

# Stock Price Prediction Using LSTM

## Abstract:

The prediction of stock value is a complex task which needs a robust algorithm background to compute the longer-term share prices. Stock prices are correlated within the nature of market; hence it will be difficult to predict the costs. The proposed algorithm using the market data to predict the share price using machine learning techniques like recurrent neural network named as **Long Short-Term Memory (LSTM)**, in that process weights are corrected for each datapoints using stochastic gradient descent.

This system will provide accurate outcomes in comparison to currently available stock price predictor algorithms. The network is trained and evaluated with various sizes of input data to urge the graphical outcomes.

## Introduction:

The share market is a place where the shares of a public company are traded. As discussed, the volatile nature of the stock market makes it an area which needs an abundance of analysis with the old data predicated. The previous stock trend prediction algorithms use the historic time series stock data. the typical scientific stock price forecasting procedures are focused on the statistical analysis of stock data. In the paper will develop a stock data predictor program that uses previous stock prices and data will be treated as training sets for the program to predict the stock prices of a particular share this program develops a procedure.

This model considers the historical equity share price of a company price and applies RNN (Recurrent Neural Network) technique called Long Short-Term Memory (LSTM). The proposed approach considers available historic data of a share and it provides prediction on a particular feature. The features of shares are Opening price, day High, day Low, previous day o price, Close price, Date of trading, Total Trade Quantity and Turnover. The proposed model uses the time series analysis in order to predict a share price for a required time span.

The Long Short-Term Memory (LSTM) networks are a type of recurrent neural network (RNN) capable of addressing linear problems. LSTM is a deep learning technique. Long-term Memory (LSTM) Units are enforced to learn very long sequences. This is a more general version of the gated recurrent system. LSTM is more benign than other deep learning methods like RNN or traditional feed forward because LSTMs tackle the evanescent gradient issue.

### **Related Work:**

While doing the literature survey, the data about Stock market prediction systems that are as of now being utilized are considered. Despite the fact that, there after numerous writings have come up in nonlinear measurable displaying of the stock returns, the majority of them required that the nonlinear model be indicated before the estimation is done. in any case, for the explanation that the financial exchange returns being boisterous, unsure, confused and nonlinear in nature. There are various functions used to forecast the parameters. Mainly include, binary threshold, linear threshold, hyperbolic sigmoid, and brown. The Investigation of Stock Market Prediction Using Machine Learning Approach has been mentioned. The stock exchange forecast has become a sharp area of interest. Particular assessment is one of them, yet it does not reliably deliver specific results, so it is essential to develop strategies for progressively accurate gauge.

The impact of the financial ratios and technical analysis on stock price forecasting using random forests, the use of AI and human-made awareness frameworks to predict stock costs is a growing example. stock value Prediction by methods for multi-Source multiple instances learning unequivocally foreseeing the protections trade is a troublesome task, anyway the web has wind up being a useful gadget in making this task less difficult, due to the related course of action of the data, it is certainly not difficult to evacuate certain inclinations right now, it is less difficult to establish associations between different variables and, for the most part, a case of adventure.

After a numerous investigation in the field of stock prediction and analysis, The Long Short-Term Memory (LSTM) networks are found out to be more capable enough of solving involute linear problems, and also there is a discussion about the usage of RNN (Recurrent Neural Networks) to predict the share prices. It is also shown in the paper that the stock prediction can be done based on data on TATAGLOBAL. Due to the technical advancement the process of predicting stock prices using AI and Machine Learning methodologies, there are many research which are being conducted to find an accurate model to predict the stock prices and there is no universal solution which is available to apply, hence the historic data of a share will be considered for stock price prediction.

### **Proposed System:**

As represented in the previous section getting the historical data from market is mandatory step. Then there is a need to extract the feature, which is required for data analysis, then divide it as testing and training data, training the algorithm to predict the price and the final step it to visualize the data.

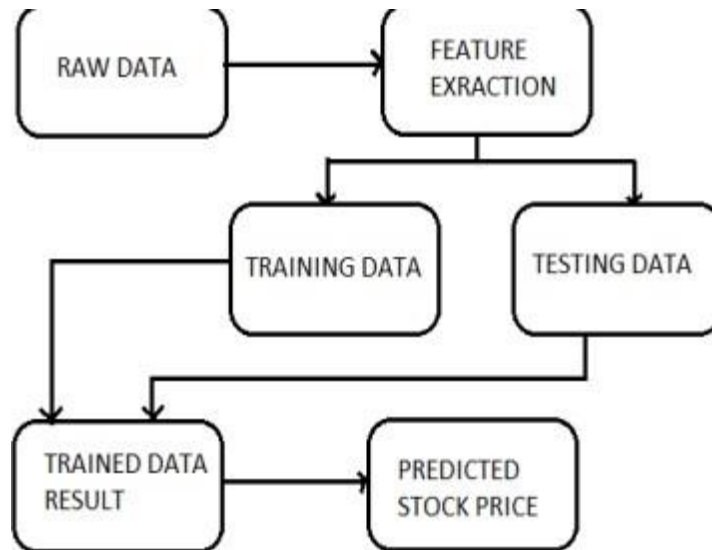


Figure 1: System Architecture

The typical LSTM unit consists of a cell, an info door, an entrance door and a door with a view. The cell collects values over discretionary time intervals, and the three inputs manage the progress of data into and out of the cell. The main advantage of the LSTM is its ability to learn context-specific temporal dependence. Each LSTM unit collects information for either a long or short period of time (hence the name) without explicitly using the activation function within the recurrent components.

## Parameters Used:

Here, is the list of parameters used in the prediction of a particular stock.

Table 1:Parameters Used

Parameter Used	Meaning
Date	Date of stock price
Open	Open price of a share
Close	Closing price of a share
Volume/ trade quantity	Number of shares traded
High	Highest share value for the day
Low	Lowest share value for the day
Turnover	Total Turnover of the share

## Stock Price Predictor using LSTM:

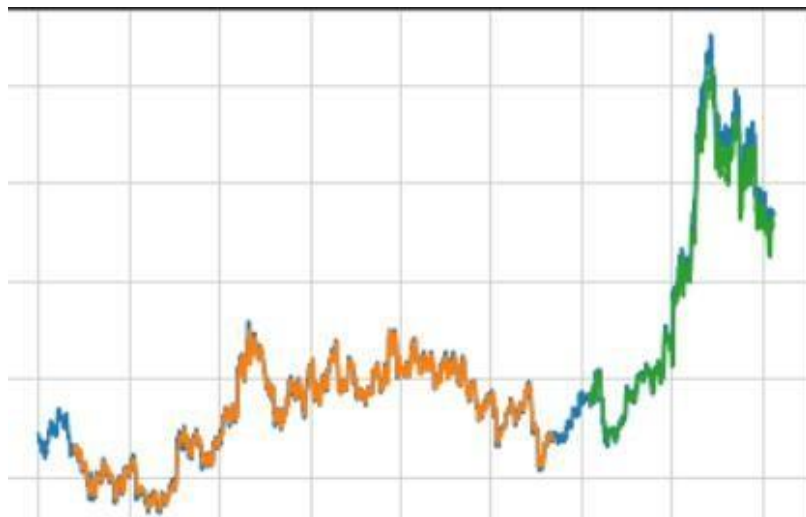
The proposed framework that learns online anticipating the close costs of the stock with the assistance of Long Short-Term Memory (LSTM). The Long Short-Term Memory (LSTM) is a counterfeit intermittent neural system (RNN) design used in the field of deep learning, unlike standard feed forward neural systems, LSTM has input associations

- Step 1: Start.
- Step 2: Data Preprocessing after getting the historic data from the market for a particular share.
- Step 3: import the dataset to the data structure and read the open price.
- Step 4: do a feature scaling on the data so that the data values will vary from 0 and 1.
- Step 5: Creating a data structure with 60 timestamps and 1 output.
- Step 6: Building the RNN (Recurrent neural network) for Step 5 data set and Initialize the RNN by using sequential repressor.
- Step 7: Adding the first LSTM layer and some Dropout regularization for removing unwanted values.
- Step 8: Adding the output layer.
- Step 9: Compiling the RNN by adding adam optimization and the loss as mean\_squared\_error. Step 10: Making the predictions and visualizing the results using plotting techniques.

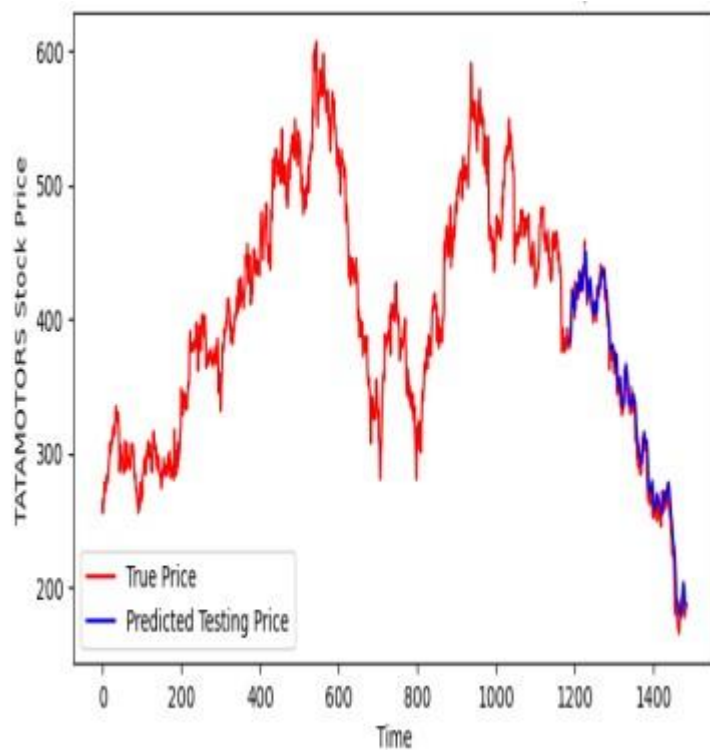
### Results and Discussions:

The implementation of proposed LSTM model using python which predicts the future price of TATAGLOBAL share based on its historical data. The below visualization figure shows the visualization of TATAGLOBAL share prediction.

In our paper the implementation of an algorithm which predicts the stock price of a share for given period, the below graph from our algorithm will show the predicted price of TATAGLOBAL share. In the result shown in the below graph is the plotted form our algorithm outcome by applying 96LSTM units for achieving the accuracy.

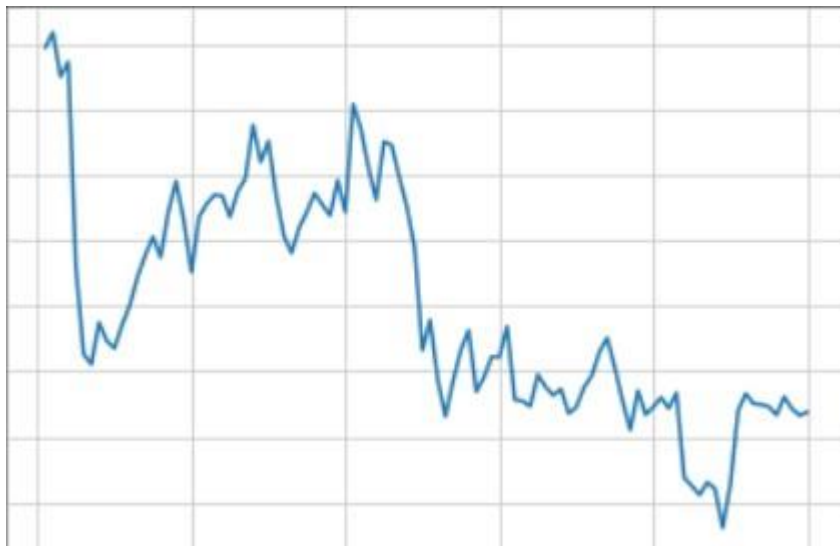


### Predicted Testing Stock Price:



### Future Prediction of Stock Price:

The proposed algorithm is able to predict the share price with very low loss and error rate, if increase the epoch batch rates the training will be more efficient, in the above section we have used epoch batch size of 77 to predict the stock prices.



## Conclusion:

The study of the share is carried out in this paper and it can be carried out for several shares in the future. Prediction could be more reliable if the model trains a greater number of data sets using higher computing capacities, an increased number of layers, and LSTM modules.

LSTM can be another great tool for stock price prediction. However, this is important to note that the predicted stock prices shall not be used as a solely definitive guide to make an investment decision without further analysis. This is because the prediction is only based on the historical prices movement that usually won't be the only factor that affects the future price movement.

The main limitation of using any machine learning algorithm in predicting stock prices is that we can only back test the historical data, but the price movement does not necessarily follow the historical trend in various unforeseen circumstances. That's the reason a further fundamental/market analysis is required here to support our investment decision making.