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ijircce@gmail.com



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A Survey on Crypto Currency Market Price Prediction Using Data Science Technique

Raghavaraju Abhilash¹, D Jaheer¹, Abinayan S¹, A Anbarasa Pandian²

UG Student, Computer Science and Engineering, Panimalar Institute of Technology, Chennai, Tamil Nadu, India¹

Professor, Department of Computer Science and Engineering, Panimalar Institute of Technology, Chennai, India²

ABSTRACT:In this survey paper, we have gathered nearly 30 papers to help us in the Crypto Currency Market Price Prediction Using Data Science Technique. Crypto currency is a digital currency in which coin ownership records are held in a ledger in the form of a computerized database that uses strong encryption to safeguard transaction records, control the creation of more coins, and verify ownership transfers. Cryptocurrencies are widely utilized nowadays, and their percentage of the market fluctuates dramatically, making it difficult to anticipate the price of a crypto currency. The data science approach is used to develop a more accurate model for forecasting the outcome. The fundamental procedure in creating a successful model is identifying variables and understanding data. Different machine learning algorithms are applied to pre-processed data and their accuracy is compared to evaluate which algorithm performed better. Other performance metrics such as precision, recall, and score are also considered when evaluating the model. The crypto currency outcome is predicted using a machine learning algorithm.

KEYWORDS: Crypto currency, machine learning algorithm, Data Science

I. INTRODUCTION

This Survey paper takes a look at the various reports that were presented as a solution to the Crypto Currency Market Price Prediction. Crypto currency behaves in a unique way, making it difficult to anticipate the future. The proposed model is to construct a model that can anticipate the price. From variable identification to model construction, the phases in the proposed model follow a data science methodology.

A Survey of 30 journal papers were reviewed around the topic of Crypto Currency, The procedure begins with the identification of variables such as dependent and independent variables, after which we locate the target column. The pre-processed data is then used to develop a model by dividing the dataset into a 7:3 ratio where 70% of the data is utilised for training purposes (the model learns the pattern) and the remaining testing data is used to test the data's performance.

II. RELATED WORK

The article [1] The goal of crypto-currency price prediction is to accurately anticipate the Bitcoin price by taking into account a variety of factors that influence the Bitcoin value. The goal of this inquiry is to get insight into optimal characteristics surrounding Bitcoin pricing while appreciating and identifying daily patterns in the Bitcoin market.

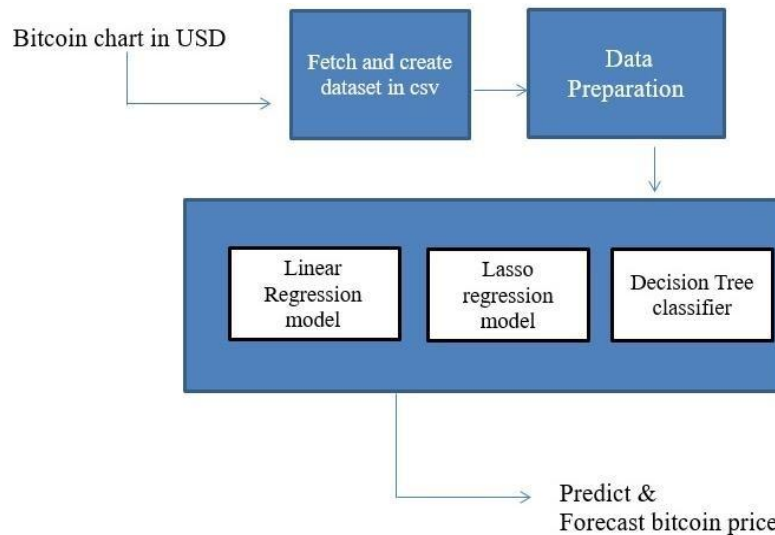
$$\text{minimize } \frac{1}{n} \sum_{i=1}^n (\text{pred}_i - y_i)^2$$
$$J = \frac{1}{n} \sum_{i=1}^n (\text{pred}_i - y_i)^2$$

The article [2] The market price prediction for cryptocurrencies is based on their historical trend. To analyse the features connected to the price of cryptocurrencies and apply a machine learning algorithm to comprehend and identify the cryptocurrency market price.

To examine multiple cryptocurrencies, we would also employ deep learning models such as LSTM. We can also utilise the previous day's data to anticipate the highest price for the next day using LSTM.

The article [3] The goal of this study is to accurately anticipate the Bitcoin price by taking into account a variety of factors that influence its worth. The data collection contains daily records of numerous features linked to the Bitcoin price and payment network throughout time. In the second phase of the inquiry, we will use the existing data to

anticipate the sign of the daily price change with the greatest accuracy feasible. Because Bitcoin is so volatile, segregated witness and distributed immutable ledgers are used to gather real-time data and feed it into regression models.



The paper [4] Cryptocurrency mining is a crucial operation that assures the cryptocurrency system's stability. Cryptocurrency mining necessitates a substantial amount of computing power. Ensure optimal performance of utilised computer capacities is one of the most critical jobs in cryptocurrency mining. In this paper, we look at the current Ethereum mining process and look for ways to speed it up by using a new asynchronous mining algorithm.

The article [5] Bitcoin is a sort of cryptocurrency that has grown into a successful open-source community and payment network with millions of users. Because the value of Bitcoin fluctuates on a daily basis, it would be quite intriguing for investors to forecast its value while also making it impossible to predict. Bitcoin is a cryptocurrency that has captivated investors due to its significant price gains.

This paper [6] begins with a quick introduction to cryptocurrencies and its history. The novelty of literature aiming to develop hybrid artificial neural network models to predict bitcoin prices is discussed.

The article [7] is because of its potential in a variety of sectors, blockchain technology is becoming increasingly popular.

$$Z = \frac{1}{x - \mu}$$

Cryptocurrency is a new type of asset [8] that has evolved as a result of advances in financial technology, and it has provided a significant research opportunity.

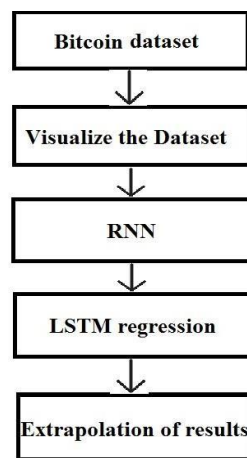
This study offers three recurrent neural network (RNN) algorithms for predicting the prices of three different cryptocurrencies: Bitcoin (BTC), Litecoin (LTC), and Ethereum (ETH) (ETH). With MAPE percentages of 0.2454 percent, 0.8267 percent, and 0.2116 percent for BTC, ETH, and LTC, respectively, GRU provides the most accurate prediction for LTC.

The field of cryptographic money [9] has grown tremendously over the last decade. Insights back up this theory, with about 1,500 Bitcoin-related queries being recorded every hour.

As the economic and social impact [10] of cryptocurrencies grows, so does the importance of related news articles and social media posts, particularly tweets. Twitter is becoming increasingly popular in the financial world, with fresh news and advice from the world's top players appearing on the platform.

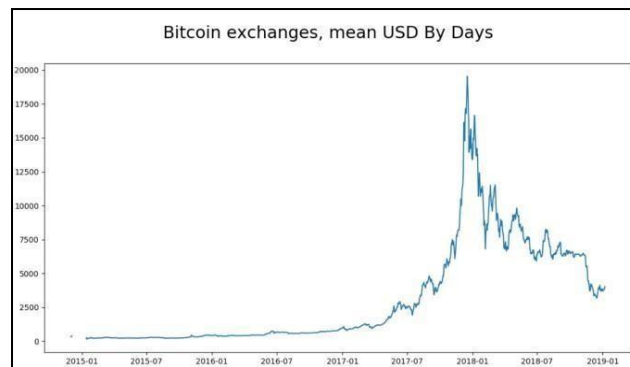
In this research [11], we attempt to accurately anticipate the Bitcoin price by taking into account a variety of factors that influence its value. We want to study and identify daily trends in the Bitcoin market in the first round of our poll, as well as obtain insight on the best elements surrounding Bitcoin price. In the second phase of our study, we will use the existing data to anticipate the sign of the daily price change with the greatest accuracy feasible.

Machine learning and AI-assisted [12] trading have gained popularity in recent years as a result of technological advancements. We achieve excellent results using tactics aided by cutting-edge algorithms. The outcomes made the bitcoin market flourish with the use of basic algorithms and design. In today's market, around 1500 crypto currencies are being traded. It is possible to create a crypto money that may be used for online transactions. Bitcoin is a type of cryptocurrency.



Work flow of the proposed model

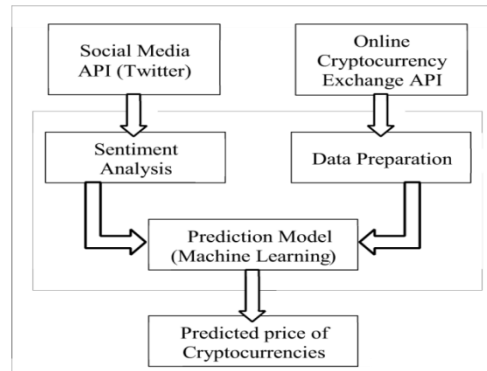
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Graph Output for Price Prediction

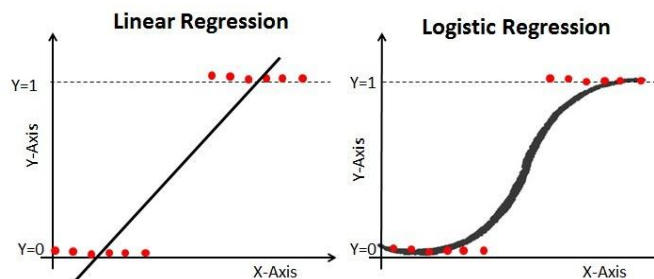
The popularity of cryptocurrencies [13], which are digital or virtual currencies that are used as a medium of exchange, has skyrocketed in recent years. Because of the anonymity of virtual currencies, investors are more vulnerable to fraud, such as "pump and dump" schemes, in which the goal is to artificially increase the perceived value of a currency in order to lure victims into investing before the fraudsters can sell their holdings. In this paper, we propose and test a computational approach for detecting pump and dump scams as they unfold by merging data from many social media platforms.

Cryptocurrencies [14] have established themselves as critical financial software platforms. Each mining strategy is assessed for its strengths, shortcomings, and potential dangers



High Level Diagram of the Proposed System.

Bitcoin [15] was not the first attempt at a digital currency, but it was the most successful, with a number of major shops now accepting it. Bitcoin is a peer-to-peer cryptocurrency that works on a peer-to-peer network. Its security is ensured by cryptographic algorithms rather than governments, and it has the potential to become a major form of e-commerce payment, as well as a competitive competitor to traditional money-transfer services. Bitcoin serves the entire world rather than just one or a few countries.



Logistic regression vs Linear Regression

Machine Learning [16] is a type of Artificial Intelligence that can predict the future based on past data. SVM has various advantages over other forecasting models, and prior research has shown that it not only delivers a result that is nearly or exactly the same as the real result, but it also improves the accuracy of the result. However, current study has shown that the general status and accuracy rate of forecasting need to be improved in future studies due to a small range of samples and data manipulation by weak evidence and professional analyzers. As a result, advanced research on the anticipated price's accuracy rate is required.

This paper discusses [17] the difficulties of short-term forecasting of bitcoin time series using a supervised machine learning (ML) approach. We used historical price data and technical indications to compile the data, which came from the daily close prices of three of the most prominent coins. To test the efficacy of these models, we employed the one step forward technique to create an out-of-sample forecast for a few time series. The accuracy rate of the anticipated prices was calculated using RF and GBM.

The importance of digital cryptocurrency and the concept of blockchain have been explored by several developers and organizations. It is assumed to be one of the secure and easy payment methods that can be used in the coming days.[18]

We demonstrated in this research [19] that using machine learning and sentimental analysis, we can anticipate the direction of price fluctuations in the growing cryptocurrency market. Improving the quality of the content and the

number of sources from which such content is acquired could improve the use of sentiment analysis for gathering social signals.

Cryptocurrency [20] is a digital or virtual currency that is decentralised. Cryptocurrencies gained popularity in 2013 and have since seen a large increase in transactions and, as a result, price volatility. It has attracted public attention, and accurate price forecast of cryptocurrencies will enable the general public to economically invest in the system.

$$MAE = \sum_{i=1}^n |(X_{\text{predicted}})_i - (X_{\text{actual}})_i|$$

Due to its positive outlook [21] on the future for crypto currencies, the price of Bitcoin has significantly increased during the last eight years in the economy. One of these characteristics is that Bitcoin allows for decentralised banking, which means it cannot be regulated by large institutions. Because there is a limit of 21 million Bitcoins that can be in circulation, a surplus of Bitcoins cannot be "produced," resulting in inflation. Bitcoin overcomes the problem of transaction security by employing a block chain, or ledger, that compiles the history of every transaction ever made into a single lengthy hexadecimal "chain" of anonymous transactions.

Cryptocurrency [22] Uniswap, Curve, and other types of Automated Market Makers (AMMs) are decentralised cryptocurrency exchange protocols that maintain a liquidity pool (LP) of two or more assets limited to maintain a mathematical relationship to each other at all times, specified by a specific function or curve. This method avoids the possibility of arbitrage.

Technology [23] is increasingly important in today's world, whether directly or indirectly. Few research have attempted to explore cryptocurrency's usage of technology because it is so new. The technological readiness features of optimism, innovation, discomfort, and insecurity were employed in this study to better understand people's adoption of cryptocurrencies. To complement PLS-SEM findings and predict higher accuracy, a deep learning Artificial Neural Network (ANN) analysis was undertaken.

Cryptocurrencies [24] acquire user trust by making their whole creation and transaction history public. In exchange, the transaction history meticulously documents the complete range of cryptocurrency user activities. The current research on knowledge discovery in bitcoin transactions using data mining techniques is analysed and summarised in this article.

Since 2009 [25], investors have been paying close attention to cryptocurrency. These new investment vehicles are digitally native, which means they can only be exchanged on digital platforms 24 hours a day, seven days a week. These tactics are designed to outperform the market. Daily returns do not indicate long-term reliance, according to past research.

In the existing centralized [26] banking system, our transaction history has the potential to reveal a great deal of personal information about each spender, both to the banking system and to the companies that surround it (e.g., governments, industry etc). The amounts spent, the things on which the amounts were spent, the spending locations, and the users with whom we exchange money are all examples of leaking information. This knowledge is extremely powerful in the hands of those who possess it, and it may be applied in a variety of ways, not all of which are beneficial to us.

Pairs trading [27] is a method that takes advantage of mean reversion in stock prices. Even while these tactics have been proved to perform well in the stock market, their performance in the realm of cryptocurrencies. At 5-minute, 1-hour, and daily frequencies, we apply the distance and cointegration approaches to a basket of 26 liquid cryptocurrencies traded on the Binance platform.

$$SSD_{ij} = \sum_{i=1}^n (P_{it} - P_{jt})^2$$
$$spread_{ij} = P_{it} - P_{jt}$$

Bitcoin [28] is a peer-to-peer digital decentralised cryptocurrency established by Satoshi Nakamoto, a fictitious person. Several developers and organisations have looked at the significance of digital currency and the notion of blockchain.

We cover a variety of subjects related to Bitcoin in this article, including blocks, blockchains, the mining process, and proof of work (PoW).

Because of the pseudo anonymity [29] and privacy they provide, they are used in cybercriminal operations, according to a systematic literature review. Researchers have been hard at work evaluating and designing new defence systems to counteract these types of operations. Collecting datasets to train defensive systems to detect and evaluate these intrusions is a huge problem for academics.

Financial technology [30] has evolved in tandem with advances in computer technology. A new sort of attack known as cryptojacking has evolved in the online realm to gain blockchain mining incentives. This attack takes use of a victim's computer resources to gain mining rewards without requiring user confirmation.

III. CONCLUSION

In light of this conclusion, as well as the fact that in this paper, we offer a unique computational approach for detecting and analysing social media-based bitcoin pump and dump operations. Our technique can determine, with fair accuracy, whether there is an unfolding attack on a certain coin on Telegram, and whether or not the subsequent pump operation will succeed in terms of fulfilling the projected price targets. We also look at the behaviours of people who are involved in pumping, and we notice a high incidence of Twitter bots in cryptocurrency-related tweets near the attack. We intend to supplement our data sets with other sources (e.g., Reddit postings) in the future to aid with the prediction tasks discussed here.

Finally, as a practical result of the work discussed here, we anticipate developing a cryptocurrency monitoring system that can detect oncoming pump assaults in real time and alert users who are vulnerable.

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BIOGRAPHY

Raghavaraju Abhilash, is a student of CSE department in Bachelor of Engineering at Panimalar Institute of Technology.

D Jaheer, is a student of CSE department in Bachelor of Engineering at Panimalar Institute of Technology.

Abinayan S, is a student of CSE department in Bachelor of Engineering at Panimalar Institute of Technology.

A Anbarasa Pandian, Professor, Department of Computer Science and Engineering, Panimalar Institute of Technology.



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