Cryptocurrency Price Prediction

Artificial Intelligence CS461   CS-6H

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Introduction

Cryptocurrencies, or virtual/digital currencies, are a digital means of exchange that uses cryptography for security. There are several different cryptocurrencies that are present on the market today, and are being actively traded. Each cryptocurrency has an ideology or purpose behind it. Some cryptocurrencies are viable currency replacements (Bitcoin, Ethereum), some are digital representations of fiat currency (Tether) called stablecoins, and others act as tokens to be used on different platforms. Multiple cryptocurrencies may be present on a single network (e.g. BTC and BCH)

Project Motivation

Cryptocurrency is an interesting investment opportunity, as it will eventually replace physical fiat currencies. There is a potential for high return on investment, but at a cost of high risk. As an investor in cryptocurrency (beginning since November 2020) it is also in my personal interest to make profitable investments.

Strategic Goal

Our goal is to predict the trends in cryptocurrencies and estimate their prices, to minimize the risk of investing in crypto currencies and make smart investments.

Variables/Data

The target variable that we want to predict is the (Closing) price of cryptocurrency from the point of the latest timestamp in the data upto a few months in the future .
The project has been fed with a dataset having information from the year 2013 till the year 2021(January).

For prediction we have considered Timestamp/Date and Close Price, but other variables such as Open, Mean can alo be substituted to predict the outcome. In models that incorporate exogenous variables, all the relevant secondary variables such as Open, High, Low can be used

Methodology

The dataset utilized was [Cryptocurrency Historical Prices,](#) last updated on Feb 27, 2021.
The methods/models we used were as follows:

- Basic Time Series Analysis
- ARIMA (Autoregressive integrated moving average)
- SARIMAX (Seasonal Auto-Regressive Integrated Moving Average with eXogenous factors)
- Facebook's Prophet
- XGBoost

The variables present in the dataset include:

- Serial number
- Name (Name of coin)
- Symbol (Symbol of coin)
- Date (Date)
- High (High value on the date)
- Low (Low value on the date)
- Open (Open value on the date)
- Close (Close value on the date)
- Volume (Volume of transactions in USD)
- Marketcap (Marketcap of coin)

The Date and Close variables were respectively chosen as the index and the target variables.

Performance Measurement

The accuracy of the predictions will be measured using the root mean square error where the aim is to get the lowest error value possible.

The expected level of accuracy is 70%-80%, even though, due to the highly volatile nature of cryptocurrency, the results may vary.

Risks and Dependencies

Since the cryptocurrency trends are extremely volatile, the predictions made using this project should not be used as financial advice and this project takes no responsibility over the financial decisions made as a result.
The predictions made in this project cannot be extended to large time frames. The predictions are only as accurate and up to date as the dataset being utilized.

Performance Checks/Metrics

The project uses various performance metrics such as mean squared error, root mean squared error, mean absolute percentage error etc. Some of the results are displayed below (next page):

Blue Line: Average Margin to Predicted Values

Grey Lines: Margin to Actual Value
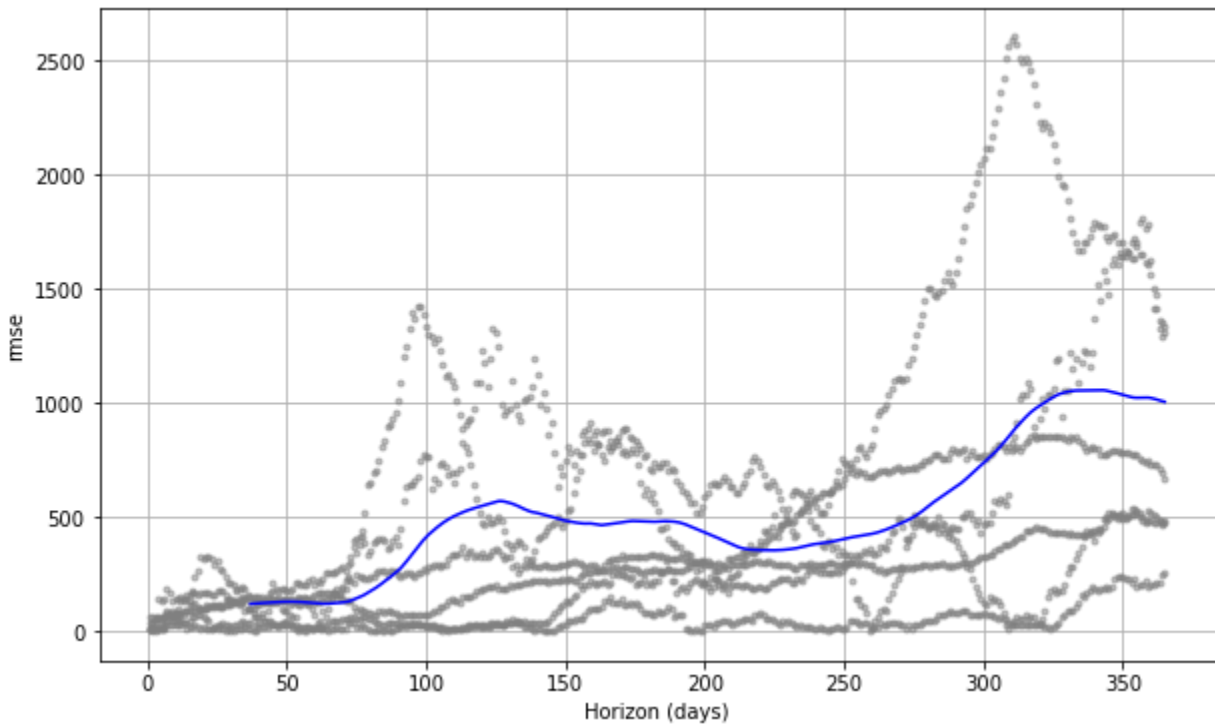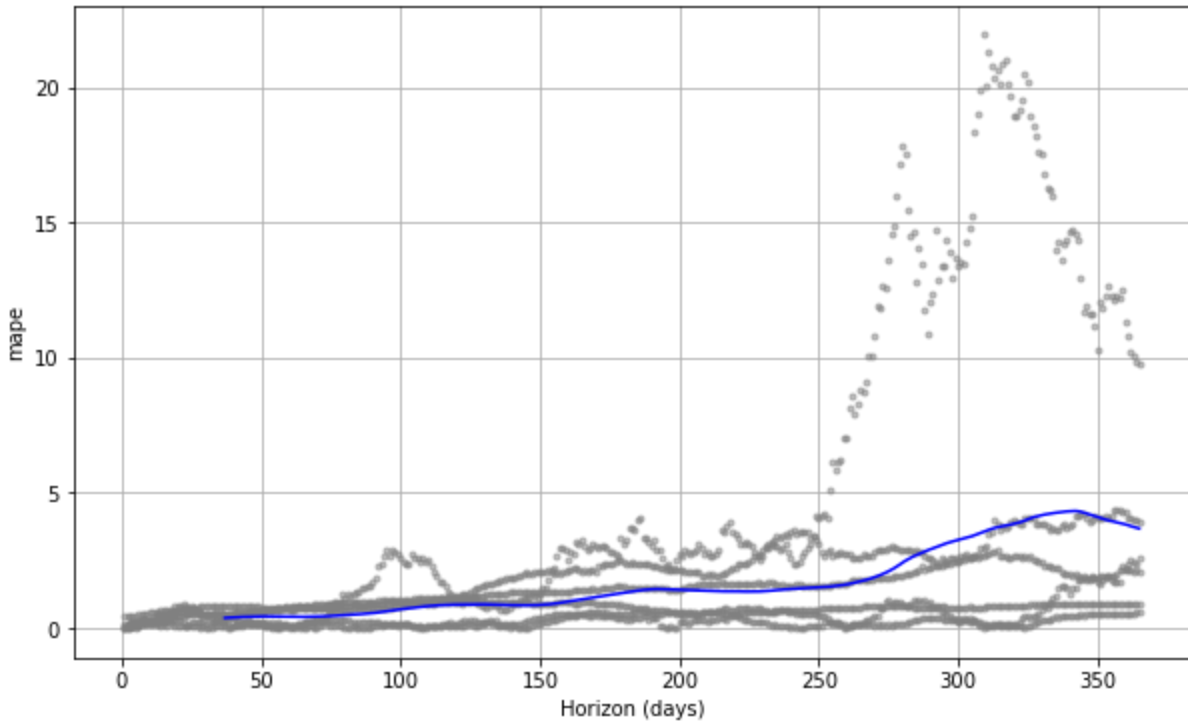
Conclusion

The dataset provided has been utilized to predict the next few months cryptocurrency prices for the different crypto currencies present. To further improve the model, machine learning and/or deep learning can be applied in conjunction with NLP to keep track of external variables, such as twitter tweets (see Elon Musk and the effect of his public tweets on the crypto market). For a proof of experiment, the project is perfectly adequate to demonstrate the use of Computer prediction models in the field of cryptocurrency/finance.

References

1. **https://www.kaggle.com/sudalairajkumar/cryptocurrencypricehistory**
2. **https://machinelearningmastery.com/**
3. **https://facebook.github.io/prophet/**
4. **https://xgboost.readthedocs.io/en/latest/**