

Stock Price Movement Prediction Using Machine Learning

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Abstract: Machine learning based stock price prediction is a way of foreseeing the upcoming value of stock traded on a stock exchange in order to profit from it. It is difficult to predict stock prices with great accuracy because there are many elements at play. This is where machine learning plays a crucial role. For the majority of researchers in this field, market forecasting provides excellent profit opportunities. The majority of researchers utilize either technical or fundamental analysis to forecast the market. Technical analysis concentrates on studying price trends to forecast future prices, whereas fundamental analysis relies on studying unstructured textual data from sources like financial news and earnings reports. With time, more and more useful market data has been made available online.

Keywords: Stock market, Long Short Term Memory (LSTM), Machine Learning

I. INTRODUCTION

Stock price prediction is way of finding the upcoming value of the stock market value. The one who invests can get more profit if the system predicts the upcoming value accurately. While detecting the upcoming value the various parameters should be included like the financial status of the company or the demand for the products, now building a model that will take all these as input and analyses and gives the output, designing such a model is a difficult task. The main intention will always be to provide accurate result and help investors gain more income. Knowing a few seconds knowledge of how stock price is changing will result is good amount of profit. investing in stocks is a important financial market activity, not knowing even a little amount of important knowledge will result in a bad result. Technical analysis concentrates on the direction of prices by examining historical stock prices to forecast future stock values. Fundamental analysis focuses on studying financial news and earnings reports. Artificial intelligence has now made it possible for the human stop develop more computable system like the stock price prediction, which has to take more parameters which the human cannot analyze and predict the output. Here the basic idea applied is to take the datasets of the particular company whose stock price we want to predict and giving those datasets to the system, then it is going to train itself with those datasets and by analyzing that it is going to provide the accurate result.

II. LITERATURE SURVEY

In the method suggested in paper [1], The approaches for predicting the stock price are improving along with the stock market's efficiency, although some academics and analysts still think the stock market is unpredictable. This is because numerous intricate aspects, including demand, outstanding shares, fundamentals, and industry standards, are at play.

These elements should be taken into consideration by the system that will forecast stock price, and on the basis of that, it should forecast the odd stock market trends. In this work, we learned that seven classifiers along with some datasets have been utilized to predict the stock market. A classification model's goal is to acquire a trustworthy assessment of the accuracy of its target definition approximation, also referred to as the model's predicted performance.

The disadvantage of this model is that it was built using a training data set, which will be often a tiny part of the domain, and the generalization attribute is crucial to the accuracy of the approximation. The model will therefore be trained using a training set of data, which may prevent it from being effective across the board.

In contrast to the current prediction system, the method suggested in the paper [2] fundamental and technical analysis are two basic methods for analysing stock values. The business that underpins the stock itself is the focus of the fundamental examination. It comprises both the market's historical values as well as current variables like product

demand, company standards, or everyday problems. Along with technical analysis, which examines past changes in the value of the stock market, fundamental analysis entails examining these factors and forecasting the value of the stock price based on them.

The method suggested in the paper [3] The primary goal of the suggested work is establishing a connection between various time series methods that are currently in use and stock price prediction. The algorithm is provided with a good datasets which is free of risk is used to train with, which can be considered as improving the accuracy of the model. By offering a different types of stock prices to customers, it is possible to combine two different time series analysis techniques in order to find results that are different from each other for shares on the stock market. The model has some flaws in those certain values, such as recent market strategy announcements, are not taken into account.

The method suggested in the paper [4] is the prediction of stock price using regression model and LSTM implemented machine learning. The stock market's open value, closing value, lowest value for that specific time period, high value, and total number of shares sold are all taken into account. This study makes an effort of predicting the stock values more accurately by using ML implementations. The LSTM algorithms gives a acceptable output with the result that are closer to the accurate result.

The paper [5], is about development of stock price pattern prediction uses features from multi-category news events. Multi-category refers to the word dictionary that has previously been established. Also used to analyze the connection between the stock price movement and certain multi-category news are SVM models and neural networks. An experimental model revealed that the bag-of-words feature is less effective than predetermined multi-category news events in predicting stock price movements. This study suggests, short-term prediction will be better than the long-term prediction.

The approach of paper [6] is the method of forecasting stock value using National Stock Exchange data utilising numerous parameters such as current market status, price-earnings ratio, and other occurrences. It uses Long Short Term Memory (LSTM) as well as the Recurrent Neural Network (RNN). In order to evaluate the model's effectiveness, the correct data and the forecasted data are compared using RNN graph. How accurate the model is is assessed using machine learning.

In technology used in paper [7], By utilising both multi-feature input variables and the single feature input variables, the LSTM neural network is utilised to forecast Apple stock prices in order to validate the model's forecasting impact on the stock time series. The experiment's outcome demonstrated great accuracy for the multivariate input of 0.033, which is correct and matches the actual need. The system is going to take these as the inputs to find more closer value to the accurate value. Here LSTM implementations are used to predict the future value.

In the paper [8], Stock price forecasting with a convolutional recurrent neural network utilising historical data (CRNN), This paper now refers to a project where it stores historical data as well as determines the prices of the upcoming stock by using designed neural network, as the pattern of stocks is typically linked to the previous value of stock price. The information of historical stocks will be provided as an input as a training data. The design of neural network is then proposed in the cited study along with the convolution RNN, and for enhancing the long-term dependence of conventional RNN, the LSTM is also employed.

The foundation of the approach in paper [9] The goal of this research is to examine the three techniques Artificial Neural Network, Support Vector Machine, Multiple Linear Regression. Here daily prediction as well as the monthly prediction is used to determine the upcoming price. The most accurate sentiment analysis stock price prediction algorithm. The less used approach is multiple linear regression, which analyses relationship between stock price and volume. The study show that the deep learning algorithms are far better than MLR and SVM algorithms.

Idea of using LSTM to find deep fake videos in research of paper [10], The stock market is the most crucial elements of the whole financial system. The related firm's investors direct money toward supporting activities and evolution. A machine learning framework is created by combining artificial neural networks (ANN) and the information theory. This method makes inventive use of information entropy to support non-linear causation, stock relevance, and ANN time series modelling. With the help of the prices for Amazon, Apple, Google, and Facebook, the viability of this machine learning architecture is evaluated. This work proposes a time series analysis technique based on LSTM and information theory to design the stock price movements.

It was suggested in paper [11] One of the less discussed areas in the machine learning community is stock price



prediction. Not only does stock price forecasting assist developers, but it also assists investors in choosing profitable companies to invest in. In this research, we learned that employing LSTM will provide us greater accuracy than other machine learning methods. In this case, the model was developed using simply the closing price for each day, and the closest forecasted value was obtained. The technique also involves gathering 60 days' worth of data for a specific y day, which allowed the model identify a pattern in the sequence of data and forecast the subsequent day and using the same methodology for 10 days with 7 top organisations.

In paper [12], In this paper, we studied many approaches that have been used to look into how financial news affects stock market forecasting. More accurate labels may result from a technical examination of the market surrounding the news's release. Labels can become more precise once news has been published. Technical indicators are helpful instruments for illuminating the actual state of the market.

| Sl. No | Title | Methodology | Algorithm | Drawback |
|--------|--|--|--|--|
| 1 | Stock Market prediction using machine learning | Stock market prediction using 7 classifiers | Random forest, Bagging, Adaboost, Decision tree, SVM, K-NN, ANN | Requires high processing time for neural networks. |
| 2 | Stock Market prediction using machine learning | Prediction done by Time series analysis, fundamental and technical analysis | Regression model and long short-term memory | Fault in the fundamental analysis. |
| 3 | Stock price forecasting using data from yahoo finance and analyzing seasonal and nonseasonal trend | To get distinguished result, two time series analysis is done | ARIMA, Holt Winter | Some parameters never taken into account such as new market strategy |
| 4 | Stock Market prediction using machine learning | Prediction of stock price using regression model and LSTM | Long short-term memory | LSTM requires more computation than other RNNs. |
| 5 | Multi-Category Events Driven stock price trends prediction | Multi-category news events are used as features to develop stock price trend prediction | Neural networks and SVM | Difficulties faced in gathering the daily news events |
| 6 | Share Price prediction using machine learning technique | Prediction using the RNN graph and the LSTM | Recurrent neural network and LSTM | Training an RNN is a completely tough task |
| 7 | Forecasting stock price in two ways based on LSTM neural network | Experiment done by providing multivariate and univariate as an input | Long short-term memory | LSTM has more parameters, which are used for forecasts |
| 8 | Share price trend prediction using CRNN with LSTM structure | Prediction done by using Convolution recurrent neural networks | CRNN, LSTM, RNN | CRNN requires a good GPU on the computer if it has several layers |
| 9 | Developing a Prediction Model for Stock Analysis | Prediction is done using Multiple Linear Regression (MLR), Support Vector Machine (SVM) and Artificial Neural Network (ANN) | Multiple Linear Regression (MLR), Support Vector Machine (SVM) and Artificial Neural Network (ANN) | Since the data need to be trained in three different algorithms, the computation and the work is more. |
| 10 | Stock Price Prediction Based on Information Entropy and Artificial Neural Network | Prediction of values using ANN and Informational theory. | ANN and Information theory | most information can be perceived, but cannot be measured, because correct definition is not found. |
| 11 | Stock Market Analysis using LSTM in Deep Learning | Long short term memory is the major algorithm used in this paper, testing is done for 10 different companies to see the result | LSTM | LSTMs take longer to train; LSTMs require more memory to train |

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| 12 | Text mining approaches for stock market prediction | Here the prediction is approached using text mining, where the daily news is the main factor of the analysis | Text mining | The effectiveness and efficiency of the system must be high, the uncertain problem can come at an intermediate stage of text mining. |
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Figure 1: Analysis Table

III. PROPOSED SYSTEM

By examining every paper, we learned that more papers employed the LSTM algorithm to forecast stock prices, using historical stock price values taken over a period of time for a specific interval. The opening stock value, closing stock value, high and low stock values throughout that period, and finally the total number of stocks traded are all included in these datasets.

IV. FINAL ANALYSIS

To anticipate the future prices of the stocks, it is important to design and create a machine learning system. Finding the accurate result will eventually result in good profit. The challenge of creating stock price predictions with artificial intelligence techniques is straightforward. Making a project that can come near to an accurate output, however, is a difficult task. Fundamental analysis is the most accurate approach to forecast stock values over the long term. Technical analysis is the most accurate method for making stock predictions in the near term.

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