Modeling Ethereum Prices

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Goal

The goal of this project is to create a model that predicts prices that allow for successful day-trading.

- Model predicts one day ahead
- The culmination of all of these predictions follows the general trend of the actual prices

Data Source and Features

The data was webscraped using Octoparse from CoinMarketCap.com.

The data includes the following features:

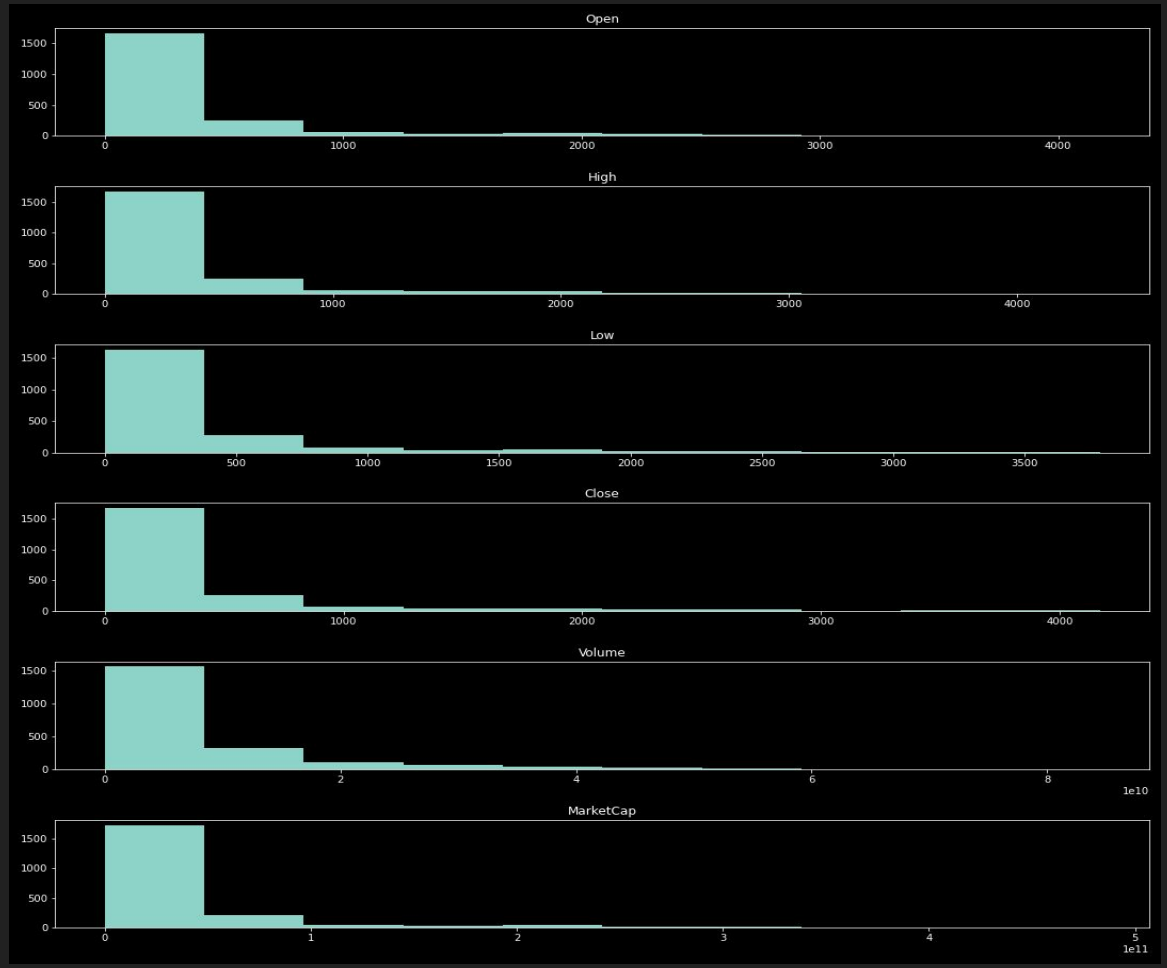
1. Open
2. High
3. Low
4. Close
5. Volume
6. Market Cap

Data Preprocessing

- Convert the 'Date' column to a datetime data type and set it as the index, then sort the index
- Drop the Date column
- Replace the dollar signs and commas with empty character
- Convert all entries to numerical data type
- Rename the columns with unconventional text in the string
- There are very few missing values, so we will drop all of them

Histograms

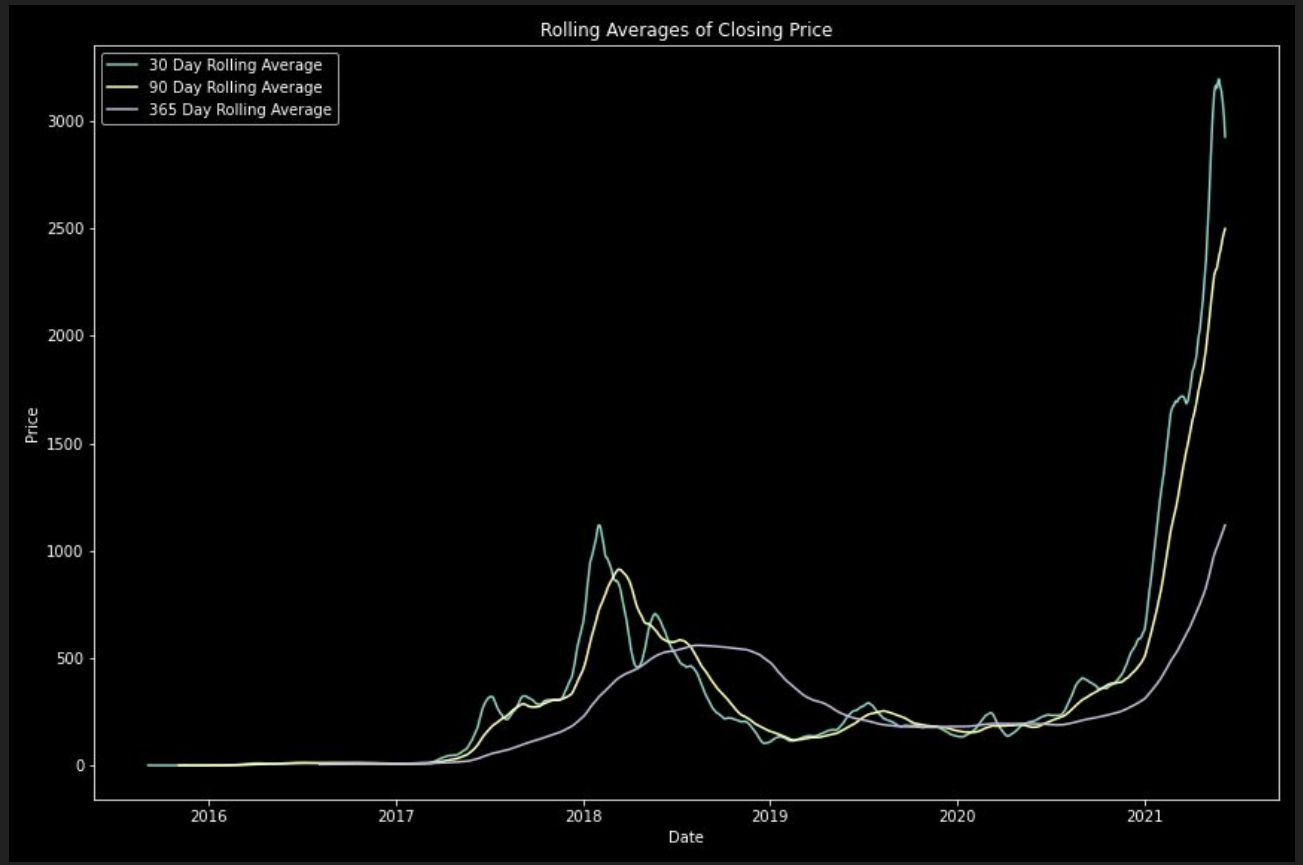
- Histograms highlight the volatility of the asset



Rolling Averages

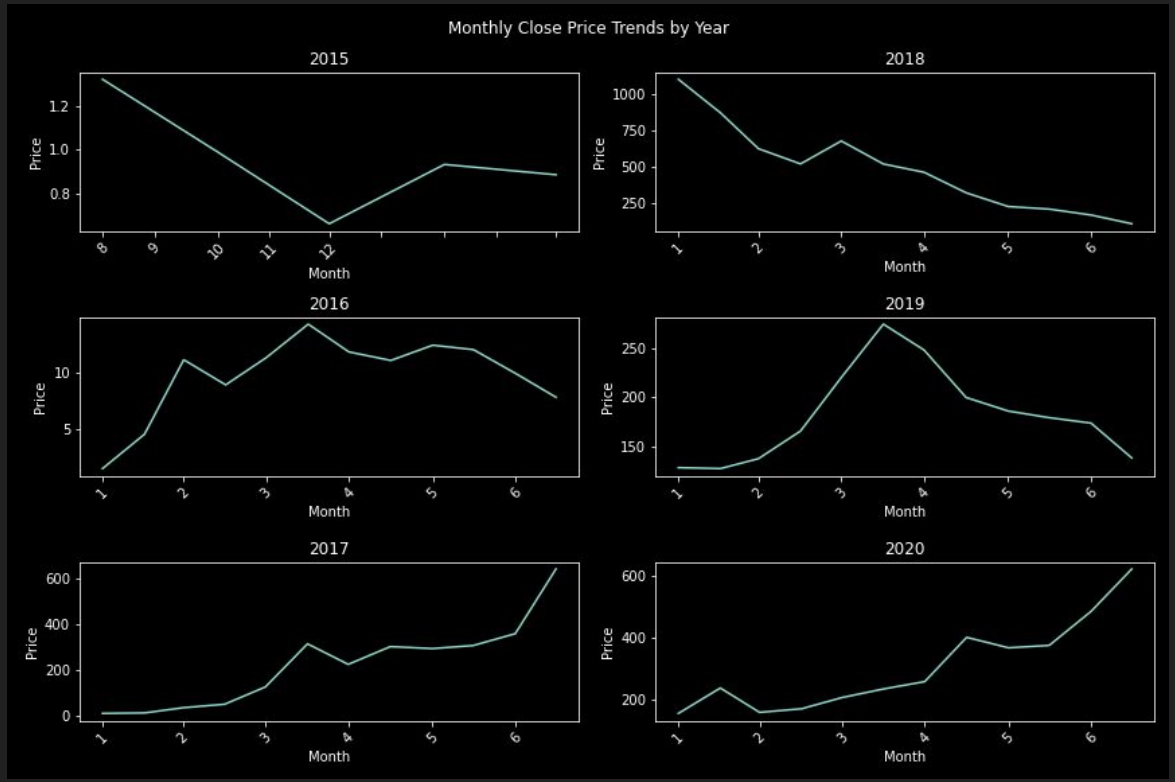
- The differences in values highlight the extreme volatility of the asset

- 90-day rolling average had an ending value closest to the true value



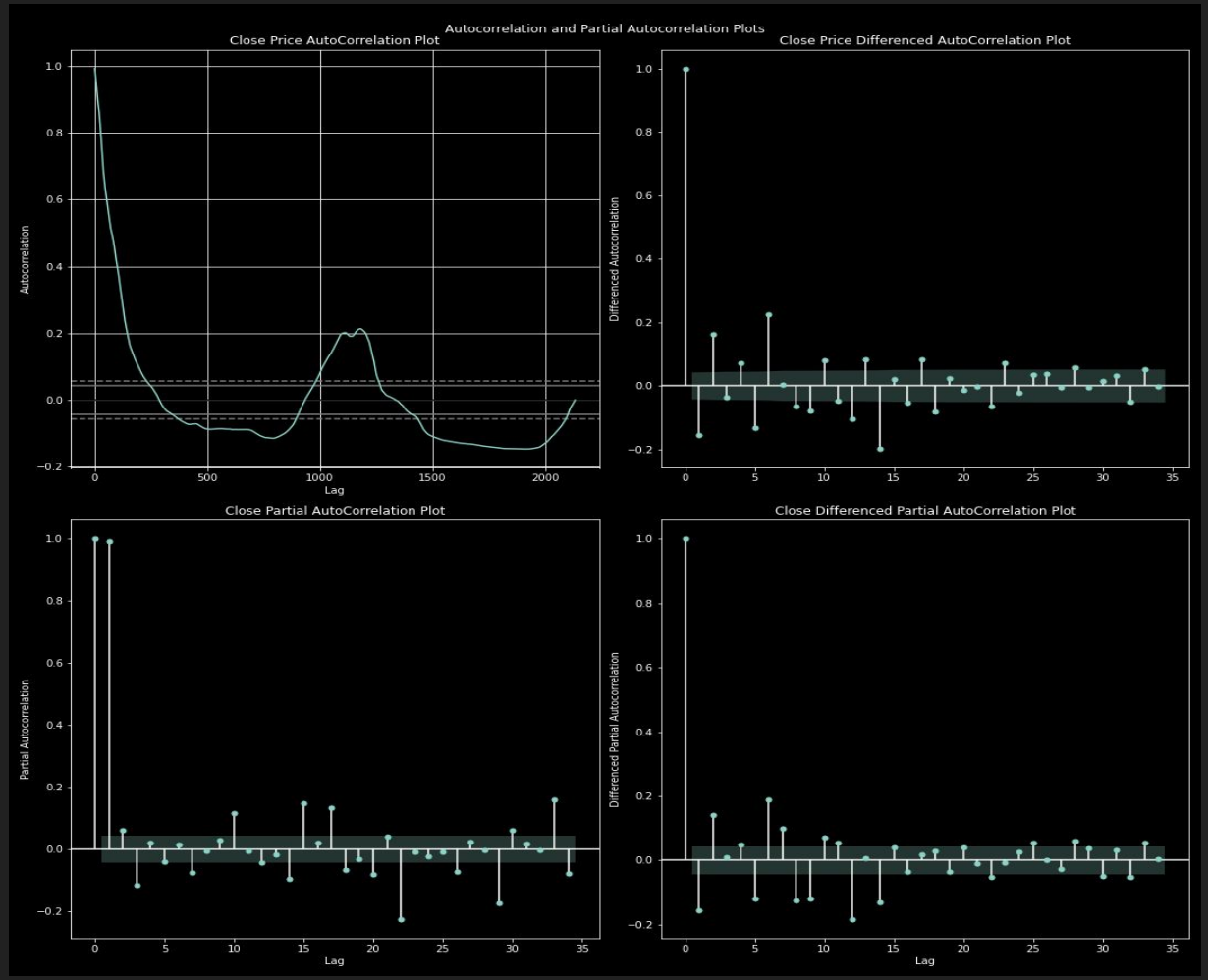
Monthly Trends

- No seasonal trends are evident



ACF/PACF

- ACF plot indicated a p value of 1
- PACF plot indicted a q value of 1

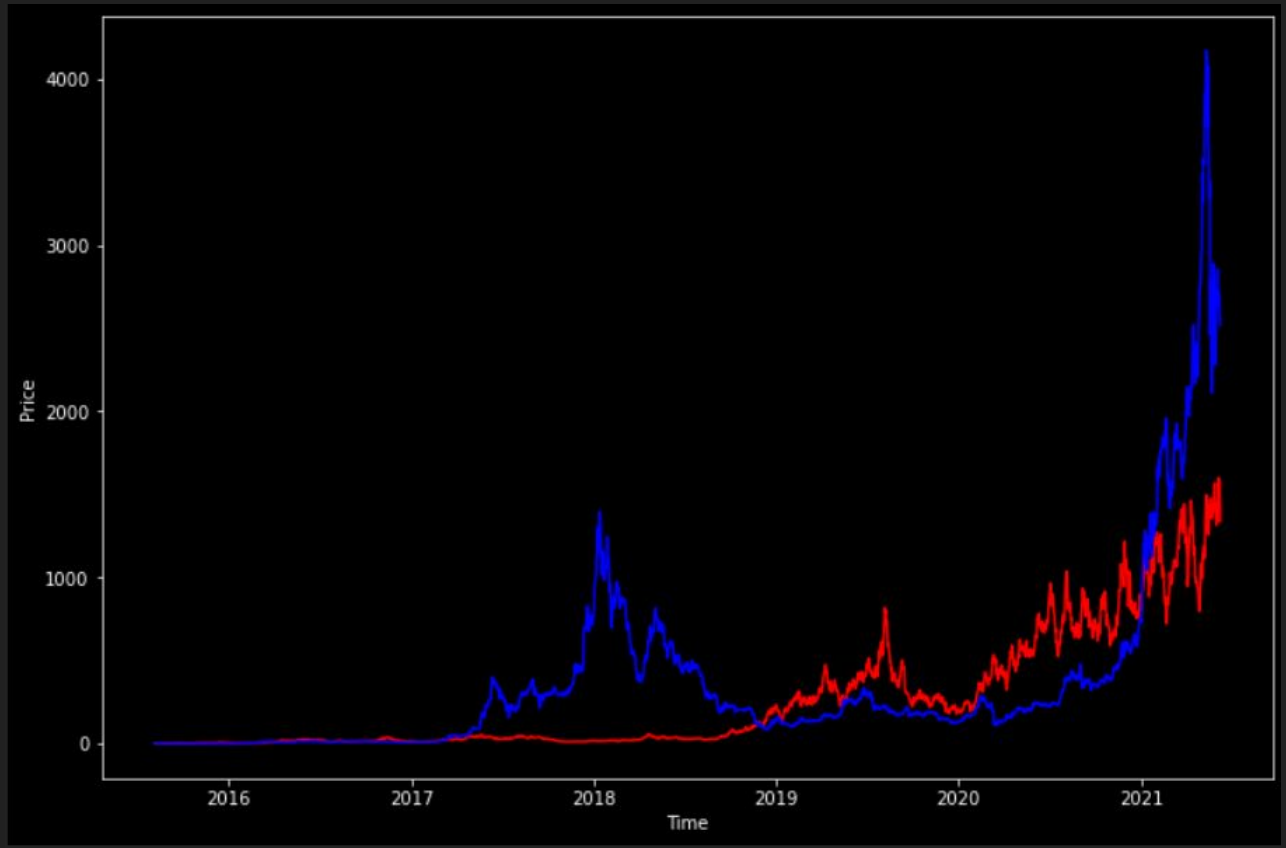


Model Evaluation

- The metric used for the evaluation of the model's created in this project was RMSE, or Root Mean Squared Error

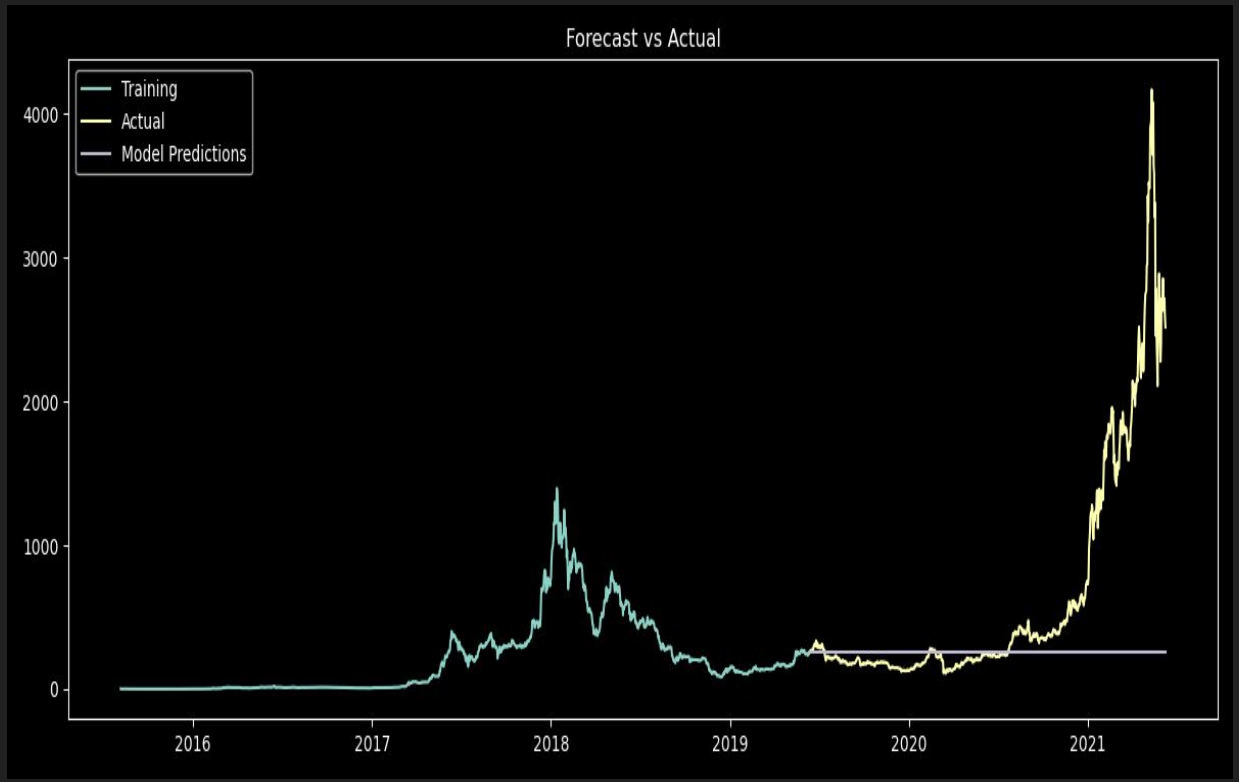
- **Random-Walk RMSE = 427.73 *(BEST = 323.097)***
- ARIMA RMSE = 915.887
- AUTO-ARIMA RMSE = 915.550
- SARIMA RMSE = 658.58
- **One Step Ahead RMSE = 72.12**
- **LSTM RMSE = 302.61**

Random Walk: RMSE = 427.73



ARIMA Forecast: RMSE = 915.550

- p=1
- q=1
- d=1

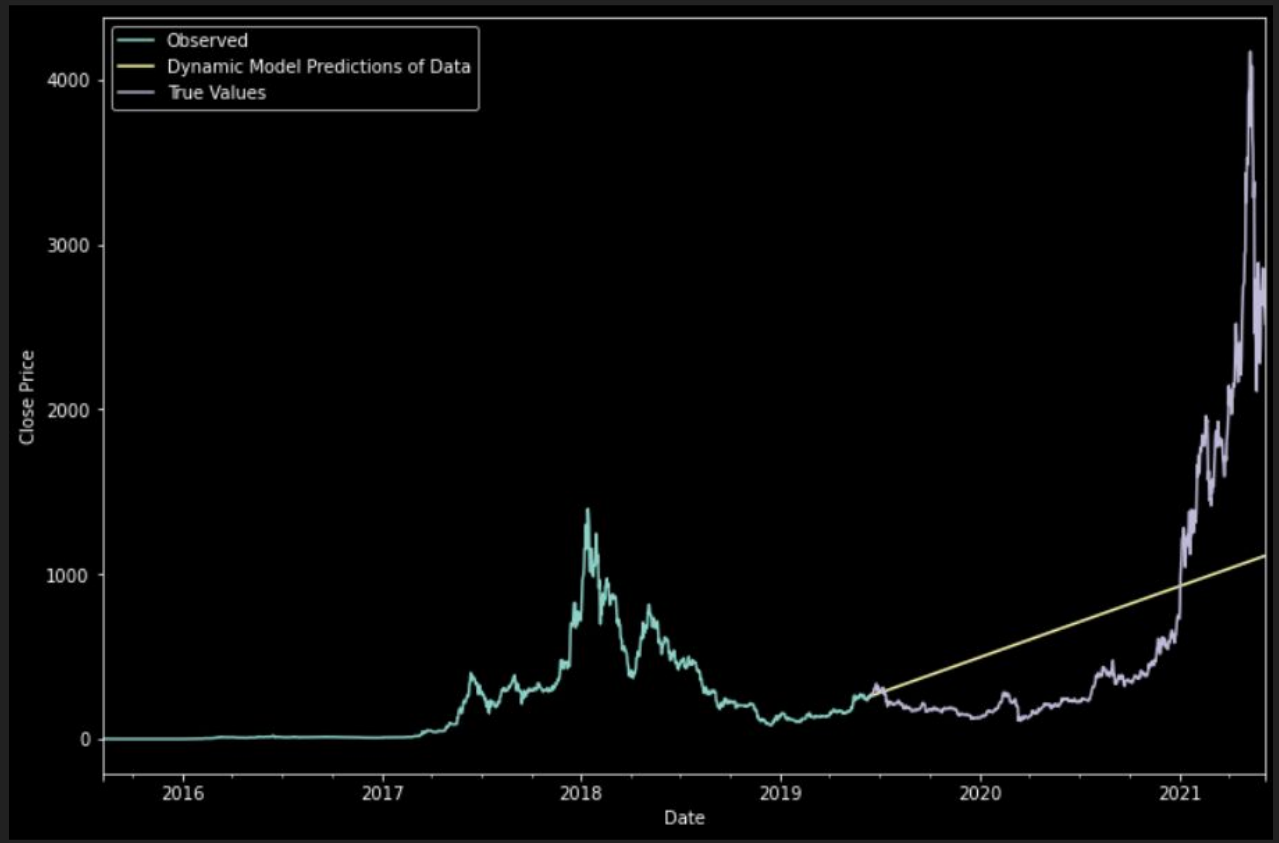


SARIMA: RMSE = 658.58

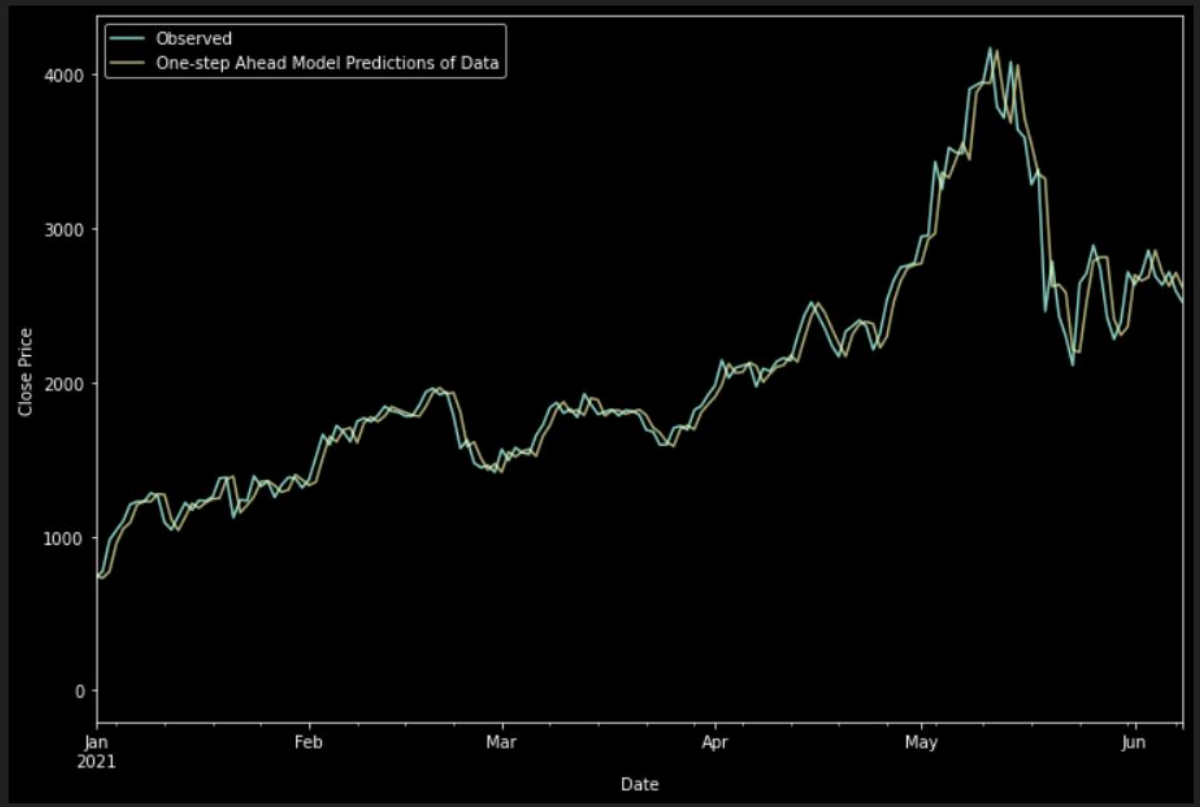
- p=1
- q=1
- d=1

- P=1
- Q=1
- D=1

- s=90

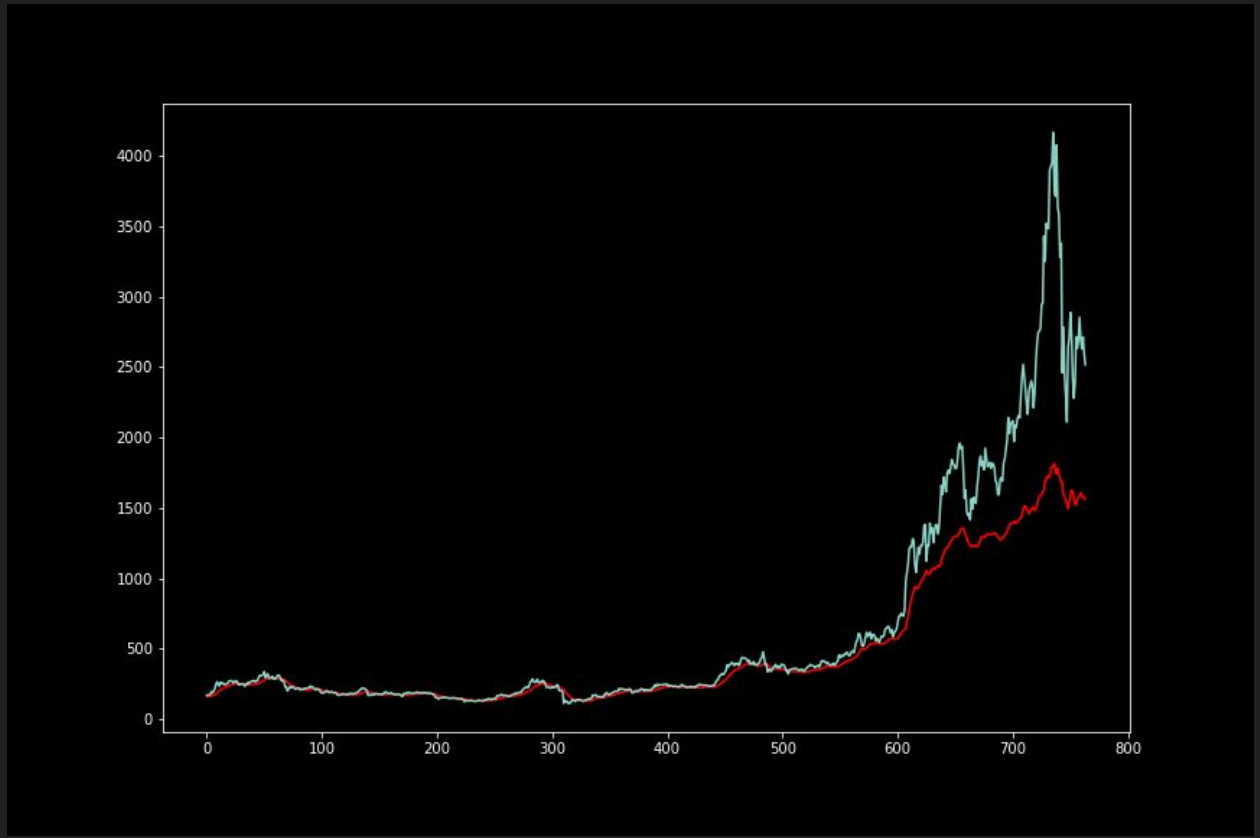


One-Step-Ahead: RMSE = 72.12



LSTM: RMSE = 302.61

- EPOCHS = 12
- LSTM Layers = 3



Conclusion

- One-step-ahead model is the most effective model.
- LSTM model has a lot of potential. The ability of the LSTM model to potentially improve in such a way is unique to it

Further Ideas/Plans

- Use the models to forecast into the future.

- Improve models through addition of exogenous variables and further tuning (and in the case of random-walk, randomizing)

- Use a broadly understandable metric for the evaluation of the models, such as profit when using model in comparison to common investing strategy