

## An Approach to Predict the Price of Bitcoin using LSTM

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**Abstract:** In this research, we endeavour to precisely measure the Bitcoin value, keeping in mind based on factors that impacts bitcoins worth. During the initial stages at our inquiry, we want to be able to realize and comprehend everyday Bitcoin while learning about the best characteristics in the area and the cost of bitcoin. Our set includes a variety of characteristics related over the period of ten years. The prices have changed dramatically over the decades, with daily entries. In the we'll predict the price of the bitcoin variation with the greatest degree of precision feasible.

### 1. INTRODUCTION

Bitcoin is a type of digital asset that is commonly used for both transactions and investments. Bitcoin is decentralized money, which means that no single person or group owns it. Bitcoins are easy to use because they are not tied to any particular jurisdiction. The best approach to invest in bitcoins is to use a bitcoin exchange. Individuals can buy and sell bitcoins with a number of different currencies. Bitcoins are stored in blocks of block chain and has a very high security that no one can break the block. Block chain stores the chronological data and log of a large number of Digital Currency Exchanges [1].

Each block chain referred as a square. Each block offers a link to previous block. The information in the block chain has jumbled. During transactions the details of individual user is kept anonymous. Bitcoin's value fluctuates in the same manner as stocks do, but it happens in a way that no one predicts. In order to find the values, various calculations are performed to financial collected data. The variables which impact are Bitcoin values are remarkable. In such a way, it's critical to forecast Bitcoin's value so that the best business decisions may be made. Unlike securities exchanges, the Bitcoin price is not decided by business or parties of government mediation. Resulting it as, critical to employ an estimation of bitcoin.

### 2. LITERATURE SURVEY

The main aim of this work is to demonstrate how a model can predicts the cost of a cryptographic currency if we provide the right amount of information and computer resources [2]. It exhibit plots with the expected qualities. With huge amount of data being produced and captured on a daily basis. Over time, Bitcoin grew increasingly computerized. This provides us to develop a model, forecasting digital currencies [3] which can be achieved using ML. The basic idea is to figure out the present Bitcoin value. The dataset containing the Bitcoin value is available [1].

The challenges are handled by reaching a great achievement through Bayesian regression execution. To optimize RNN & LSTM, The Long Short Term Memory has the greatest classification accuracy of 52% and the lowest Root mean squared error of 8% [4].

In [5], Rather than immediately projecting the future share worth, the researchers in [6] estimate the market's pattern. A structure can be drawn from the pattern. They are capable of both temporary and lengthy performance. Estimates (day-by-day or week-by-week forecasts) as well as protracted forecasts (months). They discovered that the latter resulted in With 79 percent accuracy rate, you'll get better results. The performance evaluation approach is reflected in the study. The network's criteria output is predicted based on value obtained by predicted model. Performance review chooses whether to procure, get rid off, or hold or Keep the merchandise on the shelf.

Due to their capacity to execute complicated tasks, like categorization, pattern recognition, and forecasts, with high accuracy, ANN models are one of the most extensively used forecasting techniques in a variety of industries [9][10].

[11] conducted a study of various regression method for estimating the price of bitcoin. Based on historical data, upcoming Bitcoin values were predicted using linear, SVM, and regression models. The outcomes suggested that the linear regression approach was the best one for making predictions. According to the experts, it is possible to forecast the categorisation of the stock price of Cryptocurrency with an accuracy of about 55%.

[12] The earlier marketing method outperformed the "prior day technical analysis" trading style, which created returns of around 38 percent, and a system of ideas that uses the strongest MLP (Multilayer Perceptron) model in the group, which yielded gains of about 53 percent.

### 3. METHODOLOGY

#### **Data Pre-Processing**

The history of the Bitcoin money is different from the value of the coin market, to start. In addition, the blockchain's data is included into the database. Figure 3 displays the general plan put forward. Experts believe there is no solution in sight for blockchain scalability. This indicates that the information shouldn't be used. On the other hand, a bigger quantity of records frequently indicates either increased exchange activity or increased customer influx [4]. Additionally, the PyTrends module can be used to acquire the phrase "Bitcoin" for the information in the conclusion.

#### **Obtaining and cleansing data**

It contains pertinent columns like volume, closure, open, high costs, low, and market capitalization based on the data gathered. Values having the meaning of a particular attribute are used in place of "NaN" values. After then, each dataset is combined to create a single, comprehensive dataset. The box receives data up to the present day from 2014.

### Normalization of data

It is not easy to choose a time series normalisation technique. A sizable volume of heterogeneous data needs to be examined. As an outcome, by restricting the network convergence, significant gradient modifications will take place throughout this phase. By changing raw data into the format of a data without changing the original distribution ratio of the data in between 0 and 1. By normalising the data ,learning becomes considerably simpler for the ML model.

### Time Series

It is a series of data observations that a system gathers over a given amount of time. The sequence of time data for this model is divided into two distinct timed data portions. A large portion of the data is utilized in order to train the ML model. The model is tested using the remaining time series data.

### Implementation of LSTM

The time series model namely LSTM has a lot of power. They are capable of making predictions for any number of steps in the future.

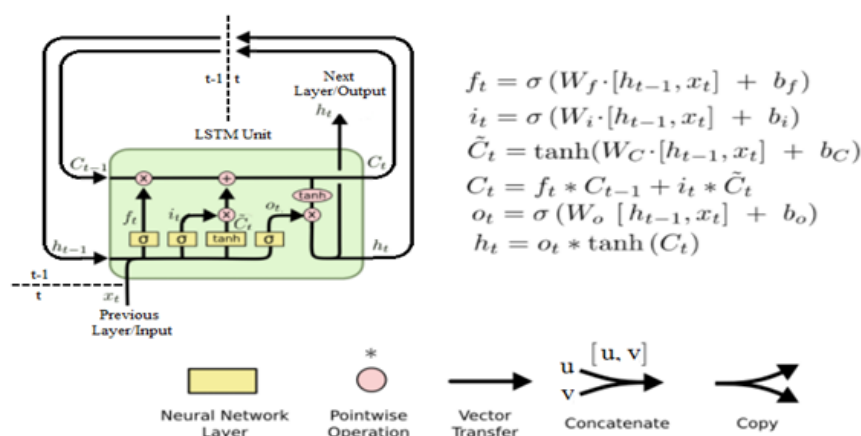


Figure 1. Working of LSTM

We should keep part of the historical Bitcoin transaction data since we have a time series and need it to make accurate predictions about the future. Through gates that open and close, the cell determines which data to be stored and which data to be read, and what to modify. The series is transformed into supervised data using the function below. In Keras, there are two models accessible. The first is a sequential model that works with a functional API and can forecast time series. The dense layer is utilized as the external layer for input forms. The optimized function that is utilized is known as "adam," and it uses the MAE as the function for loss with a learning ratio of 0.01. Absolute error is the result of the loss technique.

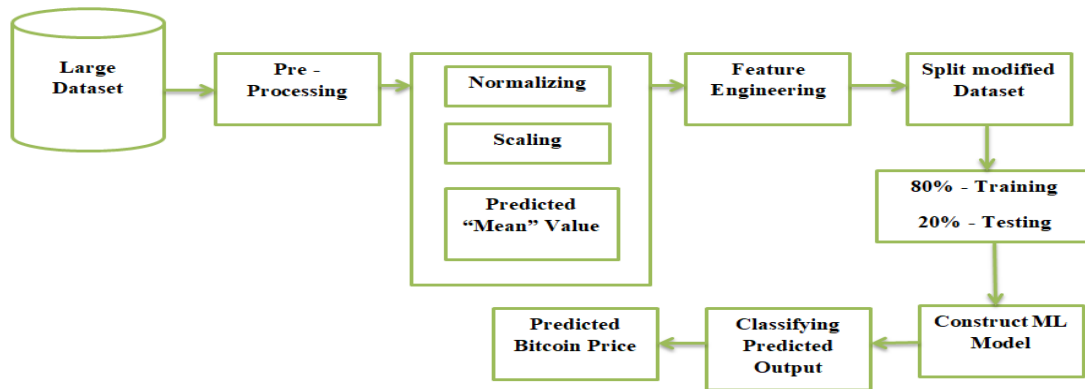


Figure 2. Proposed Model

### 4. RESULTS

The proposed LSTM model for predicting the price of bitcoin was trained, and forecasts for well-known cryptocurrencies were made.

Date	Close	predicted
2010-07-21	0.1	-870.373352
2010-07-22	0.1	-870.373352
2010-07-23	0.1	-870.373352
2010-07-24	0.1	-870.373352
2010-07-25	0.1	-870.373352
...	...	...
2022-01-26	36800.4	37890.933594
2022-01-27	37164.3	38052.089844
2022-01-28	37745.1	38209.082031
2022-01-29	38170.8	38487.093750
2022-01-30	37917.7	38936.500000

[4208 rows x 2 columns] [3, 854.5085074945367, 1342.311879655137]

Figure 3. Predicted Output

The LSTM works swiftly and efficiently to deliver the most accurate results possible. The performance measure graph from an analysis of several algorithms is shown in Figure 4. It demonstrates that the suggested technique performs better than other conventional algorithms while normalizing huge datasets.

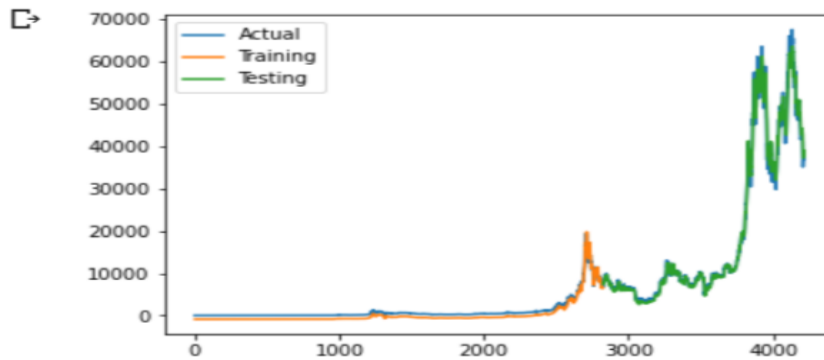


Figure 4. Plotting predicted values

## 5. CONCLUSION

The most widely used form of decentralized virtual currency, known as Bitcoin, plays a significant role in free market wealth by removing the necessity of a middleman to connect buyers and sellers. Our study's primary goal is to more accurately predict the price of bitcoin utilizing ML and neural networks while lowering the trouble for both Policymakers and investors . For prediction, we used deep learning method called LSTM.

The normalisation method-based proposed LSTM has been successful in predicting the price of bitcoin. The price of bitcoin has been predicted by researchers using theories and algorithms, but most of the models have failed because of overfitting and mistakes that result from large datasets. We can predict the future value of bitcoin using a sizable dataset and LSTM.

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