

A Survey On Cryptocurrency Market Price Prediction

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Abstract- *The cryptocurrency trend is gearing up among investors these days as they want to escape the boring norms of fiat money. The features like secured transactions, no intermediaries, and high speed have paved the way for the growth of cryptocurrencies across the globe. So, it is really important to verify and analyze the current market value. There may be a sudden rise or fall in the value and it is difficult to predict them. In the proposed work, the price of the various cryptocurrencies like Bitcoin, Ethereum, Litecoin, Binance Coin, and Maker is forecasted by considering the different parameters that influence the price. The dataset is collected till the current date with the open, high, low, and close prices of the cryptocurrencies. For the price prediction, different machine learning algorithms like linear regression, support vector regression, SGD regression, lasso regression, XG boost regression, ridge regression, and random forest regression are used and compared their performance. This helps in predicting the price of the cryptocurrency more precisely and accurately by which the investors and beginners can be easily able to choose and invest in a way more profitable.*

Keywords- Bitcoin, Cryptocurrency, Ethereum, Litecoin, machine learning.

I. INTRODUCTION

Cryptocurrency has become a game-changer because of its vast advantages like freedom of payment, anonymity, high security, speed, and mainly no third-party involvement. The snag in the current system of using the currency is that every single transaction is being recorded and it is highly vulnerable. But in the case of cryptocurrency, as it uses blockchain technology, there is no single factor that makes it vulnerable in any way. This attracts the investors to invest as it also helps in gaining an enormous amount of profit. These reasons have significantly gained its growth over the years and more people have started to invest in this. So, beginners and investors might need a foretelling system to predict the market price which will help everyone in spending their money more optimally. This system is proposed to predict the price of the cryptocurrency more precisely and minutely. The input of the system is the cryptocurrency name, the number of days to be predicted, open, close, high, and low prices while the output is

the open price prediction for the upcoming days. Initially, exploratory data analysis is made separately for each cryptocurrency to understand its nature and characteristics. Then feature engineering, scaling is made on the collected dataset to increase the efficiency and accuracy. Then the model is trained using the different regression algorithms that we have taken into account. Separate modules are built for each parameter like open, close, high, and low prices in order to loop over to predict the target open price for ‘n’ number of days. The model is validated using the test dataset and the most suitable algorithm with high accuracy is identified by comparing with the different algorithms using the performance metrics. The user interface is built with the help of flask to make the system more accessible and user-friendly. This will, in turn, produce a flawless system where one can predict the price of the cryptocurrency without any obstacles or barriers.

II. LITERATURE SURVEY

[1] This study made a computational approach to identify and reduce the pump and dump scams where the currency worth is perceived differently and lures the users in investing in their holdings. Twitter and telegram platforms have become the stage for these scammers to hype around the false value of the currencies. They have developed a system with a multi-modal approach to conclude whether a pump attempt becomes successful or not. They have also analyzed the user activity involved in pumping operations. For the identification of Twitter bots, they collect the user information whether they are active or suspended by Twitter. Secondly, they are considering the botometer score to detect the user is a bot or not. They can develop a real-time detector to warn the users about the pumping activity.

[2] This study initially identifies that the price trend changes according to the price of the bitcoin. The parameters they have taken are open, high, low, and close price of bitcoin. Their aim is to get the accuracy by comparing the machine learning algorithms such as decision tree and linear regression. The dataset is from the year 2011 to the current date. In the case of the decision tree, they have compared the root attributes with the other attributes. And in the case of Linear Regression, the base attribute is plotted as X and the anticipated attribute is plotted as Y. Compared with the two algorithms, linear

regression has a high accuracy of 97.59. The forecasting is made for 5 days. They have built this to avoid the prediction problem.

[3] This model uses a holistic approach in predicting cryptocurrency prices. The proposed system applies sentiment analysis and machine learning algorithms to improve efficiency. Various ML algorithms like SVM, ANN, Naive Bayes and Random Forest Regressor are used. Individuals' sentiments are evaluated using the various posts and tweets from social media networks like Facebook and Twitter. Using sentiment analysis can lead to less accuracy, as the tone of the text can be more difficult to interpret. Only three cryptocurrency types are used and the accuracy is calculated for these currency types separately. The prediction of Ethereum is the highest among Bitcoin and Bitcoin Cash. More digital coins could have been taken into account to widen the dataset.

[4] This project analyses the current market and the trends in social media to predict the prices. With RNN and LSTM, the sentiment analysis is done. UNIX timestamp is used to map the scores collected from Twitter and the data. Random forest regression is used for the prediction process. The prediction is verified by using the MAE and RMSE values. The data are collected from Twitter, historical data, and news. Taking the Twitter data might not have been accurate, other parameters like verified news sources and blockchain features should be added to predict more accurately. The scores from Twitter and feeds from the news are neutral. By using blockchain features, the prices might have been predicted more accurately.

[5] There have been many cases of bitcoin theft involving many illegal activities. So, to overcome this, a forensic investigation will identify suspicious bitcoin addresses involved in bitcoin transfers. FABT framework is applied in this paper, to identify suspicious addresses and which converts bitcoin transaction data into a formal model called BTN(bitcoin transaction net) visualization techniques were used for gathering the suspicious addresses identified by the pattern matching. The various transaction depths are constantly monitored to watch the flow of the coin over the suspected target. The investigation of the Mt.Gox case validates the effectiveness of the FABT. Bitcoin transactions are converted into one Petri net, where places capture the input/output relationships in transactions.

[6] This study aims in applying statistical analysis to predict the market price of bitcoin. They have chosen the data from the year 2013 to 2017. This study is based on the ARIMA model to determine the bitcoins' weighted cost. The time

series models ARIMA, MA, and AR are used on the dataset, ARIMA is chosen to predict because of its fit in the dataset. Dickey-Fuller test is made on the dataset as it is good for complex and huge datasets. This test is to characterize the time series data by a specific pattern. For estimating the relationship between the parameters, the autocorrelation method is used. Each succeeding or neighbor data has a relationship and this is formed using the autocorrelation coefficient. This study concentrates on forecasting the next 10 days' bitcoin price. More parameters should have been used to increase the accuracy.

[7] This study focuses on the security of the Bitcoin blockchain since it is progressively valued by people. At the same time, the Bitcoin blockchain has also brought some problems due to the lack of unified regulatory agencies such as drug transactions and online money laundering. Problematic transactions are analyzed and the source is traced. In this paper, a system is designed to collect data from the Bitcoin blockchain network nodes and perform basic statistical analysis on the collected data. The system was used to collect data of nearly 100,000 blocks. The biggest feature of the Bitcoin blockchain is decentralization. In the data structure, each block consists of a block header and a block body. The block header includes the version number (Bitcoin protocol), the hash value (previous block), the hash value of the Merkle root, timestamp, and random number. The block body holds all the transaction information. All transaction data in the Bitcoin blockchain is saved as data in the Merkle tree. In the data collection phase, they used two data collection methods, one is the crawler-based data collection method and the second method is to use the data collection method of website API. In the data processing stage, they conducted a preliminary analysis of the data and plotted the histograms of Number of Block & Transactions, Weight and volume.

[8] This study presents a graph mining tool for envisioning and analyzing the network of bitcoin. It explores the data and envisions the subgraph. Every output of the network has the transaction amount and a methodology to recognize the recipient. In this, the data are collected and stored in the neo4j, a graph-based DBMS. The graph model is heterogeneous, hence the nodes and relationships are of two types depending on the input and output of a transaction. This system provides two information-based algorithms that conclude with the visible information from the address graph to achieve centrality and clustering. The various approaches they have used are entropic centrality, clustering based on the confined circulation of probabilistic flows, path confluence-based address aggregation, bitcoin flow traceback/forward. Due to the limitation on space, they have ignored the snapshots of the results from the traceback/forward algorithms.

[9] This study aims in dealing with the analytical insights to help understand the nature of cryptocurrency and they have also compared the cryptocurrency features with foreign exchange and stock. They have built the correlation matrices and asset trees based on the close price of four years to run a comparison on the three different financial markets. They have chosen the parameters like volatility, robustness, structure clustering, risk and centrality are used for comparison. They have selected 50 cryptocurrencies and the market capitalization of the selected currencies is equal to more than 90% of the total value. They concluded that the temporal volatility is similar to all three markets, the cryptocurrency nature is more similar to the stock market, and lastly, cryptocurrency is a little more fragile than the other markets based on the robustness.

[10] This study aims in using the combination of regression model and expert correction to receive better results either with regression model or expert opinion. The Linear model for Bitcoin price which has regression features based on Bitcoin currency statistics, mining process, Google search trends and Wikipedia visits are summarised in this paper. Regression model prediction is easier compared to price time series. The Bayesian approach makes it possible to use the probabilistic approach using distributions with fat tails and the outliers in the Bitcoin price time series. An important goal in Bitcoin analytics is price forecasting. Received results show that the correct expert definition of time pivot points for the regression model deviation improves the prediction of Bitcoin price. In the proposed approach, they have used experts to define time pivot points which describe the deviation of the regression model based on historical data compared to real price time series.

III. COMPARISON TABLE

Author	Year	Approach	Description
M. Mirtaheri, S. Abu-El-Haija, F. Morstatter, G. V. Steeg and A. Galstyan	2021	Computational and Multi-modal approach	They proposed a computational approach to identify and reduce the pump and dump scams.
K. Rathan, S. V. Sai and T. S. Manikanta	2019	Decision Tree and Linear Regression	This study compared Decision Tree and Linear Regression algorithms to find out which is best for the prediction.
M. Wimalagunaratne and G. Poravi	2018	ANN, SVM, Naive Bayes, Random Forest	The proposed system follows a holistic approach in predicting the prices.
A. Inamdar, A. Bhagani, S. Bhatt and P. M. Shetty	2019	Random Forest Regression, RNN, LSTM	The proposed system uses RNN and LSTM for sentiment analysis and Random Forest Regression for prediction.
Y. Wu, A. Luo and D. Xu,	2019	Pattern matching, Visualization	The proposed system presents a framework for analyzing the transactions by identifying distrustful addresses.
S. Roy, S. Nanjiba and A. Chakrabarty	2018	Data analysis	They designed a system to collect data from the Bitcoin blockchain network nodes and perform basic statistical analysis on the collected data.
J. Xiaomeng, Z. Fan, L. Shenwen, Y. Jinglin and H. Ketai	2020	ARIMA/MA/AR	They introduced an algorithm for Biva for transaction and address wallet is to be analyzed and also they have used clustering
F. Oggier, S. Phetsouvanh and A. Datta	2018	Graph analytics algorithm	They proposed a graph mining tool to visualize and analyze the bitcoin network
J. Liang, L. Li, W. Chen and D. Zeng	2019	correlation matrices and asset trees	This study aims in understanding the nature of cryptocurrency by comparing it with Stock and Foreign Exchange.
B. M. Pavlyshenko	2019	linear model	They proposed a new method in which the correct expert definition of time pivot points for the regression model deviation can essentially improve the prediction of Bitcoin price.

IV. CONCLUSION

Many analysts have estimated that the market of cryptocurrency will hit triple the value. This, in turn, grasps the attention of many investors to buy them. But it is a huge challenge to invest in the right choice as the prices drop and rise rapidly. Therefore, it is a necessity to understand its nature to predict them more accurately in order to help investors to spend more wisely and carefully. This study helps in analyzing the nature of different cryptocurrencies with their parameters. It compares different regression algorithms and chooses the best among them in order to predict the price more accurately and precisely. In the future, we intend to fetch the live data directly in order to process them more lively and on point.

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