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Stock Market Forecasting

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Abstract: ***Stock market forecasting seeks to determine the worth of a firm's financial stocks in the future. Machine learning is being used in recent developments in stock market forecasting technology to produce forecasts based on the values of current stock market indices by training on their previous values.***
Future stock price projections can be difficult to make when trying to anticipate the stock market. It is incredibly challenging to forecast the stock market since shares fluctuate so frequently. Every day and frequently, stock. Foreseeing trends in the stock market is often correct using this method. This study forecasts the closing prices of numerous corporations using Long-Short Term Memory (LSTM) methodologies. These models are assessed using RMSE, which is one of the commonly used error measures. LSTM works better than SVR, as shown by the experiment's findings.
Keywords: LSTM model , RMS(Root mean square),stock prices, prices fluctuate. Forecasts for the stock market are in great demand from investors. We thoroughly evaluated a variety of well-known machine-learning models and discovered that our recommended method outperformed them all Prediction, Time series.

I. INTRODUCTION

India's stock market is the 12th largest in the world in terms of market net value. The NSE India now provides trading in 1659 firms. The primary economic pillars of India are agricultural exports and allied industries like software development and technical assistance. Recent years have seen a significant increase in the number of individuals cooperating and engaging in economic activities on a global scale, particularly participating in the stock market. This has been largely attributed to the stock market. Stock trading comes in a variety of forms. Trading is risky, but if the business is successful in making enormous profits, the investor will also make enormous gains. Both advantages and risks go hand in hand. It's incredibly challenging to invest in the stock market due to its dynamic nature, non-stationary, noisy, and non-parametric character and only 10% of individuals worldwide accept the risk of doing so, according to studies. Due to supply and demand, stock prices change over time. When more individuals want to purchase a stock than buyers (demand), the cost of the stock rises (supply). If there were more sellers than buyers of stock, the supply would outweigh the demand, resulting in a decline in price.
Almost no investor has the ability to regularly and properly forecast these hyperparameters. Predicting stock prices is incredibly challenging due to all of these factors. Once the appropriate information is gathered, it may be utilized to program a machine and provide a forecast.

II. LITERATURE REVIEW

A. R.P, V.C, D.S, AS-2021

Data is initially gathered from many social media platforms and historical sources of business. In the second phase, the pre-processing phase, dirt, duplicate data, and errors are removed. In the third phase, data sets are condensed and valuable data are chosen. In the fourth step, predictions are made utilizing various machine learning methods, including supervised and unsupervised learning techniques. The accuracy is now assessed using a variety of methods in the final step.[1]

B. I.H, A.H, M.T-2011:

One of the most difficult tasks for the artificial intelligence (AI) research community has been financial market forecasting. Both basic analysis and technical analysis are used to underpin predictions. Technology analysis is now being utilized in prediction since it attempts to produce findings with more accuracy, performance, and scope.[2]

C. V.K.S.R-2018

Even though stock market predictions are not a new phenomenon, several organizations have continued to discuss this topic. Due to market volatility, which requires an accurate prediction model, forecasting stock market indexes is extremely challenging.

The fundamental goal of the forecast is to reduce the uncertainty involved in making financial decisions. In this study, we employ a machine-learning method called the Support Vector Machine (SVM) to forecast the stock market. Future stock prices, price volatility, or market activity can all be potential targets for stock market forecasts.[3]

D. A.G, S.B, G.M, N.C.D, S.S-2019

We train our model to forecast a stock's price in the future using past stock data. Numerous intrinsic and extrinsic variables influence a company's stock price. Artificial neural networks (ANNs) have the ability to infer conclusions from historical data and make plans for the future. Many academics have attempted to utilize time series analysis to anticipate future stock values using prior stock prices as the starting point. In this study, we will explore the usage of a specific type of RNN called LSTM to estimate future business growth using historical stock prices.[4]

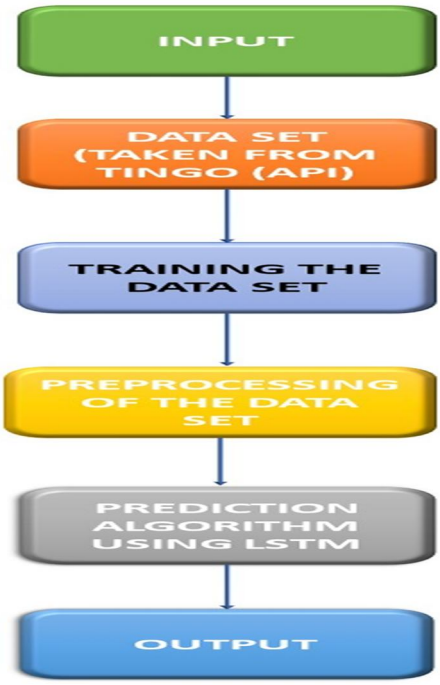
E. A.M, M.H-2020

Numerous machine learning techniques, such as artificial neural networks, gradient-boosted regression trees, support vector machines, and random predictions, have recently been enhanced by the merging of statistics with learning models. Complex non-linear patterns and some relationships that are challenging for linear algorithms to understand can be recognized by these algorithms. The many developments and uses of machine learning in quantitative finance have also been the subject of numerous studies. To forecast the adjusted closing prices for a portfolio of assets, our study uses a model.

Finding the most precise machine learning system with the necessary training to forecast future values for our portfolio is the major goal of this endeavor.[5]

III. METHODOLOGY/EXPERIMENTAL

A. Flowchart/Block Diagram



B. Algorithm

This algorithm will help to predict the next 30 days stock price
Initialize i=0
Initializing steps to 100
storing the result into lst_output
while i is less than 30

else:
passing the result into X_input and reshaping it for prediction
after reshaping storing the result into yhat
getting the yhat value
adding the yhat value to the final output and the previous output in temp_input
before adding yhat into previous output we had 100 elements in temp_input
after adding yhat into previous output we have 101 elements in temp_input
if(len(temp_input)>100):
if the lenght of the temp_input is greater than 100
we take the elements from 1st position
after this step we get new output
the new output is putted into the new input
we reshape it again
after reshaping the prediction is made again
this loop will run till i is less than or equal to 30
we can calculate the above logic using this mathematical formula
$CGR = Y_1*Gr_1 + Y_2*GR_2 + \ldots\ldots + Y_n*GR_n$
Where CGR is company growth rate
Y=years
GR=growth rate

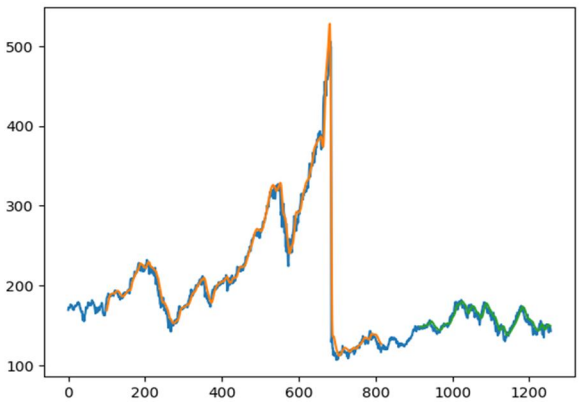
IV. RESULTS AND DISCUSSIONS

We have taken the dataset from the data source as an open-sourced data API called Tingo which will automatically get updated. The uniqueness of our proposed model is that we proposed an idea Subtraction of both losses gives the best results of prediction for our model. our customized LSTM model can improve the prediction to observe the previous works and find the gaps in the model using the epoch function which shows us the overall loss and the validation loss. scores in all the evaluation metrics.

Using Python, this LSTM model forecasts the price of an Apple share based on past data. The prediction of the APPLE share and its depiction using a Graph is shown in the image below. Here, time series is the most crucial component. Using the share price of a chosen stock and the time period provided, we built the algorithm. The algorithm's results, which require 100 LSTM units to achieve accuracy, are displayed in the graph below.

The accuracy of the trained model obtained from the technique is compared with the result in Figure 1, which is taken from the original data set. The "Y-axis" displays the number of days, while the "X-axis" displays the closing price of each stock. As seen in Fig. 1, this dataset has a slot of 1258 days.

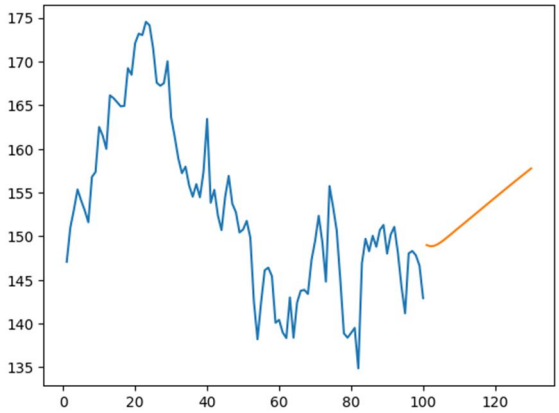
In Fig. 1 the graph was drawn from the entire dataset along with some parts of the training data. The graph shows the output of the algorithm that is implemented successfully. The original price is represented by blue color, likewise, training and testing price is represented by orange and green color, respectively. A slight difference can be seen between the original and the other two prices which indicates that this model can be used to predict the minimum loss rate for the particular share.



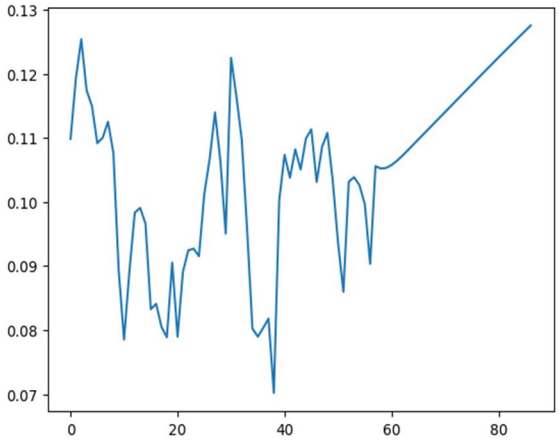
(Fig 01-Entire data set with training data)

Fig. 2 displays the future 30 days predicted price value of the stock based on the prior 100 consecutive days, so that if it is necessary to forecast the price of the 101st day, the model will take into account the data from the first 100 days, and similarly, the price of the 102nd day can be determined by taking into account the data from the 2nd to the 101st day. By storing the value in the form of neural networks and creating feedback connections with them, the LSTM model is used to forecast the future price value of the stock in this manner.

The yellow color in Fig. 2 represents the pricing value for the next 30 days. The pricing value is then scaled to make it fit between 0 and 1 as a consideration. Because the scale of the original data affects the LSTM so much.

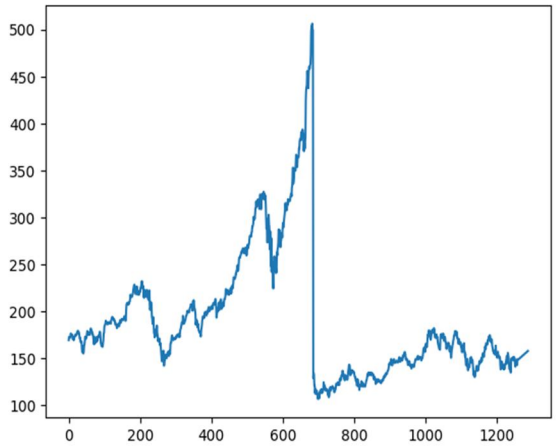


Fig(02-Prediction of 30 days)



Fig(02-Prediction of 30 days)

In this graph, you can see the overall prediction.



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V. FUTURE SCOPE

We can add additional stocks to it because it only forecasts a certain number of equities, in the future. In order for the user to effectively use this algorithm, we may create a web application or a mobile application. This method may be modified to display real-time data from different firms.

VI. CONCLUSION

This research suggests an LSTM-based machine learning system that predicts the asset values of both Amazon and Apple. The output of our model has proven to be reliable.
If the model is trained with more data sets, the forecast may be more precise.

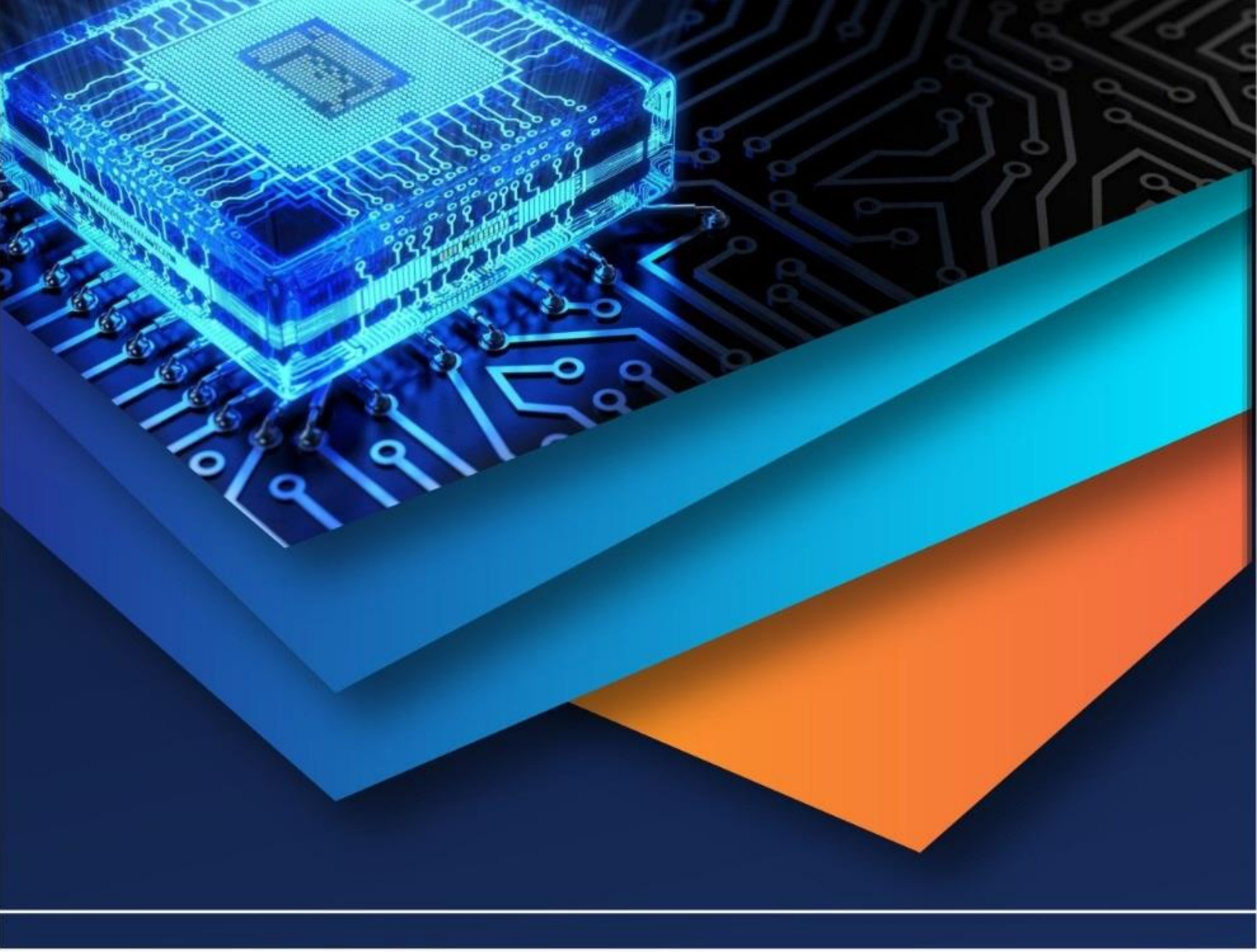
VII. ACKNOWLEDGMENT

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