

Real Time Stock Market Prediction Using ML & DL

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Abstract— Financial events such as Stock Exchanges are of great importance. Globally, it is the most discussed topic. Stock market prices play a very important role in determining the world's economy. Investors from all backgrounds have successfully utilized the stock market to gain profits. It would be very challenging for one to decide which shares to buy as they are depended on supply and demand, interest rates, natural calamities, inflation, political and economic factors. The decision to invest in a particular stock is often made based on tools or methods that will help them determine whether it is a good investment. Here, prediction comes into picture. With the introduction of Machine Learning and its strong algorithms, we can analyze stock market data and give predictions. Prediction will help people to minimize their losses and will assure consistency. It will allow people to make money in a smart way. In this paper we will study and compare various methods used for stock market predictions. Our main goal is to analyze these algorithms and to check which one of them gives us the most accurate results.

I. INTRODUCTION (HEADING 1)

Stock markets are volatile, dynamic and nonlinear. A single day can see a huge crash, and some days the market just seems to be going up no matter what happens. It is extremely difficult to predict stock prices accurately since many factors (macro and micro) influence them, including politics, global economic conditions, unexpected events, and financial performance. In addition to stock market exchange being one of the most popular fields among investors it has also become a hot topic for both technical and financial researchers. In order to make money on the stock market it is important not just to know how it's moving, but also when you should invest in something new or sell off old shares. Accurate predictions can lead the investors into huge profits. Predictions are made carefully by analyzing the past history of a particular stock. The stock market prediction is based on past performance and current financial trends. Modern Deep learning techniques can effortlessly bring those records into consideration and give us the results we want to decide whether to or not to invest in a particular stock.

In view of the stock market's dynamic nature, it can be difficult to predict its future movements. Hence the data of the stock market is also called as time series data. Time series data means the data that keeps on changing along with time. Stock market prediction has been the most favorite topic among the researchers. Machine learning and Deep learning have various modern prediction techniques and have a wide range of applications. However, stock market prediction can be further segregated into two steps. The first step is to classify whether the stock will have an upward trend or a downward trend. In the second step, we predict the stock market's value after a fixed period. The first step can be named as a classification problem and another step can be stated as a regression problem. Traditional techniques mainly deal with the linear models. And the regression problem mainly deals with the nonlinear models. Here the regression models are more favorable for stock market prediction. However, the regression models can be further divided into two different classes. The first one contains the traditional statistical methods that were used in the early days. These methods assume that the nature of the time series data is linear. Models like ARIMA and ARMA falls under this category. In contrast, machine learning algorithms extend the nonlinear nature of time series data.

The system proposed by us, that is stock market prediction in deep learning, algorithms can fill in the gaps between the people and their lack of proper information about the stock market. Our proposed system also helps people in their analyzing capability related to the stocks and its trend. This is possible only because of the huge revolution that took place in the data science. Their main aim is to create awareness among the people and give them proper guidance while investing into share market. Through the use of machine learning and deep learning algorithms, we aim to make a better investment decision. However, in our system we would discuss three different models that can help us to predict the future trend of a particular stock. Among the main concerns of the system are analyzing different machine learning and deep learning algorithms as well as getting a different graphical representation of all of them. And finally compare the results from all of the models algorithmically.

II. LITERATURE SURVEY

Sean McNally, Jason Roche, Simon Caton, "Predicting the Price of Bitcoin Using Machine Learning" 2018. This study aims to determine how accurately the direction of the price of bitcoin in US dollars can be predicted. The Bitcoin Price Index is the source of the price information. Through the use of a Bayesian-optimized recurrent neural network (RNN) and a Long Short-Term Memory (LSTM) network, the goal is accomplished to variable degrees of success. As a comparative to the deep learning models, the well-known ARIMA model for time series forecasting is used. As indicated, the non-linear deep learning techniques better the poor-performing ARIMA forecast. Finally, the performance of both deep learning models is benchmarked on CPU and GPU, with the GPU training time exceeding CPU implementation by 67.7%.

Ming-Chi Lee, "Using support vector machine with a hybrid feature selection method to the stock trend prediction" 2009. In order to forecast the trend of stock markets, they created a prediction model based on support vector machines (SVM) with a hybrid feature selection strategy in this study. The advantages of filter methods and wrapper methods are combined in this suggested hybrid feature selection method, known as F-score and Supported Sequential Forward Search (F SSFS), to choose the best feature subset from the original feature set. Their test results show that the suggested SVM-based model with F SSFS has the best level of accuracy

and beats BPN in terms of. These studies confirm their conclusion that the SVM-based model with F SSFS can be a promising complement to the current stock trend prediction techniques.

Soheila Abrishami, Michael Turek, Ahana Roy Choudhury and Piyush Kumar,” Enhancing Profit by Predicting Stock Prices using Deep Neural Networks”2020. In this study, they provide a deep learning system that forecasts stock prices using a variety of data for a sample of stocks listed on the NASDAQ exchange. The prediction model forecasts the closing price of a given stock ticker for multiple steps ahead using the minutely data for that stock ticker. Their deep learning framework consists of a Variational Autoencoder for removing noise and uses time-series data engineering to combine the higher-level features with the original features. Their framework takes minutely data for five different stocks tickers and predicts the stock closing price for 7-minute-ahead. Their findings demonstrate that the suggested model outperforms cutting-edge methods for time series forecasting.

M.Suresh Babu, Dr. N.Geethanjali, Prof B.Satyanarayana, “Clustering Approach to Stock Market Prediction”2011. This study compares the performance of the three main clustering methods, K-Means, Hierarchical clustering algorithm, and reverse K means, on the issue of accurately class-wise cluster formation. To predict the short-term stock price movements following the release of financial reports, HRK (Hierarchical Agglomerative and Recursive K-means Clustering) is offered as an efficient clustering technique. The outcomes demonstrate that HRK outperforms using the K-means clustering or the HAC approach by combining the benefits of two clustering techniques. Additionally, HRK (with ratio) leads SVM in term of accuracy and average profits.

Md. Rafiul Hassan and Baikunth Nath,”StockMarket Forecasting Using Hidden Markov Model: A New Approach”2005. They only implement one HMM(hidden markov model), which was trained using the historical data of the selected airlines. The trained HMM is used to search the previous dataset for the variable of interest behavioural data pattern. Forecasts are created by interpolating these datasets neighbouring values. HMM offers a new paradigm for stock market forecasting, the results produced using HMM are positive. Result shows that the proposed method using HMM to forecast stock price is explainable and has solid statistical foundation.

III. PROBLEM STATEMENT

Stock market is a complex and dynamic system affected by many factors of uncertainty. As a result, stock price movements are difficult to predict. Due to the globalization of technology and business and financial markets, faster and more accurate forecasting of stock prices is important. Based on Financial Prediction Indicators algorithms and machine learning techniques, an automated user-friendly trading application can be developed to predict stock returns. Stock market analysts usually don't understand how the market behaves. It is very difficult for them to trade because they aren't sure what stocks to buy and what stocks to sell for profit. This market is affected by many uncertainties. Therefore, it is difficult to predict the movement of stock prices. Faster and more accurate forecasting of stock prices is important due to the globalization of technology and business and financial markets.

In the ancient Stock Market, people could easily trade stocks and either profit from it or fall into a pitfall with huge amounts of money. It is a common misconception that the stock market is like gambling, since all it offers is profit or loss. In other words, even if there is a lack of proper knowledge and analytical ability, people tend to think so, but with the revolution in data science, big data, and human awareness, businesses are learning proper lessons about the future and setting themselves up for success.

IV. SYSTEM ARCHITECTURE

Yahoo finance provides live stock prices which can be used by API provided by them. This live stock is formatted into a training data which is used by different machine learning models like linear regression, SVM and LSTM. The result obtained by the models will be compared and check which model has the best accuracy based on the input. All the Predicted stock prices and model score with actual stock prices will be displayed on the website.

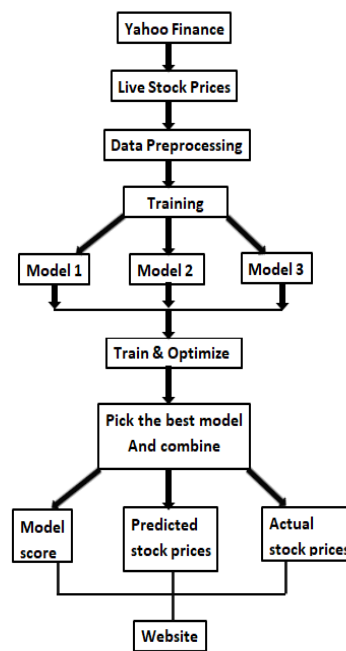


Figure 1: System Architecture

V. METHODOLOGY

Collecting live stock market prices will be the first step. Data can be collected once in a day at a pre-defined time or at the moment when the user enters the stock ticker. Then we will be loading all the gathered data into the database so that it can be used for predictions. We are using Python to implement this project. Python provides us a large number of machine learning libraries helping us to deal with the algorithms and mathematical and statistical formulas. Data pre-processing is done in the next step which includes removal of null values and extreme values that may cause errors while using it as input for prediction models. The data that is stored in the database from Yahoo! Finance is then divided into two parts. The first part is used to train the model and the other part is used to evaluate the performance of the model. In the prediction system we have designed it consists of three unique modern machine learning and deep learning techniques to predict stock market prices in the coming future. Evaluation of the models we have trained we will test them on the Test Dataset. This will tell us whether the model is perfectly trained or has some overfitting or under fitting errors. The results from all the prediction models will be analyzed and compared. The model having the highest accuracy and negligible price difference between predicted and the actual value will be selected, and its predicted value will be given as predicted value for a stock to the user.

VI. CONCLUSION

We looked into the different methods we can use to predict the future stock market trends. These predictions can help users to invest wisely and minimize their losses. There are various approaches to forecast the Stock Market Prices. Some of them are Linear Regression, LSTM and Support Vector Machines. Looking at different prediction models, we found that logistic regression gives the ability to predict and analyze the direction of market movement more accurately. This shows that it may be conceivable to use logistic regression as an effective way to predict future stock prices. Stress index variables are creative and essential to the proposed approach.

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