Stock Price Prediction using LSTM

Course Project: DS303
Ayush Patil
200070012

1. Introduction

Stock market prediction means forecasting the current trends of a company and predicting the value of stocks whether it's going up or down. The stock market is the place where a company's shares are traded. A stock is an investment in an institution where it represents ownership in a company. A stock market is a place where those stocks are purchased. Purchasing a stock of a company is owning a small share of an institution. we are predicting the stock prices using the machine learning algorithm to develop a model which forecasts the stock price effectively based on the current market trends. We have used LSTM recurrent neural networks to predict stock prices accurately. You would find two types of stocks, one of them was Intraday trading, which is known to us by the term day trading. Intraday trading is that which means all positions are squared-off before the market closes then and there and there would be no possibility of changing the ownership after the day's end. LSTMs are very important, as they are very powerful in sequence prediction problems because they could store previous or past information. This is very important in stock prediction as we need to store and read the previous stock information as well to forecast the stock prices accurately in the future. The rest of the paper is organized as follows. Section 2 introduces the research status of stock price prediction. Section 3 introduces the methodologies. Section 4 consists of the experimental results and the analysis of the results. Section 5 concludes the paper.

2. Data Collection

Table 3.1 Google

Attribute Name	Min	Max
Open	87.74	1005.49
Low	86.37	996.62
High	89.29	1008.61
Close	87.58	1004.28

Table 3.2 Nifty50

Attribute Name	Min	Max
Open	87.74	1005.49
Low	86.37	996.62
High	89.29	1008.61
Close	87.58	1004.28

Table 3.3 Reliance

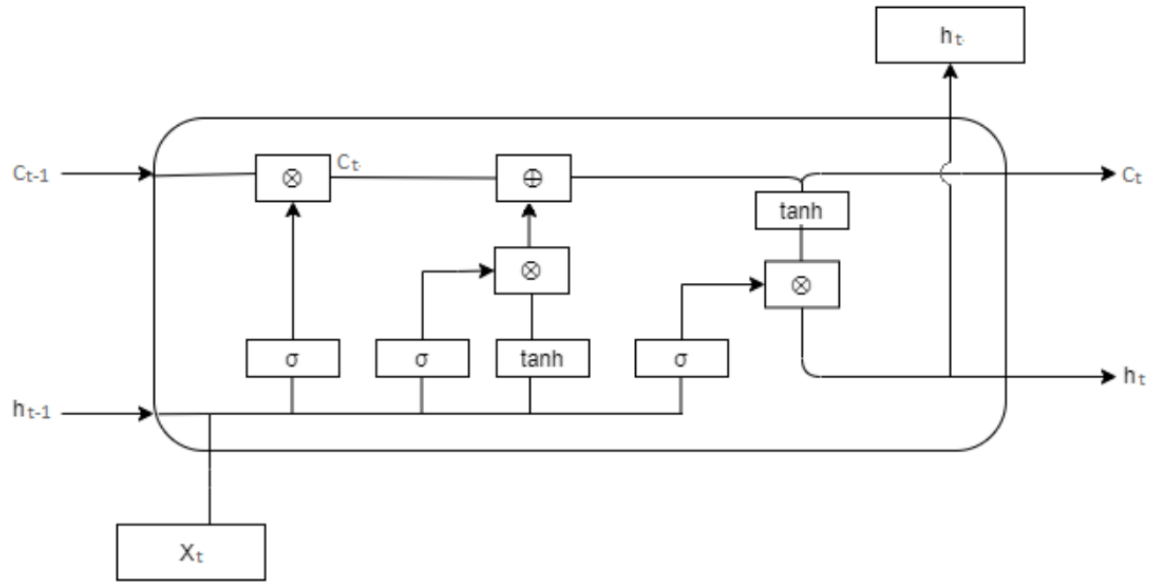
Attribute Name	Min	Max
Open	205.5	3298
Low	197.15	3141.3
High	219.5	3298
Close	203.2	3220.85

Table 3.1 Sample Input

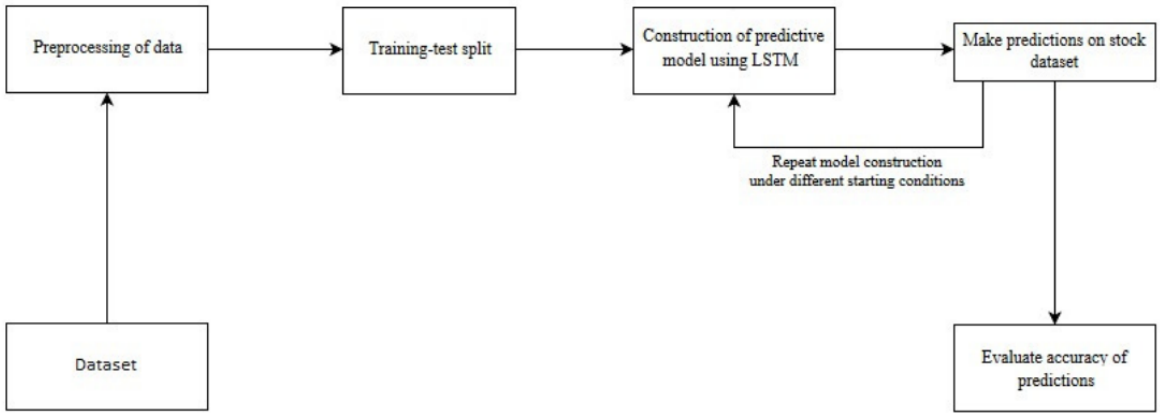
Date	Trade Open	Trade Low	Trade High	Trade Close
11-Jun-2021	2,524.92	2,498.29	2,526.99	2,513.93
10-Jun-2021	2,494.01	2,494.00	2,523.26	2,521.60
09-Jun-2021	2,499.50	2,487.33	2,505.00	2,491.40
08-Jun-2021	2,479.90	2,468.24	2,494.50	2,482.85
07-Jun-2021	2,451.32	2,441.07	2,468.00	2,466.09
04-Jun-2021	2,422.52	2,417.77	2,453.86	2,451.76
03-Jun-2021	2,395.02	2,382.83	2,409.75	2,404.61
02-Jun-2021	2,435.31	2,404.20	2,442.00	2,421.28

3. LSTM Algorithm

LSTM uses the RNN approach which has the ability to memorize. Each LSTM cell has three gates i.e. input, forget, and output gates. While the data enters the LSTM's network, the data that is required is kept and the unnecessary data will be forgotten by the forget gate. LSTM can be used in many applications such as weather forecasting, NLP, speech recognition, handwriting recognition, time-series prediction, etc.



4. System Architecture



Data Selection: The first step is to select data for an organization and split the data into training and testing. we have used 75% for training and 25% for testing purposes.

Pre-processing of data: In pre-processing, we are selecting attributes required for the algorithm, and the remaining attributes are neglected. The selected attributes are Trade Open, Trade High, Trade Low, Trade Close, and Trade Volume. In pre-processing, we are using normalization to get values in a particular range.

Prediction using LSTM: In this system, we are using the LSTM algorithm for predicting stock values. Initially, the training data is passed through the system and trained in the model. Then in the testing phase, the predicted values are compared with the actual values.

Evaluation: In the evaluation phase we are calculating the Accuracy, Mean Square Error (MSE), and Root Mean Square Error (RMSE) values for comparison.

5. Experimental Results

5.1 Google

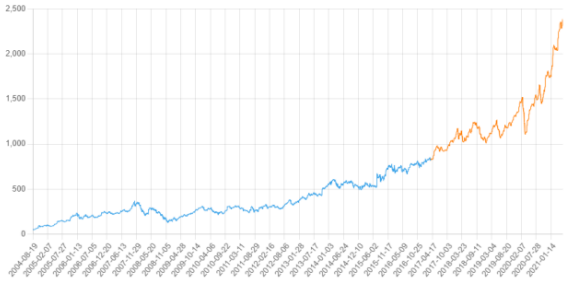


Fig 5.1.1 Google Graph

Table 5.1.2 Google Epochs

epochs	Accuracy	MSE	RMSE
10	93.00717	207.6578	14.41034
20	94.01166	156.3873	12.50549
30	95.64188	105.3248	10.26279
40	95.59026	99.17409	9.958619
50	96.99466	62.24641	7.88964

In the results, as we have shown in Fig 5.1.1, the graph shows the Trade Close value for the Google dataset. In this graph, the blue line indicates the training data and the yellow color shown is the predicted values from the test data. Table 5.1.2 shows the accuracy, MSE, and RMSE values for no of iterations (epochs).

5.2 Reliance

Fig 5.2.1 Reliance Graph

Table 5.2.2 Reliance Epochs

epochs	Accuracy	MSE	RMSE
10	96.25328	4839.5690	69.56701
20	97.63884	2653.1278	51.50852
30	98.19937	1650.3337	40.62430
40	98.13571	1616.9295	40.21106
50	98.37254	1361.8098	36.90270

Above graph 5.2.1 shows the Trade Close value for the Reliance dataset and Table 5.2.2 shows the MSE, RMSE, and accuracy values for the Reliance dataset.

6. Conclusion

We are predicting the closing stock price of any given organization, we have developed an application for predicting close stock price using the LSTM algorithm. We have used datasets belonging to Google, Nifty50, TCS, Infosys, and Reliance Stocks and achieved above 93% accuracy for these datasets. In the future, we can extend this application for predicting cryptocurrency trading and also, we can add sentiment analysis for better predictions.