

A Study on Prediction of Share Price by Using Machine Learning LSTM Model

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ABSTRACT

In this project we attempt to implement machine learning approach to predict stock prices. Machine learning is effectively implemented in forecasting stock prices. The objective is to predict the stock prices in order to make more informed and accurate investment decisions. We propose a stock price prediction system that integrates mathematical functions, machine learning, and other external factors for the purpose of achieving better stock prediction accuracy and issuing profitable trades.

There are two types of stocks. You may know of intraday trading by the commonly used term "day trading." Intraday traders hold securities positions from at least one day to the next and often for several days to weeks or months. LSTMs are very powerful in sequence prediction problems because they're able to store past information. This is important in our case because the previous price of a stock is crucial in predicting its future price. While predicting the actual price of a stock is an uphill climb, we can build a model that will predict whether the price will go up or down.

KEYWORDS: LSTM, CNN, ML, DL, Trade Open, Trade Close, Trade Low, Trade High

INTRODUCTION

- Machine learning has significant applications in the stock price prediction. In this machine learning project, we will be talking about predicting the returns on stocks.
- In this project, we will work with historical data about the stock prices of a publicly listed company. We will implement a mix of machine learning algorithms to predict the future stock price of company, starting with simple algorithms and then move on to advanced techniques like LSTM.

NEED OF THE STUDY

The purpose of the study is to analyse the future value of select companies (Tata Motors, Adani Power, SBI, Tech Mahindra & Happiest Minds) share prices.

SCOPE OF THE STUDY

- System predicts the stock prices for one or more days in advance, based on the previous stock prices.

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- The study is going to generate the signals of entry price and closing price by using Machine learning techniques.

OBJECTIVES OF THE STUDY

- To know the concept of machine learning technology with relating to stock prediction.
- To analyze time series data for investment.
- To study entry price and target price and proper stop loss by using machine learning.

RESEARCH METHODOLOGY

Secondary data: The secondary data collected from the following websites.

Yahoofinance.com

TOOLS AND TECHNIQUES

Techniques:

- LSTM Model

Tools:

- Machine learning modules and algorithms
- Python modules

Software:

- Jupyter notebook
- Tensorflow
- Anaconda navigator

LIMITATIONS OF THE STUDY

- This study is confined to Machine learning LSTM model.
- This LSTM model is used for short term investment.

Dataset Analysis of Tech Mahindra

```
In [ ]: #lstm model
        #tech mahindra
```

```
In [2]: import pandas as pd

        df = pd.read_csv('TECHM.NS.csv')

        df
```

Out[2]:

	Date	Open	High	Low	Close	Adj Close	Volume
0	2006-08-28	130.25	142.250000	125.500000	138.562500	109.847557	60664652.0
1	2006-08-29	138.75	140.975006	133.887497	134.824997	106.884598	15716452.0
2	2006-08-30	134.25	135.725006	130.375000	132.024994	104.664848	8139932.0
3	2006-08-31	131.25	136.000000	128.750000	134.612503	106.716148	6683960.0
4	2006-09-01	134.75	137.250000	133.774994	135.462494	107.389992	4704780.0
...
3946	2022-08-18	1100.00	1109.199951	1088.099976	1105.150024	1105.150024	3041422.0
3947	2022-08-19	1110.00	1135.000000	1100.000000	1104.150024	1104.150024	4577717.0
3948	2022-08-22	1096.00	1100.000000	1075.250000	1078.699951	1078.699951	2157609.0
3949	2022-08-23	1062.00	1070.099976	1047.000000	1065.900024	1065.900024	2875768.0
3950	2022-08-24	1066.00	1073.400024	1055.099976	1070.949951	1070.949951	2180800.0

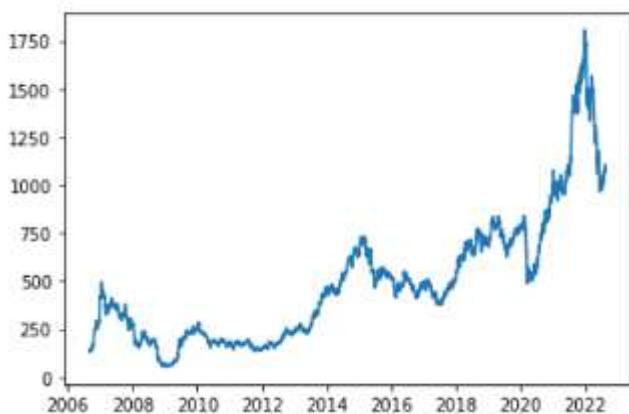
3951 rows x 7 columns

INTERPRETATION

The above figure shows that Data analysis for stock price of Tech Mahindra by using dataset. Figure represent the date, open, close, high, low, adjusted close and volume of stocks details.

1. Close Price history of TECH MAHINDRA

[<matplotlib.lines.Line2D at 0x7fd98a31d3d0>]



INTERPRETATION

By representing the dataset into plot. The plot shows the close price history of tech Mahindra from 2006 to 2022.

2. Predicted Chart

<matplotlib.legend.Legend at 0x7fd917872690>



Interpretation:

- After Dataset reading, it performed preprocessing operation on the dataset. Here the code applies Min-Max Scaler to preprocess the dataset. In

preprocessing, operation removes the noise into the data and convert data into 0 to 1 form.

- Here procure the data from the year **2020-05-25 to 2022-08-23** for the prediction of closing value.
- To apply training, from the samples of Training data.
- After performing preprocessing, the dataset divided into training and testing set. 80% of the data is used for the training while the remaining 20% of the data is used for validation and testing.
- Dataset Model fitting of Long Short-Term Memory architecture.
- After execution of test the above chart represent the training part in blue color, the validation in orange, the green color is the predicted value of the LSTM model.

3. Training prediction and training observation

<matplotlib.legend.Legend at 0x7fd917199350>

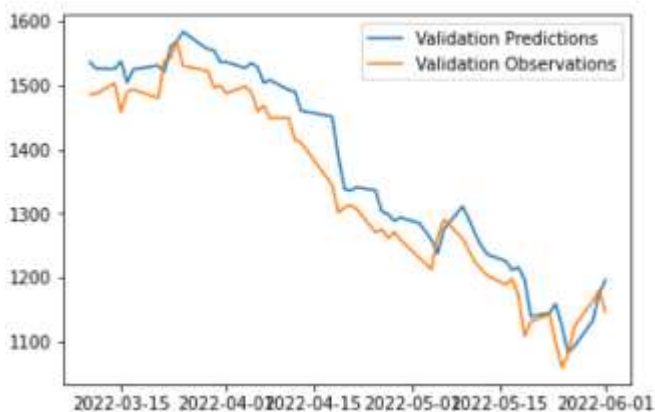


Interpretation:

The above chart shows that the training part further split into training prediction and training observation from the year 2020 to 2022. It helps to compare the training prediction and training observation. It represent the proper training part based on actual values.

4. Validation prediction and validation observation

<matplotlib.legend.Legend at 0x7fd916290390>



Interpretation:

The above chart shows that the validation part further split into validation prediction and validation observation from the date 2022-03-15 to 2022-06-01, Its helps to compare the validation prediction and validation observation. It represent the proper validation part based on actual values.

5. Testing prediction and Testing observation

<matplotlib.legend.Legend at 0x7fd91620a250>



Interpretation:

The above chart shows that the testing part further split into Testing prediction and Testing observation from the date 2022-06-01 to 2022-08-15, It helps to compare the validation prediction and validation observation. It represent the proper testing part based on actual values.

6. Final chart of prediction

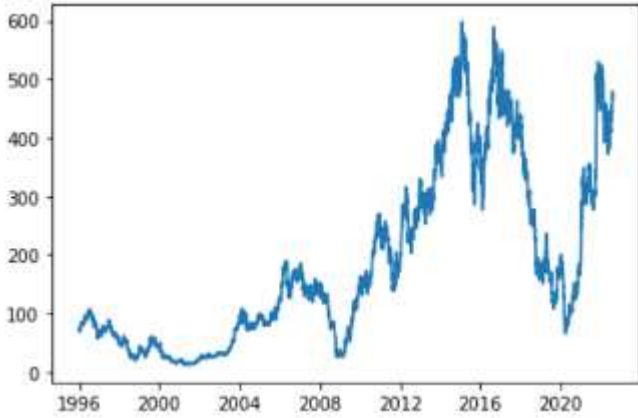
<matplotlib.legend.Legend at 0x7fd9161c95d0>



Interpretation:

The above chart shows that all predictions and observations of training, validation and testing combined together.

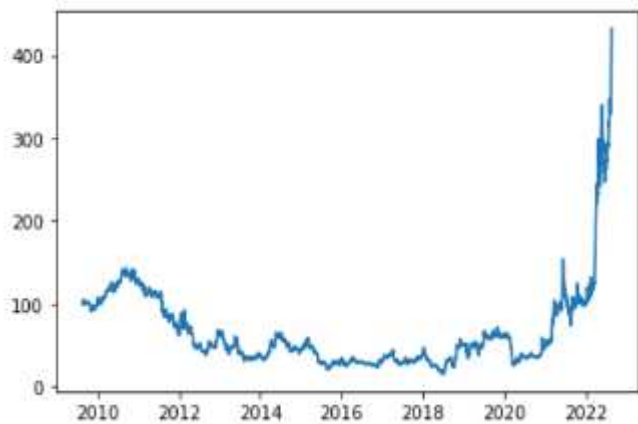
7. closing price history of TATA MOTORS and ADANI POWER
TATA MOTORS



9. Training prediction and training observation TATA MOTORS



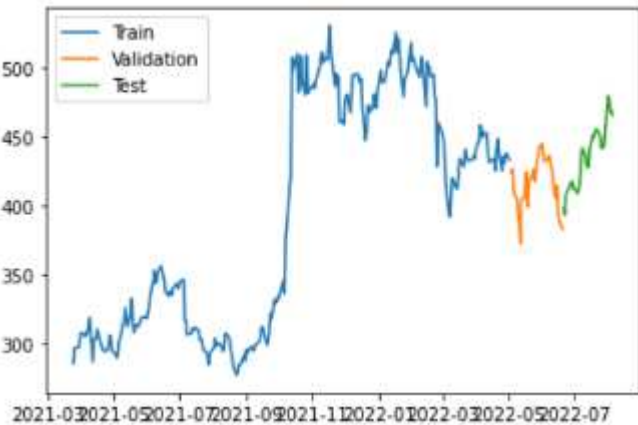
ADANI POWER



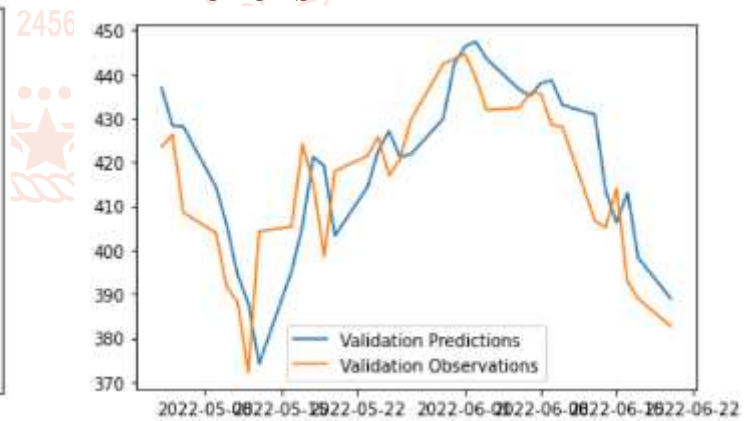
ADANI POWER



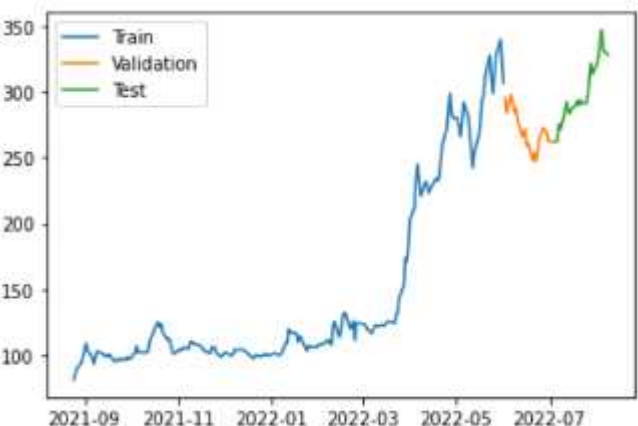
8. Predicted chart TATA MOTORS



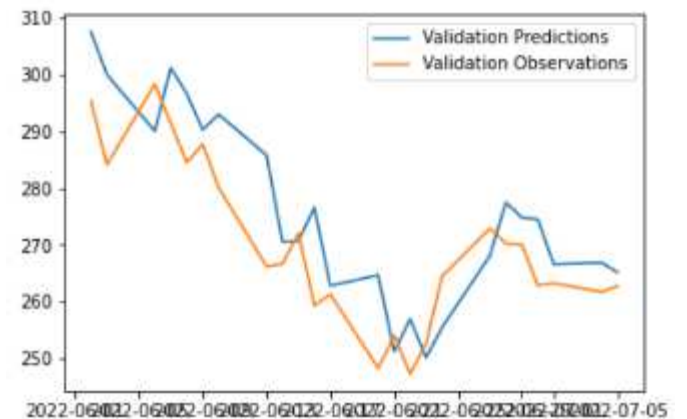
10. Validation prediction and validation observation TATA MOTORS



ADANI POWER



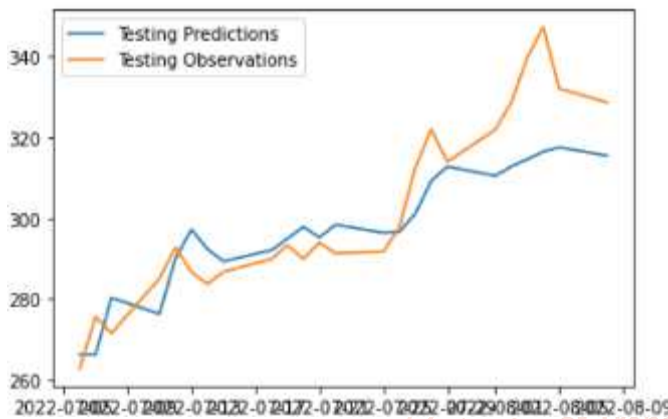
ADANI POWER



**11. Testing prediction and Testing observation
TATA MOTORS**



ADANI POWER



**12. Final chart of prediction
TATA MOTORS**

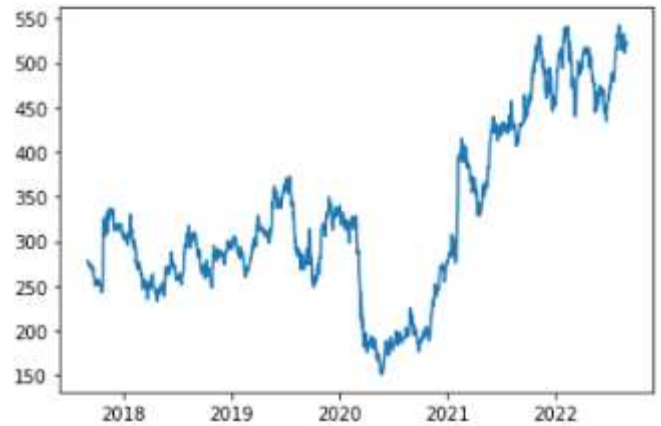


ADANI POWER

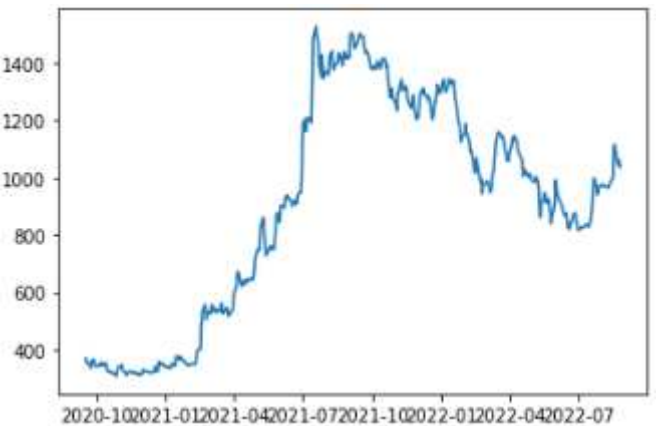


13. Closing price history of SBI and HAPPIEST MINDS

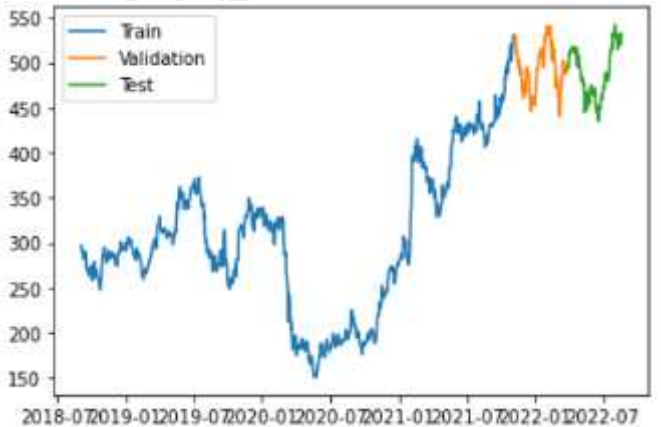
SBI



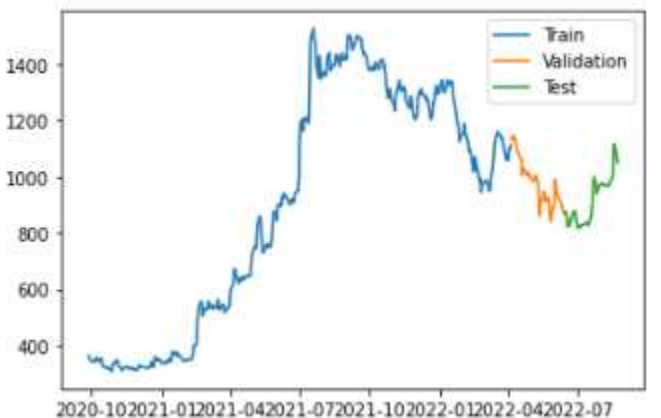
HAPPIEST MINDS



**14. Predicted Graph
SBI**



HAPPIEST MINDS



15. Training prediction and training observation SBI



17. Testing prediction and Testing observation SBI



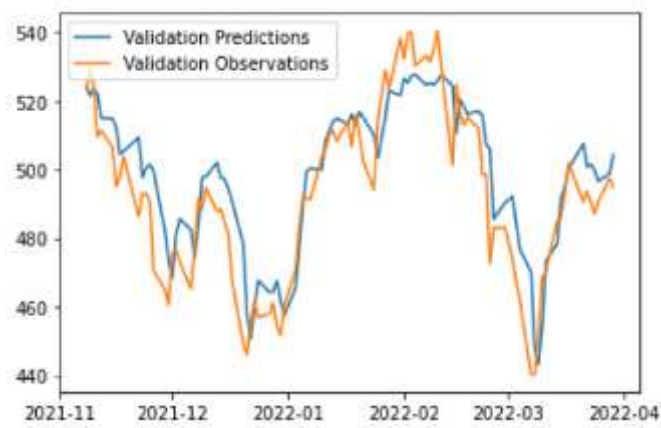
HAPPIEST MINDS



HAPPIEST MINDS



16. Validation prediction and validation observation SBI



18. Final chart of prediction SBI



HAPPIEST MINDS



HAPPIEST MINDS



TABLE 1: The following table shows that the difference between actual and predicted values with stop loss.**TARGET 1**

Stocks	Entry Price	Actual Price	LSTM	Percentage Difference	STOPLOSS	Maximum no of days to reach target 1
TECH MAHINDRA	1146	1010	1005	0.5	20	30
TATA MOTORS	393	441	435	1.3	10	16
ADANI POWER	262	291	290	0.1	10	15
SBI	501	491	505	2.7	20	30
HAPPIEST MINDS	875	815	850	4.5	20	15

TARGET 2

Stocks	Actual price	LSTM	Percentage Difference	STOPLOSS	Maximum no of days to reach target 2
TECH MAHINDRA	1049	1049	0	20	30
TATAMOTORS	454	454	0	10	14
ADANI POWER	313	309	1.3	10	4
SBI	466	467	0.1	20	60
HAPPIEST MINDS	975	985	0.5	20	30

TARGET 3

Stocks	Actual Price	Lstm	Percentage Difference	Maximum no of days to reach target 3	STOPLOSS
TECH MAHINDRA	1065	1080	1.4	15	20
TATAMOTORS	479	465	2.9	9	10
ADANI POWER	328	318	3	10	10
SBI	520	520	0	35	20
HAPPIEST MINDS	980	980	0	15	20

INTERPRETATION

The above tables shows that the difference between actual and predicted values with proper stoploss.

TECH MAHINDRA- The difference between actual value and LSTM MODEL of target1 is 0.5%, There is no difference in Target2, Target 3 is 1.4%. The stoploss based on stock performance at 20 points from entry price.

TATAMOTORS - The difference between actual value and LSTM MODEL of target1 is 1.3%, There is no difference in Target2, Target 3 is 2.9 %. The stoploss based on stock performance at 10 points from entry price.

ADANIPOWER –The difference between actual value and LSTM MODEL of target1 is 0.1%, Target2 is 1.3, Target 3 is 3 %. The stoploss based on stock performance at 10 points from entry price.

SBI - The difference between actual value and LSTM MODEL of target1 is 2.7 %, Target2 is 0.1%, There is no difference in Target3. The stoploss based on stock performance at 20 points from entry price.

HAPPIEST MINDS - The difference between actual value and LSTM MODEL of target1 is 4.5 %, Target2 is 0.5%, There is no difference in Target 3. The stoploss based on stock performance at 20 points from entry price.

FINDINGS

- As per the study LSTM Model is working to find out the closing price of stock based on historical data.
- We observed that LSTM forecast the accurate prediction based on the more input data.
- According to the study the prediction used for the short term investment.
- It forecast closing price based on previous price fluctuations.
- According to the study LSTM model produce predictions similar to the actual values.
- This model used for short term predictions.
- TECH MAHINDRA- As per the study the difference between actual value and LSTM MODEL of target1 is 0.5 percentage, There is no difference in Target2, Target 3 is 1.4 percentage. The stoploss based on stock performance at 20 points from entry price.
- TATAMOTORS - As per the study the difference between actual value and LSTM MODEL of

target1 is 1.3 percentage, There is no difference in Target2, Target 3 is 2.9 percentage. The stoploss based on stock performance at 10 points from entry price.

- ADANIPOWER - As per the study the difference between actual value and LSTM MODEL of target1 is 0.1percentage, Target2 is 1.3, Target 3 is 3 percentage. The stoploss based on stock performance at 10 points from entry price.
- SBI - As per the study the difference between actual value and LSTM MODEL of target1 is 2.7 percentage, Target2 is 0.1, There is no difference in Target3. The stoploss based on stock performance at 20 points from entry price.
- HAPPIEST MINDS - As per the study the difference between actual value and LSTM MODEL of target1 is 4.5 percentage, Target2 is 0.5, There is no difference in Target 3. The stoploss based on stock performance at 20 points from entry price.

SUGGESTIONS

- This model will help for short term investors because LSTM Model is Machine Learning model so it is suggested that investors must be aware of market conditions.
- It is suggested that before investing any company investors should go through fundamental analysis of the company, investors study news and go for LSTM. combination of fundamental analysis and LSTM will gives more efficient return and moderate risk.
- If in case the predicted Values not performing well in Realtime it is better to use stoploss.
- It is always suggested that investors need to protect their capital in order to gain returns, don't trade without stoploss.
- It is suggested that in trading investors need to monitor the invested stock and proposed stock company profile.

- It is suggested that candle stick pattern for trading.
- It is suggested that, in trading investors need to monitor the invested stock and proposed stock company profile.
- It is suggested that the candle stick pattern is useful for investors in trading with LSTM MODEL.

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