

## **BITCOIN PRICE PREDICTION USING MACHINE LEARNING IN PYTHON**

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### **ABSTRACT**

Bitcoin is a type of Internet currency that is both a digital asset and a payment method. It enables anonymous payment from one person to another, making it a popular payment mechanism for online illegal activity. Due to its recent price increase, Bitcoin has attracted a lot of attention from the media and the public. The purpose of this study is to discover the Bitcoin price's predictable price direction. Machine learning models are likely to provide us with the information we require to Understand the future of cryptocurrency. It won't tell us what will happen in the future, but it might show us the overall trend and direction in which prices are likely to move. The proposed Methodology aims to create a machine learning model that uses data to learn about the patterns in the dataset and then uses a machine-learning algorithm to forecast the bitcoin price.

### **I INTRODUCTION**

Bitcoin is digital money that may be used for both payment and investment. Bitcoin is decentralized, which means that no single person or entity owns it. Because Bitcoin transactions aren't governed by any authority, they're straight forward. Investing can be done on several "bitcoin exchanges," which are essentially online marketplaces. Users can sell and buy Bitcoins in several different currencies using these services. The most popular Bitcoin exchange is Mt Gox. Bitcoins are stored in a digital wallet, which works like a virtual bank account. The record of all transactions, as well as the time stamp data, is stored on a website known as Blockchain. Each record on a blockchain is given the term "block." Bitcoin's value changes in a similar manner to that of ia stock, but in a different one. Stock market data is subjected to several algorithms for price prediction. On the other hand, the factors that influence Bitcoin are distinct. As a result, forecasting Bitcoin's value is essential for making informed investment decisions.

## II LITERATURE SURVAY

We have all considered where bitcoin costs will be one year, two years, five years or even 10 years from now. It's really difficult to anticipate however each and everyone of us loves to do it. Tremendous measures of benefits can be made by purchasing and selling bitcoins, whenever done accurately.. It has been proven to be a fortune for many people in the past and is still making them a lot of money today. But this doesn't come without its downside too. If not thought of and calculated properly, you can lose a lot of money too. You should have an incredible comprehension of how and precisely why bitcoin costs change (organic market, guidelines, news, and so forth), which implies you should realize how individuals make their bitcoin predictions. Considering these things (supply and demand, regulations, news, etc.), one must also think about the technology of bitcoin and its progress. This aside, we now have to deal with the technical parts using various algorithms and technologies which can predict precise bitcoin prices. Although we came across various models which are currently present like Biological neural networks. (BNN), Recurrent neural network (RNN), Long short-term memory (LSTM), Auto regressive integrated moving average (ARIMA), etc. with machine learning and deep neural network concepts. Normally a time series is a sequence of numbers along time. This is due to the fact that this being a time series data set, the overall data sets should be split into two parts: inputs and outputs. Moreover, LSTM is great in comparison with the classic statistics linear models, since it can very easily handle multiple input forecasting problems.

In the approach which we are following, the LSTM will use the previous data to predict bitcoin prices 30 days ahead of its closing price. In the approach used by us, we implement Bayesian optimized Recurrent Neural Network (RNN) and a Long Short Term Memory (LSTM) network. The highest classification accuracy is achieved by LSTM with the accuracy of 52% and a RMSE of 8%. Presently we execute the famous Auto backward incorporated moving normal (ARIMA) model for time arrangement gauging as a correlation with the profound learning models. The ARIMA forecast is outperformed by the nonlinear deep learning methods which performed much better. Finally both the profound learning models are benchmarked on both a GPU and CPU. The training time on the CPU is outperformed by the GPU execution by 67.7%. In the base papers selected by us, the author collected a data set of over 25 features relating to the bitcoin price and

payment network over a period of five years, recorded on a daily basis were able to predict the sign of the daily bitcoin price change with an incredible accuracy of 98.7%.

In the second period of our examination we are just focusing in on the bitcoin price information alone and utilized information at 10 minutes and 10 seconds time frame. This is due to the fact that we saw an incredible opportunity to precisely evaluate price predictions at various levels of granularity and noisiness are modelling. This resulted in incredible results which had 50 to 55% accuracy in precisely predicting the future bitcoin price changes using 10 minute time intervals.

Bitcoin is currently a new technology and the world most expensive cryptocurrency thus there are some price prediction models available. Amjad et al. utilized the historical time series price data for price forecast and exchanging methodology [3] and Garcia et al. also appeared that the increments in opinion polarization and trade volume precede rising of Bitcoin prices [4]. Chen and Lazer [5] determined investment methodologies by observing and classifying the twitter feeds. Go et al. train the classifiers utilizing the dataset clarified by distant supervision and approve the classification performance [6]. Go et al. refer to the powerful paper by Pang et al. [7] where those analysts have set a standard for machine-learning based opinion analysis. Their approach is credited as one of the primary attempts at applying machine learning strategies to the issue of opinion analysis [7].

Some recent works focused on high-frequency trading and applying deep-learning techniques such as RNN for the prediction on time series data that have been tested dense, feed-forward networks as function model [8]. McNally [9] predicts the Bitcoin pricing process using machine learning techniques, such as recurrent neural networks (RNNs) and long short-term memory (LSTM) and compare results with those obtained using autoregressive integrated moving average (ARIMA) models. From [10] a comparison between multi-layer perceptron MLP and non-linear autoregressive exogenous (NARX) model is made. They conclude that MLP can also be used for stock market prediction even though it does not outperform the NARX model in price prediction. The authors made use of MATLAB's neural network toolbox to build and evaluate the performance of the network.

Another paper [11] deals with daily time series data 10-minute and 10-second time-interval data. They have created three time-series data sets for 30 60 and 120 minutes followed by performing

GLM/random forest on the datasets which produce three linear models. These three models are linearly combined to predict the price of bitcoin. According to [12] the author is analyzing what has been done to predict the U.S. stock market. the conclusion of his work is the mean square error of the prediction network was as large as the standard deviation of the excess return. However, the author is providing evidence that several basic financial and economic factors have predictive power for the market excess return. In [13] instead of directly forecasting the future price of the stock the authors predict the trend of the stock. The trend can be considered as a pattern. They perform both short-term predictions day or week predictions and also long-term predictions months they found that the latter produced better results with 79% accuracy. Another interesting approach the paper reflects is the performance evaluation criteria of the network. Based on the predicted output the performance evaluation algorithm decides to either buy and sell or hold the stock. In this paper, we explored some of the relevant methods of bitcoin sentiment prediction using tweets and Reddit posts and our approach is parametric and stems from a hypothetical modeling system based on stationarity and mixing.

### **III THEORETICAL BACKGROUND**

#### **3.1 PROBLEM IDENTIFICATION**

- A bitcoin specific issue is the loss or theft of ia wallet. The majority of people keep their wallets on their PCs. As a result, they can be stolen or lost if the hard drive dies. Bitcoin has a limited quantity, and its growth pace is unpredictable and uncontrollable. Bitcoin is not suitable for use as legal tender because the fixed money supply would prevent central banks from implementing counter cyclical policy. Using Attentive LSTMi with Embedding Network to Improve Bitcoin Price Fluctuation Prediction Bitcoin's price varies substantially, which is a well-known and peculiar attribute that has garnered less attention. In this work, I look at the Bitcoin price fluctuation prediction problem, which is defined as determining whether the Bitcoin price stays the same or reverts after a huge fluctuation.

### 3.2 PROBLEM SOLVING

- The objective is to generate a machine learning model for bitcoin price prediction that can potentially replace updatable supervised machine learning regression models by predicting the outcome with highest accuracy by comparing supervised algorithms.

Exploration data analysis of variable identification

- Loading the specified dataset
- Import the necessary library packages
- Analyze the general properties
- Find values that are duplicated or missing
- Counting and checking unique values

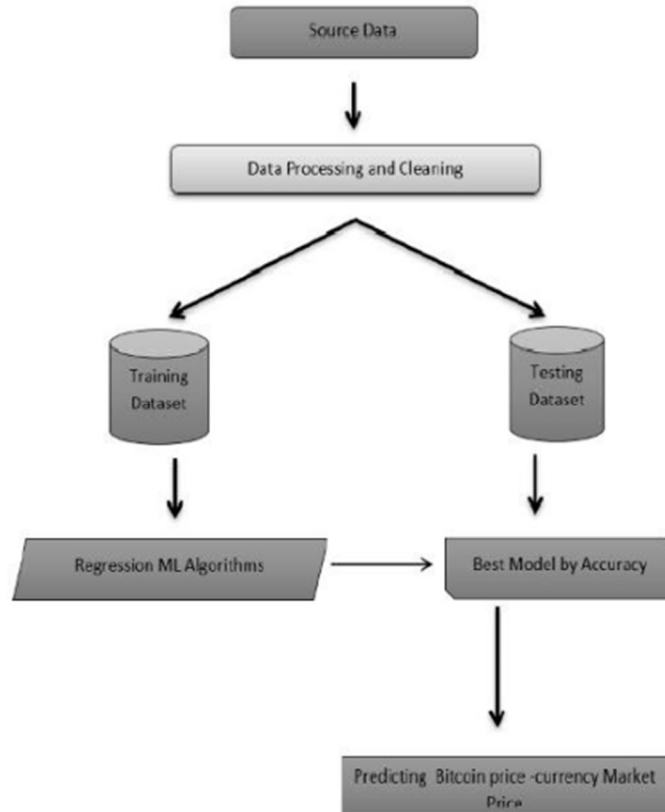
Uni-variate data analysis

- Rename, add and remove data.
- To specify the data type

Exploration data analysis of bivariate and multivariate

- Plot diagram of pair plot, heatmap, bar chart, and Histogram. Method of outlier detection with feature engineering.
- Pre-processing the given dataset
- Splitting the test and training dataset
- Comparing the Decision tree and Gradient Boosting regression model and random forest etc. Comparing algorithms to predict the result
- Based on the best accuracy.

### 3.3 SYSTEM ARCHITECTURE



## IV SYSTEM IMPLEMENTATION

### 4.1. MODULE

- Data Pre-processing
- Data Analysis of Visualization
- Machine Learning Algorithm
- Gradient Boosting Regression

### 4.2 MODULE DESCRIPTION

- **Data Pre-processing:**  
Understanding your dataset and its characteristics will aid you in deciding the method to deploy to construct your model. Several various data cleaning jobs were performed using Python's Pandas module; it focuses on the most important data screening task, missing values, as well as cleaning data fast.
- **Data Analysis of Visualization :**

It offers a useful set of tools for acquiring a qualitative perspective. This might be useful for spotting patterns, faulty data, outliers, and other things when examining and trying to get to know a dataset. It will show you how to use the various plot types available in Python when visualizing data to better understand your data. How to use line plots to visualize time series data and bar charts to visualize categorical values, and how to use histograms and box plots to summarize data distributions.

- **Machine Learning Algorithm:**

Datasets on bitcoin price from various sources would be pooled to make a generalized dataset, and then various machine learning techniques would be used to identify trend and generate the most accurate findings.

- **Gradient Boosting Regression:**

Gradient boosting is a machine learning technique used in regression and classification tasks, among others. It gives a prediction model in the form of an ensemble of weak prediction models, which are typically decision trees. When a decision tree is a weak learner, the resulting algorithm is called gradient boosted trees; it usually outperforms random forest.

## V CONCLUSION & FUTURE WORK

### 5.1 CONCLUSION

The analytical process started with data cleaning and processing, missing value, exploratory analysis, and finally model building and evaluation. The best accuracy on the public test set is a higher accuracy score is will be found out. This application can help to find the BITCOIN Market Price.

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