



Bitcoin Price Prediction

¹Amruta Awate, ²Vaishanvi Vyavahare, ³Ifragh Shaikh, ⁴Prachi Gaikwad, ⁵Dr.Preeti Patil

¹Student, B.E Information Technology, Dr. D Y Patil College of Engineering, Pune

²Student, B.E Information Technology, Dr. D Y Patil College of Engineering, Pune

³Student, B.E Information Technology, Dr. D Y Patil College of Engineering, Pune

⁴Student, B.E Information Technology, Dr. D Y Patil College of Engineering, Pune

⁵Project guide, B.E Information Technology, Dr. D Y Patil College of Engineering, Pune

ABSTRACT

Bitcoin cryptocurrency, a virtual currency designed to act as money and a form of payment outside the control of any one person, group or entity thus removing the need for third-party involvement in financial transaction. It is rewarded to blockchain miner for the work done to verify transaction. The bitcoin is volatility in world of currency.

Key Concept: volatility, miner

1. Introduction

Bitcoin stands as the most valuable cryptocurrency in the world. It has a current market capitalization of 9 billion USD according to <https://www.blockchain.info/> and sees over 250,000 transactions taking place per day. As a currency, Bitcoin offers a novel opportunity for price prediction due to its relatively young age and resulting volatility, which is far greater than that of fiat currencies. It is also unique in relation to traditional fiat currencies in terms of its open nature; no complete data exists regarding cash transaction so money in circulation for fiat currencies.

Traditional time series prediction methods such as Holt-Winters exponential smoothing models rely on linear assumptions and require data that can be broken down into trend, seasonal and noise to be effective. Regardless of the substantial fluctuations of Bitcoin prices and the massive growth in the capitalization of the related market, the condemnations about illicit uses and social concerns, it has still managed to draw the attention of many investors, such as China who is buying Bitcoin, seeing this as an opportunity of investments, as well as researchers in the scientific community to study and understand the market in order to predict the worth of Bitcoin.

Due to the lack of seasonality in the Bitcoin market and its high volatility, these methods are not highly effective for this task. Given the complexity of the task, machine learning makes for an interesting technological solution based on its performance in similar areas. Hence, a time series analysis is utilized in this paper in order to find out the pattern of bitcoin price movement and forecasting the closing price of the next few days as well as analyzing the performance of the time series models i.e., ARIMA model.

2. Literature Survey

[1] **Paper Name:** Bitcoin price prediction using ARIMA model

Author Name: M. Poongodi, Vignesh Vijayakumar CEPT University

Description: Bitcoin is a highly volatile cryptocurrency with rising popularity. It is a turning point in the way currency is seen. Now the currency, rather than being physical is becoming more and more digital. Bitcoin has removed the central party and has given the control to the users. Due to high variance of solo mining, the number of users joining top most famous Bitcoin mining pools are increasing due to the concept that users together under a same bitcoin pool will have a higher chance of generating next block in the Bitcoin's block chain by reducing the variance and earning them in reward. Furthermore, emerging mining farms with strong mining resources and fast processing power is another trend towards centralization.

[2] **Paper Name:** A Comparative Study of Bitcoin Price Prediction Using Deep Learning

Author Name: Suhwan Ji, Jongmin Kim and Hyeonseung Im

Description: Bitcoin has recently received a lot of attention from the media and the public due to its recent price surge and crash. Many researchers have found various factors that affect the Bitcoin price and the patterns for its fluctuations using various machine learning methods. In this paper, we study and compare various deep learning methods such as a deep neural network (DNN), a long short-term memory (LSTM) model, a

convolutional neural network, a deep residual network, and their combinations for Bitcoin price prediction than regression models for algorithmic trading. Overall, the performances of the proposed deep learning-based prediction models were comparable.

[3] **Paper Name:** Bitcoin Price Prediction using ARIMA Model

Author Name: Dr. Jinan Fiaidhi, Ahmer Sabah, Mahpara Anwer Ansari

Description: Bitcoin is considered to be most valuable and expensive currency in the world. Besides being first decentralized digital currency, its value has also experienced a steep increase, from around 1 dollar in 2010 to around 18000 in 2017. In recent years, it has attracted considerable attention in a diverse set of fields, including economics, finance and computer science. Firstly, we are going to collect the historical data of Bitcoin prices over the years 2013 to 2019 and do prediction for the year 2020. Further, we have created web services using ASP.NET to make the predictions on bitcoin price online and lastly, we have plotted the results in a responsive chart using High charts.

3. Motivation

The proposed solution to the issue concerned with bitcoin includes the use of a tool that can identify and predict bitcoin value from the results provided to a user by a search engine or a social media. With this project we are trying to get high accuracy and also reduce the time to predict the bitcoin value. Also we can use this project to detect the multiple values of bitcoin.

4. Analysis Model

The SDLC model can be applied as effective System Development Life Cycle (SDLC) which, should result in a high quality system that meets customer Expectations reaches completion within time and cost evaluations, and works effectively and efficiently in the current and planned Information Technology infrastructure.

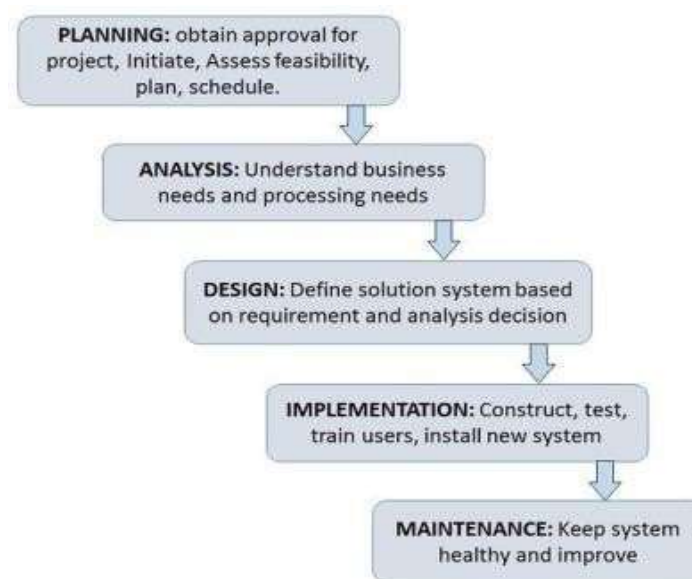


Fig. Analysis Model

Stage1: Planning and requirement analysis

Planning is the most important and necessary stage in SDLC. Planning for the quality assurance requirements and identifications of the risks associated with the projects is also done at this stage. Project organizer set up a meeting with the client to gather all the data like what the customer wants to build, who will be the end user, what is the objective of the product. Before creating a product, a core understanding or knowledge of the product is very necessary.

Stage2: Analysis

Once the requirement analysis is done, the next stage is to certainly represent and document the software requirements and get them accepted from the project stakeholders. This is accomplished through "SRS"-Software Requirement Specification document which contains all the product requirements to be constructed and developed during the project life cycle.

Stage3: Designing the Software

The next phase is about to bring down all the knowledge of requirements, analysis, and design of the software project. This phase is the product of the last two, like inputs from the customer and requirement gathering.

Stage4:Deployment

Once the software is certified, and no bugs or errors are stated, then it is deployed. Then based on the assessment, the software may be released as it is or with suggested enhancement in the object segment. After the software is deployed, the maintenance begins.

Stage5:Maintenance

Once when the client starts using the developed systems, then the real issues come up and requirements to be solved from time to time. This procedure where the care is taken for developed product is known as maintenance.

5. System Architecture

The system architecture defines that the input is taken from different sources such as twitter data google trends, stock market, etc. These data are called as historic data. Now the data preprocessing is performed on this different data collection. The Machine learning model called ARIMA model is used for bitcoin price prediction in order to predict the value of bitcoins and their future prediction are also done. to predict the value of bitcoins and their future prediction are also done.

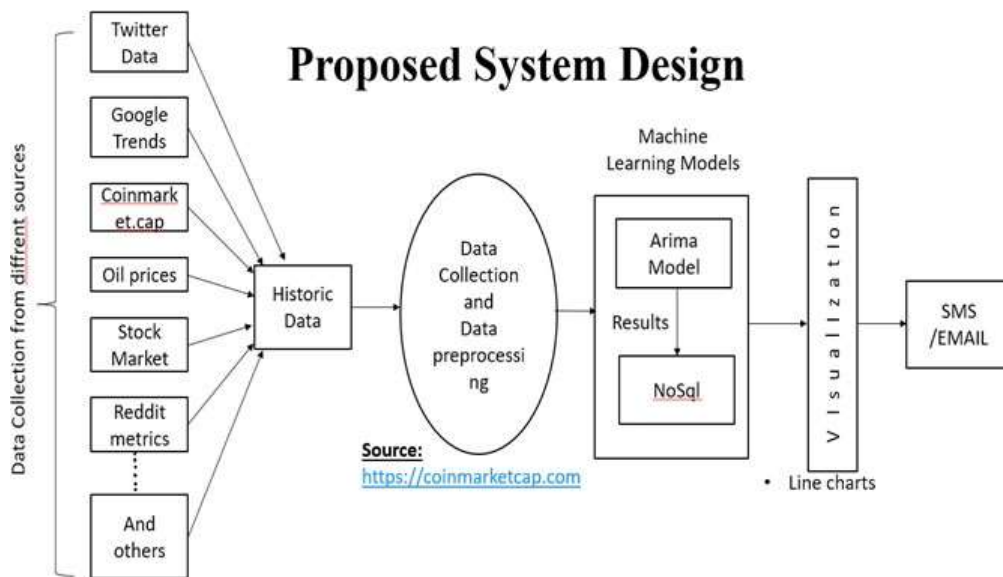


Fig. System Architecture

The database which is used for storing the results and the data is NoSql database, which is used to store the unstructured data. The proper visualization is done on the obtained results such as line chart. The SMS/Emails are sent to the users regarding to the predicted price of the bitcoin.

6. Methodologies

Methodologies outlining a few areas of the project's work are provided below. The description includes a number of worthwhile topics that emphasize some of their drawbacks, which promote discovering more solutions, as well as some of their advantages, which explains why these topics and their features are employed in this project.

What is Bitcoin?

A cryptocurrency, such as Bitcoin (BTC), eliminates the need for third parties to be involved in financial transactions by acting as money and a means of payment independent of any one person, group, or entity. It is available for purchase on numerous platforms and is given to blockchain miners as compensation for their efforts in verifying transactions. By utilizing the alias Satoshi Nakamoto, an unidentified developer or group of developers presented Bitcoin to the general public in 2009.

Since then, it has grown to be the most well-known cryptocurrency worldwide. Numerous additional cryptocurrencies have been developed as a result of its popularity. These rivals either want to displace it as a means of payment or they serve as utility or security tokens on other blockchains and developing payment systems.

How Does Bitcoin Work?

The whole Bitcoin network is based on the block chain, a shared public ledger. The block chain contains all verified transactions. It enables Bitcoin wallets to figure out their spendable amount, enabling new transactions to be confirmed and making sure the spender genuinely owns them. Cryptography is used to enforce the block chain's integrity and chronological order.

Any value transfer between Bitcoin wallets that is recorded in the block chain is referred to as a transaction. Private keys, also known as seeds, are kept secret in bitcoin wallets and are used to sign transactions, proving mathematically that they originated from the wallet's owner. The transaction cannot be changed by anyone after it has been issued thanks to the signature. Through a process known as mining, all transactions are broadcast to the network and often start to be confirmed within 10–20 minutes.

By adding them to the block chain, mining is a distributed consensus technique that is used to confirm pending transactions. It ensures that the block chain is chronologically ordered, safeguards the network's neutrality, and enables several computers to concur on the system's status. Transactions must be contained in a block that complies with stringent cryptographic requirements that the network will verify in order to be confirmed. Because doing so would render all subsequent blocks invalid, these rules forbid modifications to earlier blocks. Additionally, mining produces a competitive lottery-like environment that makes it difficult for anyone to just add new blocks in a row to the block chain. No organisation or person may thus dictate what is contained in the block.

How to Buy Bitcoin?

Bitcoin can be bought through a cryptocurrency exchange if you are unwilling to mine it. Due to its high price, most people won't be able to buy a whole bitcoin, but you can buy fractions of it on these exchanges using fiat money like dollars. For instance, by creating an account and funding it, you can purchase bitcoin via Coinbase. You may fund your account using a debit card, credit card, or bank account.

7. Arima Model

The ARIMA model are one of the most popular econometrics models which are used to predict time series data such as stock prices, oil prices, demand forecasting, and even the spread of infectious diseases. An ARIMA model is basically an ARMA model that is fitted on order differenced time series such that the final differenced time series is stationary. ARIMA models use differencing to convert a non-stationary time series into an accurate stationary one, and then predict future values from the collected historical data. These model "auto" correlations and moving averages over residual errors in the data to forecast future values. ARIMA models provide another approach to time series forecasting. The exponential smoothing and the ARIMA models are the two widely used approaches to time series forecasting and these provide complementary approaches to solve the problem.

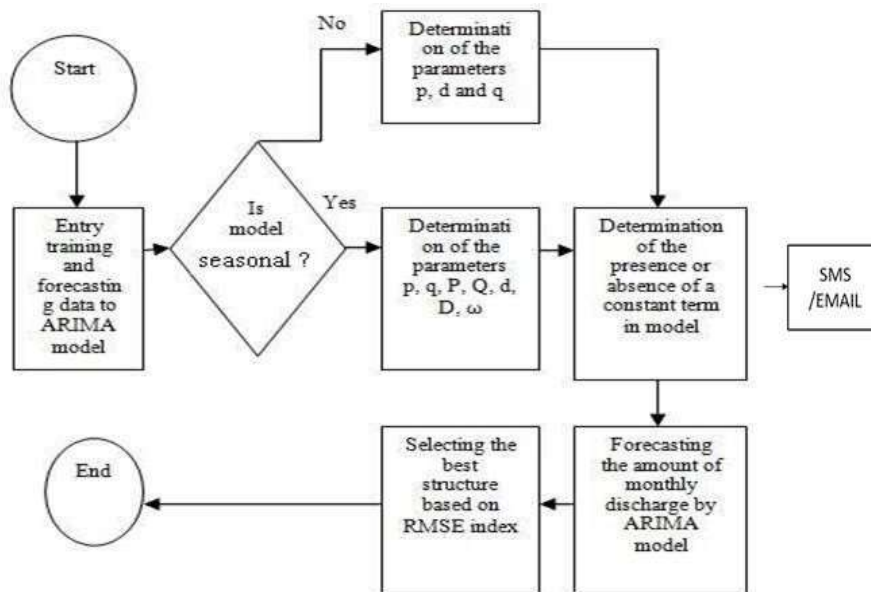


Fig. ARIMA Model

While exponential smoothing model are based on a description of the trend and seasonality in the data, ARIMA model aim to describe the auto correlations in the data.

9. Conclusion

Deep learning models such as the RNN and LSTM are evidently effective for Bitcoin prediction with the LSTM more capable for recognizing longer-term dependencies. However, a high variance task of this nature make sit difficult to transpire this into impressive validation results.As a result, it remains

a difficult task. There is a fine line between overfitting a model and preventing it from learning sufficiently. Dropout is a valuable feature to assist in improving this.

However, despite using Bayesian optimization to optimize the selection of dropout it still couldn't guarantee good validation results. Despite the metric of sensitivity, specificity and precision indicating good performance, the actual performance of the ARIMA forecast based on error was significantly worse than the neural network models.

9. Future Scope

There is much scope for the evolution of Bitcoin during the next 10 years. It will be imperative for the investors to focus closely on several areas in the ecosystem of Bitcoin at present. Right now, we can define a crypto currency to be somewhere between a medium for day-to-day transactions and a store of value.

1. We can also provide additional functionality to the users.
2. We can also add a chat module between user and administrator so that the exchange of information can be done properly without any confusion and delay.

10. Acknowledgement

We are highly indebted to Dr Mrs. Preeti Patil our project guide for his guidance and constant supervision as well as for providing necessary information regarding the project & also for his support in completing this Research Paper. We would like to express my gratitude towards Head of I.T. Department Dr Mrs. Preeti Patil for her kind co-operation and encouragement which helped in the completion of this Research Paper.

11. References and Research papers

- **References:**
 1. Mastering Bitcoin, programming the open book, Second Edition, Andreas M. Antonopoulos.
 2. Deep Learning, First Edition, Ian Goodfellow.
 3. Bitcoin and cryptocurrency technologies, A Comprehensive Introduction, First Edition, Arvind Narayanan, Joseph Bonneau.
- **Research Paper:**
 1. https://www.researchgate.net/publication/340566388_Bitcoin_Price_Prediction_using_ARIMA_Model.
 2. <https://ieeexplore.ieee.org/document/9751925>.