Stock Market Prediction Using Machine Learning

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ABSTRACT

Predicting the stock market has been an area of interest not only for traders but also for the computer engineers. Predictions can be performed by mainly two means, one by using previous data available against the stock and the other by analyzing the social media information. 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, c lose, low, high and volume. Prediction plays a very important role in stock market business which is very complicated and challenging process. Employing traditional methods like fundamental and technical analysis may not ensure the reliability of the prediction. This paper use to evaluate and compare LSTM deep learning architectures for short- and long-term prediction of financial time series. The evaluations are conducted using a publicly available dataset for stock market closing prices. 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. Based on temporal characteristics of stock and LSTM neural network algorithm, this paper uses the LSTM recurrent neural networks to filter, extract feature value and analyze the stock data, and set up the prediction model of the corresponding stock transaction.

Keywords: Stock transaction prediction, LSTM, Machine Learning, Linear Regression, Data Analysis, Supervised Machine Learning

I. INTRODUCTION

1.1 Why Machine Learning

The stock market is one of the factors that symbolizes a country's economy. Few people excel at correctly understanding the changing trend of stocks, and thus many people fear from investing in stocks. This paper elaborates the technical analysis of prediction that is

performed using historical data of stocks by applying Machine Learning (ML) algorithms.

Prediction of data is based on the existing stock data that includes previous opening price, closing price, highest price, lowest price, adjusted closing price and volume. It will be helpful in predicting the future outcomes regarding a particular stock. The development is being done from the customer's point of view so that they can invest in the stock market by null avoiding the risk as much as possible. Different mathematical models such as Neural Network (NN), Linear Regression (LR), Naïve Bayesian and Supervised Learning (SL) are used for getting the best results.

The major contribution of this work has enhanced the stock market predictions as close to reality as possible. LSTM neural network algorithm on time series to predict short-term changes of the corresponding stock transaction. This paper will develop a financial data predictor program there will be dataset storing all historical stock prices and data will be treated as training sets for the program.

Regression techniques are part of the machine learning approach. The trend in the stock index data can be identified using classical techniques like regression. Common regression analysis involves inputs of numerical data which may consist of infinite or a wide range of values. In recent years, numerous machine learning-based models have been presented for time series analysis.

1.2 Main Goal:

In the past decades, there is an increasing interest in predicting markets among economists, policymakers, academics and market makers. The objective of the proposed work is to study and improve the supervised learning algorithms to predict the stock price.

The main objective of this project is to implement the proposed research project involves using the existing data and building a model using machine learning algorithms. . It will be helpful in predicting the future outcomes regarding a particular stock. The development is being done from the customer's point of view so that they can invest with the complete knowledge and idea about the stock market. The primary goal of the project is to predict the approximate values of the stock price and to provide analysis for the users through an efficient web application. This project will be very useful for investors to invest in the stock market based on the various factors.

The project aim is to create a web application that analyzes the previous data of the companies and to predict the future stock prices with the help of machine learning. Deep learning is a recent methodology that can be employed to perform prediction and classification operations based on highly complex training data. mainly focus on the deep learning methodology and explore its advantages in financial time series prediction.

II. LITERATURE SURVEY

Khaled A. Althelaya, El-Sayed M. El-Alfy, Salahadin Mohammed" Evaluation of Bidirectional LSTM for Short- and Long-Term Stock Market Prediction" 2018 . In this paper, we aim at evaluating and comparing LSTM deep learning architectures for short- and long-term prediction of financial time series. This problem is often considered as one of the most challenging real-world applications for time series prediction. Unlike traditional recurrent neural networks, LSTM supports time steps of arbitrary sizes and without the vanishing gradient problem.

Siyuan Liu, Guangzhong Lia ,Yifan Ding "Stock Transaction Prediction Modeling and Analysis Based on LSTM" 2018. Stock price volatility is a highly

complex nonlinear dynamic system. The stock's trading volume affects the stock's self-correlation and inertial effect, and the adjustment of the stock is not to advance with a homogeneous time process, which has its own independent time to promote the process. LSTM (Term Memory Long-Short) is a kind of time recurrent neural network, which is suitable for processing and predicting the important events of interval and long delay in time series.

Meghna Misra, Ajay Prakash Yadav, Harkiran Kaur "Stock Market Prediction using Machine Learning Algorithms: A Classification Study" 2018. Predictions based on previous data lack accuracy due to changing patterns in the stock market al.so, some fields might have been missed due to their insignificance in some stocks or unavailability of data. For example, some models may require 'return rate' as a parameter for stock prediction, but the available data might not have it. On the other hand, a model predicting only on the basis of the return rate may find opening and closing price to be insignificant parameters. The data has to be cleansed before it can be used for predictions.

Hakan Gunduz, Zehra Cataltepe, Yusuf Yaslan "Stock Market Direction Prediction Using Deep Neural Networks" 2017. In this study, the daily movement directions of three frequently traded stocks (GARAN, THYAO and ISCTR) in Borsa Istanbul were predicted using deep neural networks. Technical indicators obtained from individual stock prices and dollar gold prices were used as features in the prediction. Class labels indicating the movement direction were found using daily close prices of the stocks and they were aligned with the feature vectors.

Kunal Pahwa, Neha Agarwal "Stock Market Analysis using Supervised Machine Learning"14th Feb 2019. 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.

Vivek Kanade, Bhausaheb Devikar, Sayali Phadatare, Pranali Munde, Shubhangi Sonone "Stock Market Prediction: Using Historical Data Analysis" 1, January 2017.

The Stock market process is full of uncertainty and it's affected by many factors. Hence the Stock market prediction is one of the important exertions in business and finance. In this paper both fundamental and technical analysis are considered. Fundamental analysis is done using social media data by applying sentiment analysis process. Social media data has high impact today than ever, it can helpful in predicting the trend of the stock market and Technical analysis is done using historical data of stock prices by applying machine learning algorithms. The method involves collecting news and also collect social media data and extracting sentiments expressed by individual. Then the correlation between the sentiments and stock values is analyzed. The learned model can then be used to make future predictions about stock value.
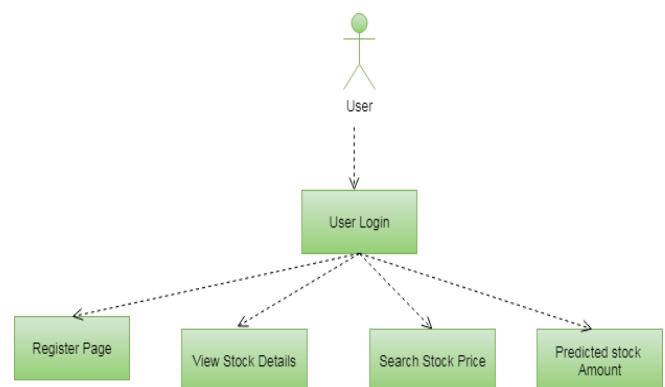
III. SYSTEM DESIGN

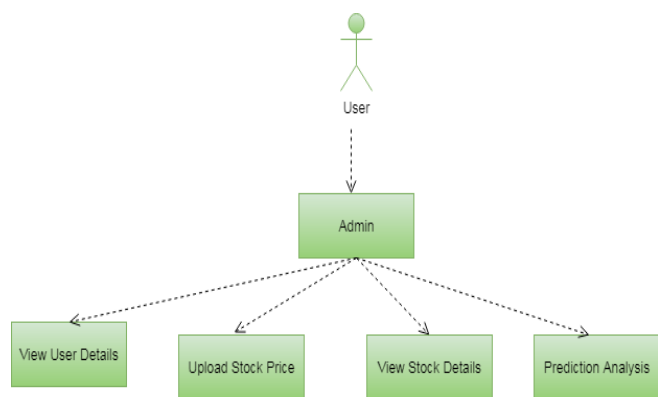Figure (1) Working Diagram [User]

Figure (2) Working Diagram [Admin]

1) Stock market prediction seems a complex problem because there are many factors that have yet to be addressed and it doesn't seem statistical at first. But by proper use of machine learning techniques, one can relate previous data to the current data and train the machine to learn from it and make appropriate assumptions.

2) The dataset being utilized for analysis was picked up from Yahoo Finance. The dataset consisted of approximately 9 lakh records of the required stock prices and other relevant values. The data reflected the stock prices at certain time intervals for each day of the year. It consisted of various sections namely date, symbol, open, close, low, high and volume.

3) For the purpose of simulation and analysis, the data for only one company was considered. All the data was available in a file of csv format which was first read and transformed into a data-frame using the Pandas library in Python. From this, the data for one particular company was extracted by segregating data on the basis of the symbol field.

4) This normalization of the data was performed through usage of the sklearn library in Python and the data was divided into training and testing sets. The test set was kept as 20% of the available dataset. Although machine learning as such has many models but this paper focuses on two of the most important amongst them and made the predictions using these.

5) Predicting stock Price based on last five year stock market history the accuracy of the stock market prediction system can be further improved by utilizing a much bigger dataset than the one being utilized currently.
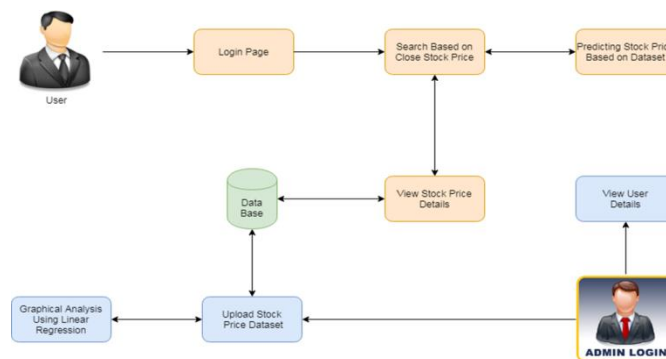

Figure (3) System Architecture

IV. DATA FLOW DIAGRAM

A DFD shows what quite data are going to be input to and output from the system, however the information can advance through the system, and wherever the information are going to be keep. It doesn't show data concerning method temporal arrangement or whether or not processes can operate in sequence or in parallel, not like a standard structured flow sheet that focuses on management flow, or a UML activity advancement diagram, that presents each management and knowledge flows as a unified model
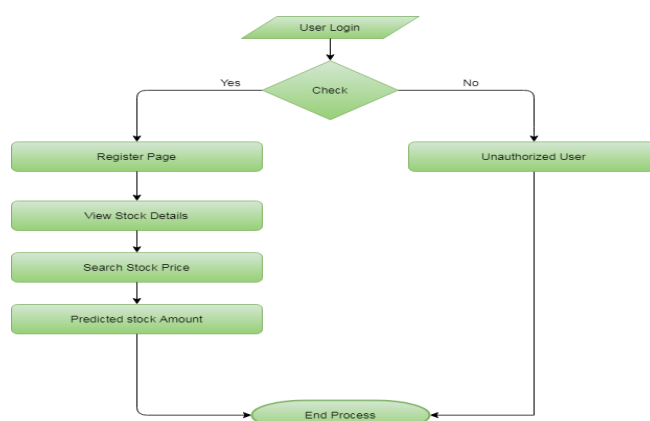
4.1 User Flow Diagram

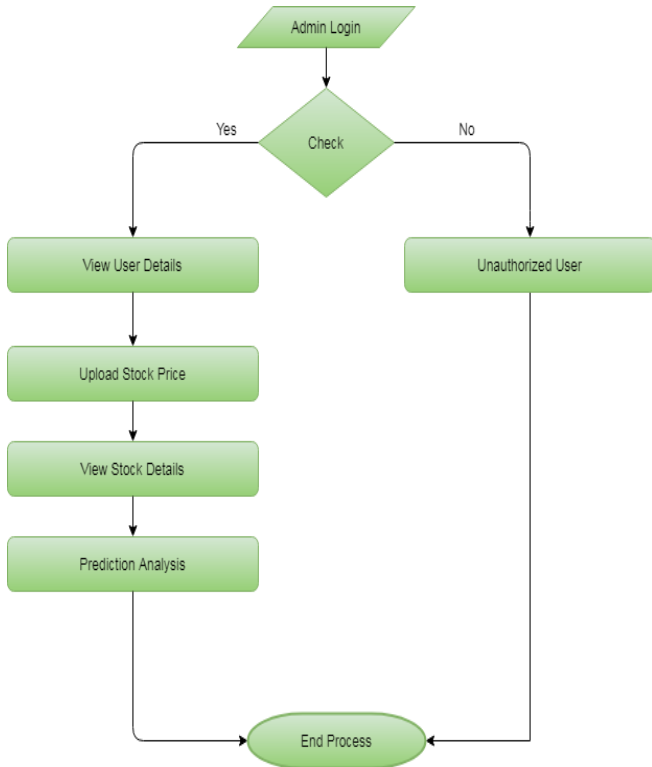**Figure (4) Flow Diagram of User**

4.2 Admin Flow Diagram

Figure (5) Flow Diagram of Admin

V. MODULE

5.1. User Plug-in

In our Secure System we've a user friendly program to act with our System. Each acts twin role as information a knowledge an information owner and data shopper whereas uploading file they're the owner of that file if they search other's file than they're the patron. We've authentication system; we tend to solely enable licensed users to access our system.

Figure (6) User Plug-in

5.2. Upload Module

This module used to upload all stock market details from last 5 year dataset, there will be a open, close, low, high and volume. Open, close, low and high are different bid prices for the stock at separate times with nearly direct names. The volume is the number of shares that passed from one owner to another during the time period.

Figure (7) Uploading Details

5.3. Regression Based Model

Linear Regression as governed by the above equation is performed on the data and then the relevant predictions are made. The factors considered for the regression were low, open, high, close and volume. The

R-square confidence test was used to determine the confidence score and the predictions were plotted to show the results of the stock market prices versus time.

Figure (8) Searching Stocks

Figure (9) Stock Prediction

5.4. Long Short Term Memory (LSTM) Network Based Model

Figure (10) Stock Prediction – Graphical Representation

LSTM is the advanced version of Recurrent-Neural-Networks (RNN) where the information belonging to previous state persists. These are different from RNNs as they involve long term dependencies and RNNs works on finding the relationship between the recent and the current information. This indicates that the interval of information is relatively smaller than that to LSTM. The main purpose behind using this model in stock market prediction is that the predictions depends on large amounts of data and are generally dependent on the long term history of the market. So LSTM regulates error by giving an aid to the RNNs through retaining information for olderstages making the prediction more accurate. Thus proving itself as much more reliable compared to other methods.

5.5. Stock Price Prediction Module:

Predicting stock Price based on last five year stock market history the accuracy of the stock market prediction system can be further improved by utilizing a much bigger dataset than the one being utilized currently.

VI.CONCLUSION

This paper was an attempt to determine the future prices of the stocks of a company with greater accuracy and reliability using machine learning techniques. The primary contribution of the researchers being the application of the novel LSTM Model as a means of determining the stock prices.

Both the techniques have shown an improvement in the accuracy of predictions, thereby yielding positive results with the LSTM model proving to be more efficient. The results are quite promising and has led to the conclusion that it is possible to predict stock market with more accuracy and efficiency using machine learning techniques. In the future, the accuracy of the stock market prediction system can be further improved by utilizing a much bigger dataset than the one being utilized currently.

VII. REFERENCES

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