price, view lowest price, view highest price, final predicted rate, graph of predicted value of company}

F = Fusion in system
F = {adminreg(), adminlogin(), addSystem(), userRegistration(), userLogin(), requestStockPrice(), viewRequest(), uploadStockPriceHistory(), fetchOpenPrice(), fetchClosePrice(), fetchLowestPrice(), fetchHighestPrice(), finalPredictedRate(), preparegraph()}

DD = Deterministic data
DD = {Null}

NDD = Non Deterministic data
NDD = {I, O}

RESULTS AND DISCUSSION

In our proposed system the system starts with a login window where the user can log in. If the user is not an authorized user then the user has to register first. The user type provides two options-user (consumer) and admin (system controller).

The registration window is handle by system admin. To register a new user have to fill all its details like-Name, Email, Mobile No, Address, Password, and Confirm Password.

If the user is a frequent user then the user can directly login by providing login name and password which is authenticated by the system admin.

Admin-Admin gives access to the authenticated user. Admin has access to the database where all the records of different companies are stored. Admin fetch the rate history of a particular company as requested by an authenticated user. Admin provides stock price history, predicted rate, and predicted rate graph.

User-User registers at the admin side by filling the details. The registered user gets access from the system admin. Users can request for rate prediction of any particular company and can also view the stock prediction of the company. Users can also view the predicted and actual rate graph comparison.

CONCLUSION

In a very short period, the stock market prediction system has revolutionized the stock market. They came up with a new concept of investing with no interference involved. It provides a user-friendly platform for a simple and proper interaction for investors, with no middleman or broker involved.

From the results and discussion it is concluded that the "Machine Learning-based Stock Prediction System" provides a user-friendly platform to its users. By using a back-propagation neural network and an artificial neural network algorithm, the outcomes are more precise and accurate.

The best results from predictions are obtained from the smallest values of the computational results of each prediction.

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