

# Cryptocurrency Price Forecast

Yash Shukla, Gunjan Mishra, Vivek Gupta, Shiv Pratap Singh, Yash Aditya Srivastava

Department of Computer Science and Engineering

Babu Banarasi Das Institute of Technology and Management, Lucknow

\*\*\*

**Abstract** - In this paper, we attempt to predict the price of different cryptocurrencies accurately by performing various two different models on their past performance. For the first phase of our investigation, we aim to understand and identify previous trends in the Cryptocurrency market while gaining insight into optimal features surrounding Cryptocurrency prices. Our data set consists of various features relating to the Cryptocurrency price and payment network throughout starting and ending years given by the user. For the second phase of our investigation, using the available information, we will predict the sign of the future price change with the highest possible accuracy.

**Key Words:** Bitcoin, Cryptocurrency, LSTM, ARIMA.

## 1. INTRODUCTION

While Nakamoto (Nakamoto, 2008) invented the foremost well-known cryptocurrency, Bitcoin, the concept of a secure peer-to-peer blockchain-based digital currency had been around for many years. In a very 1983 study, cryptographer David Chaum proposed the concept of employing a virtual system to boost the protection of mastercard transactions (Chaum, 1983). He also co-founded DigiCash, the primary cryptocurrency, which went bankrupt after a decade. Despite a scarcity of serious growth within the first few years after its inception, Bitcoin has grown at an implausible rate since 2017. Price increases are frequent, attracting an oversized number of investors. Its popularity has grown to the purpose where, additionally to several private businesses, a rustic has just stated that it'll accept it as a payment method. Furthermore, financial organisation academics are studying and debating it since a minimum of 2014. The decentralisation of Bitcoin sets it but other currencies. To place it in our own way, unlike other currencies, Bitcoin transactions don't seem to be handled or controlled by any government. Its monetary resource grows over time, though not linearly, because of an incentive system referred to as "mining." In exchange for bitcoins, computers solve mathematical equations using brute force. The rate of exchange of Bitcoin prices to other currencies is, in fact, determined by supply and demand rules. Bitcoin values may be anticipated using artificial neural network algorithms, similar to the other financial transaction. While artificial neural network approaches for predicting other financial processes have an extended history, there's not the maximum amount research on bitcoin price prediction because of its novelty. Despite this, an increasing number of

researchers have sought to construct hybrid models of artificial neural networks that predict the worth and/or price volatility of cryptocurrency values, with a specific concentration on Bitcoin, over the last few years.

## 2. RELATED WORK

Using various methodologies and algorithms, many researchers have attempted to forecast the crypto market. Some people have tried to figure out how different parameters affect cryptocurrency prices.

The literature on the factors that influence Bitcoin price formation is mostly empirical. Ladislav Kristoufek [1] studied the relationship between Bitcoin and Wikipedia and Google Trends search volume, first viewing the Bitcoin industry as totally speculative and devoid of fundamentalism. His research indicated a considerable asymmetry in the relationship between Bitcoin price and search queries, showing that Bitcoin price dynamics in the cryptocurrency market are driven by speculation and trend-chasing. Later, Kristoufek [2] used wavelet coherence analysis to seek for potential Bitcoin price drivers such as fundamental, speculative, and technical elements, and uncovered Bitcoin's unique traits as both a regular and speculative financial asset. Adam Hayes [3] used cross-sectional empirical data to look at 66 "coins" to see what factors drive the value of cryptocurrencies in the technical area. Using daily Bitcoin data to implement time-series analysis techniques Pavel [4], Using the framework of a Barro [5] model, did an empirical investigation on the price determinants of Bitcoin. Their findings found that, among the traditional determinants and factors related to digital currencies, market forces and investor attractiveness influence Bitcoin price the most, indicating that macro-level financial trends are not the long-term drivers of Bitcoin.

## 3. METHODOLOGY

### 3.1. Data Collection

Yahoo Finance has a wealth of information about stocks, bonds, currencies, and cryptocurrencies. It is the only competitor that provides market news, research, and analysis, as well as options and fundamentals data.

Pandas Datareader is a Python programme that lets us construct a Pandas DataFrame object from a variety of internet data sources. It's unique in that it can work with real-time stock price data. In this article, I'll show you how to use the Pandas DataReader in Python. We also

specify a data retrieval start and end date.

Attribute	Description
Date	Transaction date of cryptocurrency
Open	Opening price/cryptocurrency initial price at a certain time
High	The highest price of the opening price
Low	The lowest price of the opening price
Close	The closing price/cryptocurrency final price of a certain time

	Open	High	Low	Close
2014-09-17T00:00:00	465.8640	468.1740	452.4220	457.3340
2014-09-18T00:00:00	456.8600	456.8600	413.1040	424.4400
2014-09-19T00:00:00	424.1030	427.8350	384.5320	394.7960
2014-09-20T00:00:00	394.6730	423.2960	389.8830	408.9040
2014-09-21T00:00:00	408.0850	412.4260	393.1810	398.8210

Figure 1. Data Fetch from the yahoo finance

### 3.2. Data Preprocessing

We choose the Close attribute and Date attribute for fetching the previous data from start date to end date, as our prediction for future day will be based on past close price of the cryptocurrency.

#### Closing Price Vs Time chart

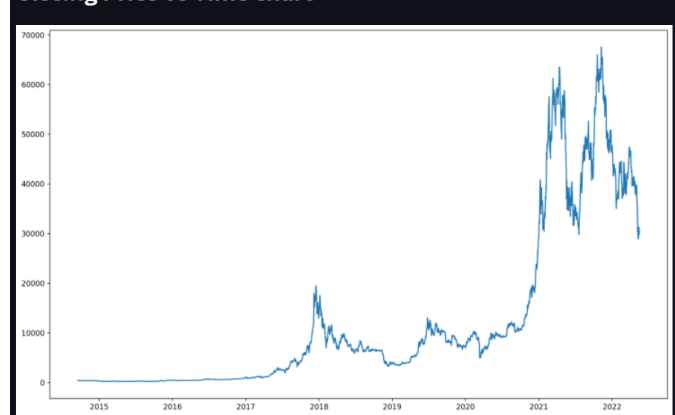


Figure 2. Closing Price Vs Time Chart

### 3.3. Data Splitting

The new data which consist of close and date attribute is now splitting into training data and testing data.

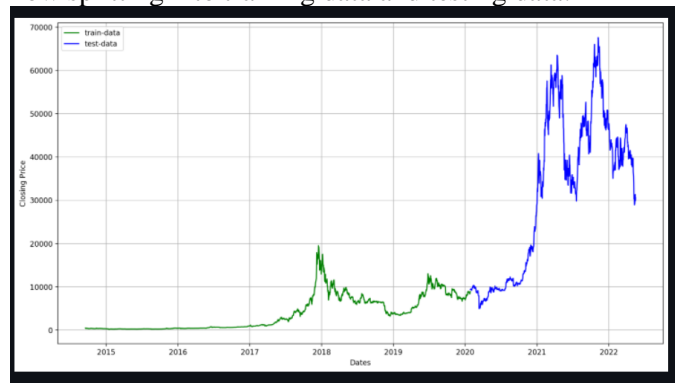


Figure 3. Splitting data into trained-70% and tested-30%

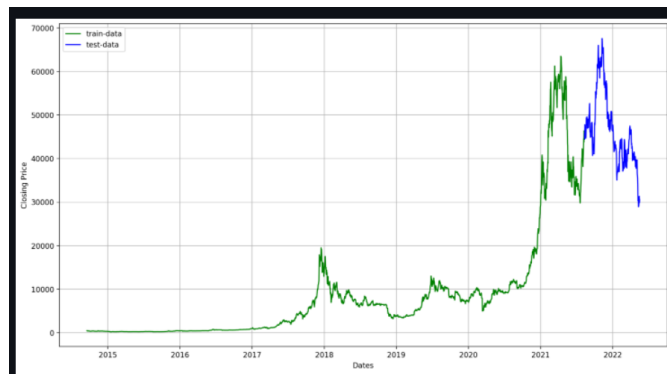


Figure 4. Splitting data into trained-90% and tested-10%

### 3.4. Testing Data

Now load the testing data into our model to predict the future price and the trend of the cryptocurrency using LSTM and ARIMA model.

#### LSTM:

A recurrent neural network could be a form of long short term memory. The output of the previous step is employed as input within the current step in RNN. Hochreiter & Schmidhuber created the LSTM. It addressed the problem of RNN long-term dependency, within which the RNN is unable to predict words stored in LTM but can make more accurate predictions using recent data. RNN doesn't provide an efficient performance because the gap length rises. By default, LSTM may store information for a lengthy period of your time. It's used for time-series processing, prediction, and classification.

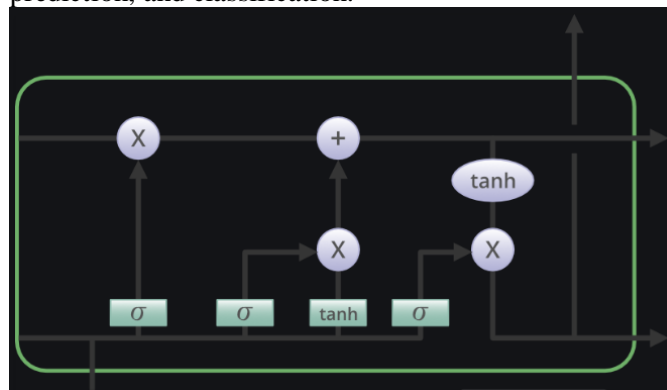


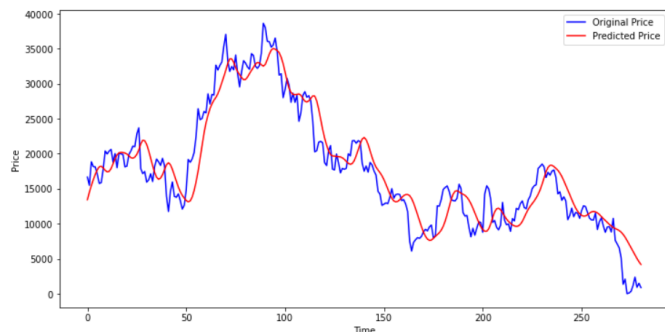
Figure 5. Structure of LSTM model

An LSTM recurrent unit, in theory, strives to "remember" all of the network's previous information while "forgetting" unnecessary material. This is accomplished by using different "gates," or activation function layers, for various reasons. Each LSTM recurrent unit additionally keeps an Internal Cell State vector, which theoretically describes the information that the previous LSTM recurrent unit decided to keep. There are four different gates in a Long Short Term Memory Network: -  
Forget Gate  $f$   
Input Gate  $i$   
Input Modulation Gate  $g$

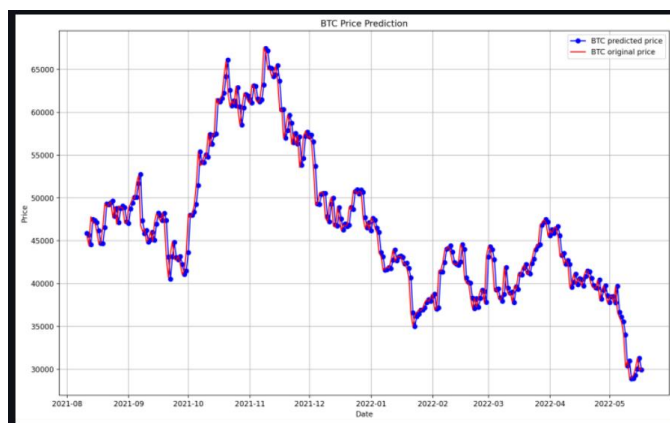
## ARIMA

An autoregressive integrated moving normal (ARIMA) model could be a generalization of an autoregressive moving normal (ARMA) model in statistics and econometrics, particularly in statistical analysis. ARIMA stands for the autoregressive integrated moving normal. It's a statistical analysis model that uses statistical data to advanced understand the word set or anticipate unborn trends. However, it's called autoregressive, if a statistical model predicts future values that are supported by former values. An autoregressive integrated moving average model could be a style of multivariate analysis that determines how strong one variable volume is as compared to other changing variables. The end of the model is to anticipate unborn securities or fiscal request movements by viewing disagreement between values within the series rather of factual values. Each element in ARIMA functions as a parameter with a regular memorandum. For ARIMA models, a typical memorandum would be ARIMA with p, d, and q, where integer values cover for the parameters to point to the kind of ARIMA model used. The parameters may be defined as p the number of pause compliances within the model; also called the pause order, d the number of times that the raw compliances are separated; also called the degree of difference, q the confines of the moving average window; also called the order of the moving.

## 5. RESULT



**Figure 6.** Prediction using LSTM model



**Figure 7.** Prediction using ARIMA model

## 4. CONCLUSIONS

The ARIMA Model provides the highest accuracy and time, according to the findings. Several things might have contributed to this outcome. The outcomes can also be influenced by the parameters used and the overall amount of data. We only have a tiny quantity of data to work with in this article. As previous research articles have demonstrated, RNN often performs better on larger datasets. The feature you've chosen may not be enough to properly anticipate bitcoin values. Price changes are influenced by a variety of variables, including country legislation and social media responses. Including more characteristics might improve the models' performance.

## REFERENCES

- [1] L. Kristoufek, Bitcoin meets google trends and wikipedia: quantifying the relationship between phenomena of the internet era, *Sci. Rep.* 3 (2013) 3415.  
[http://refhub.elsevier.com/S0377-0427\(19\)30398-X/sb19](http://refhub.elsevier.com/S0377-0427(19)30398-X/sb19)
- [2] L. Kristoufek, What are the main drivers of the Bitcoin price? evidence from wavelet coherence analysis, *PLoS One* 10 (4) (2015) e0123923.  
[http://refhub.elsevier.com/S0377-0427\(19\)30398-X/sb20](http://refhub.elsevier.com/S0377-0427(19)30398-X/sb20)
- [3] A. Hayes, What factors give cryptocurrencies their value: An empirical analysis, 2015.  
[http://refhub.elsevier.com/S0377-0427\(19\)30398-X/sb22](http://refhub.elsevier.com/S0377-0427(19)30398-X/sb22)
- [4] P. Ciaian, M. Rajcaniova, d.A. Kancs, The economics of bitcoin price formation, *Appl. Econ.* 48 (19) (2016) 1799–1815.  
[http://refhub.elsevier.com/S0377-0427\(19\)30398-X/sb23](http://refhub.elsevier.com/S0377-0427(19)30398-X/sb23)
- [5] R.J. Barro, Money and the price level under the gold standard, *Econ. J.* 89 (353) (1979) 13–33.
- [6] Bitcoin price prediction using Deep Learning  
Algorithm Er. Muhammad Rizwan Department of Information Technology Mehran UET Jamshoro  
[10.1109/MACS48846.2019.9024772](https://doi.org/10.1109/MACS48846.2019.9024772)