

# Price Prediction of Cryptocurrency using Machine Learning

**Asst Prof. Imran Ulla Khan<sup>1</sup>, Prabhat Kumar<sup>2</sup>, Rohan Yadav C<sup>3</sup>, V Rudrateja Reddy<sup>4</sup>, P Sandip Kumar<sup>5</sup>**

<sup>1</sup> Faculty CSE Department, Sri Krishna Institute of Technology, B'llore-560090, India

<sup>2,3,4,5</sup> Student CSE Department, Sri Krishna Institute of Technology, B'llore-560090, India

**Abstract**—We analyze the Crypto market forecast from 01 to 60 min. on the forecast horizon. To this end, we tested various MachineLearning models and found that while they all work as stochastic classifiers, the combination of neural repetitive and gradient enhancing classifiers is particularly good for the set tasks. We use a wide variety of methods, including technology, blockchain-based, interest-based, and resource-based. Our results show that core features are still relevant in most ways, followed by blockchain-based options and emotion-based features. We try to accurately estimate the value of Bitcoin, taking into account many factors that do not affect the value of Bitcoin. Our aim for the first phase of our research is to understand and analyze the daily events in the Bitcoin market while understanding the best aspects of Bitcoin price. Our data includes five years of Bitcoin price recorded daily and many features related to the payment network. In the second phase of our research, we will use the available data to predict the signs of daily price changes with the highest accuracy. To better understand the price effects and understand this great invention, we start with a brief overview of the Bitcoin business. Then we interpret the data, including stock market data, theory, and in this survey we show the use of LSTM models for the mentioned period. To finish, we found the Bitcoin price forecast 30 days and 60 days.

**Index Terms**—Bitcoin price movement; classification models; market predictions; random forest; technical indicators.

## I. Introduction

In this research we analyze the short-term forecast of the BTC market. That's why we use a lot of MachineLearning and

think about predictive business processes. Machine learning is being used more and more as a response here, due to its ability to easily choose between a huge number of attributes and learn the high correlation between different features and targets. pays less for new cryptocurrency flows. In peculiar, the ShortTerm forecast of the BTC(Bitcoin) market has not yet been fully confirmed. Also, most studies only consider features without analyzing the importance of machine learning models. These allow people to sell/buy Bitcoin using different currencies. The largest bitcoin exchange is Mt Gox. Bitcoins reside in an advanced wallet that looks like a virtual currency. Many transaction data and log files are stored in a place called the blockchain. Each file in the blockchain is called a block. Each frame has a marker to previous data frames. Information on the blockchain is mixed. The name of the customer will not be disclosed during the transaction, only the wallet identity will be disclosed. Bitcoin's price fluctuates like a stock, only unexpectedly. Financial markets have a number of accounting methods for estimating costs. However, its impact on Bitcoin is unusual. In this way, it is necessary to predict the correct price of Bitcoin(BTC) in order to make the right investment. This website aims to analyse the result(price) of different cryptocurrencies to date. It uses MachineLearning(ML) algorithms to analyze historical price information or predict the future price of selected cryptocurrencies. This document will provide a brief overview of the website and its activities.

Unlike the stock market, Bitcoin's price is not dependent on market timing or government regulation. Therefore, in contemplation of predict the price, we believe it is important to use smart tools to forecast the price of Bitcoin. Bitcoin(BTC) is the first cryptocurrency created in 2009. However, it did not

become widespread until 2012. These codes are generated on high-performance computers.

Since Bitcoin was created, many other cryptocurrencies called altcoins have been created. Since bitcoin is not controlled by any bank and is generally publicly available via the blockchain, it is profitable because there are no controls by intermediaries or officials natural tax bitcoins could be considered gold in the early 19th century. Banks and business owners were ready to convert it into currency, but they couldn't handle it in any way. Likewise, bitcoins can be exchanged for currency, used to buy goods or even complete transactions. For each coin which needs to be mined, there may be only 21 million coins, of which 11 million have already been mined. The biggest problems analysts and researchers face is the use of old methods that can predict the correct value. In this new research and implementation, our students use ML algorithms to predict short-term Bitcoin price changes based on historical time series data on various factors affecting Bitcoin prices. The idea is to use a system that can analyze data in real time to give investors a sense of direction to help them make decisions. The app uses data from the real world and updates the data ready to be fed into machine learning algorithms. You can use this information to predict tomorrow's Bitcoin price.

## II. Overview

Every day, cryptocurrencies worth more than \$40 billion are exchanged. Despite being one of the most widely used investments and speculative assets, it has shown to be extremely volatile. While some millionaires enjoyed the fluctuating prices, others suffered significant losses. Is it possible to foresee any of these price fluctuations in advance?

You will apply your machine learning abilities to this challenge to forecast the short-term returns on 14 well-known cryptocurrencies. For you to create your own models, we have assembled a dataset of millions of rows of high frequency market data from 2018. Your ultimate score will be determined once the submission deadline has passed using real-time cryptographic data gathered over the following three months. The manner that hundreds of traders work now guarantees that most signals will be transient, sustaining alpha will be very hard to spot, and overlap risk will be high. Additionally, since 2018, there has been an increase in interest in the cryptocurrency market, so our data's volatility and correlation structure are likely to be highly volatile. Competitors who are successful will pay close attention to these details and learn important knowledge about the art and science of financial forecasting in the process. Leading quantitative financial research firm in Europe is G-Research. We have looked into big data, machine learning, market forecasting, and some of the most cutting-edge technology available.

## III. Objective

The website is built using Python and Django, and utilizes various MachineLearning(ML) algorithms to make price predictions. The MachineLearning(ML) algorithms used are: Linear Regression, Random Forest Regression, and Gradient Boosting Regression. The website also utilizes the Cryptocompare API to get real-time price data for Cryptocurrencies. The objective of Crypto Prediction is to discover with what correctness the price of cryptocurrency be predicted using distinct MachineLearning and blockchain algorithm and compare their accuracy. Using the technical analysis like PCR ratio, 1\10--10 ratio, Moving Average Convergence/ Divergence(MACD), volume ratio etc. it will predict the trajectory of the market. Specially more useful for intraday traders, and option traders.

## IV. Scope

We comprehensively compare several prophecy models, characteristics, and timeframes to mark the previously mentioned research gap. As a result, we put data collection, pre-processing, and model construction into practise using Python programming and the libraries Tensor-Flow, Scikit Learn, and XG-Boost. The following steps are involved in price prediction:

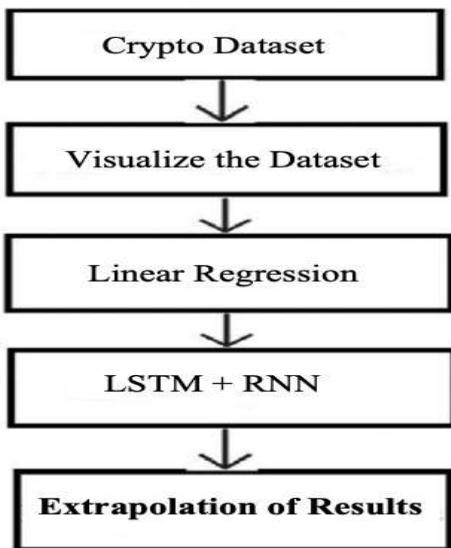
1. Obtaining current cryptocurrency data.
2. Create the training and test data.
3. Make cryptocurrency price predictions using a linear regression/LSTM neural network.
4. Display the outcomes of the prediction.

## V. Applications

These services are:

- This service uses machine learning to help predict cryptocurrency prices.
- It is dedicated to further valuing and predicting the Market value of bitcoin.
- The system uses the Long Term Memory (LSTM) model and Recurrent-Neural-Network(RNN) to generate predictions.
- This is a quick and easy process. The data used by covers the last eight years from 2015 to 2022.
- A method of using MachineLearning(ML) to predict the price of a cryptocurrency such as Bitcoin, Ethereum, Bitcoin(Cash), XRP and Litecoin, users can check their predictions.

## VI. System Design



**Crypto Dataset:-** Crypto datasets can be used for machine learning-based cryptocurrency price prognosis. We can handle that data to train models to forecast future prices and prepare informed investment decisions.

**Visualization of the Dataset:-** The information (in the form of previous prices of the cryptocurrency) collected from the dataset will be visualized by the algorithm used in this project.

**Linear Regression:-** The use of Linear Regression will help to analyse the relation between the price using technical indicators, and other variables, which enables the prediction to be made based on the previous data.

**LSTM:-** Long-short-term memory(LSTM) is used to utilize the past data to make future prediction using Machine-Learning(ML) algorithm.

**RNN:-** (RNN)Recurrent Neural Network is used to reduce the error rate of the price predicted by the Machine-Learning(ML) algorithm.

**Exploration of Result:-** It is very crucial for improving or maintaining the accuracy of the cryptocurrency price using ML because of its volatility. It helps to identify the strengths and weaknesses of the different models, fine-tune(FT) parameters, and select the best approach for future predictions of the Cryptocurrency price.

## VII. Features

### Features:

- Supports price prediction for five different currency.
- Allows users to select the date for which they want to predict the price.
- Provides a predicted price for the selected cryptocurrency on the selected date.
- Uses machine learning algorithms to make predictions.
- Supports multiple regression algorithms for making Predictions.
- Utilizes real-time price data from the Cryptocompare API.
- Provides suggestions for cryptocurrency symbols in the input field.
- Responsive design for mobile and desktop devices.

## VIII. Technology

### Technology Stack:

- Python: Programming language used to develop the website.
- Django: Python web framework used for building the website.
- HTML/CSS: Markup and styling languages used to create the user interface.
- JavaScript: Programming language used for client-side functionality.
- Autocomplete.js: JavaScript library used to provide suggestions for cryptocurrency symbols in the input field.
- Cryptocompare API: API used to get real-time price data for cryptocurrencies.

Figure 1 shows the distribution of the predicted variable for Bitcoin. Particularly, Figure 1 shows that the predicted variable's class 1 is slightly more bigger than 50% of the time, meaning there are more buy indicators than sell indicators. The predicted variable is relatively balanced. Figures 2, 3, and 4 show an evaluation of the proposed approach (which makes use of the RF classifier), starting by a simple backtesting strategy, then the calculation of the confusion matrix, and eventually the evaluation of the feature's importance. The proposed backtesting strategy consists of

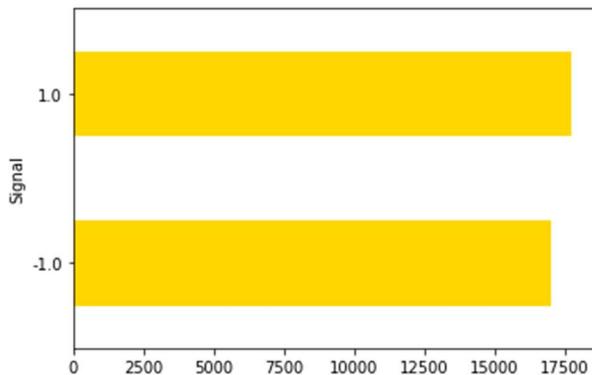


Fig. 1: The predicted variable of Bitcoin.



Fig. 2: Bitcoin backtesting

calculating the predicted returns (aka, strategy returns) and comparing it with the actual returns. Figure 2 shows that the predicted returns are very close to the actual returns. This means that the proposed approach performs well for predicting Bitcoin.

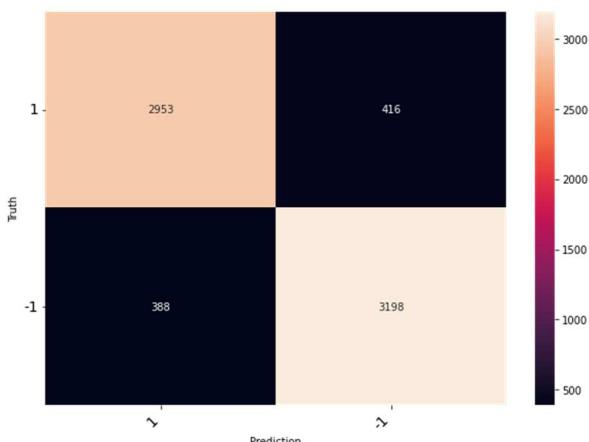


Fig. 3: Bitcoin confusion matrix.

The confusion matrices for Bitcoin are displayed in Figure 3. In instance, Figure 3 demonstrates that the model predicts

that we should carry out  $2953 + 388$  Buy operations (in the first column of the matrix). The reality is that we should only carry out 2953 Buy activities, with the remaining 388 being Sell operations. Additionally, the model suggests that we should carry out  $416+3198$  Sell operations in the second column of the matrix. The truth is that we should only carry out 3198 Sell activities, with the remaining (416) being Buy operations.

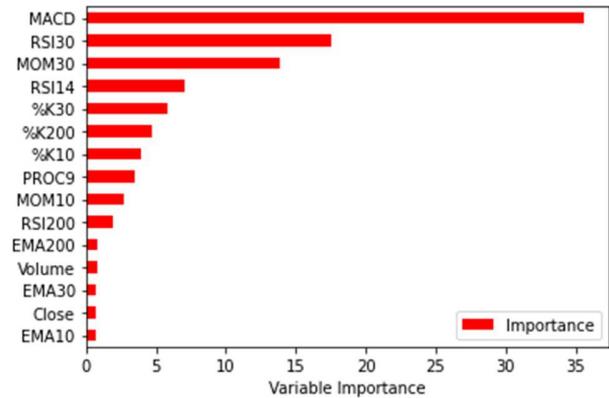


Fig. 4: Bitcoin feature importance.

Figure 4 demonstrates that the elements that significantly improve the productiveness of suggested strategy are the MACD, RSI30, and MOM30. The features that contribute least to enhancing the performance of our technique are Cp (Close price), EMA10, EMA30, EMA200, and the V (Volume). To sum up, we gather information on the cryptocurrency market and use the most important factors, such as volume and technical indicators, that affect price. In contrast to closing price and volume, technical indicator aspects seem to have the most bearing (Figure 4). Our method yields respectable accuracy, precision, and recall. To bring actual/real returns as near as feasible to the returns of our method/strategy, this technique still need development. It's very important to observe that, forecasting the prices of cryptocurrencies is quite difficult because unorthodox variables like social media and investor psychology has a notable effect on the market. Building on a forecasting method that includes additional parameters (such as cash flow, mining rate, and number of transactions), also using more machine learning models, might be the main emphasis of future research efforts.

## IX . CONCLUSION

By forecasting the price of various cryptocurrencies for a certain date, the website that provides cryptocurrency price predictions hopes to help out the every people who are interested in trading or investing in cryptocurrencies. The website has a user-friendly layout and makes accurate forecasts using cutting-edge machine learning algorithms and real-time

market information. The algorithms examine past price patterns, market sentiment, trading volumes, and other potential price-influencing elements before making forecasts about future pricing of cryptocurrencies.

The time for the desired price forecast may be entered by users after selecting a coin. A forecast is created by the website using the chosen coin and the supplied date. In conclusion, anyone looking to invest in or trade cryptocurrencies might find a valuable tool on the cryptocurrency price prediction website.

## REFERENCES

- [1] G. Hileman and M. Rauchs, "Global cryptocurrency benchmarking study," *Cambridge Centre for Alternative Finance*, vol. 33, no. 1, pp. 33–113, 2017.
- [2] P. Treleaven, R. G. Brown, and D. Yang, "Blockchain technology in finance," *Computer*, vol. 50, no. 9, pp. 14–17, 2017.
- [3] CoinGecko, "Cryptocurrency prices, charts, and crypto market cap," Available at <https://www.coingecko.com/>, Accessed: 02-Jul-2022.
- [4] M. Saad, J. Choi, D. Nyang, J. Kim, and A. Mohaisen, "Toward characterizing blockchain-based cryptocurrencies for highly accurate predictions," *IEEE Systems Journal*, vol. 14, no. 1, pp. 321–332, 2019.
- [5] Y. Shynkevich, T. M. McGinnity, S. A. Coleman, A. Belatreche, and Y. Li, "Forecasting price movements using technical indicators: Investigating the impact of varying input window length," *Neurocomputing*, vol. 264, pp. 71–88, 2017.
- [6] P. Oncharoen and P. Vateekul, "Deep learning for stock market prediction using event embedding and technical indicators," in *2018 5th international conference on advanced informatics: concept theory and applications (ICAICTA)*. IEEE, 2018, pp. 19–24.
- [7] S. McNally, J. Roche, and S. Caton, "Predicting the price of bitcoin using machine learning," in *2018 26th euromicro international conference on parallel, distributed and network-based processing (PDP)*. IEEE, 2018, pp. 339–343.
- [8] P. Jay, V. Kalariya, P. Parmar, S. Tanwar, N. Kumar, and M. Alazab, "Stochastic neural networks for cryptocurrency price prediction," *Ieee access*, vol. 8, pp. 82804–82818, 2020.
- [9] H. Singh and P. Agarwal, "Empirical analysis of bitcoin market volatility using supervised learning approach," in *2018 Eleventh International Conference on Contemporary Computing (IC3)*. IEEE, 2018, pp. 1–5. [10] S. B. Achelis, "Technical analysis from a to z," 2001.
- [11] J. M. Lucas and M. S. Saccucci, "Exponentially weighted moving average control schemes: properties and enhancements," *Technometrics*, vol. 32, no. 1, pp. 1–12, 1990.
- [12] G. Appel, *Technical analysis: power tools for active investors*. FT Press, 2005.
- [13] J. W. Wilder, *New concepts in technical trading systems*. Trend Research, 1978.
- [14] L. K. Chan, N. Jegadeesh, and J. Lakonishok, "Momentum strategies," *The Journal of Finance*, vol. 51, no. 5, pp. 1681–1713, 1996.
- [15] C. Cortes and V. Vapnik, "Support-vector networks," *Machine learning*, vol. 20, no. 3, pp. 273–297, 1995.
- [16] T. K. Ho, "Random decision forests," in *Proceedings of 3rd international conference on document analysis and recognition*, vol. 1. IEEE, 1995, pp. 278–282.
- [17] A. Geron, *'Hands-on machine learning with Scikit-Learn, Keras, and TensorFlow: Concepts, tools, and techniques to build intelligent systems.'* O'Reilly Media, Inc., 2019.
- [18] Binance, "Binance api," Available <https://www.binance.com/en/binance-api>, Accessed: 16-Jul-2022.
- [19] G. Biau and E. Scornet, "A random forest guided tour," *Test*, vol. 25, no. 2, pp. 197–227, 2016.
- [20] Fei Qian, Xianfu Chen. "Stock Prediction Based on LSTM under Different Stability", 2021 IEEE 4th International Conference on Cloud Computing and Big Data Analysis (ICCCBDA), 2021.
- [21] Jie Chen, Jie Shao, Fumin Shen, Chengkun He, Lianli Gao, Heng Tao Shen. "Movie Fill in the Blank with Adaptive Temporal Attention and Description Update" , Proceedings of the 2017 ACM on Conference on Information and Knowledge Management - CIKM '17, 2021.
- [22] Matthew Dixon, Diego Klabjan, Jin Hoon Bang. "Classification-based financial markets prediction using deep neural networks", *Algorithmic Finance*, 2022