Cryptocurrency Market analysis using ML

Shoumyadeep Dhani, Atharva Dhande, and Shivang Parnami
Shoumyadeep.dhani2019@vitstudent.ac.in, atharva.dhande2019@vitstudent.ac.in, shivang.parnami2019@vitstudent.ac.in

Abstract **- You can't predict what's going to happen within the future, particularly with the cryptocurrency market, wherever the media, influencers, whales and governments will have such a sharp and vital impact on worth. A crypto market technical analysis is an overarching term used when you take existing, real-world data from the cryptocurrency market and attempt to plot it forward in the hope of predicting where it will go next. If foretold properly, this enables you to buy when the value is low (buying on the dip) and sell once it's high so as to form a profit.**

Index Terms – Future, Market, Price, Prediction,

INTRODUCTION

We will be taking existing, real-world information from the cryptocurrency market and plan to plot it forward with the hope of predicting wherever it'll go next. within the best-case situation, this enables us to forecast once the market is going to be pessimistic (trending down) or optimistic (trending up). If foretold properly, this enables us to shop when the value is low (buying on the dip) and sell once it's high so as to form a profit Doing a technical analysis of a coin helps us read the market. It involves examining price charts and graphs in different ways and looking to find a consensus within that information to help us predict where the market is going. In this project, we will be predicting six cryptocurrencies namely bitcoin, dogecoin, Litecoin, dash coin and monero

Problem Statement

Cryptocurrencies such as Bitcoin, Ethereum, etc. generated significant attention in 2017. Cryptocurrencies have significant volatility as there is rampant speculation. Given the high variance in prices, can machine learning methods be used to model the market dynamics?

RELATED WORK

I. Comparative Performance of Machine Learning Algorithms for Cryptocurrency Forecasting

Machine Learning is part of Artificial Intelligence that has the ability to make future forecasting based on previous experience. Methods have been proposed to construct models including machine learning algorithms such as Neural Networks (NN), Support Vector Machines (SVM) and Deep Learning. This paper presents a comparative performance of Machine Learning algorithms for cryptocurrency forecasting. Specifically, this paper concentrates on forecasting time series data. SVM has several advantages over the other models in forecasting, and previous research revealed that SVM provides a result that is almost or close to the actual result yet also improves the accuracy of the result itself. However, recent research has shown that due to the small range of samples and data manipulation by inadequate evidence and professional analyzers, the overall status and accuracy rate of the forecasting needs to be improved in further studies. Thus, advanced research on the accuracy rate of the forecasted price has to be done.

II. Forecasting and trading cryptocurrencies with machine learning under changing market conditions

This study examines the predictability of three major cryptocurrencies—Bitcoin, Ethereum, and Litecoin—and the profitability of trading strategies devised upon machine learning techniques (e.g., linear models, random forests, and support vector machines). The models are validated in a period characterized by unprecedented turmoil and tested in a period of bear markets, allowing the assessment of whether the predictions are good even when the market direction changes between the validation and test periods. The classification and regression methods use attributes from trading and network activity for the period from August 15, 2015 to March 03, 2019, with the test sample beginning on April 13, 2018

DATASET USED

We used one dataset per cryptocurrency, each dataset has 300-400 entries and the columns used are Unix Timestamp, symbol for the cryptocurrency, high, low, open, close values for each cryptocurrency and volume in crypto and USD

High - Highest price reached during time interval, in quote currency.

Low - Lowest price reached during time interval, in quote currency.

Open - Opening price of the time interval in quote currency

Close - Closing price of the time interval, in the quote currency.

Volume - Quantity of asset bought or sold, displayed in base currency.

PROPOSED SYSTEM

We used two methods to analyse the dataset; RNN and linear regression

I. Recurrent neural network method

Recurrent Neural Network (RNN) are a type of Neural Network where the output from previous step are fed as input to the current step. In traditional neural networks, all the inputs and outputs are independent of each other, but in cases like when it is required to predict the next word of a sentence, the previous words are required and hence there is a need to remember the previous words. Thus, RNN came into existence, which solved this issue with the help of a Hidden Layer. The main and most important feature of RNN is Hidden state, which remembers some information about a sequence.

a) Training using RNN

1. A single time step of the input is provided to the network.
2. Then calculate its current state using set of current input and the previous state.
3. The current ht becomes ht-1 for the next time step.
4. One can go as many time steps according to the problem and join the information from all the previous states.
5. Once all the time steps are completed the final current state is used to calculate the output.
6. The output is then compared to the actual output i.e the target output and the error is generated.
7. The error is then back-propagated to the network to update the weights and hence the network (RNN) is trained.

b) *Output using RNN*

Bitcoin:

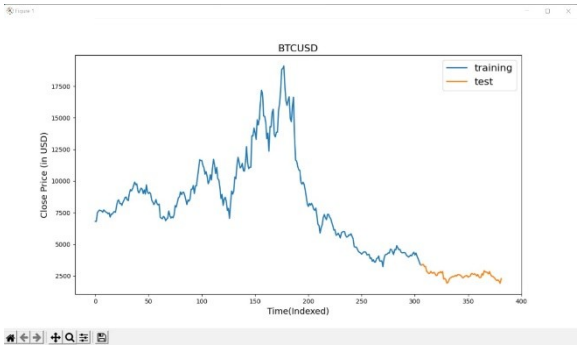


Figure 1: Training Test Split

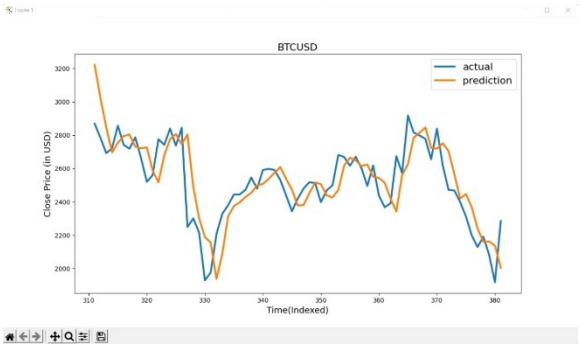


Figure 2: Bitcoin Prediction

Ethereum:

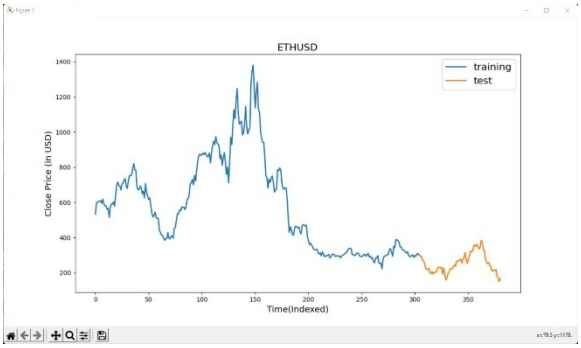


Figure 3: Training Test Split

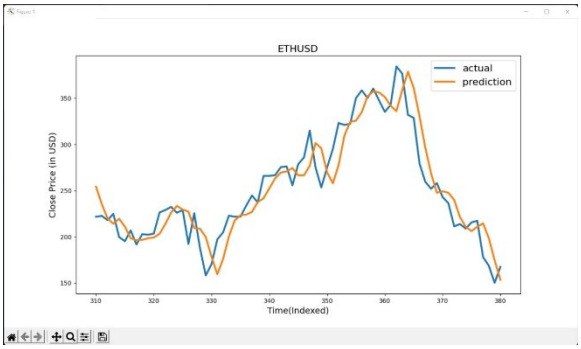


Figure 4: Ethereum Prediction

Dash Coin:

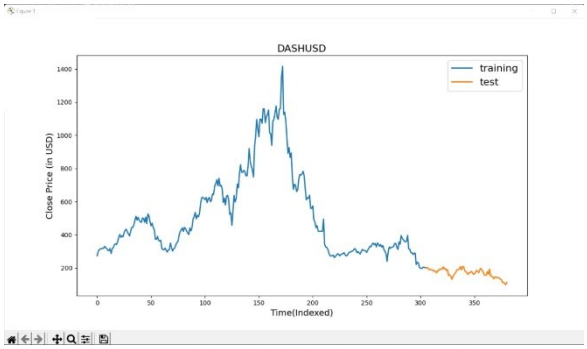


Figure 5: Training test split

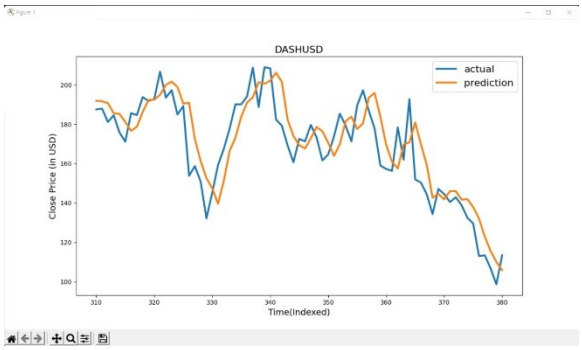


Figure 6: Dash Prediction

Doge Coin:

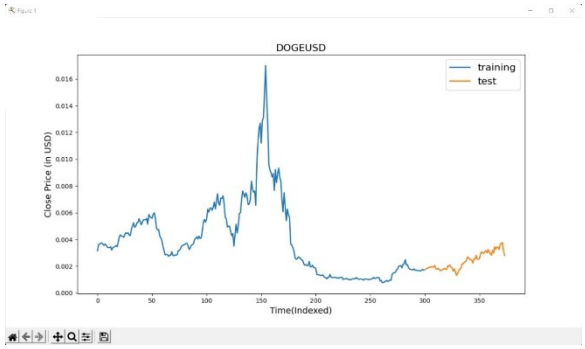


Figure 7: Training test split

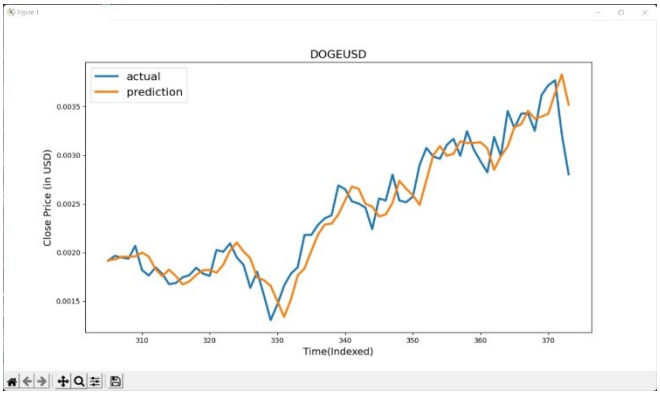


Figure 8: Doge Prediction

Litecoin:

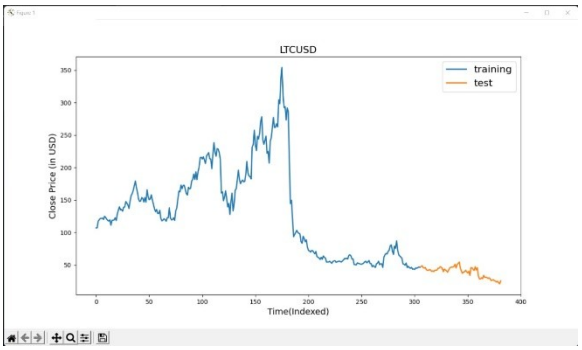


Figure 9: Training test split

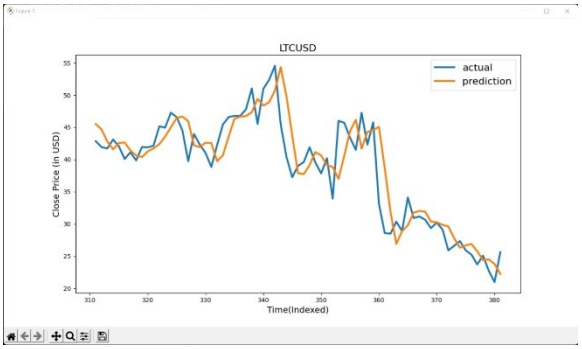


Figure 10: Litecoin Prediction

Monero:

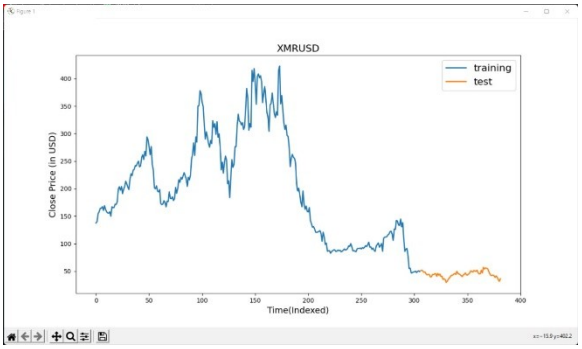


Figure 11: Training test split

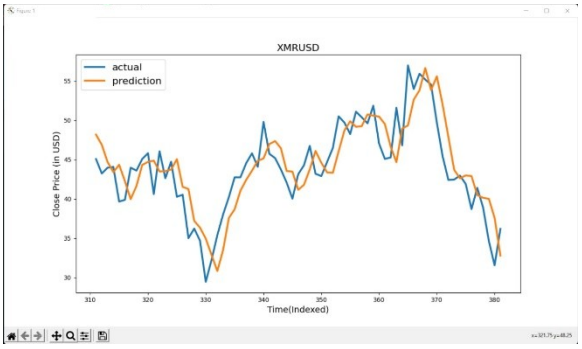


Figure 12: XMR Prediction

II. Linear Regression method

Linear Regression is a machine learning algorithm based on supervised learning. It performs a regression task. Regression models a target prediction value based on independent variables. It is mostly used for finding out the relationship between variables and forecasting. Different regression models differ based on – the kind of relationship between dependent and independent variables, they are considering and the number of independent variables being used.

a) Training using LR

While training the model we are given:
x: input training data (univariate – one input variable(parameter))
y: labels to data (supervised learning)
When training the model – it fits the best line to predict the value of y for a given value of x. The model gets the best regression fit line by finding the best θ_1 and θ_2 values.
θ_1: intercept
θ_2: coefficient of x
Once we find the best θ_1 and θ_2 values, we get the best fit line. So, when we are finally using our model for prediction, it will predict the value of y for the input value of x.

b) Output using LR

Bitcoin:

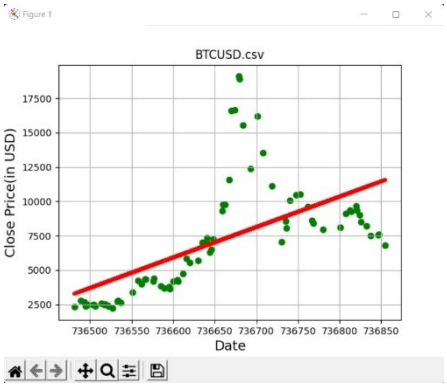


Figure 13: Bitcoin

Ethereum:

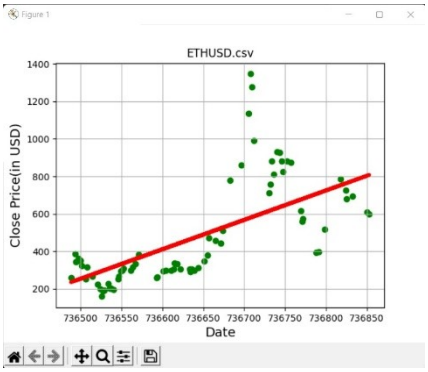


Figure 14: Ethereum

Dash coin:

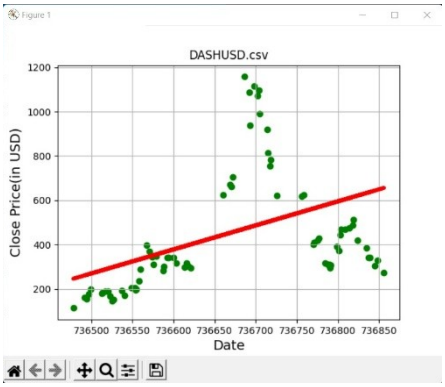


Figure 15: Dash coin

Dogecoin:

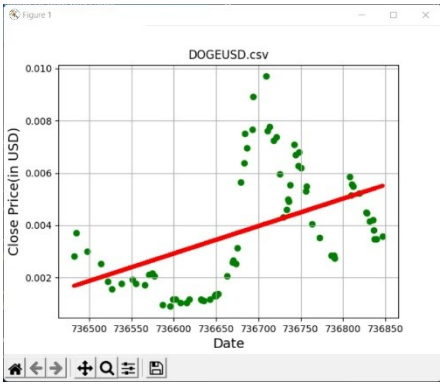


Figure 16: Doge Coin

Litecoin:

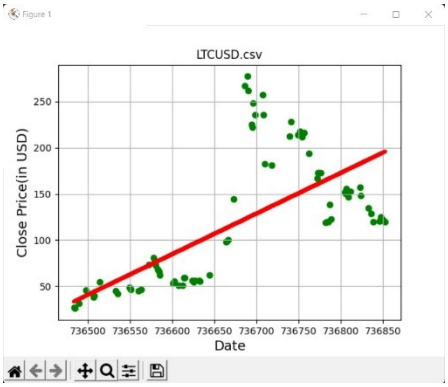
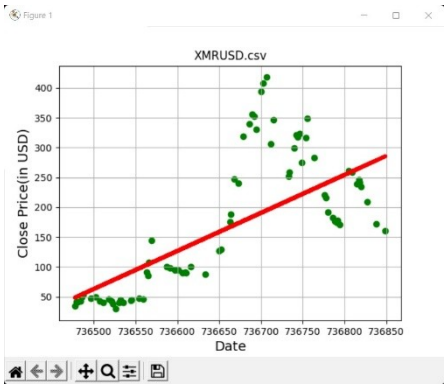


Figure 17: Lite Coin

Monero:



CODE

github.com/shivangjay/Cryptocurrency-analysis-using-ML

CONCLUSION

The cryptocurrencies we analyzed fluctuated a lot but all gained in a given time period. Therefore, Extensive studies should be performed on the economic effects of Cryptocurrency's effect on long standing fiat currency performance, and compare the results to countries that are beginning to adopt state-sponsored cryptocurrencies such as Hoffman of Iceland. The ability for cryptocurrency to perform micro transactions may allow it to bridge an economic gap that traditional state sponsored currencies would not be able to solve, but requires a much deeper market and economic analysis to determine.

PROPOSED SYSTEM VS EXISTING SYSTEM

In the existing system, they only use 1 cryptocurrency at a time but we are using multiple at a time and also, we are taking the cryptos in a bigger time period. So, our accuracy is better due to the low time constraint of our project

FUTURE WORK

In future work, we will try to collect more data and incorporate more cryptocurrencies and will test with different ml regression algorithms to better the accuracy of the model. Then we will try to build an API pipeline to funnel real-time data to the model that can get real time predictions for crypto trades and other people who are interested in cryptocurrency.

REFERENCES

1. Rejeb, Abderahman & Rejeb, Karim & Keogh, John. (2021). Cryptocurrencies in Modern Finance: A Literature Review. ETIKONOMI. 20. 93-118. 10.15408/etk. v20i1.169111.
2. S. Alzahrani and T. U. Daim, "Analysis of the Cryptocurrency Adoption Decision: Literature Review," 2019 Portland International Conference on Management of Engineering and Technology (PICMET), 2019, pp. 1-11, doi: 10.23919/PICMET.2019.8893819.
3. Abuín JM, Lopes N, Ferreira L, Pena TF, Schmidt B. Big Data in metagenomics: Apache Spark vs MPI. PLoS One. 2020 Oct 6;15(10):e0239741. doi: 10.1371/journal.pone.0239741. PMID: 33022000; PMCID: PMC7537910.
4. Salloum S, Dautov R, Chen X, Peng PX, Huang JZ. Big data analytics on apache spark. International Journal of Data Science and Analytics. 2016;1(3):145–164. doi: 10.1007/s41060-016-0027-9.
5. Giudici, G., Milne, A. & Vinogradov, D. Cryptocurrencies: market analysis and perspectives. *J. Ind. Bus. Econ.* **47,** 1–18 (2020).