

Short Term Crypto Currency Price Predictor using ML

A Project Work Synopsis

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Abstract

Cryptocurrency has grown significantly in recent years. Additional progress in the planetarium has recognized the importance of embracing quantitative benefits and rapid progress in this field. In today's financial markets, the decision to buy or sell cryptocurrency is an interesting challenge that traders face every day. During the year, it reached unprecedented highs, leading to the idea that explains the growth trend. The question of whether the movement of financial assets can be predicted has been of great interest to investors, economists and researchers in recent years. Therefore, the paper uses machine learning to build a model to predict the price of Stocks and Cryptocurrency using technical indicators, which is the most important to learn market trends. This study explores how to adapt Long Short Term Memory (LSTM) to build cryptocurrency price prediction models. The main factors used are the available price, closing price, high price, low price, volume and market capitalization among several cryptocurrencies, based on the size of important trading characteristics that affect the unpredictability of using the model to improve the efficiency of the process. However, the cryptocurrency market lacks a strong and unpredictable regulatory structure, making price prediction more difficult and complex. From the analysis, it was found that the machine learning model provides better performance in cryptocurrency price prediction

In this project, we use LSTM version of recurrent neural network, price for Bitcoin. To better understand the price impact and make an overview of this great invention, we first take a brief look at the Bitcoin economy. Next, we define a database that includes data from the market index, sentiment, blockchain, and Coinmarketcap. In this analysis, we show the use of LSTM structure and the aforementioned time. Finally, we pull the results of Bitcoin price prediction 30 and 60 days in advance

Keywords

Bitcoin, Crypto Currency, Machine Learning, Blockchain, Long Short-Term Memory (LSTM), Recurrent Neural Network (RNN), Prediction

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1. INTRODUCTION

Bitcoin is a decentralized digital currency that uses cryptography for security and is not controlled by governments or financial institutions. It was created in 2008 with a paper entitled "Bitcoin: A Peer-to-Peer (P2P) Electronic Cash System" by an individual or a group of individuals using the pseudonym Satoshi Nakamoto (2008). Bitcoin transactions are recorded on the public blockchain, which allows anyone to see the history of a particular Bitcoin. The decentralized nature of Bitcoin allows it to be used independently of central banks and can be instantly transferred worldwide. It became popular as a medium of exchange and store of value. In the last 10 years, in November 2021, one coin has exceeded USD 68,000, and the total value once exceeded USD 1.2 trillion.

However, Bitcoin as a commodity has high volatility. During the seven-year period from April 2015 to April 2023, Bitcoin's average daily return was 3.85%, which is 2.68 times the return rate of gold in the same period, 3 times the S & P500. This is 36 times higher. Bitcoin's functionality as a commodity, as a store, and as a currency has been called into question due to its large price swings.

Taking advantage of Bitcoin's security and decentralization, it has become a challenge how to understand the trend of Bitcoin in order to reduce the risk of Bitcoin floating. Many researchers try to understand the trend of Bitcoin through the correlation between the price of Bitcoin and the price of other commodities.

In past studies, another form of research to understand the Bitcoin price trend is to predict the price of Bitcoin in the future using AI algorithms and powerful computing power of computers. Machine learning technology has become a hot research area in the 21st century with improvements in hardware performance. Initially, machine learning was used in various fields such as stocks, crude oil market, gold market and futures market.

Predicting AI by Bitcoin mainly falls into two categories. The first category is classification research to predict whether Bitcoin will rise or fall in the future. Standard errors of DA and F1. Another category is the regression test on Bitcoin price prediction, with relative error RMSE and MAPE. Because the price of Bitcoin fluctuates so much, just knowing whether the price of Bitcoin will rise or fall in the future will not allow investors to avoid risk. Instead, it is more useful to take the price of bitcoin as a reference value.

1.1 Problem Definition

Cryptocurrency is a type of digital currency similar to the dollar, euro and yen. The difference is that instead of being backed by a nation or federal bank, it uses an online ledger with strong cryptography to secure online transactions.

Through cryptocurrency exchanges, one can buy and sell cryptocurrency. It can also be "mining". The popularity of cryptocurrencies skyrocketed in 2017 as a result of several months of exponential growth in their market capitalization.

As geopolitical and economic issues have escalated over the past two years, global currency values have plummeted, stock markets have seen a poor run and investors have lost wealth. This has rekindled interest in digital currencies.

Our system helps predict the price of cryptocurrencies using machine learning.

1.2 Problem Overview

Buying and selling cryptocurrencies like Bitcoin can yield tremendous gains if done correctly. It has proved lucky for many people in the past and is still earning them a lot of money today. But this does not come without its downsides. If not thought and calculated properly, one can lose all your money. There should be an incredible understanding of how and precisely crypto costs change (according to market news, various crypto events, technical analysis and so on), which suggests that realizing how individuals make their crypto predictions is very important. Considering these things (supply and demand, regulations, news, etc.), the prices of various crypto currencies are finally predicted.

Short term crypto currency price predictor using ML is a very useful project. Crypto currency market is growing like a boom day by day.

This project will help you predict the future price of various crypto currencies based on the historical data of that particular currency, so that it becomes easier and more efficient for a crypto trader to forecast the market and earn money by trading in various. Crypto currency.

1.3 Hardware Specification

1. RAM: 6GB or more
2. PROCESSOR: 64bit
3. Laptop with GPU with more than or equal to 4cores.

1.4 Software Specification

1. Python
2. Anaconda software
3. Jupyter Notebook

Tools Required:

1. NumPy
2. Pandas
3. Matplotlib
4. Scikit learn
5. Tensorflow

2. LITERATURE SURVEY

We're all predicting where bitcoin spending will be in one year, two years, five years, or 10 years. Waiting is hard, but we all love to do it. Buying and selling bitcoins can be done accurately every time. It has proven to be an asset for many people in the past and is still earning a lot of money. But it won't hurt either. If it is not properly thought and considered correctly, you can lose a lot of money. You must have a great understanding of how and exactly the price of bitcoin changes (organic market, trends, news, etc.), which means you must understand how we make bitcoin predictions. With this in mind (supply and demand, regulations, news, etc.), bitcoin technology and its development should be considered. In addition to this, we have to deal with the technical aspects of using various algorithms and technologies that can accurately predict the price of bitcoin. We have found some models that exist today, such as the biological nervous system. (BNN), Recurrent Neural Network (RNN), Long Short Term Memory (LSTM), Automatic Regressive Integral Moving Average (ARIMA) etc. Time series is usually a series of numbers over time. This is because, as a time series data set, the total data set must be divided into two parts: input and output. In addition, LSTM is excellent compared to classical statistical linear models because it can easily solve multi-input prediction problems.

2.1 EXISTING SYSTEM

Initial research on Bitcoin disputes whether it is actually another form of currency or a purely speculative asset, with most authors favoring the latter view due to its high volatility, very short-term returns, and bubble-like behavior. (For example Yermack 2015; Dwyer 2015; Cheung et al. 2015; Cheah and Fry 2015). This claim has been carried over to other well-executed cryptocurrencies such as Ethereum, Litecoin, and Bitcoin (eg Gkillas and Katsiampa 2018; Catania et al. 2018; Corbet et al. 2018 Charfeddine and Mauchi 2019). The idea that cryptocurrencies are purely speculative assets with no intrinsic value

investigated the possible relationship between macroeconomic and financial variables and price determinants in investor behavior. These factors also proved to be very important for traditional markets. For example, Wen et al. (2019) show that

Chinese firms with greater exposure to retail investors have a lower risk of stock price collapse.

Christoufek (2013) showed that there is a high correlation between Google Trends and search queries on Wikipedia and the price of bitcoin. Kristoufek (2015) reinforced the previous results and found no significant correlation with basic variables such as the Financial Stress Index and the gold price of the Swiss Franc. Bouoiyour and Selmi (2015) investigated the relationship between the price of bitcoin and several variables such as the gold market price, Google search, and bitcoin rate, and found that only Google search has a significant effect at the 1% level. Polasik et al. (2015) showed that bitcoin price formation is mainly related to the volume of news, news sentiment, and the number of traded bitcoins.

2.2 PROPOSED SYSTEM

In our approach, LSTM will use historical data to predict the closing price of bitcoin 30 days in advance. In the approach we use, we apply a Bayesian optimized recurrent neural network (RNN) and a long-term memory network (LSTM). The highest classification accuracy was achieved by LSTM with an accuracy of 52% and an RMSE of 8%. We now apply the popular Auto Backward Revolving Average (ARIMA) model for timing as a correlation and deep learning model. ARIMA forecasting is performed better by nonlinear deep learning methods. Finally, both deep learning models are defined on GPU and CPU. Training time on CPU is 67.7% higher than GPU performance. Among the key papers we selected, the authors collected more than 25 years of feature sets related to bitcoin prices and payment systems, recorded daily, and were able to predict the sign of daily bitcoin price changes. with an excellent accuracy of 98.7%.

In the second phase of our experiment, we focus only on bitcoin price data and use data for 10 minutes and 10 seconds.

This is because we see a great opportunity to accurately evaluate price forecasts at different levels of granularity and granularity. This results in excellent results with 50-55% accuracy in predicting future bitcoin price changes in 10 minute time intervals.

2.3 LITERATURE REVIEW SUMMARY

Article	Dependent variable	Sample Period	Model	Input Set	Main Findings
Madan et al. (2015)	Bitcoin prices in USD from Coinbase	5 years since the inception of Bitcoin	Binomial logistic regressions (BLR) and random forest (RF)	Prices and 16 blockchain features	10-min data give a better sensitivity and specificity ratio than the 10-s data
Żbikowski (2016)	Bitcoin prices in USD from Bitstamp	Jan-2015 to Feb-2015	Box support vector machine (SVM) and volume weighted SVM (VW-SVM)	10 technical analysis indicators	VW-SVM is the best model in terms of average return and maximum drawdown
Jang and Lee (2018)	Bitcoin price index in USD	Sep-2011 to Aug-2017	Bayesian networks (BNN), linear regression and support vector regressions (SVM)	Trading information, exchange rates and macroeconomic variables	The BNN is the best prediction model
McNally et al. (2018)	Bitcoin prices in USD from CoinDesk	Aug-2013 to July-2016	Bayesian neural (RNN) and long short term memory (LSTM)	OHLC prices, difficulty, and hash rate of blockchain	The best time lengths are 100 days for the LSTM and 20 days for the RNN
Shintate and Pichl (2019)	Bitcoin returns in CNY and USD from OkCoin	Jun-2013 to Mar-2017	Random sampling method (RSM)	OHLC prices	The proposed RSM outperforms several alternatives.
Sun et al. (2020)	42 crypto currencies	Jan-2018 to Jun-2018	LightGBM, SVM support vectors (SVM) and RF	Trading data and macroeconomic variables	LightGBM outperforms SVM and RF

3. PROBLEM FORMULATION

In fact, huge profits can be made by buying and selling cryptocurrencies like bitcoin. It has proven to be an asset for many people in the past and is still earning a lot of money. But it won't hurt either. If not properly thought out and considered correct, you can lose all your money. You need to have a good understanding of how and exactly crypto prices change (market news, crypto events, technical analysis, etc.), which means it's important to understand how people make crypto predictions. Taking these factors (supply and demand, regulations, news, etc.) into consideration, the latest price predictions of various cryptocurrencies are made.

A short-term cryptocurrency price forecast using ML is a very useful project. The cryptocurrency market is growing every day.

This project will help predict the future price of various cryptocurrencies with the accuracy of the historical data base of a certain currency, so it will be easier and more efficient for crypto traders to predict the market and make money by trading various. crypto currency.

Bitcoin was initially successful as a peer-to-peer (P2P) virtual currency because it solved the two-cost problem with a cryptographic-based technology that eliminated the need for a trusted third party. Blockchain is the technology behind bitcoin, which acts as a public (permissionless) digital record of transactions between users. Since there is no central authority, this record can be used among network participants (points), which are supported together using special software (Yaga et al. 2019). The Bitcoin ecosystem has several characteristics: decentralized (being an electronic system based on cryptographic entities with no physical representation or intrinsic value), decentralized (no need for trusted third-party intermediaries), accessible and compliant (open source, which manages the balance and transactions). of bitcoins with the system), integrated (solving the two-cost problem), transparent (information about the entire process publicly available), global (no geographic or economic barriers to its use), fast.), divisible (the smallest unit of bitcoin is called a satoshi, i.e. bitcoin is called 10^{-8}), resilient (proven safe from cyber-attacks), anonymous (the system does not reveal the user's identity, but their wallet. address), and the supply of bitcoin is 21 million units.

4. OBJECTIVES

The goals of the short-term crypto price predictor can vary depending on the use case and target audience.

Short Term Crypto currency Price Predictor using ML is a very useful project. As the market of crypto currency is increasing like a boom day by day.

This project will help you predict the future price of various crypto currencies on the bases of historical data of that particular currency with high accuracy, so that for a crypto trader it becomes easy and much efficient to predict the market and earn money by trading in various crypto currencies.

The main part is that this project will provide future prizes of various cryptocurrencies available in the market so that the user can trade the crypto currency in a big picture view, which decreases the chances of the loss and increases the profit ratio.

5. METHODOLOGY

Machine learning is an important branch of artificial intelligence (AI). Depending on whether or not there is a target variable, it can be classified into supervised training, unsupervised training, and strengthening training. The purpose of this study is to predict the future price of Bitcoin, so the regression function and supervised learning are used. The logic of the integration of machine learning is that after the algorithm has been determined, a learner is generated and the learner-high accuracy is obtained by repeatedly training the learner through the training data and validation process. Finally, tests replace students who are trained to evaluate and use data.

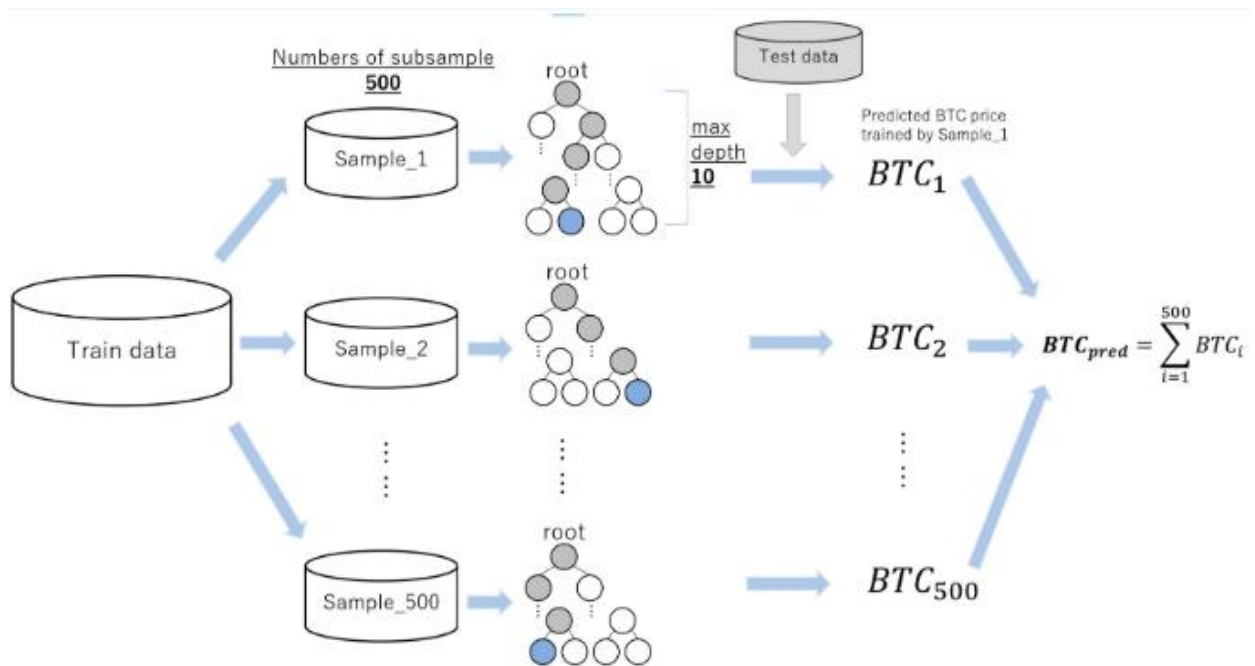
The random forest regression and LSTM model training in this paper were performed using the Python open-source machine learning library. sklearn, the library used by Random Forest Regression, uses Keras for LSTM search. Pre-processing and data collection is done by panda.

Random forest is a type of ensemble of multiple regression trees. The advantages are clear, but the predicted results are limited to study samples. The principle of the regression tree is to divide the main group into subgroups using a certain \

\variable index, and the classification is based on minimizing the average squared residuals of each group shown in the equation below.

$$\frac{1}{n_1} \sum_{i=1}^{n_1} (y_i - \overline{y_{(1:n_1)}}) + \frac{1}{n_2 - n_1} \sum_{j=n_1+1}^{n_2} (y_j - \overline{y_{(n_1+1:n_2)}}) \rightarrow \min$$

Regarding parameter settings, the maximum depth of a sub-regression tree is 10, and the number of sub-regression trees in the random forest is 500. I tried the maximum depth of the interval [min = 3, max = 20] and the number of sub-regression trees in the interval [min = 200, max = 1000] respectively. My future tests show that when the maximum depth is greater than 10 or the number of sub-regression trees is greater than 500, the training data and prediction errors do not change.



6. EXPERIMENTAL SETUP

An experimental setup to evaluate short-term crypto price predictor includes the following components:

DATA GATHERING

Daily data for all four channels has been monitored since 2013. First of all, the history of Bitcoin price release, the coin market is the market leader with an open API. Second, we prefer data from Blockchain, especially the standard block size, number of user addresses, production volume, and number of miners.

DATA CLEANSING

From exchange data, we look only at the related Volume, Close, Unlock, higher prices, and market capitalization. In all data sets, if the NaN values are found to be correct there, it is replaced by a description of the appropriate attribute. After this, all data sets are merged into one, according to the magnitude of the time

DATA NORMALIZATION

Deciding how to get used to the timeline, especially finance is by no means easy. What else, as a sixth rule, the neural network must load data taking large amounts of different. Doing so can create major gradient updates that will prevent the network from changing. Doing reading easy on the network, data should have the following features:

- Take small values- Typically most values should be in range 0-1.
- Be homogeneous- That is, all features should take values at roughly the same range.

DATA TRAINING AND SPLITTING

We first wanted to predict next year, but this may mean, that data from 1 Jan 2018 until September 2018 will be used for testing, the downside of this, is actually a major slope in 2017, which could make the neural network learn this pattern as the final input, and the prediction of the year 2018 would not have been so sensible.

LSTM IMPLEMENTATION

A key feature of food webs is that they are memory inefficient. Therefore, each entry is processed independently, without any pending state in the middle of the entry. Given that we are dealing with several periods that require information from the previous price of Bitcoin, we need to track future events. The building block that provides this is an output-coupled recurrent neural network (RNN) automatic loop. Therefore, the window that we present as input is processed sequentially instead of in one step.

7. CONCLUSION

In general, price-related variables are difficult to predict because of the many forces affecting the market. Furthermore, prices are largely based on the future rather than historical data. However, using deep neural networks has given us a better understanding of Bitcoin and LSTM architecture. Ongoing work includes performing hyperparameter tuning to obtain a more accurate network architecture. Also, other features can be considered (more features do not always lead to good results from our tests with Bitcoin). Microeconomic factors can be incorporated into the model for better forecasting results. However, maybe 6 Conclusion In general, given the large number of forces affecting the market, it is difficult to predict the variables related to the price. Furthermore, prices are largely based on the future rather than historical data. However, using deep neural networks has given us a better understanding of Bitcoin and LSTM architecture. Ongoing work includes performing hyperparameter tuning to obtain a more accurate network architecture. Also, other features can be considered (more features do not always lead to good results from our tests with Bitcoin). Microeconomic factors can be incorporated into the model for better forecasting results. However, perhaps the data we have collected for Bitcoin, although collected over the years, can be interesting, making historical interpretations over the past few years. In addition, the successful evolution of peer-to-peer transactions continues and changes the face of payment services. Apparently, with all doubts resolved, the time to act may be perfect. We think it's hard to think Bitcoin is perfect for the future.

8. TENTATIVE CHAPTER PLAN FOR THE PROPOSED WORK

CHAPTER 1: INTRODUCTION

This chapter covers the basic overview of project “Short Term Crypto Currency Price Predictor using ML”, basic idea of how it works and use case, future scope.

CHAPTER 2: LITERATURE REVIEW

This chapter includes the literature available for the project work. The findings of the researchers are highlighted which is the basis of the current implementation.

CHAPTER 3: OBJECTIVE

This chapter provides introduction to the concepts which are necessary to understand the proposed system.

CHAPTER 4: METHODOLOGIES

This chapter covers the technical details of the proposed approach with various mathematical equations used in the project and some figures for the idea of how the code is working.

CHAPTER 5: EXPERIMENTAL SETUP

This chapter provides information about the subject system and tools used for evaluation of proposed methods.

CHAPTER 6: CONCLUSION AND FUTURE SCOPE

The major finding of the work is presented in this chapter. Also, directions for extending the current study are discussed.

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