Stock Market Prediction and Profiling using Machine learning approach

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Abstract—**This article describes a web-based tool that can help traders and investors predict the best outcomes for stock prices of various companies. To achieve accurate predictions, the tool uses a combination of a Backpropagation neural network and an artificial neural network to determine the relevant parameters. The aim is to introduce a more effective method for predicting stock movements with greater precision.**

Keywords—Neural Network, prediction, stock

I. INTRODUCTION

Ever since the pandemic, the interest of stock market has increased globally especially in India. The growing rate of retail investors in India has grown to a tremendous amount that plays a major role in economic turnover of a country. Different types of stock trading are available. Risk involves both advantages and hazards, and if a corporation can generate substantial profits, investors can also reap substantial rewards. As a result, predicting the present developments in the stock market frequently involves examining past stock prices or historical records.

Economic conditions, such as the level of monetary policy and interest rates, as well as fiscal policies and taxes, have a critical influence on the movement of stock prices. These factors are carefully considered by investors when determining their preferred stocks, given the volatile nature of the stock market and individual stock performance. While linear regression, time series analysis, and chaos theory have been used in the past to forecast stock market movements, they are prone to errors. To overcome this, machine learning methods, including neural networks and fuzzy systems, have emerged as more effective approaches to predicting stock market behaviour and finding solutions to related challenges.

II. REVIEW OF LITERATURE

We had gone through five research papers for the purpose of our review of literature for better understanding of the topic and the disadvantages of each one.

First research paper proposed a proposed a 'stock price prediction model with self-adaptability and self-learning ability.' Using CNN and convolutional neural networks. Some disadvantages included inability to use certain types of indicators and to cope up with the noisy and complex market data.

Second paper researched upon 'Survey of well-known efficient regression approach to predict the stock market price from the data' using regression analysis and there was no use of technical indicators used and the complexity of the algorithm itself is lengthy as well as the problem of underfitting the data.

Another research paper 'a three layered survey using MLR, SVM and ANN through which the sentiment analysis is done and opening stock price is predicted'. However, it could only predict opening price of a stock which is not a key instrument in trading/investing. Sentiment analysis not always right.

Furthermore, another paper proposed 'model which predicts the future price of a stock using different algorithms based on the subjective relevance of the stock' with the inability to use certain types of indicators and to cope up with the noisy and complex market data.

III. PROBLEM STATEMENT

Predicting the performance of the stock market can be an arduous task because of the sheer amount of data involved and the multitude of users. In pursuit of higher profits, brokers may sometimes lead investors to make wrong investments. Stock prices are subject to constant fluctuations due to the dynamic nature of the stock market. To overcome these difficulties and achieve more accurate and precise results for maximizing returns, a back-propagation neural network with an artificial neural network is utilized. The inputs are fed into the back-propagation neural network, which analyses the data and produces an output. Since the relationship between input and output in financial prediction is complex, an artificial neural network model is employed to predict stock prices. The processing element of an artificial neural network resembles a neuron in the human brain and replicates the brain's learning capabilities.

IV. PROPOSED SYSTEM

Fundamental analysis involves critically examining a business at its most basic or fundamental financial level. By arriving at a forecast of future stock price movements, informed investors can profit from them accordingly. Technical analysis indicators are commonly used by investors in the stock market to predict stock price trends. However, these indicators may not produce satisfactory results when they solely rely on stock price and do not consider volume.

Volume is a crucial factor in technical analysis to determine whether a market is bullish or bearish. In a bullish market, an increase in price should be accompanied by an increase in volume, and it's risky if the price increases without a corresponding increase in volume. In a correction market, volume should decrease. In a bearish market, a decrease in price should be accompanied by an increase in volume, and a price increase should be accompanied by a decrease in volume. Hence, investors should consider volume when

creating an effective moving average. They can assign greater weight to high-volume trading days and lesser weight to low-volume trading days.

Volume-Weighted Moving averages can be given by

$$P_n = [P(t-1) + P(t-2) + \ldots + P(t-n)]/ n$$
$$= \sum P(t-i)/n$$

V. METHODOLOGY

In this project, the stock prediction is done by using the Long short-term memory (LSTM) algorithm which uses feedback connections.

LSTM networks are a more advanced version of recurrent neural networks (RNNs) that were specifically created to overcome the limitations of RNNs. Recurrent neural networks process input data based on previous output and temporarily store this information in short-term memory.
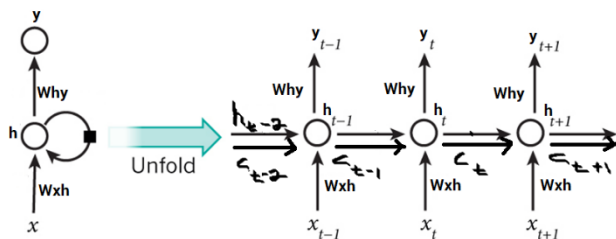

Above figure is the hidden layer of LSTM that is not present in RNN. It is called the forget gate as current layers output takes into account the input of previous cell and it has got 3 layers with each layer communicating with each other. There are multiple variations to it but we just have to go with the conventional one.

Recurrent Neural Networks (RNNs) have a limitation of not being able to retain information for extended periods. In some cases, it becomes necessary to access information from the distant past to make accurate predictions about the present output. However, RNNs struggle to handle these "long-term dependencies" effectively. Additionally, RNNs lack precision in deciding which part of the context should be retained and how much of the past should be "forgotten".

a) Moving Averages : Technical analysis frequently utilizes moving averages to identify trends and potential trading opportunities in financial markets. Traders use moving averages to pinpoint critical levels of support and resistance, as well as to create buy and sell signals by analyzing the crossover points of various movin averages.

Simple Moving Average (SMA) is computed by taking the meaning of a particular number of data points over a

specified period. In contrast, the Exponential Moving Average (EMA) also calculates the average of the data points over the same period, but it assigns more importance to the most recent data points. To accomplish this, each data point in the calculation is given a weighting factor, with the most recent data points receiving the highest.

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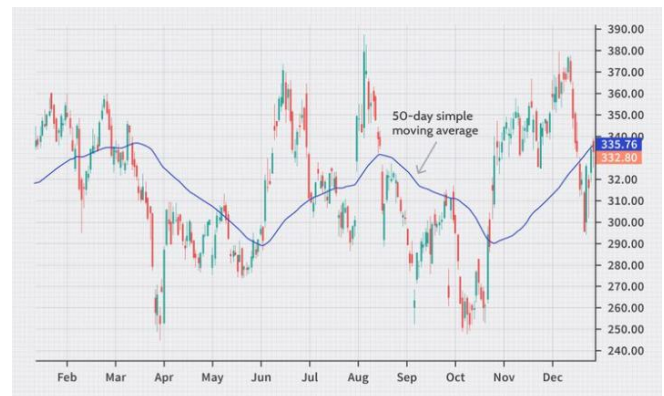
VI. CONCLUSION

The stock market prediction system has brought about a revolution in a short time by introducing a new investment concept that eliminates interference and offers a user-friendly platform for investors without brokers. The study shows that the "Machine Learning-based Stock Prediction System" is user-friendly and delivers more accurate outcomes through the use of back-propagation neural network and artificial neural network algorithms. The predictions with the highest accuracy are produced by the lowest computational values obtained from each prediction.

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