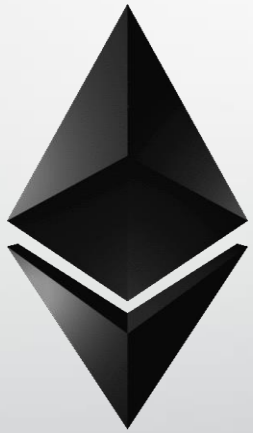
Ethereum: Time Series and Forecasting



Final Project

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What is Ethereum

- Decentralized blockchain that provides a verified and trusted environment for programs to run.
- A cryptocurrency

Problem Statement and Goals

Problem Statement

- Cryptocurrency is very risk hence is Ethereum. Knowledge of the price of Ethereum gives directions on investing or the measure of investing in this cryptocurrency.

Goals

- observe the trends of the price of Ethereum over the years through Exploratory Data Analysis.
- predict the price of Ethereum using various Time Series and Machine Learning algorithms.

Data Cleaning and Data Wrangling

Dataset

Historical dataset of the price of Ethereum (ETH) from March 10th 2016 to August 9th 2021 . It has the following variables

- **Date:** Date of the ETH prices
- **Price:** Prices of ETH (dollars)
- **Open:** Opening price of ETH on the respective date (Dollars)
- **High:** Highest price of ETH on the respective date (Dollars)
- **Low:** Lowest price of ETH on the respective date (Dollars)
- **Vol.:** Volume of ETH on the respective date (Dollars).
- **Change %:** Percentage of Change in ETH prices on the respective

Data Wrangling

- Below shows the transformation of the original dataset obtained

	Date	Price	Open	High	Low	Vol.	Change %
0	Aug 09, 2021	3,162.93	3,011.88	3,184.84	2,899.24	1.44M	5.01%
1	Aug 08, 2021	3,012.07	3,158.30	3,188.49	2,949.66	1.25M	-4.62%
2	Aug 07, 2021	3,158.00	2,889.58	3,169.74	2,867.58	64.84K	9.29%
3	Aug 06, 2021	2,889.43	2,827.23	2,946.62	2,726.04	1.06M	2.20%
4	Aug 05, 2021	2,827.21	2,725.28	2,842.95	2,533.51	1.65M	3.74%

	Date	Price	Open	High	Low	Vol.	Change %
0	2021-08-09	3162.93	3011.88	3184.84	2899.24	1.44000	5.01
1	2021-08-08	3012.07	3158.30	3188.49	2949.66	1.25000	-4.62
2	2021-08-07	3158.00	2889.58	3169.74	2867.58	0.06484	9.29
3	2021-08-06	2889.43	2827.23	2946.62	2726.04	1.06000	2.20
4	2021-08-05	2827.21	2725.28	2842.95	2533.51	1.65000	3.74

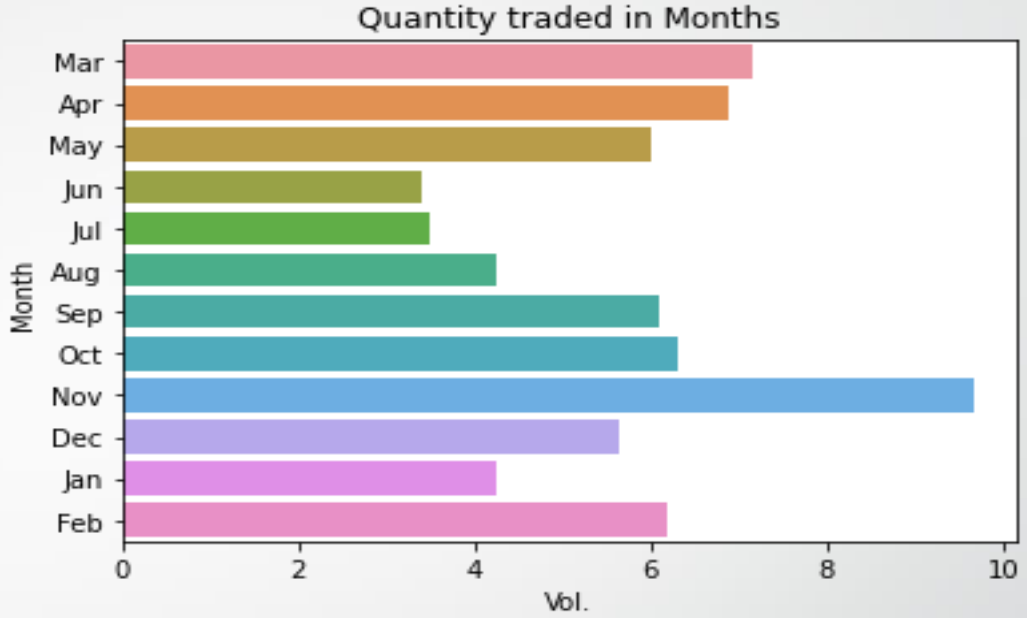
- Date variable changed to time
- Commas in Price, Open, Low, High variable removed
- Volume variable change to real amount
- Missing and undesired variables removed

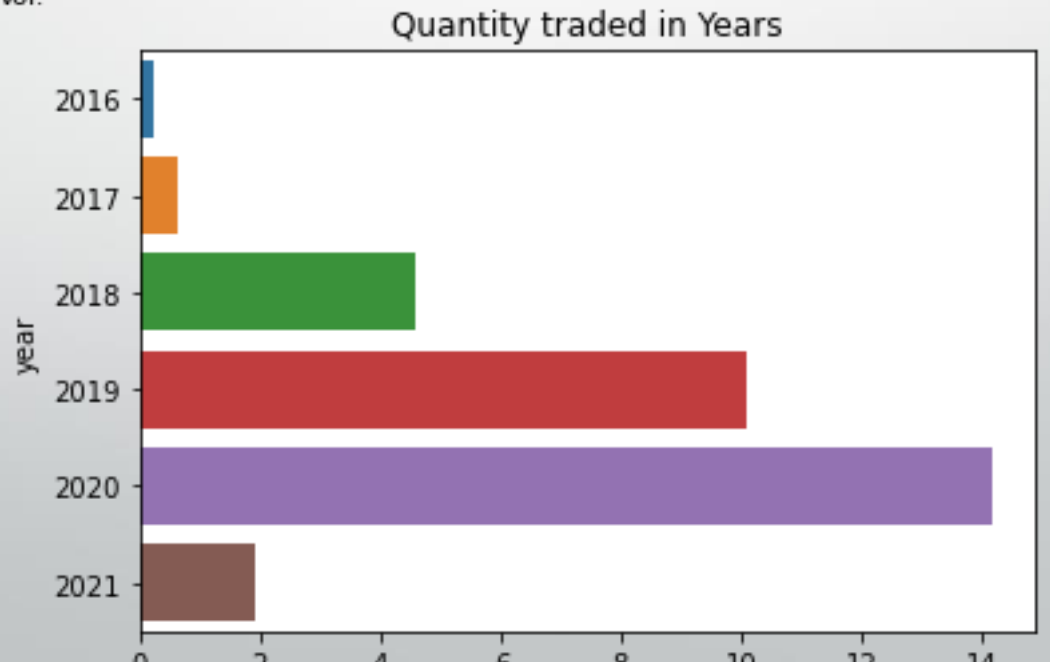
Exploratory Data Analysis (EDA)

New variables (Year, Days and Months) where created for exploratory data analysis (EDA). The final data frame for EDA is below.

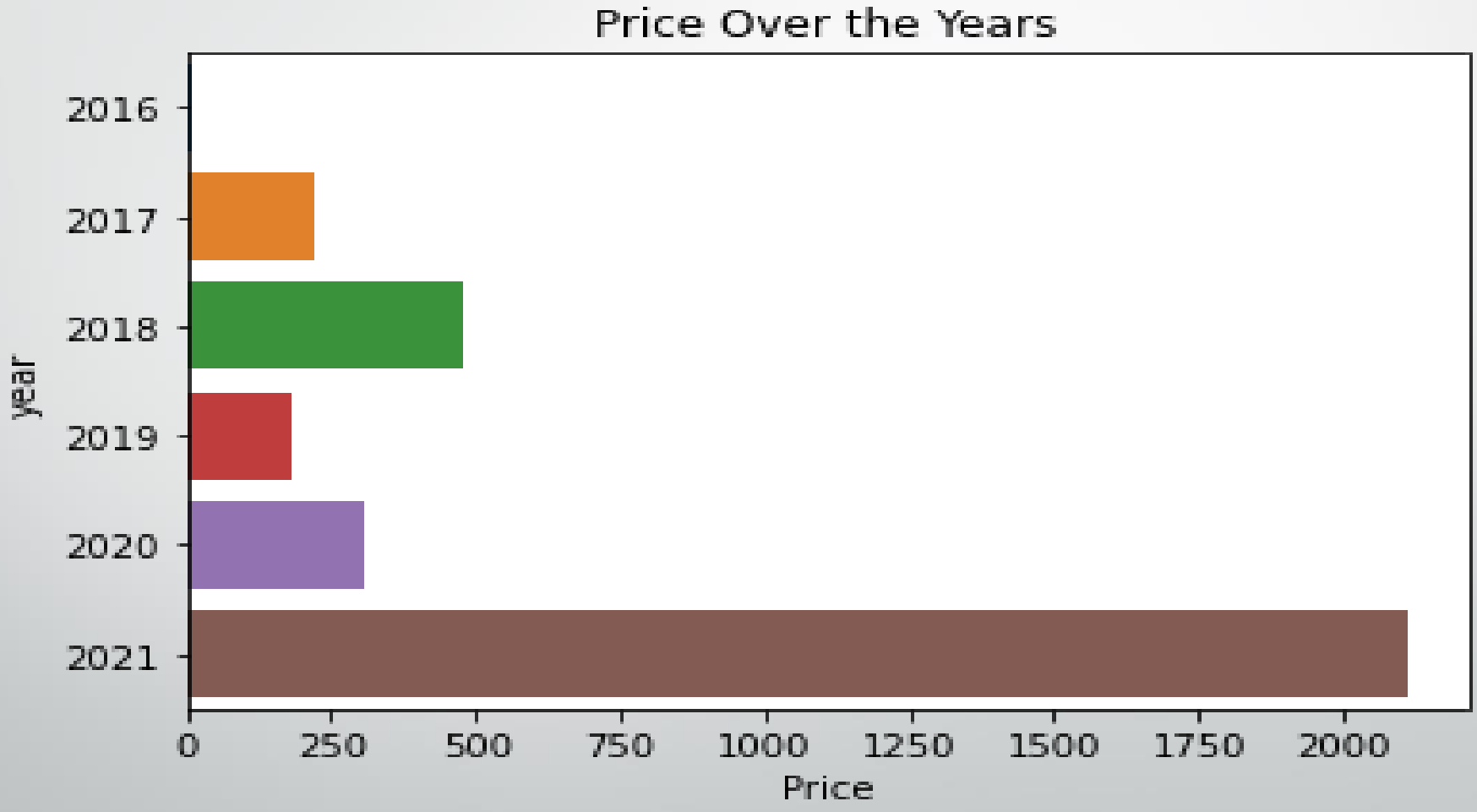
	Date	Price	Open	High	Low	Vol.	Change %	Year	Month	Day
0	2021-08-09	3162.93	3011.88	3184.84	2899.24	1.44000	5.01	2021	Aug	Monday
1	2021-08-08	3012.07	3158.30	3188.49	2949.66	1.25000	-4.62	2021	Aug	Sunday
2	2021-08-07	3158.00	2889.58	3169.74	2867.58	0.06484	9.29	2021	Aug	Saturday
3	2021-08-06	2889.43	2827.23	2946.62	2726.04	1.06000	2.20	2021	Aug	Friday
4	2021-08-05	2827.21	2725.28	2842.95	2533.51	1.65000	3.74	2021	Aug	Thursday

Checking Volume Traded with time

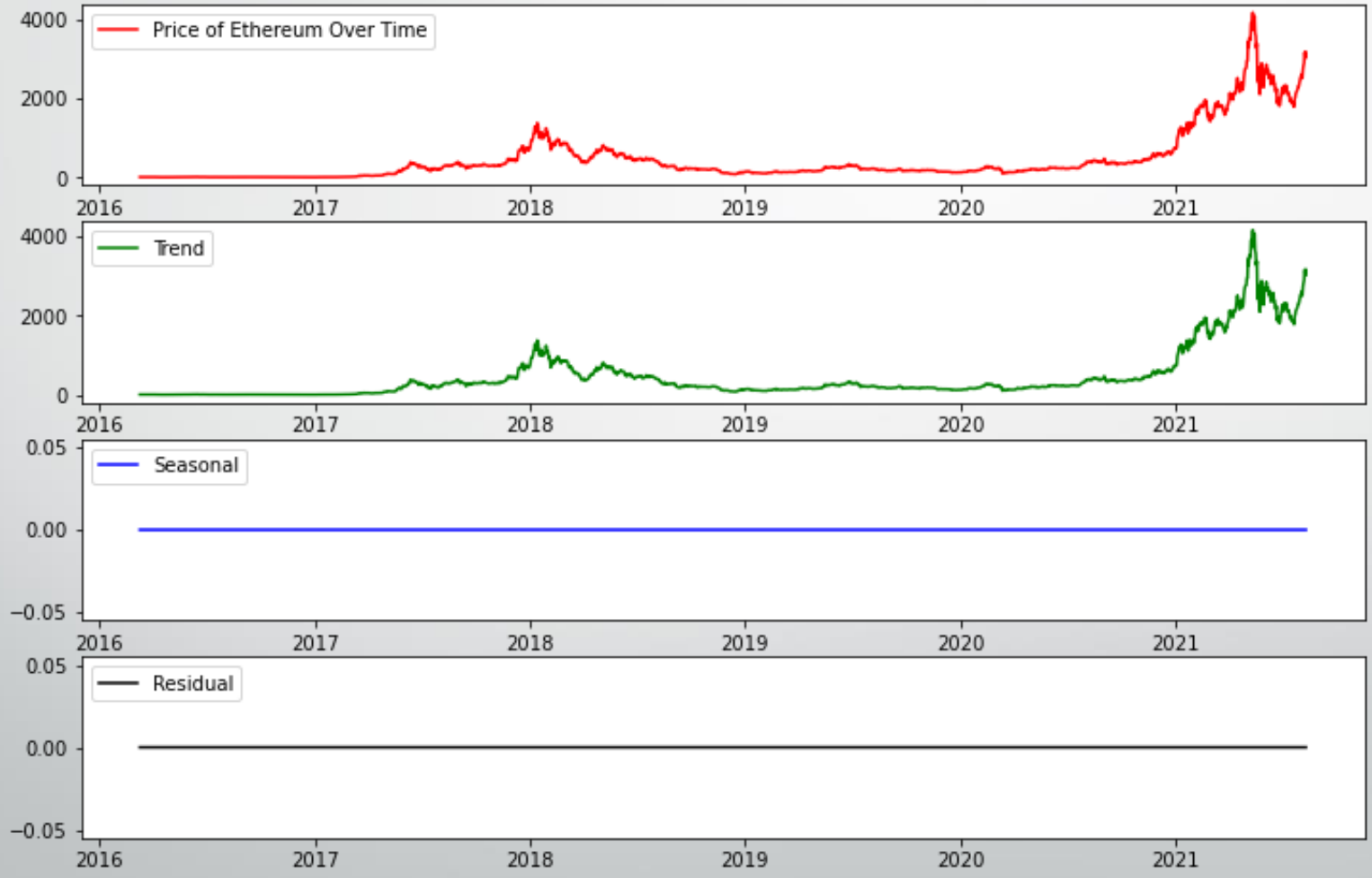




Price compared with years



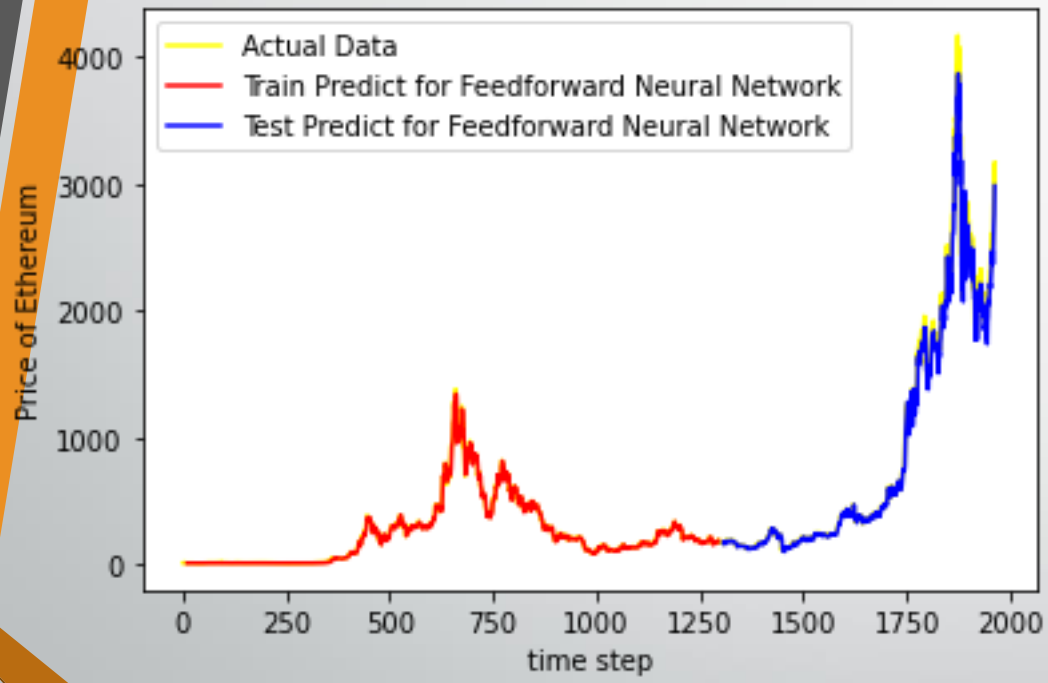
Seasonality and Trend Check



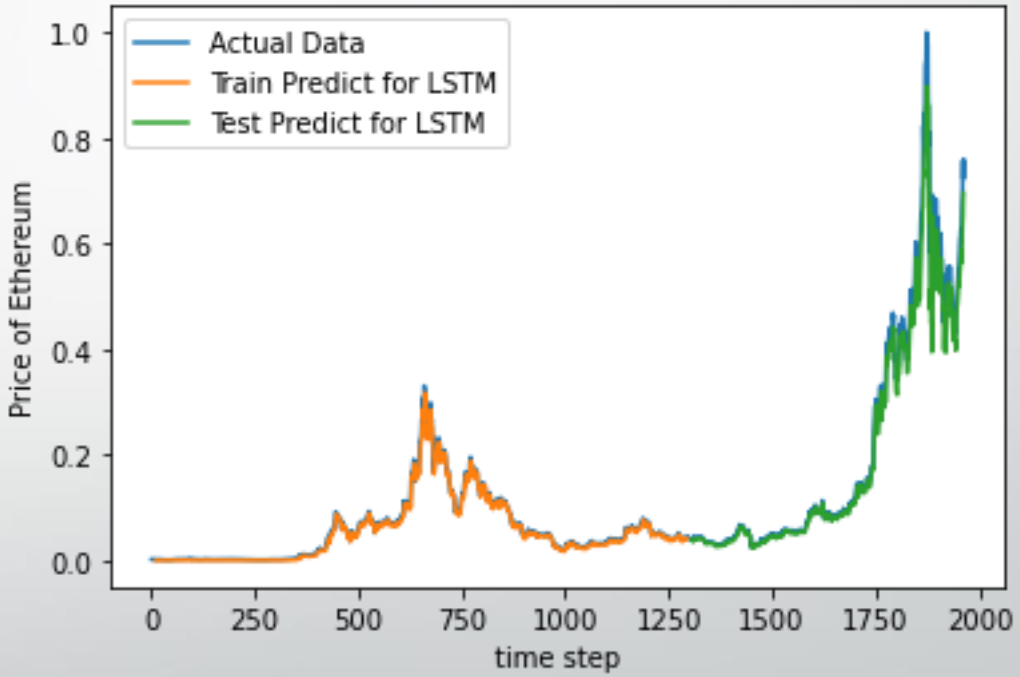
Model, Forecasting, Recommendation

Model

- Deep Learning algorithm, Feedforward Neural Network and Long short-term memory were used to fit the model. The graphs below were obtained



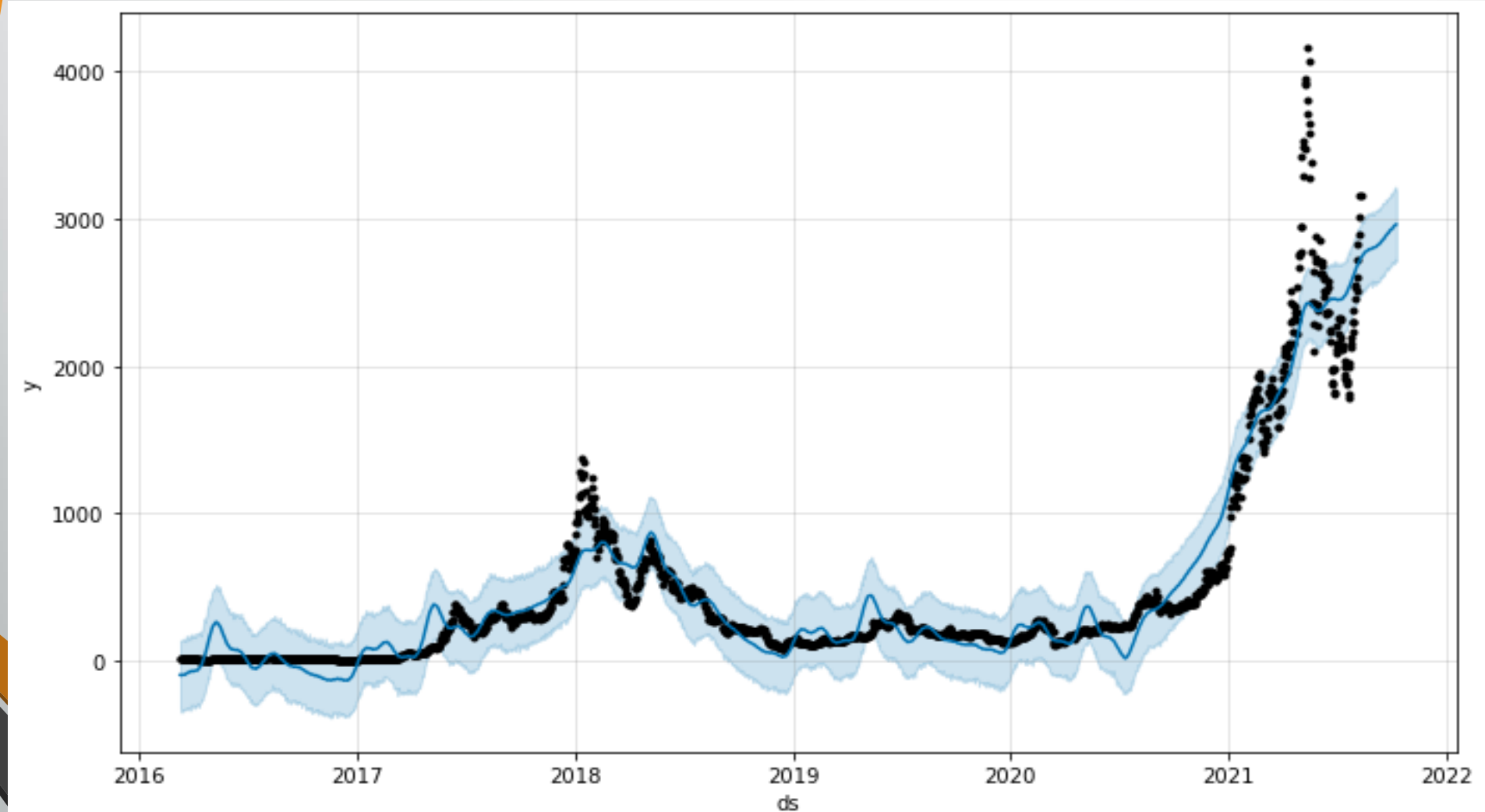
- **Train Score: 22.45 RMSE,**
- **Test Score: 118.38 RMSE**



- **Train Score: 0.01 RMSE,**
- **Test Score: 0.04 RMSE**

Forecasting

- Facebook Prophet was used as the forecasting tool for this project.
- Time variable was changed to ***ds*** and Price was change ***y.***



Statistical Summary

Statistics	Value
count	114.00
mean	3141.10
std	208.49
min	2826.66
25%	2959.90
50%	3112.47
75%	3305.63
max	3600.77

Recommendation

Below are recommendations for further study

- I will consider using more and most current data of the historical price of Ethereum
- will consider other Machine Learning time series algorithm
- I will also use other ways to evaluate Deep learning models

End

Thank You Very Much