

Stock Market Prediction Strategies Using DeepLearning Algorithms

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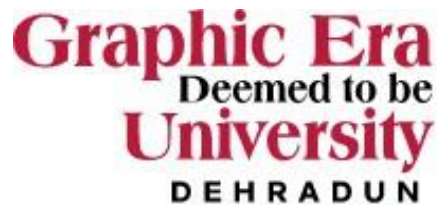


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CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the project report entitled “**Stock Market Prediction Strategies using Deep Learning Algorithm**” in partial fulfillment of the requirements for the award of the Degree of Bachelor of Technology in Computer Science and Engineering of the Graphic Era Deemed to be University, Dehradun shall be carried out by the under the mentorship of **Dr. A Suresh Kumar**, Department of Computer Science and Engineering, Graphic Era Deemed to be University, Dehradun.

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Table of Contents

Chapter No.	Description	Page No.
Chapter 1	Introduction	4-5
Chapter 2	Literature Survey	6-7
Chapter 3	Methodology	8-9
Chapter 4	Result and Discussion	10-11
Chapter 5	Conclusion and Future Work	12-13
	References	14

Introduction

A successful stock forecast can result in enormous gains for the seller and the broker. It is frequently argued that prediction is chaotic rather than random, implying that it is predictable.

by thoroughly examining the stock market's history. Such processes can be effectively represented using machine learning. By predicting a market value that is somewhat near to the tangible worth, it improves accuracy. Due to its effective and precise measures, machine learning's introduction to the field of stock prediction has attracted the attention of many researchers.

The dataset utilized is a crucial component of machine literacy. Because even a tiny modification in the data might result in significant changes in the outcome, the data set should be as precise as it can be. On a dataset obtained from Yahoo Finance, supervised machine literacy is used in this approach. The five variables open, close, low, high, and volume make up this dataset. Different shot prices for stocks at various times with relatively uncomplicated names include open, near, low, and high. The quantity of shares traded over a given period of time is referred to as volume. Test data are also used to evaluate the model.

Regression and LSTM models are used separately for this assumption. Regression involves error minimization and LSTM [3] [4] contributes to long-term memorization of data and results. Finally, graphs are plotted for the price fluctuation with the data (for the regression-based model) and between the actual and predicted price (for the LSTM-based model). The remainder of the paper consists of the following: Section II discusses related work. Section III details the two models used and the methods used in them. Section IV discusses in detail the results obtained with different graphs for both models. While section V consists of conclusion and the last section contains references.

The stock market is frequently used as a mood gauge and has the potential to affect GDP (gross domestic product). A measure of an economy's overall production of goods and services is the gross domestic product (GDP). The state of the economy changes along with the stock market's ups and downs. Spending patterns change in reaction to shifts in the emotions that fuel GDP expansion. On the other hand, the stock market can impact GDP both favorably and unfavorably. The average way to describe GDP is as a percentage growth from one time period to the next. When the economy increased by 2% year over year in a quarter, for instance, it meant that the quarter's growth rate was 2%.

Literature Survey

He discussed all of the current stock market forecasting strategies and introduced several new ones. Major prediction techniques, including data mining, machine learning, and deep learning, are used to forecast future stock values. Their benefits and drawbacks are discussed. Its them,

1. Arima Model
2. Time Series Linear Model
3. Recurrent Neural Networks.

Holt-Winters, artificial neural network, hidden Markov model are machine learning techniques, ARIMA model is a time series technique, and linear time series model and recurrent neural networks are deep learning techniques

ARIMA Model

Box and Jenkins first presented this ARIMA model in 1970. When used with time series data, the Box—Jenkins approach is a set of procedures for locating, estimating, and analyzing ARIMA models. The most crucial approach to financial forecasting is the model. It has been demonstrated that ARIMA models are useful for making immediate forecasts. In the ARIMA model, a variable's future value is a linear mixture of its previous values and mistakes.

Advantages

- Robust and efficient prediction of financial time series.
- It has a relatively small regression standard error

Disadvantages

- This model is only suitable for short-term forecasting.
- ARIMA models provide investors with a short-term forecast that could help in making investment decisions.

Time Series Linear Model

The linear time series model (TSLM) is one of the stochastic methods for putting a prediction model into practice. A linear time series model first develops an ideal linear model, which is then updated with data to represent the characteristics of the real data. The fundamental benefit of this time series linear model is that it incorporates real data into an ideal linear model. Both conventional trends and seasonal data trends are acceptable.

Recurrent Neural Network

Recurrent neural networks (RNN) use back propagation to learn, but their nodes have a feedback mechanism. Because of this, RNN models can predict a stock price based on recent history and is recurrent.

```
model <- trains (Y = trainy, X = trainx, learning rate = 0.05, hidden_dim = 5, num
epochs = 2600)
pred <- predict(model, testx ).
```

Advantage

Previous time points to the input layer containing the inputs.

Disadvantage

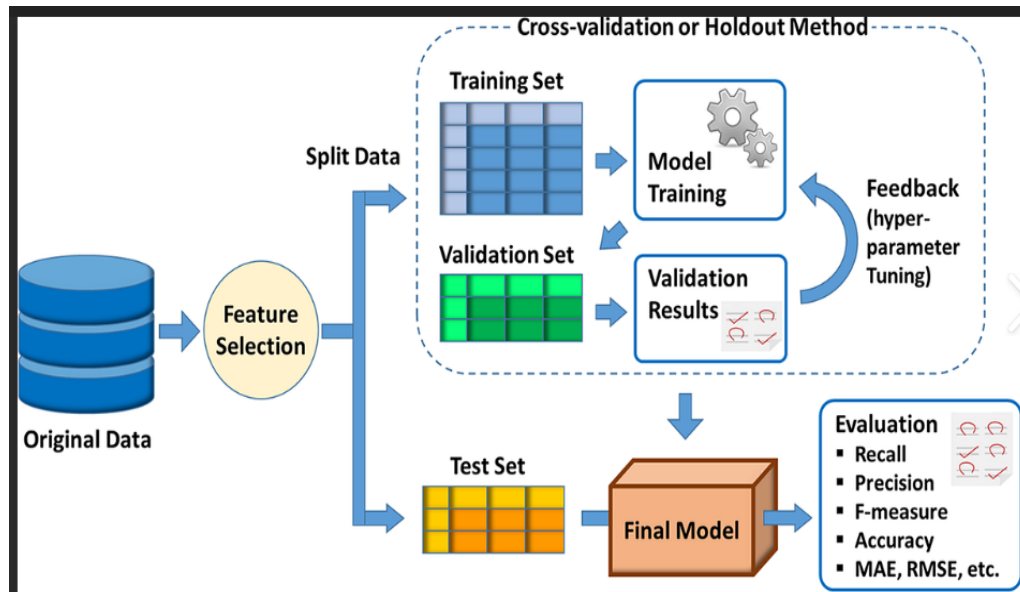
An RNN allows these words to be delivered through a much smaller set of input nodes

METHODOLOGY

Stock market prediction seems to be a complex problem because there are many factors which has yet to be addressed and at first it does not look statistical. But with the right use of machine learning techniques, previous data can be combined with current data and a machine can be trained to learn from it and make appropriate assumptions.

Comparison of Prediction Techniques

S .No	Techniques	Advantages	Disadvantages	Parameter used
1.	Hidden Markov model	Used for optimization purpose	Evaluation, decoding and learning	Technical indicators
2.	ARIMA	Robust and efficient	It is suitable for short term predictions only	Open, high, low, close prices and moving average
3.	Time series linear Model	Integrate the actual data to the ideal linear model	Traditional and the seasonal trends present in the data	Data and number of months



An artificial neuron is the most fundamental component of an artificial neural network. It accepts many inputs, multiplies them by set weights, and adds bias. The output of the activation function, which defines at what level the neuron will fire, is input into the result, and the corresponding value is sent to the neurons in the following layer of neurons.

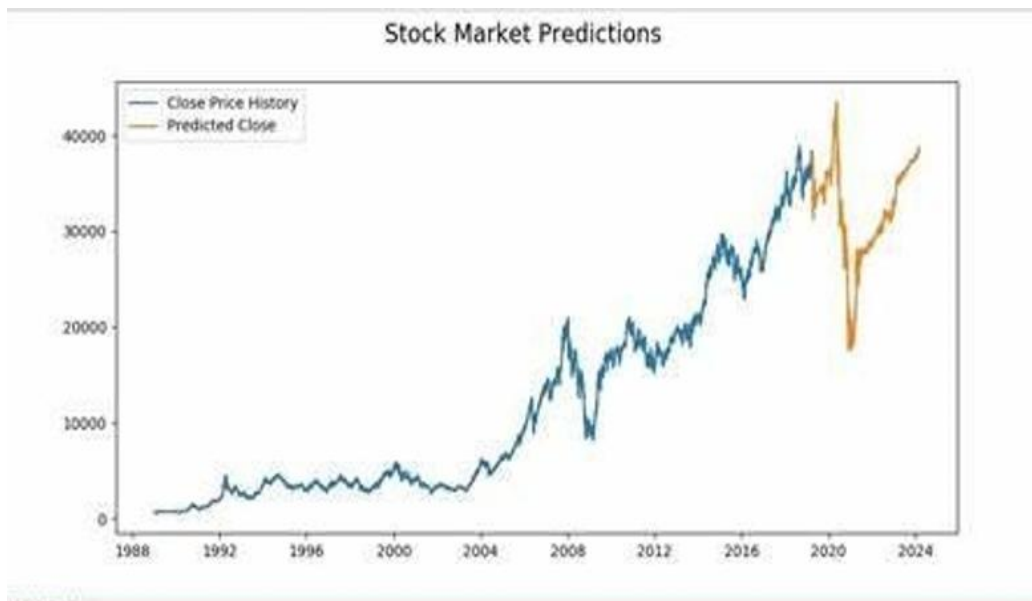
The most popular deep neural network type for analyzing and applying artificial intelligence to visual pictures is the convolutional neural network (CNN or Conv-Net).

They are sometimes referred to as shift invariant or spatially invariant artificial neural networks (SIANN) due to its architecture of shared weights and translation invariance qualities. They are used in natural language processing, recommender systems, image classification, medical image analysis, and image and video recognition.

The term "convolutional neural network" designates a neural network that makes use of the convolution mathematical technique. A specific kind of linear processing is convolution. Convolutional networks are essentially neural networks with at least one layer that utilize convolution rather than standard matrix multiplication

Result and Discussion

Artificial Neural Networks, which were previously used for stock market prediction, provide approximately 97.66% accuracy, while the Convolutional Neural Network model provides 98.92% accuracy on the dataset. The performance of the CNN model is clearly better than that of the ANN model. This is because the ANN model loses the context from the time series data before the CNN mode



As mentioned above, there is a clear picture of the level of accuracy obtained from the model used in this study compared to studies done previously on similar topics. The boosted tree and LSTM model provide valuable insight into the predictions, but the accuracy is significantly less compared to the model proposed in this study. The model used in this study obtained a significantly higher level of accuracy. The convolutional neural network model has been shown to perform significantly well even in extreme market fluctuations such as in the case of the COVID-19 pandemic

Conclusion and Future Work

It was created to forecast the 'open', 'close', 'high', and 'low' attributes of NIFTY on a daily basis during the Covid-19 epidemic in March and April 2020 in order to evaluate the effectiveness and accuracy of the model in unforeseen circumstances. NIFTY has dropped significantly during this time span, making this a difficult test for the model. In this case study, the model functioned fairly admirably.

During the initial days of the crash, the model's average forecast accuracy fell to about 91%–94%, although it quickly compensated. The average forecast accuracy rose to a range of 95–98% as the model swiftly adjusted. As a result, even though the model was adversely affected by an unforeseen circumstance, it handled it successfully. The top graphic contains charts that display the NIFTY's predicted value and actual value for the "Open," "Close," "High," and "Low" features from January 15, 2020,



Two methods for forecasting stock indices and stock prices are put forth in this study. In this study, the training procedure is carried out using a back-propagation algorithm and a feed-forward neural network. This model offered a graphical representation of the forecast's expected appearance as well as some rudimentary insight into the prediction trend. The average prediction accuracy of this model was 97.66%, which was satisfactory but necessitated a large amount of training data and iterations. Additionally, it had some noticeable ting issues, which the regularization method helped to resolve. In order to avoid the high cost of intensive training, this study also offers a more hygienic method.

A neural network model has been shown to provide better results on a given dataset. The study seeks a different approach to analyzing time series data. It uses 2D grayscale histograms generated from time series data for prediction. The entire dataset is divided into 15 segments, each segment is fed into the CNN model, and the maximum accuracy is obtained for each segment. This increase in model input makes a huge difference in training time and prediction accuracy.

This article seeks a different approach to analyzing time series data. It uses 2D grayscale histograms generated from time series data for prediction. The entire dataset is divided into 15 segments, each segment is fed into the CNN model, and the maximum accuracy is obtained for each segment. This increase in model input makes a huge difference in training time and prediction accuracy.

An overview and comparative analysis of various methods for forecasting stock market parameters are provided in this article. These methods are employed to assess stock market trends and performance. system to forecast the stock market with more precision. In order to improve the prediction of inventory findings, a new technique is being examined in this study. To do this, we will integrate two or more existing approaches to develop the new approach.

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