ASSIGNMENT 4: RNN AND LSTM MODEL PREDICTING ETHEREUM PRICE

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INTRODUCTION

Ethereum is the reason for the recent drop in bitcoin prices. The price of Ethereum is currently very cheap compared to bitcoin, but some financial experts, including Tesla's CEO Elon Musk, claiming that we will see a rise in the price of Ethereum soon. So, the question is how to predict the future prices of Ethereum, this small project throws some light on how to predict the price of Ethereum with the help of RNN and LSTM. In this small project report, I will walk you through the task of Ethereum Price Prediction with Deep Learning using Python.

ETHEREUM PRICE PREDICTION

Predicting the price of a cryptocurrency is a regression problem. Bitcoin is one of the most successful examples of cryptocurrency, but we recently saw a major drop in bitcoin prices due to Ethereum. Unlike bitcoin, Ethereum is very cheap right now, but financial experts are predicting that we may see a major increase in Ethereum prices.

There are many machine learning approaches that we can use for the task of Ethereum price prediction. You can train a machine learning model, or you can also use an already available powerful model like the Facebook Prophet Model. But in the section below, I will be using the Deep Learning approach using RNN and LSTM for the task of Ethereum price prediction and, I try experimenting one machine learning approach that is a powerful model named as Facebook Prophet Model.

DATA COLLECTION

To predict future Ethereum prices, we first need to get a dataset for this task. So, to get a dataset for the Ethereum price prediction task I just follow the steps mentioned below:

1. Visit Yahoo Finance
2. Search for Ethereum
3. Go to Historical Data Section
4. Click on Download (Now you are halfway through)

After completing the steps mentioned above, we will find a dataset of historical prices of Ethereum in our downloads folder. Now let's get started with the task of Ethereum price prediction by importing the necessary Python libraries and the dataset:

ETHEREUM PRICE PREDICTION

IMPORING NECESSARY LIBRARIES AND RELEVANT PACKAGES

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.preprocessing import MinMaxScaler
from keras import models
from keras.layers import Dense
from keras.layers import Dropout
from keras.layers import LSTM
import tensorflow as tf
```

LOADING DATASET

ETH.ipynb

File Edit View Insert Runtime Tools Help All changes saved

Comment Share

+ Code + Text

RAM Disk Editing

```
from google.colab import files
uploaded = files.upload()
```

Choose Files ETH-USD_train.csv

- **ETH-USD_train.csv**(application/vnd.ms-excel) - 56358 bytes, last modified: 12/16/2021 - 100% done

Saving ETH-USD_train.csv to ETH-USD_train.csv

```
[4] dataset_train = pd.read_csv("ETH-USD_train.csv")
```

```
dataset_train
```

1 to 25 of 730 entries Filter

index	Date	Open	High	Low	Close	Adj Close	Volume
0	2018-01-01	755.757019	782.530029	742.0040280000001	772.640991	772.640991	2595760128
1	2018-01-02	772.346008	914.830017	772.346008	884.4439699999999	884.4439699999999	5783349760
2	2018-01-03	886.0	974.471008	868.450989	962.7199710000001	962.7199710000001	5093159936
3	2018-01-04	961.713013	1045.079956	946.085999	980.921997	980.921997	6502859776
4	2018-01-05	975.75	1075.390015	956.3250119999999	997.7199710000001	997.7199710000001	6683149824
5	2018-01-06	995.153992	1060.709961	994.6220089999999	1041.680054	1041.680054	4662219776
6	2018-01-07	1043.01001	1153.170044	1043.01001	1153.170044	1153.170044	5569880064
7	2018-01-08	1158.26001	1266.930054	1016.0499880000001	1148.530029	1148.530029	8450970112
8	2018-01-09	1146.0	1320.97998	1145.48999	1299.73999	1299.73999	7965459968
9	2018-01-10	1300.339966	1417.380005	1226.599976	1255.819946	1255.819946	9214950400
10	2018-01-11	1268.089966	1337.300049	1135.170044	1154.930054	1154.930054	7235899904
11	2018-01-12	1158.290039	1296.040039	1120.089966	1273.199951	1273.199951	5222300160
12	2018-01-13	1270.469971	1432.880005	1270.469971	1396.420044	1396.420044	5746760192
13	2018-01-14	1397.47998	1400.560059	1286.209961	1366.77002	1366.77002	4841630208
14	2018-01-15	1365.209961	1390.589966	1290.599976	1291.920044	1291.920044	4781100032
15	2018-01-16	1292.630005	1292.630005	875.544983	1053.689941	1053.689941	8405139968
16	2018-01-17	1061.339966	1090.22998	780.9219969999999	1014.25	1014.25	8545160192
17	2018-01-18	1016.4400019999999	1100.310059	967.7589720000001	1036.280029	1036.280029	5938319872

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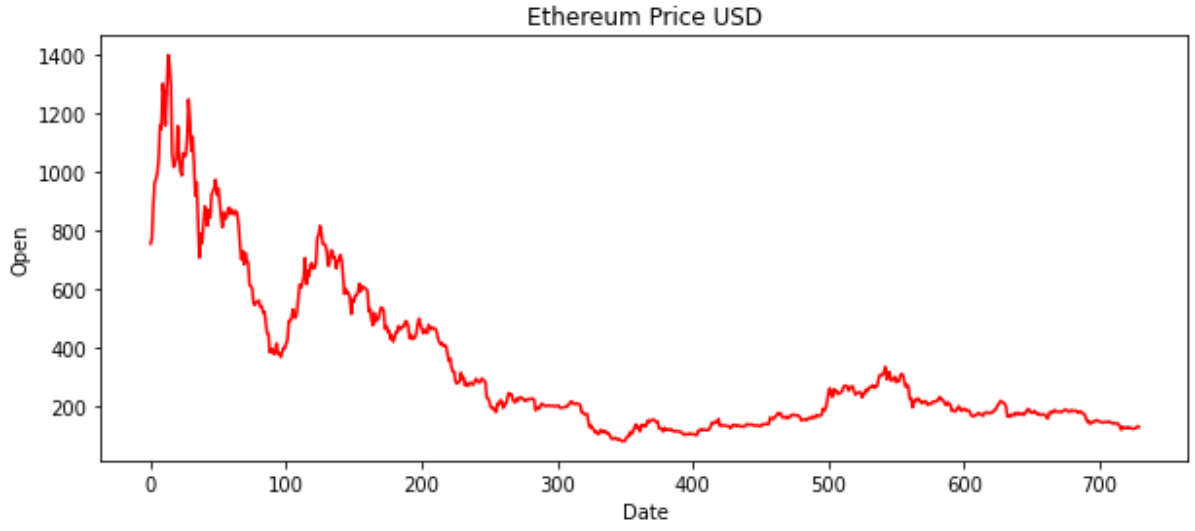
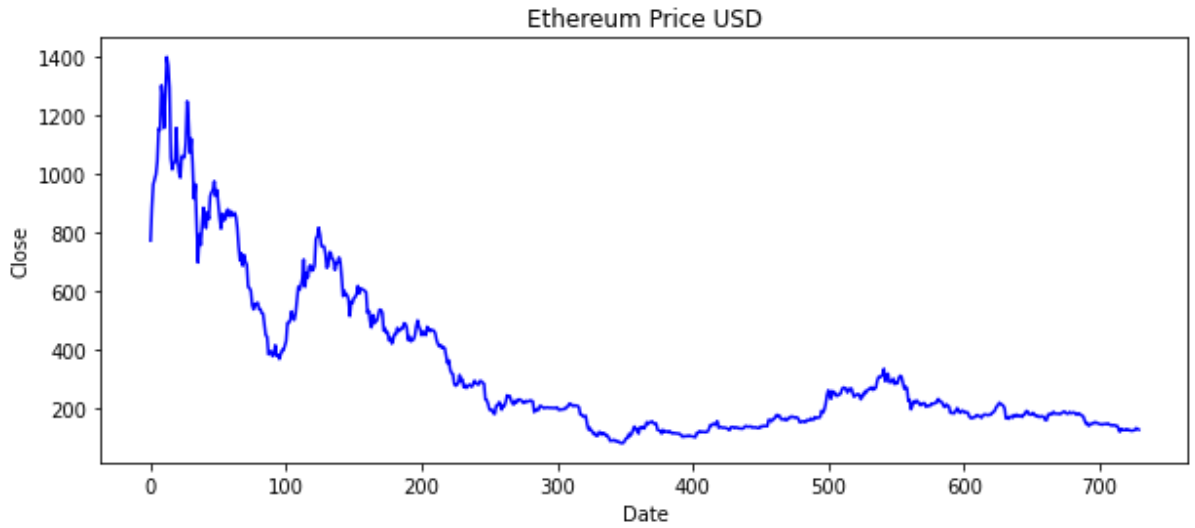
ENG IN 21:32 17-12-2021

Dataset that we collected is from 01/01/2018 till 31/12/2019. Contains 730 Entries in total.

In this dataset, the “Open” column contains the values whose future values that we want to predict, so let’s have a closer look at the historical values of Open prices of Ethereum:

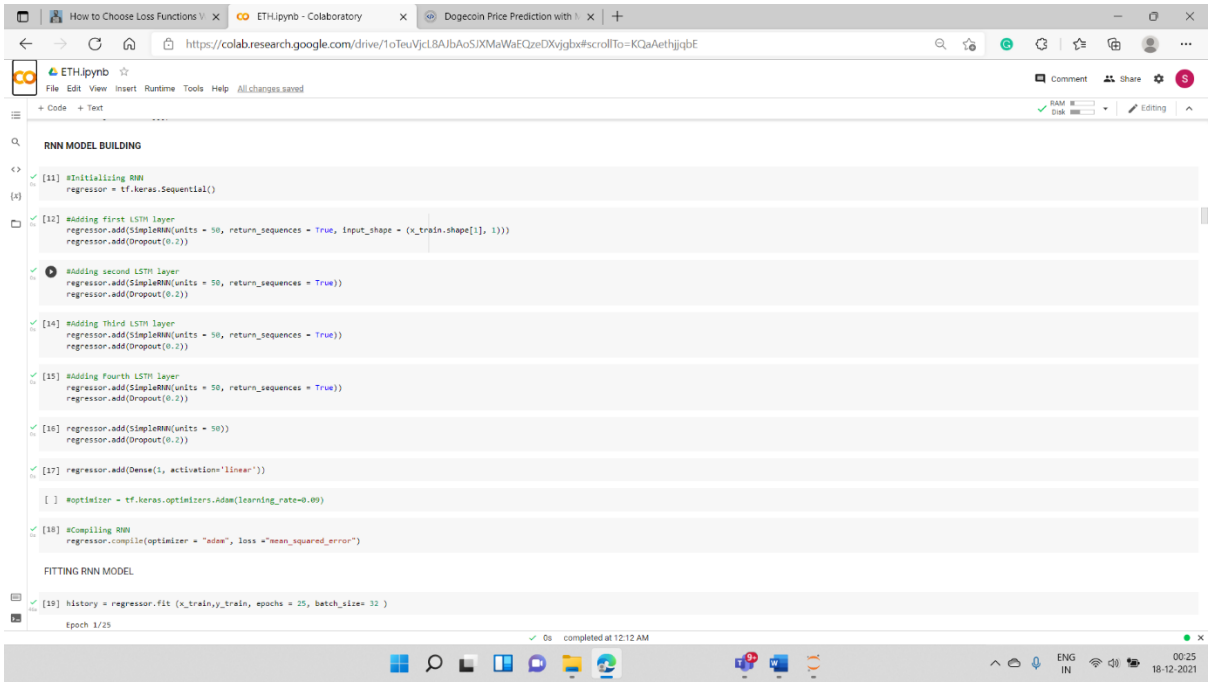


Similarly, we can plot for “Close” Column of Ethereum and see how it is behaving for better understanding.

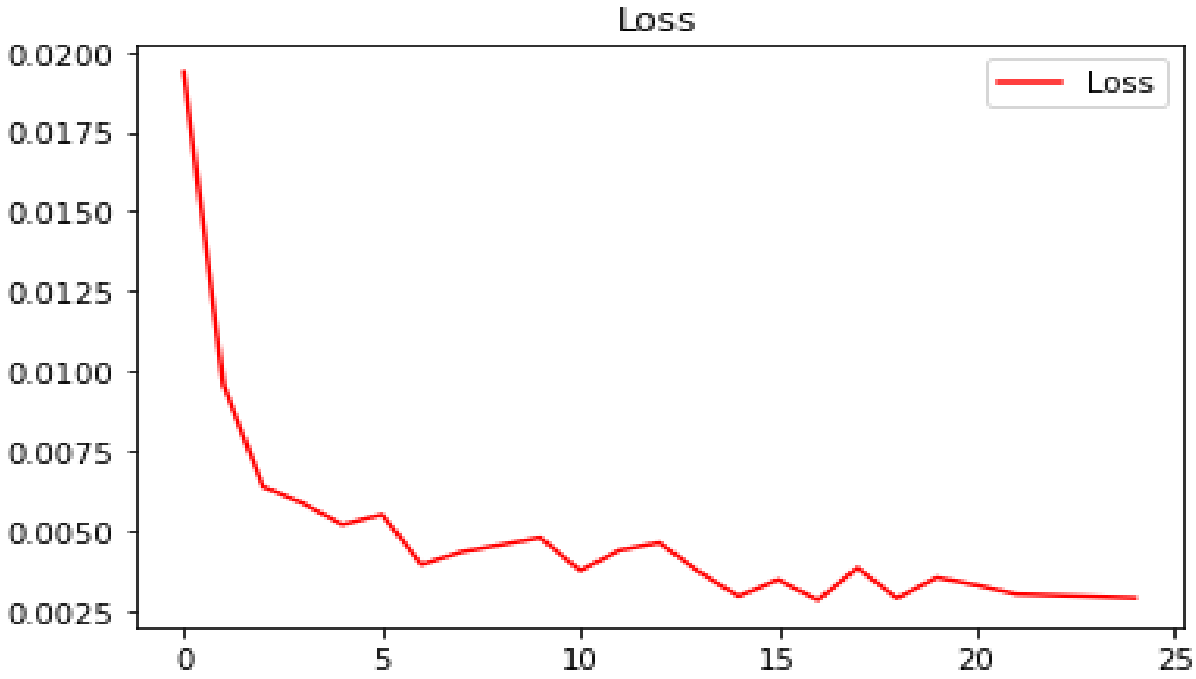


I have decided to work on opening price of Ethereum. Then I did feature scaling the reason doing feature scaling is to bring the attribute in same dimensions.

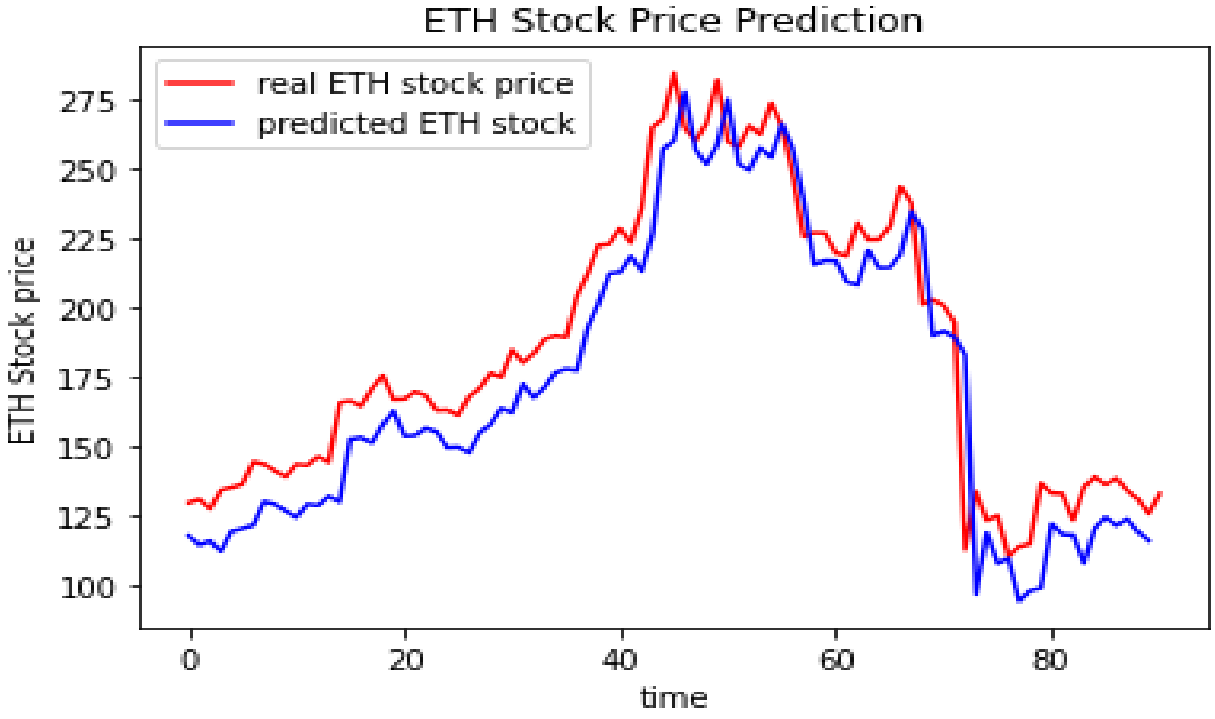
BUILDING RNN MODEL



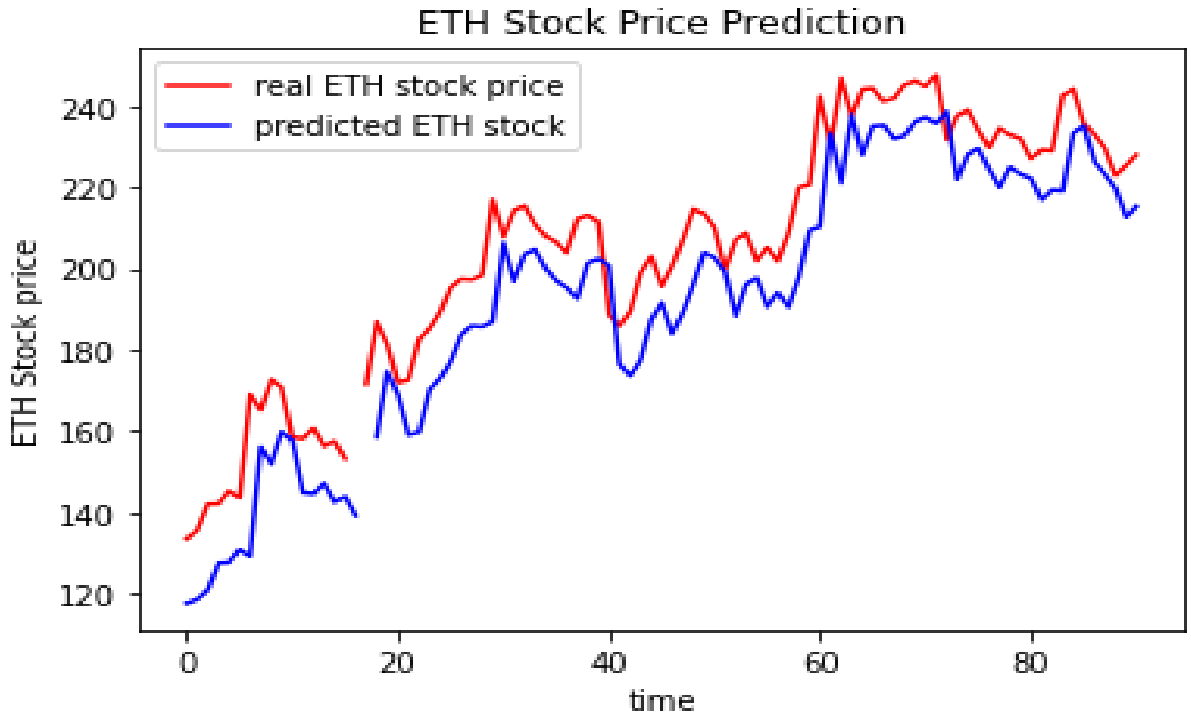
LOSS/MEAN SQUARED ERROR



TESTING ON TEST DATA 1 (FROM 01/01/2020 TILL 31/03/2020)

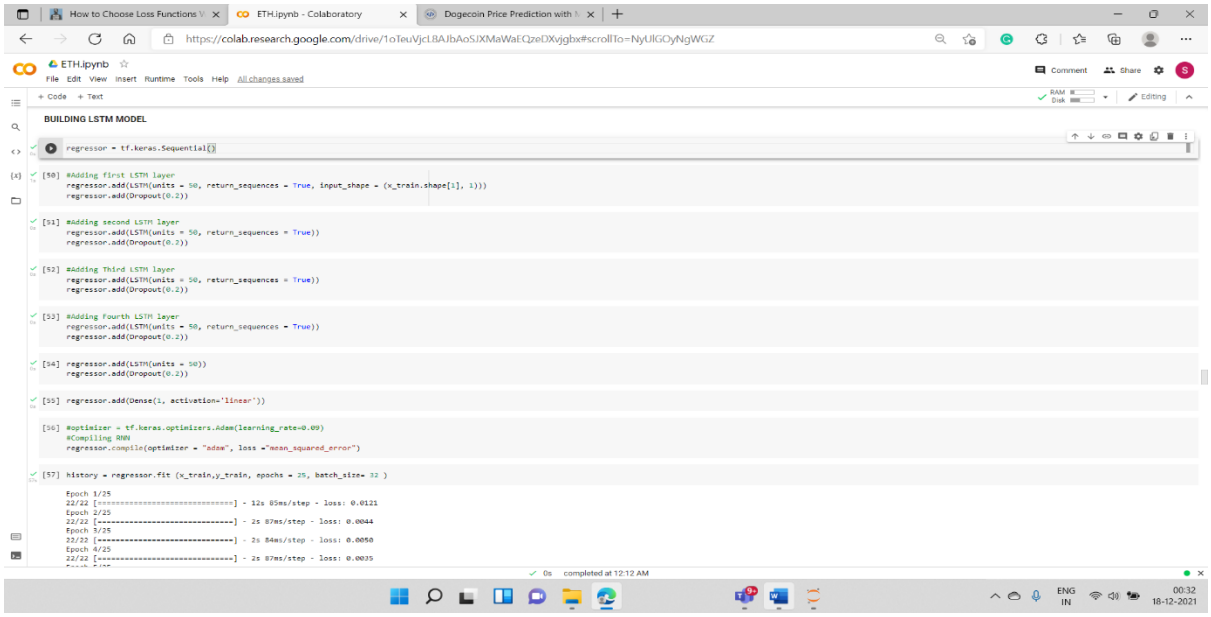


TESTING ON TEST DATA 2 (FROM 01/04/2020 TILL 31/06/2020)

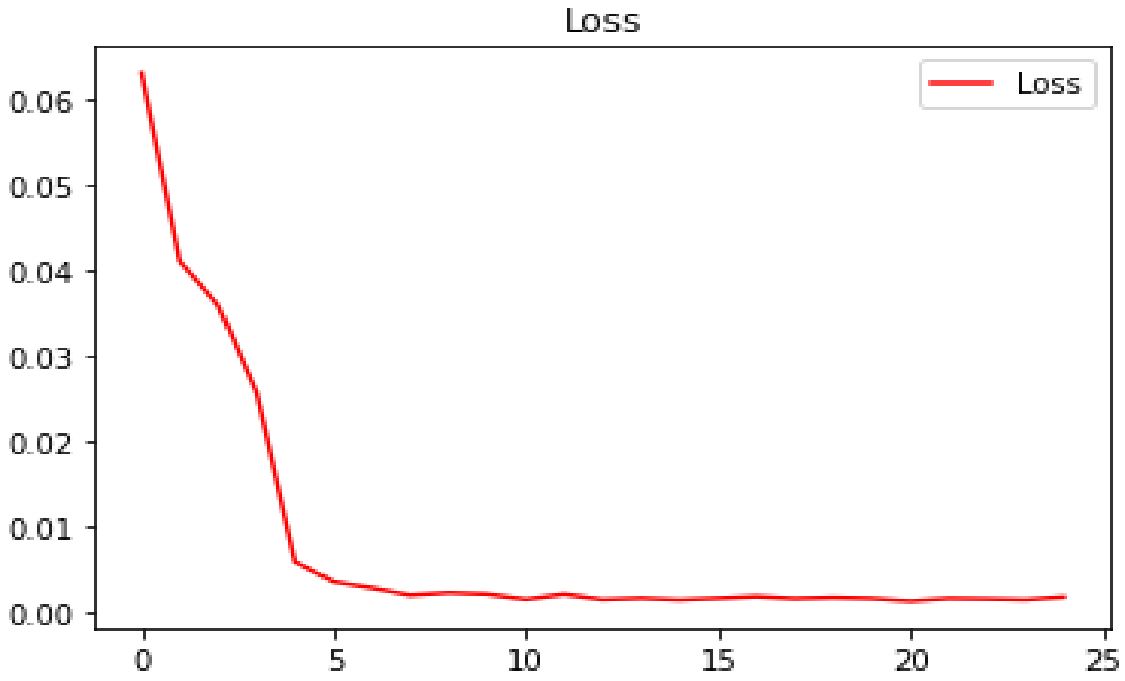


Total model error is: 18.27382878730733

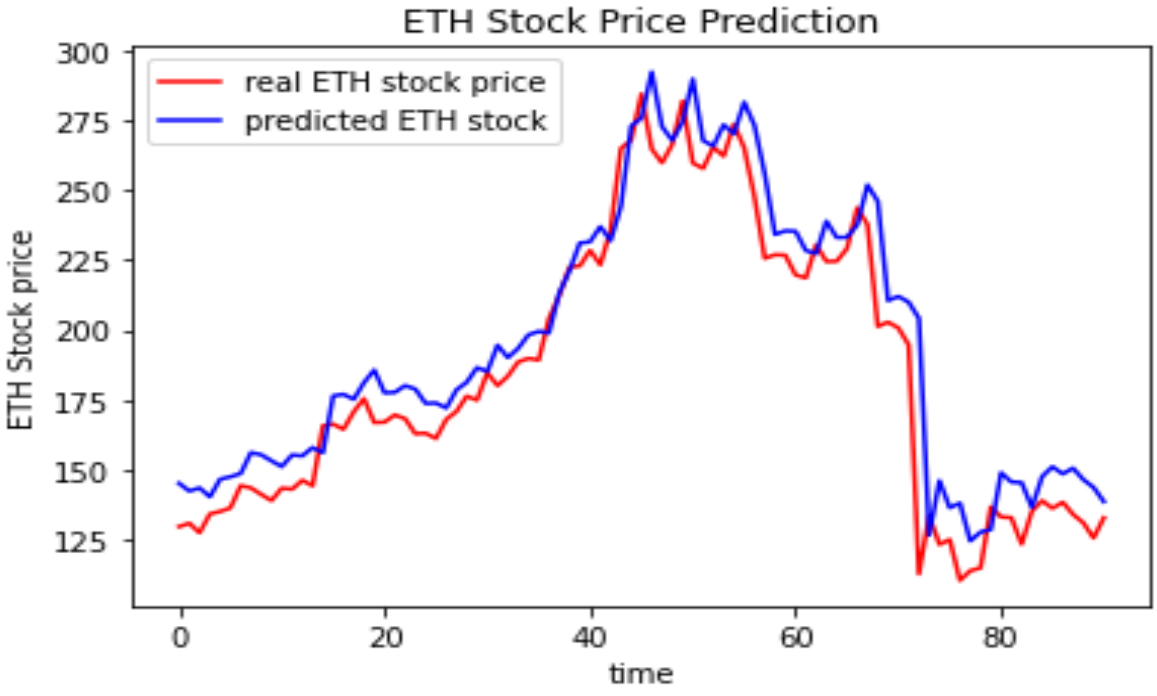
BUILDING LSTM MODEL



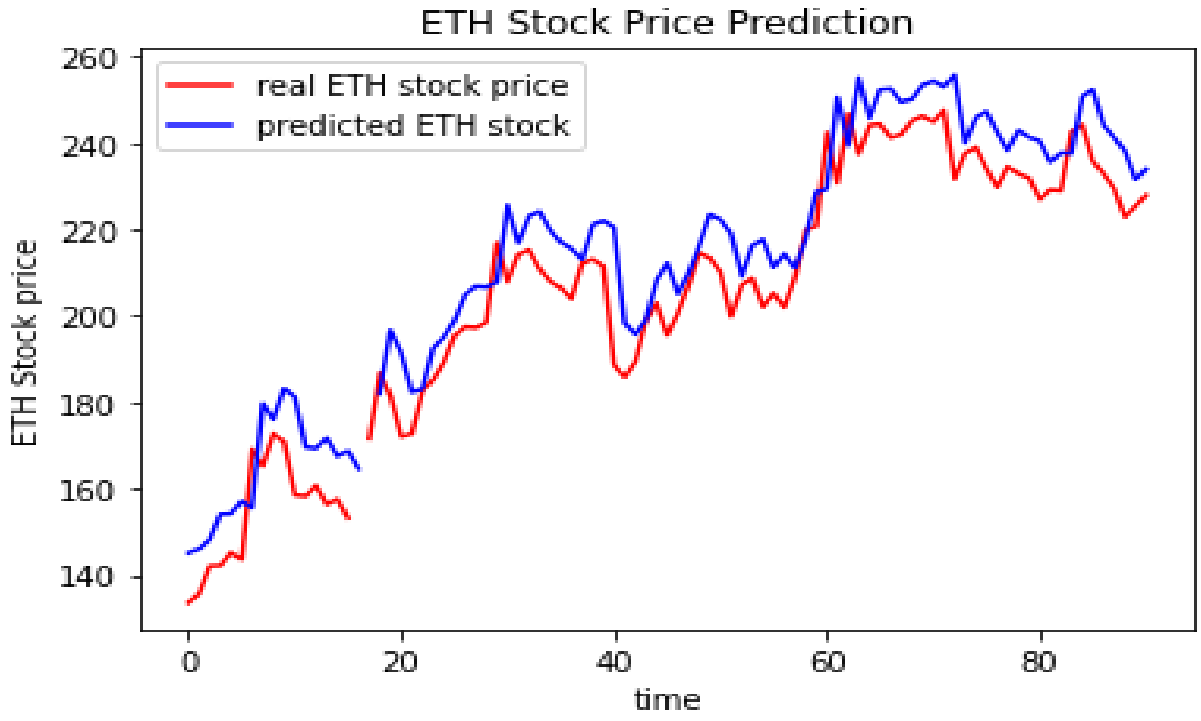
LOSS/MEAN SQUARED ERROR



TESTING ON TEST DATA 1 (FROM 01/01/2020 TILL 31/03/2020)

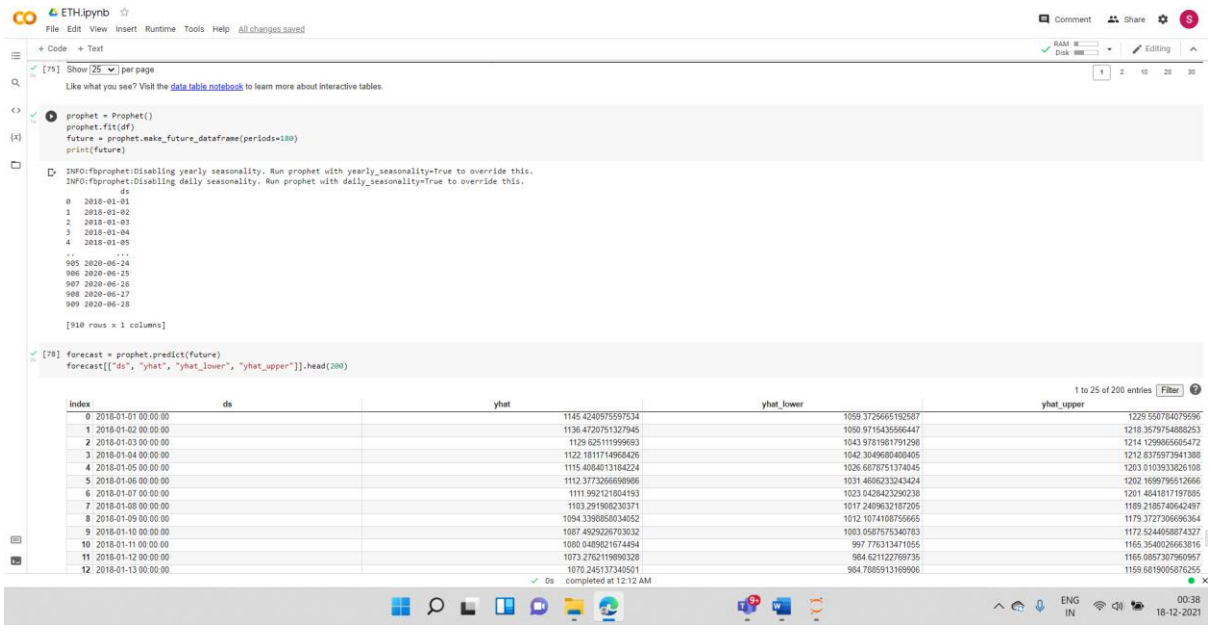


TESTING ON TEST DATA 2 (FROM 01/04/2020 TILL 31/06/2020)

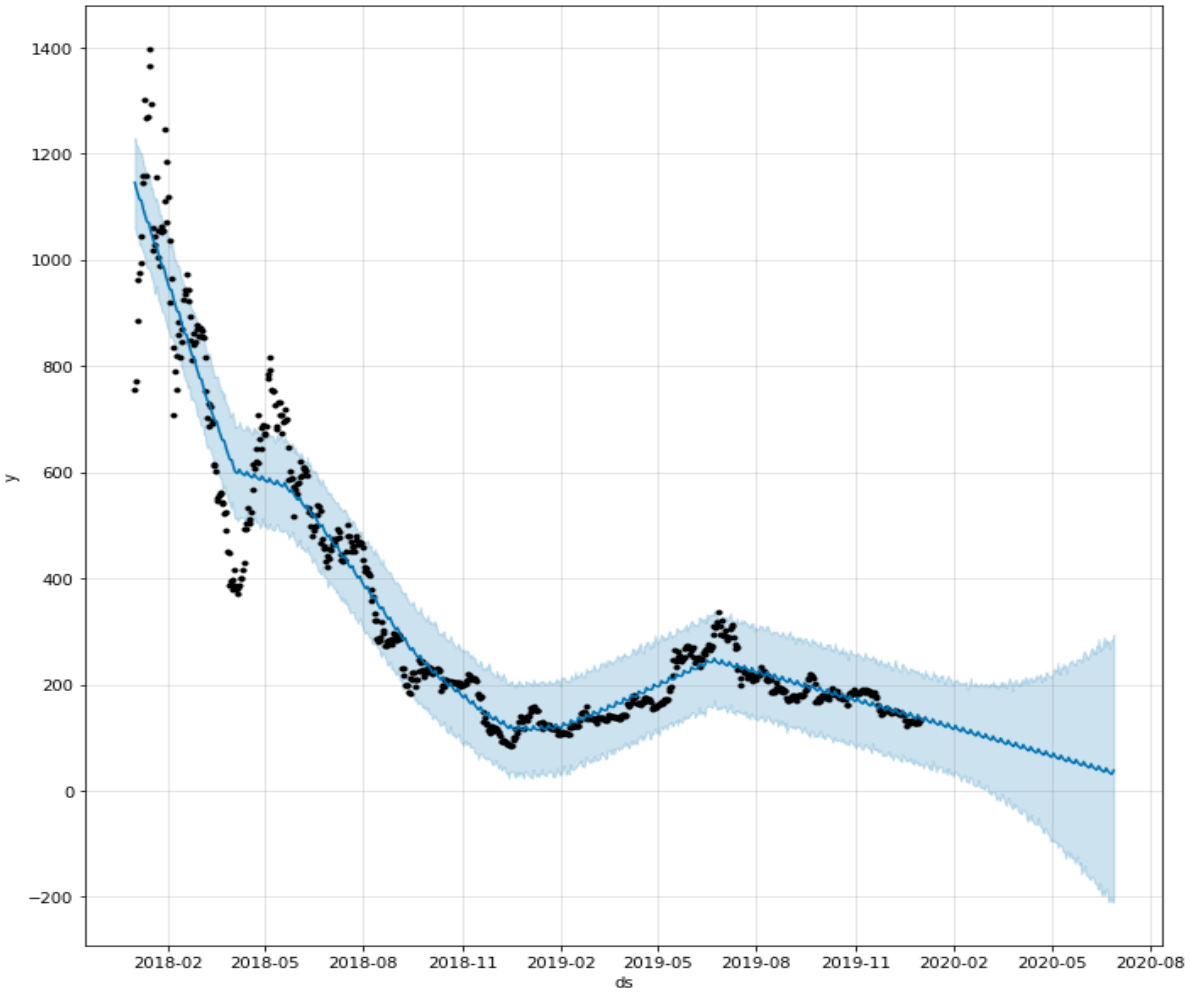


Total model error is: 16.53464686501529

BUILDING FACEBOOK PROPHET MODEL



OUTPUT OF FACEBOOK PROPHET MODEL



SUMMARY

There are many machine learning approaches that we can use for the task of predicting the future prices of Ethereum. In this Project, I introduced you to how you can predict the future prices of Ethereum by using the RNN and LSTM in Python. And I did try Facebook Prophet Model but unable to get anything out of it. I hope you liked this project on how to predict the future prices of Ethereum with RNN and LSTM using Python.

Here, I found that the Root mean squared error of LSTM is slightly lower than that of RNN and on the other hand the predicted price value of Ethereum almost converges to that of Real price of Ethereum. As per the evidence we can conclude that LSTM performs better than RNN.

The Root mean square error of **RNN** was found to be **18%** and **LSTM** was approx. **16%**.

For justifying the predicted price of Ethereum I concluded that due to covid financial condition become worse and this is the reason for irregularities in the graph.