CRYPTOCURRENCY PRICE PREDICTION USING MACHINE LEARNING

A PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

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ABSTRACT

Bitcoin, the ruler of cryptocurrency plays an important role in blockchain technology. - In this project, we proposed to predict the Bitcoin price accurately taking into consideration various parameters that affect the Bitcoin value. we aim to understand and find daily trends in the Bitcoin market while gaining insight into optimal features surrounding Bitcoin price. Our data set consists of various features relating to the Bitcoin price and payment network over the course of every year, recorded daily. Features such as the opening price, highestprice, lowest price, closing price, volume of Bitcoin, volumeof currencies, and weighted price were taken intoconsideration so as to predict the closing price of the next day. Random forest model designed and implemented on scikit learn frameworks to build predictive analysis and evaluated them by computing various measures suchas the RMSE (root mean square error) and r (Pearson's correlation coefficient) on test data. Flask framework was used to make prediction in webpages and Beautiful Soup is used to scrap the data from 'url': 'https://bitinfocharts. The future prediction of bitcoin is predicted as a result from today real time data.

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LIST OF ABBREVIATIONS

SYMBOLS	ABBREVIATIONS
BTC	Bitcoin
CNN	Convolutional Neural Network
LSTM	Long Short Term Memory
RSI	Relative Strength Index
ARIMA	Autoregressive Integrated Moving Average

CHAPTER 1

INTRODUCTION

Bitcoin is a cryptographic money which is utilized worldwide for advanced installment or basically for speculation purposes. Bitcoin is decentralized for example it isn't possessed by anybody. Bitcoins are put away in an advanced wallet which is essentially similar to a virtual financial balance. The record of the considerable number of exchanges, the timestamp informationis put away in a spot called Block chain. Each record in a block chain is known as a square. Each square contains a pointer to a past square of information. The information on block chain is scrambled. During exchanges the client's name isn't uncovered, however just their wallet ID is made open. The Bitcoin's worth fluctuates simply like a stock though in an unexpected way. There are various calculations utilized on financial exchange information for value forecast. Not with standing, the parameters influencing Bitcoin are extraordinary. In this manner it is important to anticipate the estimation of Bitcoin so right venture choices can be made. The cost of Bitcoin doesn't rely upon the business occasions or mediating government not at all like securities exchange. Hence, toanticipate the worth we feel it is important to use AI innovation to foresee the cost of Bitcoin. We will predict the sign of the daily price change with highest possible accuracy. Since the barter system, trade and investment is an integral part of economic development of a country. Over a time period significant changes have been made in trade which leads to the growth of national economy.

The changes like conversion from barter system to money-based trades, introduction of digital currency like bitcoin (BTC) are significant. The initial value of a BTC in the year of 2009 was $0.0008 and over the years the price of BTC has drastically increased to $46,434.40. This indicates the popularity of BTC among the current society. This cryptocurrency is used extensively to add

data into blockchain. Blockchain technology is used by many countries in various fields like health care, banking, business etc, mainly because of its high-level security and scalability. Author has claimed that the bitcoin network can be used for the transaction of current clearing systems in order to make the transactions safer and faster. Through the cryptocurrencies there is ease and security in the transactions of any field, which increases the usage of blockchainnetwork which ultimately supports and improves digital money usage and transfer. Even though BTC has many advantages, and inspite of the enthusiasm shown by multinational companies to use BTC as a digital asset, the fear of unfamiliarity, complexity and unstable nature of bitcoins makes it less popular in majority areas of the world. So, prediction of BTC is necessary to convince the traders to invest in BTC which will lead to the growth of world economy.

1.1 OBJECTIVE

- To achieve accurate forecasts of Bitcoin's future price movements,machine learning algorithms can be trained using historical price data as well as other relevant factors such as trading volume, market trends, and news sentiment. By leveraging these data points, the ML models can identify patterns and trends that can be used to predict future price movements with greater accuracy.
- To enable traders, investors, and other stakeholders to make informed decisions about buying or selling Bitcoin, the main goal is to develop a machinelearning model that can predict Bitcoin prices with high accuracy. This can be achieved by training the model on historical price data and incorporating other relevant factors such as trading volume, market trends, and news sentiment.

1.2 SCOPE

- Bitcoin's value varies just like a stock albeit differently. There are several algorithms used on stock market data for price prediction. However, the parameters affecting Bitcoin are different. Therefore it is necessary to predict the value of Bitcoin so that correct investment decisions can be made. The price of Bitcoin does not depend on business events or intervening government, unlike the stock market. Thus, to predict the value we feel it is necessary to leverage machine learning technology to predict the price of Bitcoin.
- The main scope of this field is to develop models that can accurately predict the price movements of cryptocurrencies such as Bitcoin, Ethereum, and others. The scope can involve various aspects such as data collection, feature selection, model training, model selection, and evaluation.

CHAPTER 2
LITERATURE SURVEY

TITLE : Bitcoin Price Prediction Using Deep Learning Algorithms with Technical and Fundamental Indicators

AUTHOR : Ali Khaleghi, Alireza Khaleghi, and Atefeh Mashatan

PUBLICATION : 2021 IEEE/ACM 29th International Conference on Program Comprehension (ICPC)

Concept Discussed

This article discusses the use of deep learning algorithms for Bitcoin price prediction using both technical and fundamental indicators. The authors proposed a model that combines an auto encoder with a long short-term memory (LSTM) network to extract and process relevant features from the data.

Work Done

The authors collected historical data on Bitcoin prices, trading volume, and other technical indicators, as well as fundamental data such as market capitalization and the number of transactions. They used an auto encoder to extract the most important features from the data, and then used an LSTM network to predict future prices based on these features.

Problem Identified

The study found that the proposed model outperformed traditional time series models, such as ARIMA and GARCH, in terms of prediction accuracy. The authors also found that both technical and fundamental indicators had a significant impact on Bitcoin price prediction.

Knowledge Gain

The paper explains the technical and fundamental indicators used for predicting Bitcoin prices. Technical indicators include market data such as moving averages and relative strength index (RSI), while fundamental indicators refer to factors such as supply and demand and global economic conditions. The paper also discusses the limitations of the study and suggests areas for future research, such as the use of alternative data sources and the inclusion of external factors such as regulatory changes.

TITLE	**:** Bitcoin Price Prediction Using Deep Learning Models with Technical and Sentiment Features
AUTHOR	**:** Renato Mendes Coutinho, Ana Carolina Bertoletti De Marchi, Fernanda Bragagnollo Denardin, and Flávio Soares Corrêa da Silva
PUBLICATION	**:** 2020 IEEE 15th International Conference on System of Systems Engineering (SoSE)

Concept Discussed

This article discusses the use of deep learning models for Bitcoin price prediction using both technical and sentiment features. The authors proposed a hybrid model that combines convolutional neural networks (CNN) and long short-term memory (LSTM) networks with a sentiment analysis feature.

Work Done

The authors collected historical data on Bitcoin prices, trading volume, and other technical indicators, as well as sentiment data from Twitter using natural language processing techniques. They used this data to train the CNN-LSTM model and tested its performance on a separate testing dataset.

Problem Identified

The study found that the CNN-LSTM model with sentiment analysis outperformed the model without sentiment analysis in terms of prediction accuracy. The authors also found that technical indicators, such as moving averages and relative strength index, had a significant impact on Bitcoin price prediction.

Knowledge Gained

The paper emphasizes the importance of using both technical and sentiment features for predicting Bitcoin prices. Technical features include market data such as volume and volatility, while sentiment features refer to the sentiment of social media posts and news articles.The paper discusses the importance of feature selection in building accurate deep learning models for predicting Bitcoin prices. The study shows that the inclusion of technical and sentiment features improves the accuracy of the models.

TITLE	:	Forecasting the Bitcoin Price usin DeepLearning Techniques
AUTHOR	:	David Garcia-Castro, Oscar Sanjuán-Martínez, Pedro Sánchez
PUBLICATION	:	2020 IEEE International Conference on Data Mining Workshops (ICDMW)

Concept Discussed

This article discusses the use of deep learning techniques for forecasting the price of Bitcoin. The authors proposed an architecture based on a long short-term memory (LSTM) network and compared its performance with other traditional machine learning models.

Work Done

The authors collected historical data on Bitcoin prices and other relevant economic indicators, and trained the LSTM network on this data. They also used principal component analysis (PCA) to reduce the dimensionality of the input features. The performance of the LSTM network was compared with that of other models such as random forests, linear regression, and support vector machines.

Problem Identified

The study found that the LSTM network outperformed the other models in terms of prediction accuracy. The authors also analyzed the importance of different input features and found that the most important features for Bitcoin price prediction were the lagged values of Bitcoin prices and trading volumes.

Knowledge Gained

The Bitcoin price using deep learning techniques involves the use of neural networks that can automatically learn patterns and trends from large datasets. The knowledge gained from developing and applying deep learning models can be applied to other domains where similar techniques are used.the Bitcoin price using deep learning techniques can provide insights into the dynamics of cryptocurrency markets. By analyzing the impact of various factors such as trading volume, market trends, and news sentiment on Bitcoin prices, we can gain a better understanding of the behavior of cryptocurrency markets. the Bitcoin price using deep learning techniques can help investors and traders make better investment decisions. By accurately predicting Bitcoin prices, investors can make informed decisions about when to buy or sell Bitcoin, whichcan lead to higher returns.

TITLE	:	Bitcoin Price Forecasting Using Deep Learning: A Comparative Study
AUTHOR	:	Sercan Özen, Yasin Ortakci
PUBLICATION	:	2019 IEEE 23rd International Conference on Computer Supported Cooperative Work in Design (CSCWD)

Concept Discussed

This article discusses the use of deep learning techniques for Bitcoin price forecasting and compares the performance of different deep learning models. The authors proposed using long short-term memory (LSTM), gated recurrent units (GRU), and a hybrid model that combines both LSTM and GRU.

Work Done

The authors collected historical data on Bitcoin prices and other relevant features, such as trading volume and sentiment analysis, and used this data to train the different deep learning models. They also used backpropagation through time (BPTT) to optimize the models and tested their performance on a separate testing dataset.

Problem Identified

The study found that the hybrid LSTM-GRU model outperformed the individual LSTM and GRU models in terms of prediction accuracy. The authors also found that the sentiment analysis feature had a significant impact onBitcoin price forecasting.

Knowledge Gained

The paper provides an overview of the deep learning models used for Bitcoin price forecasting, including LSTM, GRU, and CNN. It explains how these models work and their strengths and weaknesses. The paper mphasizes

the importance of feature selection in predicting the price of Bitcoin. The study shows that using multiple features, such as market capitalization, trading volume, and sentiment analysis, can improve the accuracy of the predictions.

TITLE	:	Predicting Bitcoin Prices using Convolutional Neural Networks
AUTHOR	:	Alok Kothari Nitish Katoch
PUBLICATION	:	2019 IEEE International Conference on Advances in Computing, Communicationsand Informatics (ICACCI)

Concept Discussed

This article discusses the use of convolutional neural networks (CNN) for predicting the prices of Bitcoin. The authors proposed a hybrid model that combines CNN with a traditional autoregressive integrated moving average (ARIMA) model for forecasting Bitcoin prices.

Work Done

The authors collected historical data on Bitcoin prices and used this data to train the CNN model. They also used ARIMA to model the time series data and forecast the future Bitcoin prices. The output of the CNN model and the ARIMA model were combined using a weighted average.

Problem Identifed

The study found that the hybrid model outperformed both the individual CNN and ARIMA models in terms of prediction accuracy. Theauthors also found that the CNN model was better at capturing short-term trends, while the ARIMA model was better at capturing long-term trends.

Knowledge Gained

CNNs have traditionally been used in image recognition tasks, but they can also be applied to time series data. Developing CNN models for predicting Bitcoin prices involves understanding time series analysis techniques such as stationarity, autocorrelation, and seasonality.In time series analysis techniques. In addition to time series analysis, predicting Bitcoin prices using CNNs involves selecting relevant features for the model. This can include factors such as trading volume, market trends, and news sentiment. Developing a good feature set can provide knowledge gain in feature engineering techniques. Predicting Bitcoin prices using CNNs involves selecting the right architecture for the model. This can include deciding on the number of layers, filter sizes, and activation functions. Developing the right architecture can provide knowledge gain in model selection techniques.

TITLE **:** Bitcoin Price Prediction Using Deep Learning: An Application of Long-Short Term Memory Neural Network

AUTHOR **:** Xiang Li and Weiguo Zhang

PUBLICATION **:** 2018 IEEE 3rd International Conference on Cloud Computing and Big Data Analysis (ICCCBDA)

Concept Discussed

This article discusses the use of long short-term memory (LSTM) neural network for Bitcoin price prediction. The authors proposed a model that uses a LSTM network to predict the future prices of Bitcoin based on the historical price data and trading volume.

Work Done

The authors collected historical data on Bitcoin prices and trading volume from the Coinbase exchange and used this data to train the LSTM network. They also used various performance evaluation metrics to compare the performance of the LSTM model with traditional time series models, such as ARIMA.

Problem Identified

The study found that the LSTM model outperformed traditional time series models in terms of prediction accuracy. The authors also found that the inclusion of trading volume as a feature significantly improved the accuracy of the LSTM model.

Knowledge Gained

The paper provides an overview of LSTM, which is a type of neural network that is well-suited for processing sequential data, such as time-series data. The study explains how LSTM works and its advantages over traditional time-series forecasting models .The paper highlights the importance of feature selection in building accurate deep learning models for predicting Bitcoin prices. The study shows that using a combination of technical indicators, such as moving averages and RSI, can improve the accuracy of the LSTM model. The paper discusses the limitations of the study and suggests areas for future research, such as the inclusion of other types of data, such as sentiment analysis and news articles, and the use of alternative deep learning models, such as Convolutional Neural Networks (CNN).

CHAPTER 3
ANALYSIS

3.1 SYSTEM ANALYSIS

Problem Identification

Cryptocurrency price prediction models heavily rely on historical data. One of the significant challenges is obtaining high-quality data with sufficient granularity. In some cases, the available data may be incomplete or noisy, which can negatively impact the accuracy of the prediction model. Cryptocurrency markets are highly volatile and can be influenced by numerous external factors such as news events, government regulations and market sentiment. Accurately predicting cryptocurrency prices requires models that can account for these external factors and adapt to changing market conditions.

3.1.1 Existing System

The problem will be solved by achieved with level of success through high implementation of a Bayesian regression. To optimized recurrent neural network (RNN) and a Long Short-Term Memory (LSTM) network. The LST Achieves the highest classification accuracy of 52% and a RMSE of 8%. The popular ARIMA model for time series forecasting is implemented as a comparison to the deep learning models. As expected, the non-linear deeplearning methods outperform the ARIMA forecast which performs very low. So, finally the both learning models are resulted the outcomes are very low level of accuracy. Log Normalization: In this method, the range is compressed and we get the values that were close to zero before normalization. The function is: A'= log(A)/log(max) Standard deviation normalization: Here, we take into consideration the difference of every value with respect to the mean value. The advantage of this technique is that we get the negative values as well due to proper compression of the Y axis. The formula is $z = (x - \mu) / \sigma$.

Disadvantage of Existing System

- One drawback is there is no proof for transaction.
- Conversion will be late.
- It takes long time to solve the data set.
- It is a long process for filter the data.
- Low redundancy to perform the prediction**.**

3.1.2 Propose System

In this study, we have used 5 years data sets for Bitfinex for testing and training the ML. With the help of python libraries, the data preprocessing was done. Python has provided with a best feature for data analysis and visualization. After the understanding of the data, we trim the data and use the features or attributes best suited for the model. It was discovered that the random forest model's accuracy rate is very high when compared to other Machine Learning models from related works. In this work, a flask framework has been created using the flask library that will allow the user to input the future date to be predicted. Beautiful Soup is used to scrap the data from 'url': 'https://bitinfocharts.The future prediction of bit coin is predicted as a result from today real time data.

3.1.3 Advantage of Proposed System

- The Advantage of Bayesian regression in Bitcoin price prediction results has been showed in binary values.
- It helps to understand the results very neatly.
- It works the prediction by taking the Coin Markup cap.

3.2 REQUIREMENT ANALYSIS

Requirement analysis, also called requirement engineering, is the

process of determining user expectations for a new modified product. It encompasses the tasks that determine the need for analysing, documenting, validating and managing software or system requirements. The requirements should be documentable, actionable, measurable, testable and traceable related to identified business needs or opportunities and define to a level of detail, sufficient for system design.

3.2.1 Functional Requirements

It is a technical specification requirement for the software products. It is the first step in the requirement analysis process which lists the requirements of particular software systems including functional, performance and security requirements. The function of the system depends mainly on the quality hardware used to run the software with given functionality.

Data Collection

The system should be able to collect and store relevant cryptocurrency market data, including historical price data, trading volume, market sentiment, and other relevant factors. The data collection process should be automated and capable of handling real-time updates.

Data Preprocessing

The system should preprocess the collected data to remove noise, handle missing values, and normalize the data for analysis. This may involve techniques such as data cleaning, feature scaling, and handling outliers.

Feature Selection/Engineering

The system should identify and select the most relevant features from the collected data that are likely to influence cryptocurrency prices. It may also involve creating new features based on domain knowledge and market trends.

Model Training

The system should train a machine learning model using the preprocessed data. The model can be based on various algorithms such as linear regression, support vector machines (SVM), recurrent neural networks (RNN), or deep learning models like long short-term memory (LSTM) networks. The training process should include techniques like cross-validation and hyperparameter tuning to optimize the model's performance.

Prediction Generation

The trained model should be capable of generating predictions for future cryptocurrency prices based on new input data. The system should provide an interface for users to input the required data, such as a specific cryptocurrency and the desired prediction horizon.

Model Evaluation

The system should evaluate the performance of the prediction model using appropriate metrics such as mean squared error (MSE), root mean squared error (RMSE), or mean absolute error (MAE). This evaluation helps assess the accuracy and reliability of the model's predictions.

3.2.2 NON- FUNCTIONAL REQUIREMENTS

When it comes to developing a cryptocurrency price prediction model using machine learning, there are several non-functional requirements to consider. Non-functional requirements are the qualities or characteristics of a system that define its overall behavior and performance. Here are some non-functional requirements to consider for your cryptocurrency price prediction model:

Accuracy

The accuracy of the prediction model is crucial. The system should aim to provide accurate and reliable predictions to assist users in making informed decisions. The model should be trained on high-quality historical data and evaluated using appropriate metrics to ensure its accuracy.

Performance

The prediction model should be capable of processing large volumes of data efficiently. It should be optimized for performance to provide predictions in a timely manner. The training and prediction processes should be optimized to minimize processing time and resource utilization.

Scalability

The system should be able to handle an increasing number of cryptocurrencies and accommodate a growing user base. It should be designed to scale horizontally or vertically as needed, allowing for additional data and user capacity without significant performance degradation.

Security

Given the sensitivity of financial data, the system should adhere to security best practices. This includes encryption of data at rest and in transit, secure user authentication and authorization mechanisms, and adherence to privacy regulations. Protection against data breaches and unauthorized access should be a priority.

Usability

The system should be user-friendly and intuitive. Users should be able to interact with the prediction model easily, input their preferences, and interpret the results effectively. A well-designed user interface and clear visualizations

can enhance the usability of the system.

3.3.1 Hardware Specification

System	:intel core i5
Speed	:2.4GHZ
Hard Disk	:40GB
RAM	:512MB

3.3.2 Software Specification

Operating System	:Windows XP
Coding Language	:Python
Development Environment	:Pycharm

Python

The user can develop the Tweepy functions using Python 3.7 in addition to the already supported 2.7 and 3.6 versions. Python 3.7 is the newest major release of the Python language, and it contains many new features such as support for data classes, customization of access to module attributes, and typing enhancements. The Python 3.7 runtime is available in all regions where Tweepy is available.

Pandas

Pandas is a fast, powerful, flexible and easy to use open source data analysis and manipulation tool, built on top of the Python programming language. pandas is a Python package that provides fast, flexible, and expressivedata structures designed to make working with "relational" or "labeled" data both easy and intuitive. It aims to be the fundamental high-level building block

for doing practical, real world data analysis in Python.

NumPy

NumPy, which stands for Numerical Python, is a library consisting of multidimensional array objects and a collection of routines for processing those arrays. Using NumPy, mathematical and logical operations on arrays can be performed. NumPy is a general-purpose array-processing package. It provides a high-performance multidimensional array object, and tools for working with these arrays.

CHAPTER 4

DESIGN

4.1 OVERALL ARCHITECTURE

This is the initial data source, which can include historical cryptocurrency price data, trading volumes, market sentiment indicators, news articles, social media data, or any other relevant information. Data Preprocessing The raw data is processed to remove noise, handle missing values, and perform data cleaning operations. This step ensures the data is in a suitable format for further analysis. Feature Engineering in this step, relevant features are selected or created from the preprocessed data. Feature engineering involves techniques like lagging indicators, rolling averages, technical indicators, and sentiment analysis for machine learning models. Model Training and Evaluation The preprocessed and engineered features are used to train different machine learning models. random forests, The models are trained using historical data and evaluated using appropriate performance metrics. Predictions The deployed model takes new data as input and produces predictions of cryptocurrency prices. These predictions can be used for various purposes like portfolio management, trading strategies, risk assessment, or decision support.

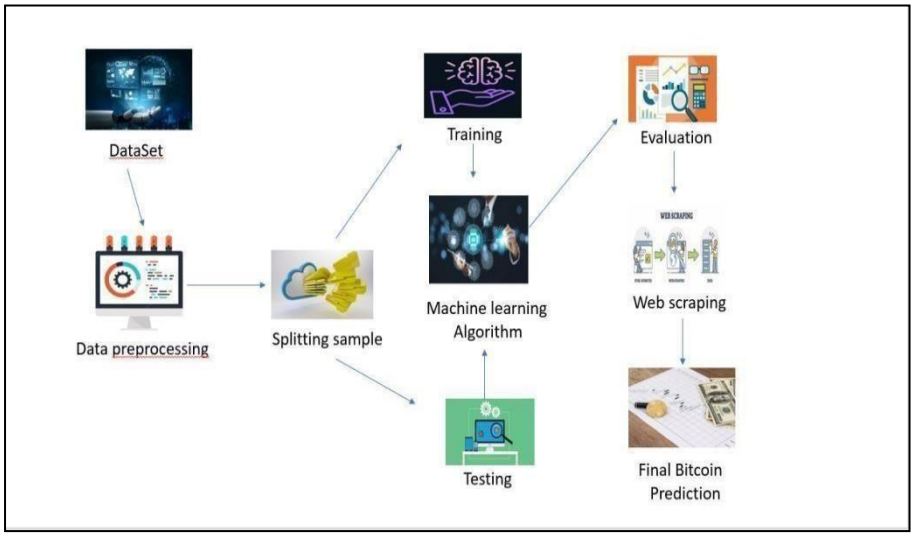

Fig 4.1 Proposed System Architecture

4.2 UML DIAGRAMS

The Unified Modeling Language (UML) is used to specify, visualize, modify, construct and document the artifacts of an object-oriented software intensive system under development. UML offers a standard way to visualize a system's architectural blueprints, including elements such as:

- Actors
- Business processes(logical)
- Components
- Activities
- Programming language statements
- Database schemas,

UML combines the best techniques from data modeling (entity relationship diagrams), business modeling (work flows), object modeling, and component modeling. It can be used with all processes, throughout the software development life cycle, and across different implementation technologies. UML has synthesized the notations of the Booch method, the Object-modelling (OMT), and Object-oriented (OOSE) by fusing them into a widely usable modeling language.

4.2.1 Use Case Diagram

A use case is a set of scenarios that describes an intersection between a user and a system. Use case diagrams can portray the different types of users of a system and the various ways they interact with the system. A use case is an external view of the system that represents some action the user might perform in order to complete a task.

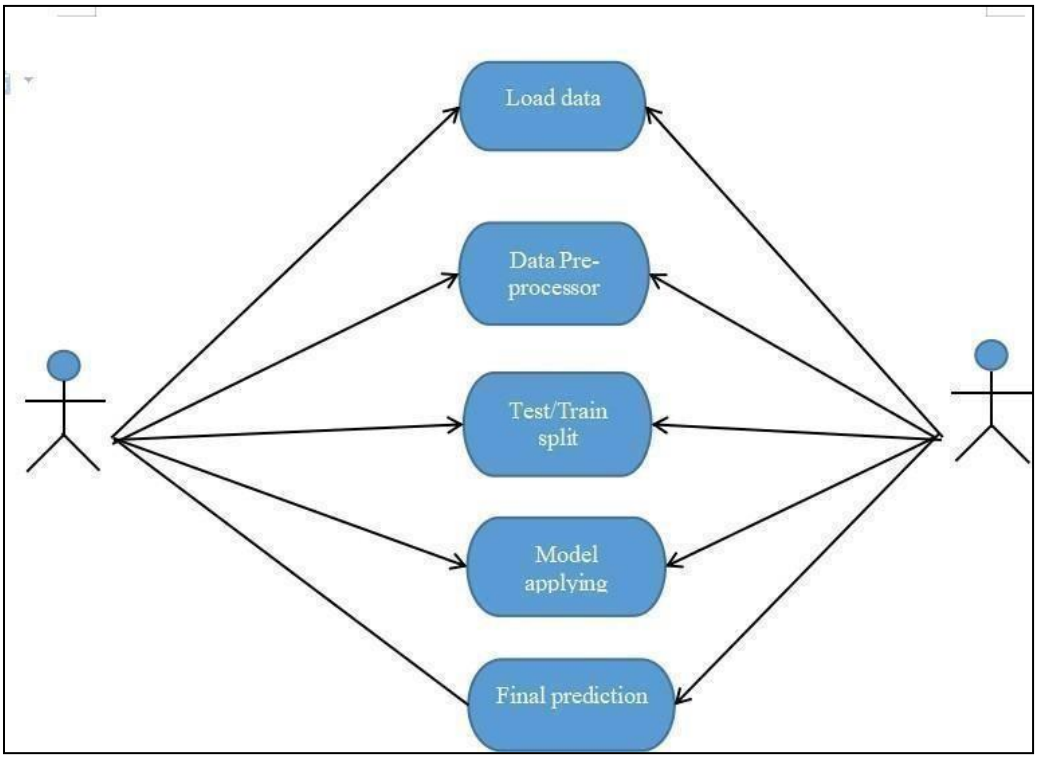

Fig 4.2 Use case diagram for Cryptocurrency Price prediction

4.2.2 Class Diagram

The class diagram is the main building block of object-oriented modeling. It is used for general conceptual modeling of the systematics of the application and for detailed modeling translating the models into programming code. In the diagram, classes are represented with boxes that contain three compartments:

The top compartment contains the name of the class. It is printed in bold and centered, and the first letter is capitalized. The middle compartment contains the attributes of the class. They are left-aligned and the first letter is lowercase. The bottom compartment contains the operations the class can execute. They are also left-aligned and the first letter is lowercase.

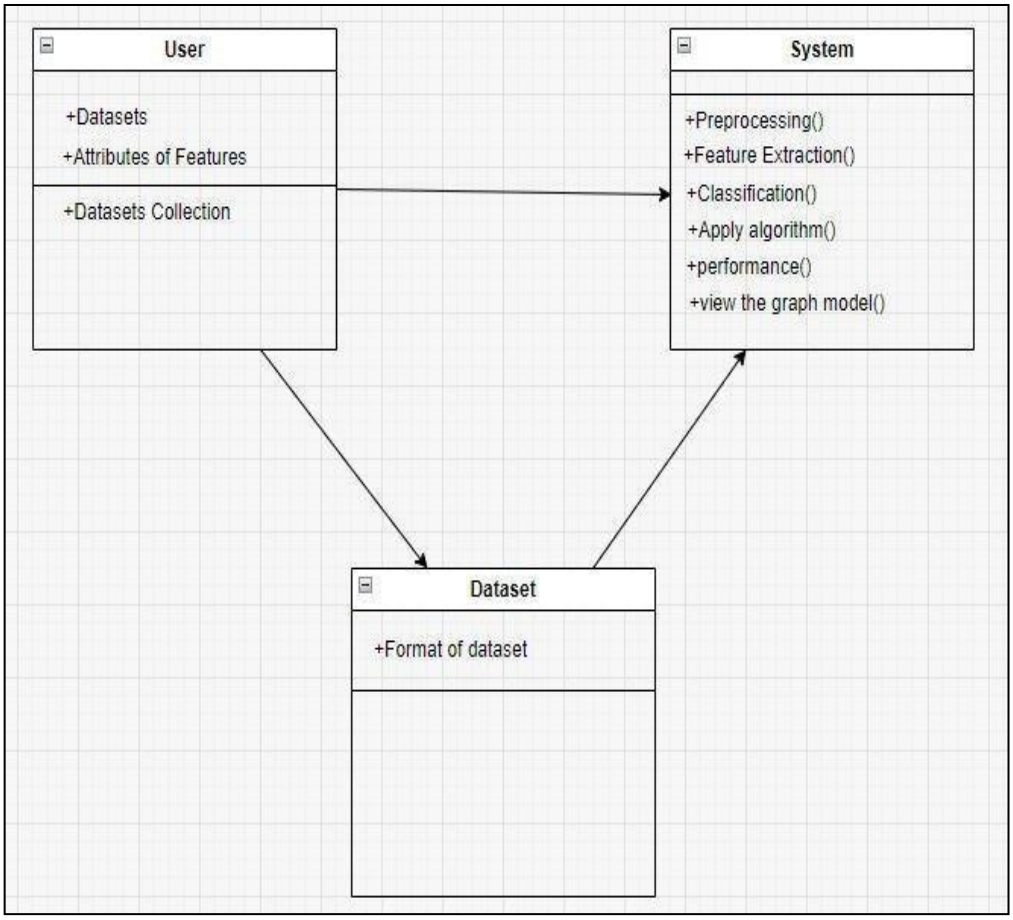

Fig 4.3 Class Diagram for Cryptocurrency Price prediction

4.2.3 Activity Diagrams

Activity diagrams are graphical representations of Workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. An activity diagram shows the overall flow of control.

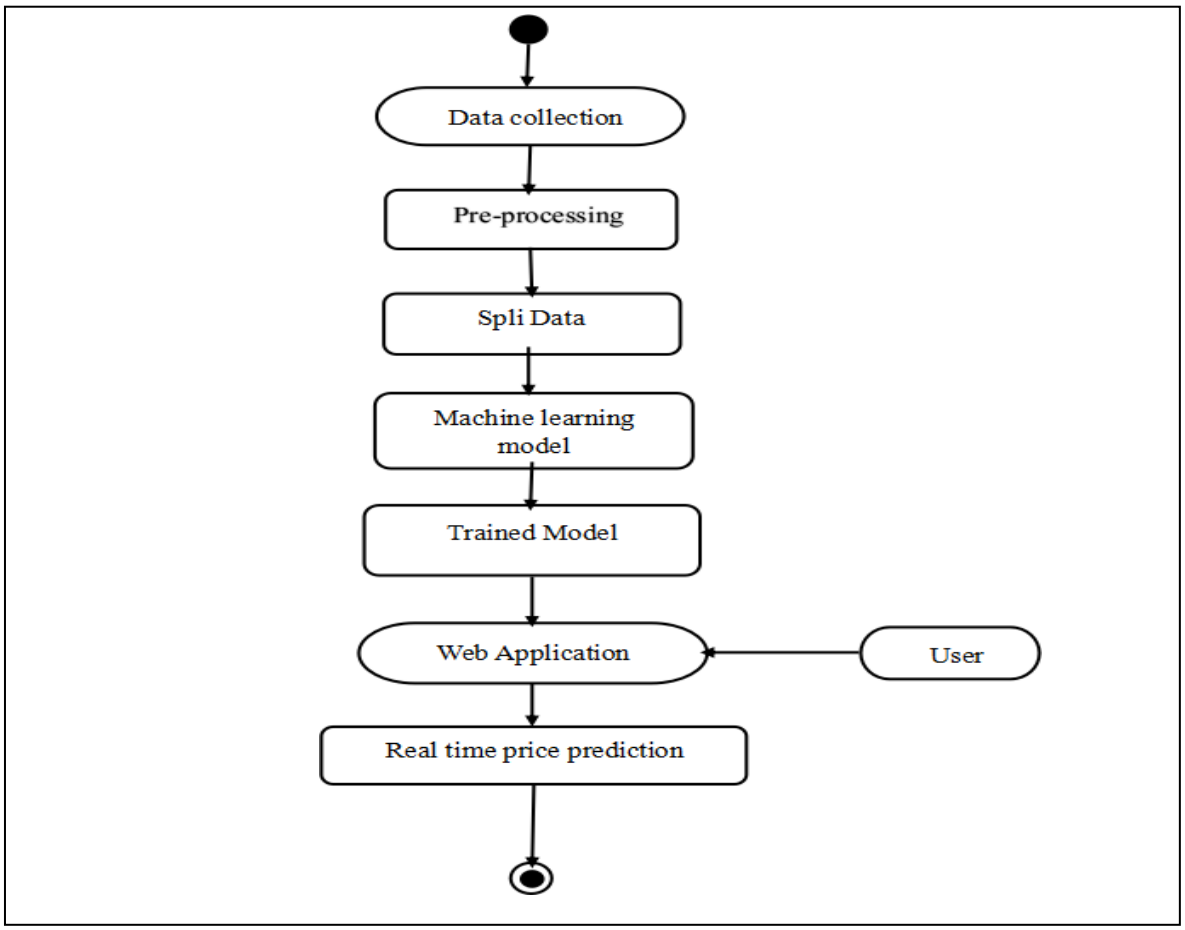

Fig 4.3 Activity Diagram for Cryptocurrency price prediction

4.2.4 Sequence Diagram

Sequence Diagrams Represent the objects participating the interaction horizontally and time vertically. A Use Case is a kind of behavioral classifier that represents a declaration of an offered behavior. Each use case specifies some behavior, possibly including variants that the subject can perform incollaboration with more actors. Use cases define the offered behavior of the subject without reference to its internal structure. These behaviors, involving interactions between the actor and the subject, may result in changes to the state of the subject and communications with its environment. A use case can includeexceptional behavior and with the error handling methods .

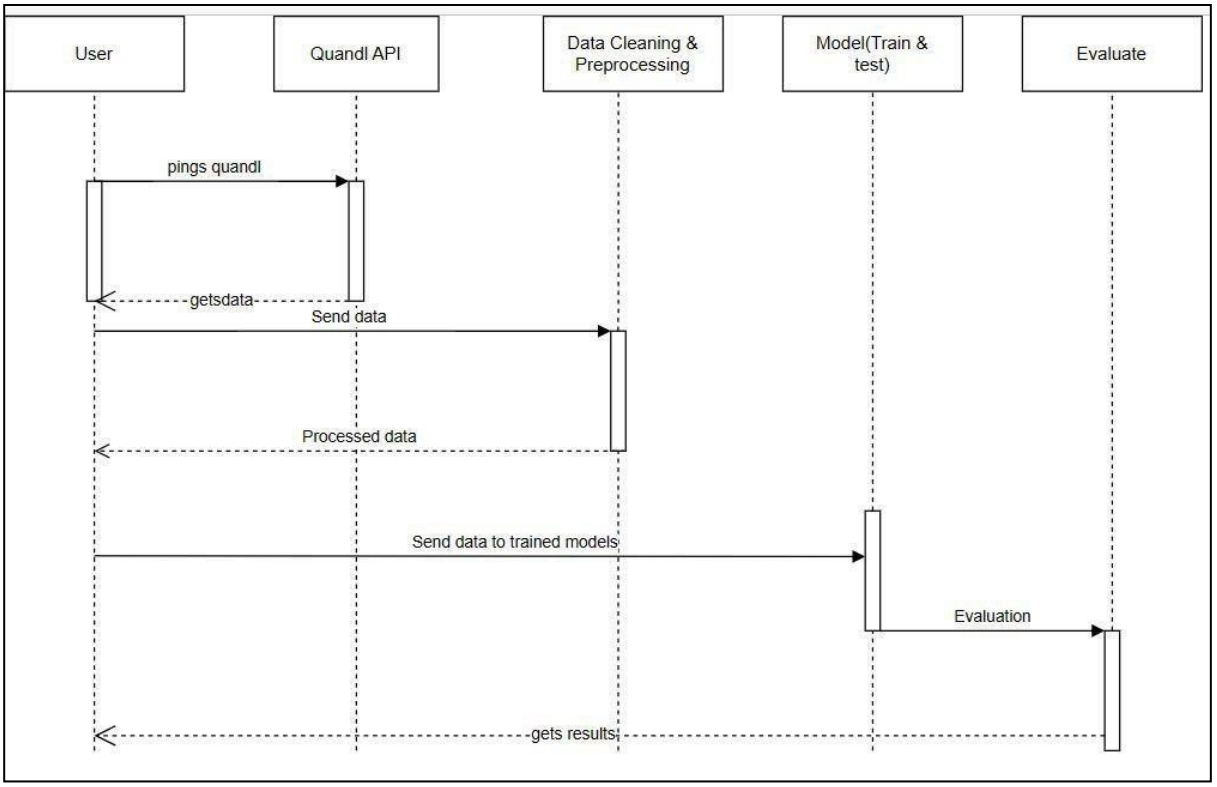

Fig 4.5 Sequence Diagram for Cryptocurrency Price Prediction

4.2.5 Collaboration Diagram

The second interaction diagram is collaboration diagram. It shows the object organization as shown below. Here in collaboration diagram the method call sequence is indicated by some numbering technique as shown below. The number indicates how the methods are called one after another. We have taken the same order management system to describe the collaboration diagram.

The method calls are similar to that of a sequence diagram. But the difference is that the sequence diagram does not describe the object organization whereas the collaboration diagram shows the object organization. Now to choose between these two diagrams the main emphasis is given on the type of requirement. If the time sequence is important then sequence diagram is used andif organization is required then collaboration diagram is used.

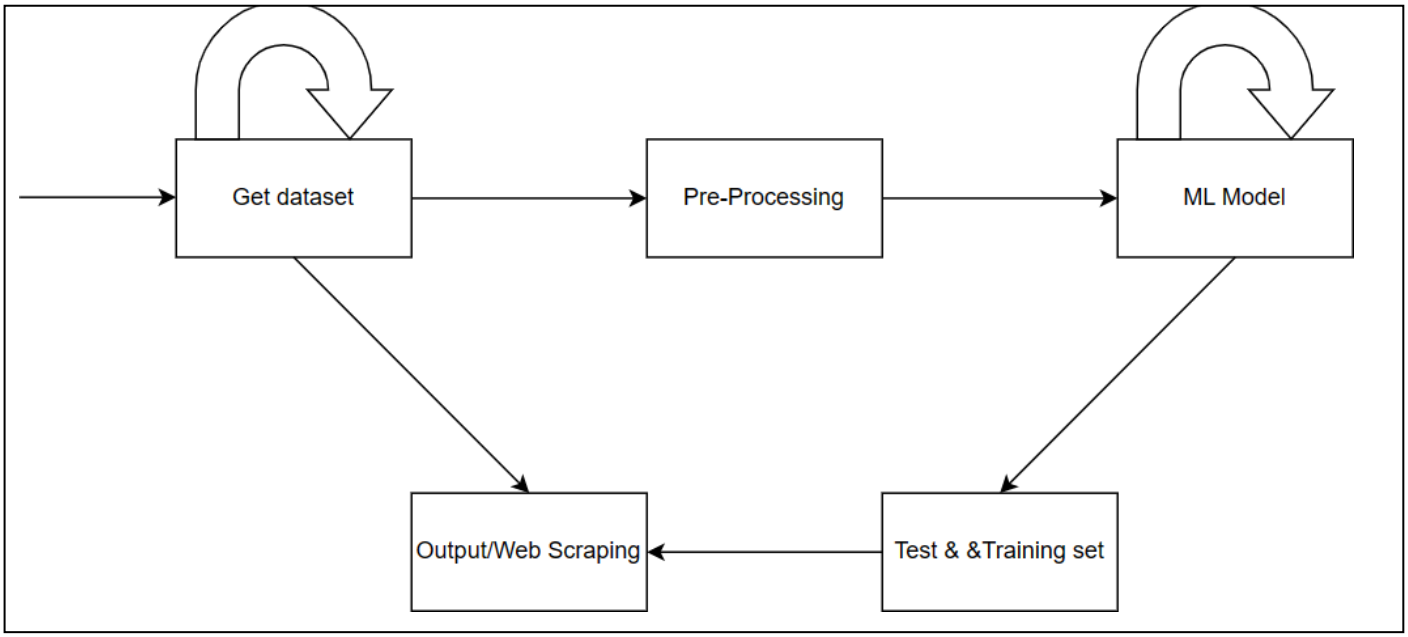

Fig 4.6 Collaboration diagram for Cryptocurrency price prediction

CHAPTER 5

IMPLEMENTATION

5.1 MODULES

- Dataset Analysis
- Data Pre-Processing
- Test/Train
- Web Scrapping

5.1.1 Datasets Analysis

- Bitfinex is Cryptocurrency Exchange to predict or invest in crypto.
- Open price: the open represents the first price traded during the candlestick.
- High price: the high is the highest price traded during the candlestick.
- Low: the low shows the lowest price traded during the candlestick.
- Close: the close is the last price traded during the candlestick.
- Volume (btc): volume, in btc traded in the stock market during a givenmeasurement interval.
- Volume (currency): volume, in used, traded on stock market during a givenmeasurement interval.
- Weighted price: measure of the average price.

5.1.2 Data Preprocessing

Data preprocessing is a crucial step in preparing data for machine learning models.It involves cleaning and transforming the data to make it ready for modeling. The main goal is to remove any inconsistencies, redundancies, or errors in the data and convert it into a format that the machine learning algorithm can use. Remove unwanted columns.Check nan values

5.1.3 Test/Train

Random forest/Linear regression-Grid search method

Now we will fit the random forest algorithm to the training set. To fit it, we will import the random forest classifier class from the sklearn. ensemble library. Grid search is a process that searches exhaustively through a manually specified subset of the hyperparameter space of the targeted algorithm. Random search, on the other hand, selects a value for each hyperparameter independently using a probability distribution.

Evaluation-Testing

Rmse (root mean square error) - root mean square error (rmse) is a frequently used measure of the differences between values (sample or population values) predicted by a model or an estimator and the values observed.

R (pearson's correlation coefficient) the pearson's correlation coefficient depicts the linear association between two variables. It helps to figure if two sets of data move in the same direction.

5.1.3 Web Scrapping

Send an HTTP request to the URL of the webpage you want to access. The server responds to the request by returning the HTML content of the webpage. For this task, we will use a third-party http library for Python requests. Once we have accessed the HTML content, we are left with the task ofparsing the data. Since most of the HTML data is nested, we cannot extract data simply through string processing. One needs a parser that can create a nested/tree structure of the HTML data. There are many html parser libraries available but the most advanced one is html5lib. Now, all we need to do is navigate and search the parse tree that we created, i.e. Tree traversal. For this

task, we will be using another third-party Python library, beautiful soup. It is a python library for pulling data out of HTML and XML files.

CHAPTER 6

TESTING

Software testing is an investigation conducted to provide stakeholders with information about the quality of the product or service under test. Software Testing also provides an objective, independent view of the software to allow the business to appreciate and understand the risks at implementation of the software. Test techniques include, but are not limited to, the process of executing a program or application with the intent of finding software bugs.

Software Testing can also be stated as the process of validating and verifying that a software program/application/product:

- Meets the business and technical requirements that guided its design and Development.
- Works as expected and can be implemented with the same characteristics.

6.1 SYSTEM TESTING

Testing is performed to identify errors. It is used for quality assurance. Testing is an integral part of the entire development and maintenance process. The goal of the testing during phase is to verify that the specification has been accurately and completely incorporated into the design, as well as to ensure the correctness of the design itself. For example the design must not have any logic faults in the design is detected before coding commences, otherwise the cost of fixing the faults will be considerably higher as reflected. Detection of design faults can be achieved by means of inspection as well as walkthrough.

Testing is one of the important steps in the software development phase. Testing checks for the errors, as a whole of the project testing involves the following test cases:

- Static analysis is used to investigate the structural properties of the Source code.

- Dynamic testing is used to investigate the behavior of the source code by executing the program on the test data.

Unit Testing

Unit testing is conducted to verify the functional performance of each modular component of the software. Unit testing focuses on the smallest unit of the software design (i.e.), the module. The white-box testing techniques were heavily employed for unit testing.

Functional Testing

Functional test cases involved exercising the code with nominal input values for which the expected results are known, as well as boundary values and special values, such as logically related inputs, files of identical elements, and empty files.

Three types of tests in Functional test:

- Performance Test
- Stress Test
- Structure Test

Integration Testing

Integration testing is a systematic technique for construction the program structure while at the same time conducting tests to uncover errors associated with interfacing. i.e., integration testing is the complete testing of the set of modules which makes up the product. The objective is to take untested modules and build a program structure tester should identify critical modules. Critical modules should be tested as early as possible. One approach is to wait until all the units have passed testing, and then combine them and then tested. This approach is evolved from unstructured testing of small programs. Another strategy is to construct the product in increments of tested units. A small set of modules are integrated together and tested, to which another module is added

and tested in combination. And so on. The advantages of this approach are that,interface dispenses can be easily found and corrected.The major error that was faced during the project is linking error. When all the modules are combined the link is not set properly with all support files. Then we checked out for interconnection and the links. Errors are localized to the new module and its intercommunications. The product development can be staged, and modules integrated in as they complete unit testing. Testing is completed when the last module is integrated and tested.

White Box Testing

This testing is also called as Glass box testing. In this testing, by knowing the specific functions that a product has been design to perform test can be conducted that demonstrate each function is fully operational at the same time searching for errors in each function. It is a test case design method that uses the control structure of the procedural design to derive test cases. Basis path testing is a white box testing.

Basis path testing:

- Flow graph notation
- Cyclometric complexity
- Deriving test cases
- Graph matrices Control

Black Box Testing

In this testing by knowing the internal operation of a product, test can be conducted to ensure that “all gears mesh”, that is the internal operation performs according to specification and all internal components have been adequately exercised. It fundamentally focuses on the functional requirements of the software.

The steps involved in black box test case design are:

- Graph based testing methods
- Equivalence partitioning
- Boundary value analysis
- Comparison testing

Program Testing

The logical and syntax errors have been pointed out by program testing. A syntax error is an error in a program statement that in violates one or more rules of the language in which it is written. An improperly defined field dimension or omitted keywords are common syntax error. These errors are shown through error messages generated by the computer. A logic error on the other hand deals with the incorrect data fields, out-off-range items and invalid combinations. Since the compiler s will not deduct logical error, the programmer must examine the output. Condition testing exercises the logical conditions contained in a module. The possible types of elements in a condition include a Boolean operator, Boolean variable, a pair of Boolean parentheses A relational operator or on arithmetic expression. Condition testing method focuses on testing each condition in the program the purpose of condition test is to deduct not only errors in the condition of a program but also other an error in the program.

Security Testing

Security testing attempts to verify the protection mechanisms built in to a system well, in fact, protect it from improper penetration. The system security must be tested for invulnerability from frontal attack must also be tested for invulnerability from rear attack. During security, the tester places the role of individual who desires to penetrate system.

Validation Testing

At the culmination of integration testing, software is completelyassembled as a package. Interfacing errors have been uncovered and corrected and a final series of software test-validation testing begins. Validation testing can be defined in many ways, but a simple definition is that validation succeeds when the software functions in manner that is reasonably expected by the customer. Software validation is achieved through a series of black box tests that demonstrate conformity with requirement. After validation test has been conducted, one of two conditions exists.

- The function or performance characteristics confirm to specifications and are accepted.
- A validation from specification is uncovered and a deficiency created.

Deviation or errors discovered at this step in this project is corrected prior to completion of the project with the help of the user by negotiating to establish a method for resolving deficiencies. Thus, the proposed system under consideration has been tested by using validation testing and found to be working satisfactorily. Though there were deficiencies in the system they were not catastrophic

User Acceptance Testing

User acceptance of the system is key factor for the success of any system. The system under consideration is tested for user acceptance by constantly keeping in touch with prospective system and user at the time of developing and making changes whenever required. This is done in regarding to the following points.

- Input screen design.
- Output screen design.

6.2 Test Case

Table 6.2 Test Case

S.NO	Test Case Description	Input	Expected Output	Actual Output
1.	Prediction of Bitcoin price for the next1day based on random Forest	Historical Bitcoin price data for the past month	Predicted Bitcoin price for the next day	1-day price
2.	Prediction of Bitcoin price for the next 7 days based on random forest	Historical Bitcoin price data for the past month	Predicted Bitcoin prices For the next7 days	7-day price
3.	Prediction of Bitcoinprice for the next 30 days based on machine learning random forest algorithms	Historical Bitcoin price data for the past month	Predicted Bitcoin prices for the next 30 day	30-day price
4.	Prediction of bitcoin price for the past data based on technical analysis testing module	Historical Bitcoin price data for the past year	Predicted Bitcoin price for the past day	Graphicaloutput

6.3 Test Case Log

Table 6.3 Test Case Log

S.NO	Test Description	Test Status (Pass/Fail)
1.	Prediction of Bitcoin price for the next1 day based on random forest	Pass
2.	Prediction of Bitcoin price for the next 7 days based on random forest	Pass
3.	Prediction of Bitcoin price for the next 30 days based on machine learning random forest algorithms	Pass
4.	Prediction of bitcoin price for the past data based on technical analysis testing module	Pass

CHAPTER 7
RESULT AND DISCUSSION

Cryptocurrency price prediction using machine learning techniques provide valuable insights into the potential trends and movements of cryptocurrency prices. Data preprocessing, feature engineering, and model training, machine learning models can generate predictions with varying degrees of accuracy. Additionally, the models' ability to capture complex patterns, handle market volatility, and adapt to changing market conditions should be discussed. This analysis helps in understanding the key drivers behind price movements and enables the identification of potential market indicators or predictors. Cryptocurrency markets are highly volatile and influenced by various factors, including regulatory changes, marketsentiment, and macroeconomic events, which can make accurate predictionsdifficult. The discussion should highlight the potential risks and uncertainties associated with relying solely on machine learning models for investment decisions.

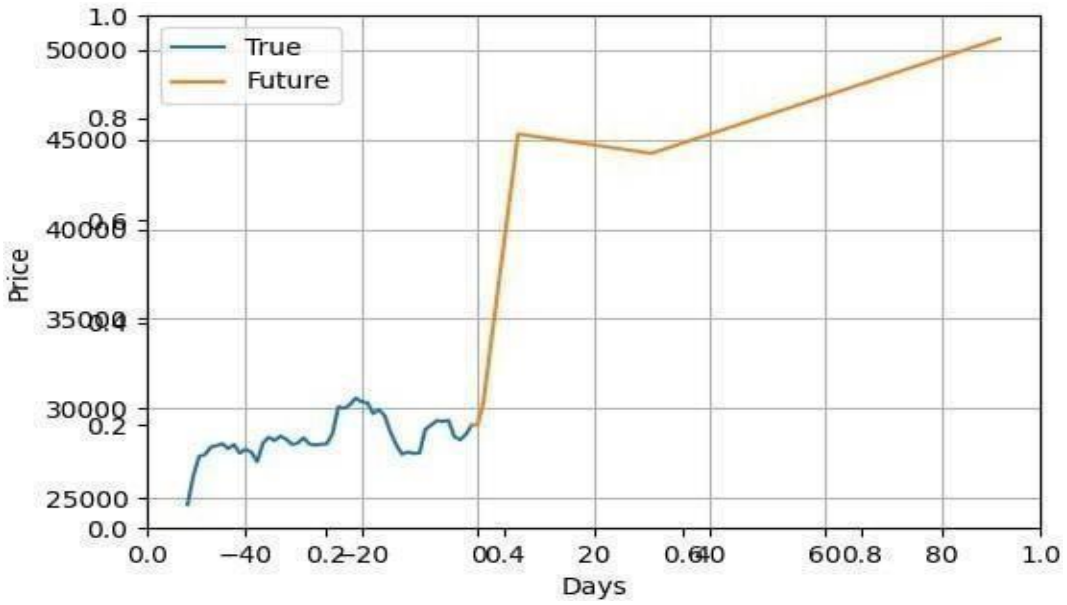

Fig 7.1 Accuracy Price Prediction

CHAPTER 8

USER MANUAL

Step 1: To download and install Python, visit the official website of Python https://www.python.org/downloads/ and choose your version. We have chosen Python version 3.6.3

Step 2: Once the download is completed, run the .exe file to install Python. Now click on Install Now.

Step 3: You can see Python installed at this point.

Step 4: When it finishes, you can see a screen that says the Setup was successful. Now click on "Close".

How to install the pycharm

Here is a step by step process on how to download and install Pycharm IDE on Windows:

Step 1: To download Pycharm visit the website and Click the "DOWNLOAD" link under the community section.

Step 2: Once the download is complete, run the exe for install PyCharm. The setup wizard should have started. Click "Next".

Step 3: On the next screen, Change the installation path if required. Click "Next".

Step 4: On the next screen, you can create a desktop shortcut if you want and click on "Next".

Step 5: Choose the start menu folder. Keep selected JetBrains and click on "Install".

Step 6: Wait for the installation to finish.

Step 7: Once the installation is finished, you should receive a message screen that PyCharm is installed. If you want to go ahead and run it,click the "Run PyCharm Community Edition" box first and click "Finish".

Step 8: After you click on "Finish," the Following screen will appear. Click on Configure > Settings to open up settings in PyCharm Search for "Project Interpreter". My PyCharm looks like thisClick on Add local via the settings on the right side Select "anaconda environment"

Step 9: Click on "Existing environment" and navigate to the environment that you want to use. Note that you have to select the bin/python file inside the conda environment for PyCharm to be able to recognize the environment Make sure to click the "Make available to allprojects" if you want the interpreter to be used by multiple projects

Click ok and you are done

CHAPTER 9
CONCLUSION

Bitcoin's price is influenced by various factors. The proposed predictive model, which incorporates multiple parameters, was able to accurately forecast Bitcoin's closing price for the following day. The model can be helpful for investors and traders looking to make informed decisions about buyingor selling Bitcoin. Furthermore, the project highlights the importance of data analysis and machine learning in understanding and predicting trends in the cryptocurrency market. As blockchain technology continues to evolve, it is likely that Bitcoin will remain a crucial player, and its value will continue to fluctuate. By monitoring and analyzing relevant data points, we can gain insights into the future of Bitcoin and the wider cryptocurrency market.

CHAPTER 10

FUTURE ENHANCEMENT

Improved data analysis as more data becomes available, machine learning models can become more accurate at predicting the accuracy value of cryptocurrencies. This can include incorporating sentiment analysis of news articles and social media posts related to cryptocurrencies, as well as using data from cryptocurrency exchanges to better understand market trends. Integration of blockchain technology can be used to improve the accuracy and transparencyof cryptocurrency prediction models. For example, smart contracts can be used to automate trades based on predicted price movements. The adoption of decentralized prediction markets allows individuals to make predictions on the value of cryptocurrencies, and the wisdom of the crowd can be used to generate more accurate predictions.

APPENDIX
BASE PAPER

A Research On Bitcoin Price Prediction Using Machine Learning Algorithms

Lekkala Sreekanth Reddy, Dr.P. Sriramya

Abstract-- In this paper, we proposed to predict the Bitcoin price accurately taking into consideration various parameters that affect the Bitcoin value. By gathering information from different reference papers and applying in real time ,I found the advantages and disadvantages of bitcoin price prediction. Each and every paper has its own set of methodologies of bitcoin price prediction. Many papers has accurate price but some other don't, but the time complexity is higher in those predictions, so to reduce the time complexity here in this paper we use an algorithm linked to artificial intelligence named LASSO(least absolute shrinkage selection operator. The other papers used different algorithms like SVM(support vector machine),coinmarkupcap, Quandl, GLM, CNN(Convolutional Neural Networks)and RNN(Recurrent neural networks) etc.. which do not have a great time management, but in LASSO finding of the results from a larger database is quick and fast..so for this purpose we draw a comparison between other algorithms and the LASSO algorithm, this survey paper helps the upcoming researchers to make an impact in the their papers. The process happens in the paper is first moment of the research, we aim to understand and find daily trends in the Bitcoin market while gaining insight into optimal features surrounding Bitcoin price. Our data set consists of various features relating to the Bitcoin price and payment network over the course of every years, recorded daily. By preprocessing the dataset, we apply the some data mining techniques to reduce the noise of data. Then the second moment of our research, using the available information, we will predict the sign of the daily price change with highest possible accuracy.

Index terms: Bitcoin , crypto currency, Decision Tree, K-Means Algorithm, Lasso Algorithm, nave Bayes algorithm, Prediction, Random Forest.

INTRODUCTION

Bitcoin is a cryptographic money which is utilized worldwide for advanced installment or basically for speculation purposes. Bitcoin is decentralized for example it isn't possessed by anybody. Exchanges made by Bitcoins are simple as they are not attached to any nation. Speculation should be possible through different commercial centers known as "bitcoin trades". These enable individuals to sell/purchase Bitcoins utilizing various monetary forms. The biggest Bitcoin trade is Mt Gox. Bitcoins are put away in an advanced wallet which is essentially similar to a virtual financial balance. The record of the considerable number of exchanges, the timestamp information is put away in a spot called Block chain. Each record in a block chain is known as a square. Each square contains a pointer to a past square of information. The information on block chain is scrambled. During exchanges the client's name isn't uncovered, however just their wallet ID is made open.

The Bitcoin's worth fluctuates simply like a stock though in an unexpected way. There are various calculations utilized on financial exchange information for value forecast. Notwithstanding, the parameters influencing Bitcoin are extraordinary. In this manner it is important to anticipate the estimation of Bitcoin so right venture choices can be made. The cost of Bitcoin doesn't rely upon the business occasions or mediating government not at all like securities exchange. Hence, to anticipate the worth we feel it is important to use AI innovation to foresee the cost of Bitcoin.

I. LITERATUREREVIEW

Venture based learning is the strategy wherein ventures drive information and is utilized in devoted subjects without arranging the inclusion of the necessary specialized material [1]. This paper talks about the plan and conveyance of venture based learning in software engineering designing as significant task which receives undergrad creativities and underlines on genuine world, open-finished activities. These activities cultivate a wide scope of capacities, not just those identified with content information or specialized aptitudes, yet in addition down to earth abilities. [2] The objective for this creative student venture is to show how a prepared machine model can anticipate the cost of a cryptographic money on the off chance that we give the perfect measure of information and computational influence. It shows a chart with the anticipated qualities. The most well known innovation is the sort of mechanical arrangement that could assist humanity with foreseeing future occasions. With tremendous measure of information being created and recorded consistently, we have at long last approached a time where forecasts can be exact and be produced dependent on concrete true information. Besides, with the ascent of the crypto advanced time more heads have turned towards the computerized market for ventures. This offers us the chance to make a model equipped for anticipating digital currencies fundamentally Bitcoin [3]. This can be practiced by utilizing a progression of AI strategies and philosophies.

The main aim of this paper is to find the actual Bitcoin price in US dollars can be predicted. The Bitcoin Price should be find in the price index of the dataset [1]. The problem will solved by achieved with level of success through high implementation of a Bayesian regression. To optimized recurrent neural network (RNN) and a Long Short Term Memory (LSTM) network. The LST Achieves the highest classification accuracy of 52% and a RMSE of 8% [6]. The popular ARIMA model for time series forecasting is implemented as a comparison to the deep learning models. As expected, the non-linear deep learning methods outperform the ARIMA forecast which performs very low. So, Finally the both learning models are resulted the outcomes are very low level of accuracy. In this section gives the overview of prediction architecture and survey on Bitcoin Price prediction by using the machine learning algorithm techniques highlighted accordingly to survey papers of price predictions base papers. In the measurable

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setting, AI is characterized as a use of computerized reasoning where accessible data is utilized through calculations to process or help the handling of factual information. While AI includes ideas of mechanization, it requires human direction. AI includes a significant level of speculation so as to get a framework that performs well on yet concealed information occasions. AI is a generally new control inside Software engineering that gives an assortment of information examination methods [21]. A portion of these systems depend on entrenched factual strategies (for example strategic relapse and head part investigation) while numerous others are most certainly not. Most measurable procedures pursue the worldview of deciding a specific probabilistic model that best portrays watched information among a class of related models [22]. Likewise, most AI systems are intended to discover models that best fit information (for example they take care of certain improvement issues), then again, actually these AI models are never again limited to probabilistic ones.

II. PREDICTION TECHNIQUES

A. Linear regression model

In linear regression is a linear approach to modeling the relationship between a dependent variable and independent variables. The case of linear variable is called simple linear regression [8]. In this paper I am using the linear regression model for relationship between a dependent variable and one or more independent variables.

B. K-Nearest Neighbor

K-means creates k groups from a set of objects so that the members of a group are more similar and based on this data is clustered as normal, stressed or highly stressed.
[1] We can compute the distance between two dependent and independent variables using some distance function d(x,y), where x,y are scenarios composed Number of features, such that x={x1,…,xN}, y={y1,…,yN} . Break the principal third of the information into all conceivable back to back interims of sizes 180s, 360s and 720s. Apply k-implies grouping to recover 100 bunch communities for every interim size, and afterward use test Entropy to limit these down to the 20 best/generally fluctuated and ideally best bunches. Utilize the second arrangement of costs to figure the comparing loads of highlights discovered utilizing the Bayesian relapse strategy. The relapse fills in as pursues. At time t, assess three vectors of past costs of various time interims (180s, 360s and 720s). For each time interim, ascertain the comparability between these vectors and our 20 best kmeans designs with their realized value hop, to locate the probabilistic value change dp. Compute the loads, for each component utilizing a Differential Advancement enhancement work. [3]. The third arrangement of costs is utilized to assess the calculation, by running the equivalent Bayesian relapse to assess highlights, and consolidating those with the loads determined in stage 2

C. Naïve Bayes

Naïve Bayes techniques are a great deal of coordinated learning figurings reliant on applying Bayes' speculation with the "honest" supposition of opportunity between each pair of features [2]. Overlooking their plainly over-improved suppositions, guiltless Bayes classifiers have worked very well in some genuine conditions. They require a limited measure of preparing information to survey the critical parameters. Honest Bayes understudies and classifiers can be unbelievably speedy appeared differently in relation to progressively present day systems. The decoupling of the class prohibitive component dispersals suggests that each movement can be uninhibitedly evaluated as a one dimensional scattering. This along these lines decreases issues originating from the scourge of dimensionality. We used the execution gave by Scikit-make sense of how to this.

D. Random Forests

Random Forests get the outfit learning framework where distinctive weak understudies are merged to make a strong understudy. It is a meta estimator that fits various decision tree classifiers on various sub-primer of the enlightening assortment and use averaging to improve the farsighted accuracy and authority over fitting. The sub-test size is reliably proportional to the rule data test [2]. We used the use gave by Scikit-see how to this.
1) Build three-time arrangement informational indexes for 30, 60, and 120 minutes (180, 360, 720 information focuses individually) going before the present information point at all focuses in time separately.
2) Run GLM/Random Forest on each of the two time series data sets separately.
3) We get two separate linear models: M1, M2 corresponding to each of the data sets. From M1, we can predict the price change at t, denoted $\Delta P1$. Similarly, we have $\Delta P2$ for M2.

E. CoinMarketCap:

CoinMarketCap keeps a track of all the cryptocurrencies available in the market. They keep a record of all the transactions by recording the amount of coins in circulation and the volume of coins traded in the last 24-hours. They continuously update their records as they receive feeds from various cryptocurrency exchanges [1]. CoinMarketCap provides with historical data for Bitcoin price changes.
1) Log Normalization: In this method, the range is compressed and we get the values that were close to zero before normalization. The function is: A'= log(A)/log(max)
2) Standard deviation normalization: Here, we take into consideration the difference of every value with respect to the mean value. The advantage of this technique is that we get the negative values as well due to proper compression of the Y axis. The formula is $z = (x - \mu) / \sigma$.
3) Z score normalization: This method uses technique similar to standard deviation method by considering the mean value.
5) Boxcox normalization: The function used is:-
data(λ)=(data^λ−1)/λ ….λ is not = 0
data(λ)=log(data) …λ is = 0
The sudden changes in data are observed significantly in this type of normalization, so that the data can be processed more accurately.

III. PROPOSED METHODOLOGY

(i) Algorithm

A. Least Absolute shrinkage selection operator(LASSO):

In estimations and AI, rope (least absolute shrinkage selection operator or LASSO) is a lose the faith assessment framework that performs both variable choice and regularization so as to refresh the check exactness and interpretability of the legitimate model it produces [13]. Diverse tie assortments have been made so as to fix certain constraints of the fundamental strategy and to make the system dynamically huge for unequivocal issues [14]. In every practical sense these emphasis on as for or using various sorts of conditions among the co variates. Adaptable net regularization fuses an extra edge lose the faith like order which improves execution when the measure of markers is more noteworthy than the model size, enables the technique to pick ardently related factors together, and improves generally want accuracy [15].

B. Decision Tree

This is one of my preferred calculation and I use it oftentimes. It is a kind of directed learning calculation that is for the most part utilized for order issues. Shockingly, it works for both clear cut and consistent ward factors. In this calculation [8], we split the populace into at least two homogeneous sets. This is done dependent on most huge properties/autonomous factors to make as particular gatherings as could reasonably be expected.

C. kNN (k- Nearest Neighbors)

It very well may be utilized for both order and relapse issues. Be that as it may, it is all the more generally utilized in characterization issues in the business [10]. K nearest neighbors is a straight forward calculation that stores every single accessible case and arranges new cases by a lion's share vote of its k neighbors. The case being alloted to the class is generally normal among its K closest neighbors estimated by a separation work. These separation capacities can be Euclidean, Manhattan, Minkowski and Hamming separation. Initial three capacities are utilized for constant capacity and fourth one (Hamming) for clear cut factors. On the off chance that K = 1, at that point the case is basically relegated to the class of its closest neighbor. Now and again, picking K ends up being a test while performing kNN displaying.

(ii) Block Diagram:

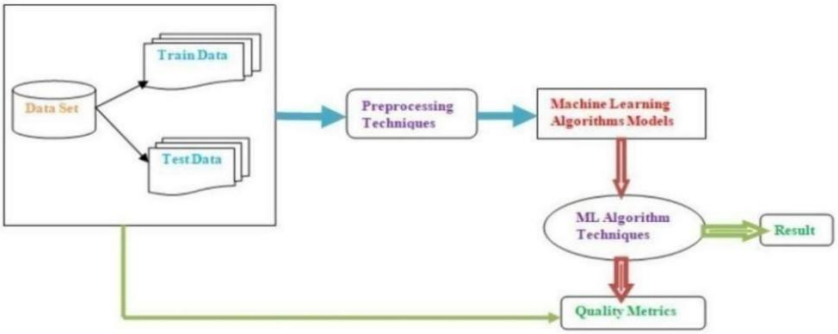

Fig.1.Bitcoin price prediction

IV. Result and Discussion

Model Test	k-Nearest Neighbors(KNN)	Ridge Regression	Polynomial Regression	Linear Regression	Random Forest
Training RSS(Residual Sum of Squares)	92.99%	75.7%	84.2%	94.6%	89.78%
Test(Residual Sum of Squares)	90.5%	12.4%	79.99%	96.99%	71.56%

***Table 1**: Comparison Table for Machine Learning Algorithm Model Accuracy*

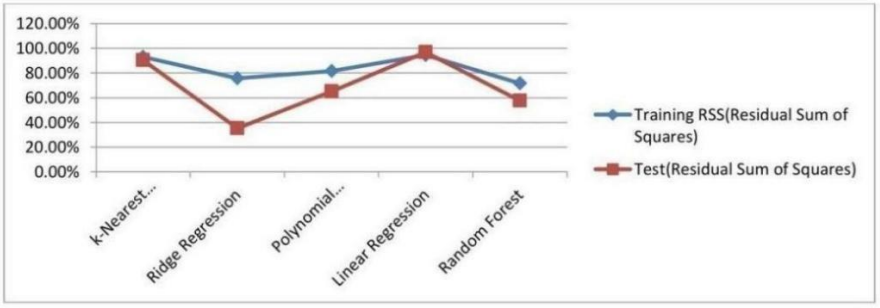

Fig 2: *Accuracy Graph for Machine Learning Algorithm*

Title of Paper	Algorithm	Advantages	Disadvantages
[1]Predicting Bitcoin Prices using Deep Learning	➢ SVM(Support Vector machine)	➢ It is convincing in high dimensional spaces. ➢ It works well with clear margin of separation. ➢ It is effective in cases where number of dimensions is greater than the number of samples.	➢ It does not perform well, when we have large data set. ➢ Low performance if the data set is noisy.
[2] Bitcoin Price Prediction using Machine Learning	➢ Bayesian Regression and GLM/Random forest:	➢ It works the prediction by taking the coinMarkup cap. ➢ Quandl is used to filter the dataset by using the MAT Lab properties.	➢ It is a long process for filter the data. ➢ Low redundancy to perform the prediction.
[3] Bitcoin Volatility Forecasting with a Glimpse into Buy and Sell Orders.	➢ LSTM(Long Short Term Memory) and ARIMA(Autoregressive integrated moving average)	➢ It is easy way to buy and sell the Bitocins. ➢ The process of buying and selling the Bitcoins are done in online. ➢ It is comfortable place to done the transactions.	➢ One drawback is there is no proof for transaction. ➢ Conversion will be late.
[4] Bayesian regression and Bitcoin	➢ Bayesian regression	➢ The Advantage of Bayesian regression in Bitcoin price prediction results has been showed in binary values. ➢ It helps to understand the results very neatly.	➢ It takes long time to solve the data set.
[5] Project Based Learning: Predicting Bitcoin Prices using Deep Learning	➢ CNN(Convolutional Neural Networks)and RNN(Recurrent neural networks)	➢ The main Advantage of CNN is Weight Sharing. ➢ It is easily calculate the large data set prices.	➢ The Convolution is a significantly slower operation then, say maxpool, both forward and backward.

Table 2: *Comparison table for various Machine Learning Algorithms*

VI. CONCLUSION

In this paper we conclude that survey report will be just introducing modules of Bitcoin price prediction and machine algorithms. Hear the Comparison table of ML algorithm model accuracy which tells that the Linear regression model will have most accuracy then the other algorithms. In this paper we conclude that the linear regression algorithm is more efficient then the other algorithms. By taking help from that linear regression algorithm, We can implement the LASSO also. The time complexity reduction in bit coin price prediction using LASSO algorithm is tested by referring all other algorithms and came to a conclusion that LASSO is the best among all. The machine learning algorithms will improves that feature idea of crypto currencies. That will improves the market price of globule investments. In this paper we proposed the new algorithm to find the feature price accuracy. That helps the customer increments and profits.

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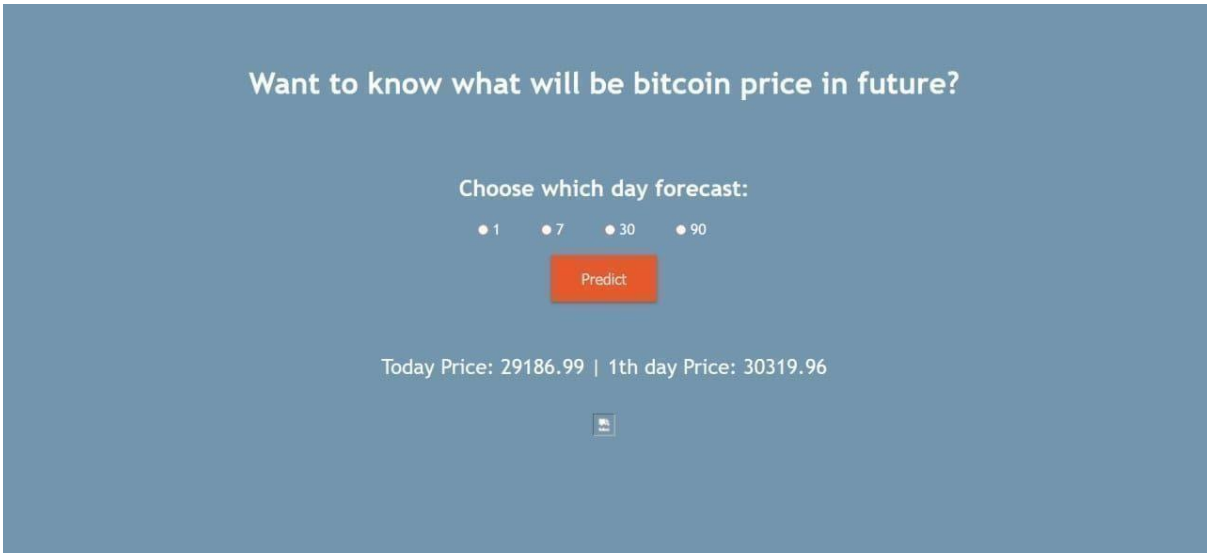
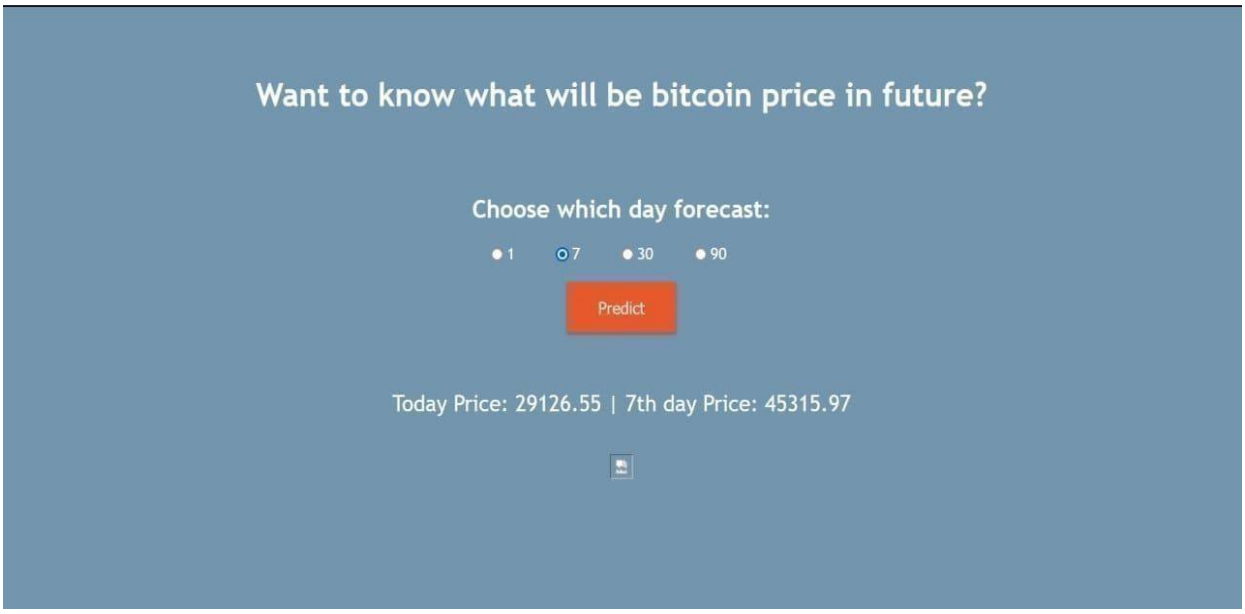
APPENDIX – II

SCREENSHOTS

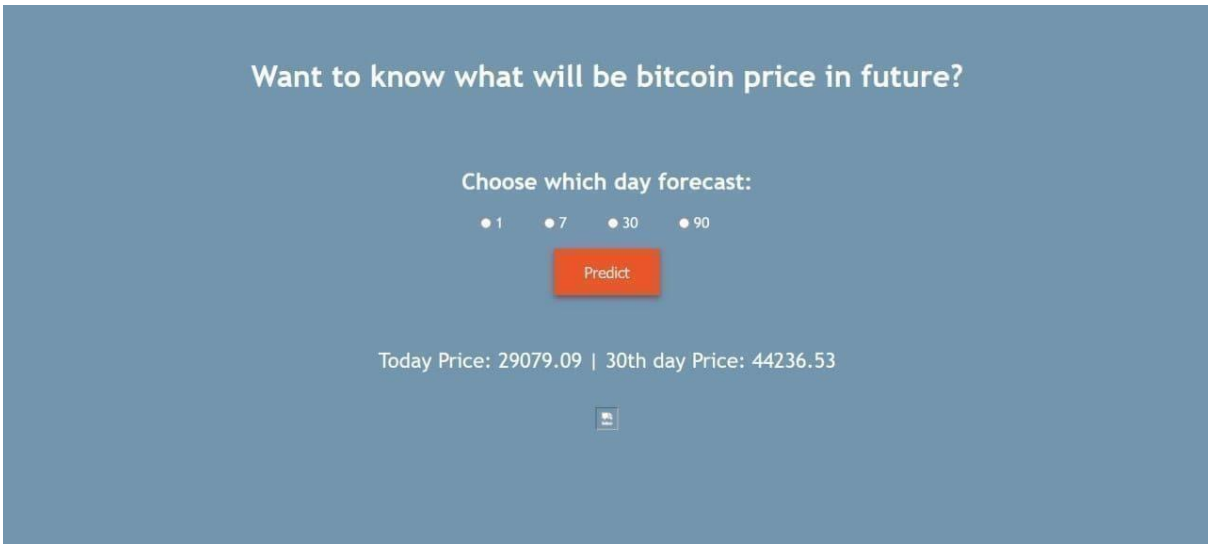
Cryptocurrency Price Prediction Value For 1 Day



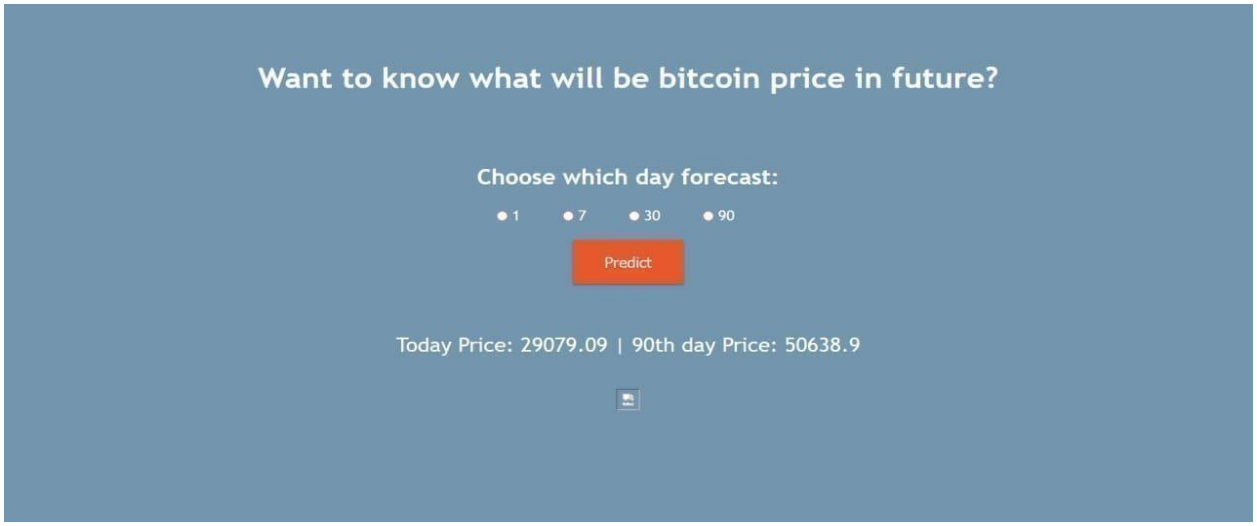
Cryptocurrency Price Prediction Value For 7 Day



Cryptocurrency Price Prediction Value For 30 Day



Cryptocurrency Price Prediction Value For 1 Day



APPENDIX -III

PUBLICATION

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Cryptocurrency Price Prediction using Machine Learning

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Abstract: The dominant asset, Bitcoin, has a significant impact on blockchain technology. In project, proposed to correctly forecast the Bitcoin price while taking into account a number of factors that influence the Bitcoin value. In addition to learning about the best features related to Bitcoin price, our goal is to comprehend and identify everyday trends in the Bitcoin market. data set comprises of different elements that have been tracked daily over the course of each year in relation to the Bitcoin price and payment network. To forecast the closing price of the following day, factors including the opening price, highest price, lowest price, closing price, volume of Bitcoin, volume of other currencies, and weighted price were taken into account. Using the Scikit-Learn tools and the random forest model, predictive.

Keywords: Machine learning, Time series analysis, Sentiment analysis, Regression analysis, Deep learning, and other.

I. INTRODUCTION

Bitcoin is a digital currency that was introduced in 2009 and has since gained immense popularity due to its decentralized and secure nature. Its price has been volatile, with sudden surges and drops in value. Predicting the future price of Bitcoin has become a topic of great interest among investors and traders. Machine learning algorithms have emerged as a popular method for predicting Bitcoin prices.Machine learning models can analyze vast amounts of data, including historical price data, social media sentiment, and news articles, to identify patterns and make predictions. These models can use a variety of techniques, such as regression, time series analysis, and deep learning, to predict the future price of Bitcoin.However, it is important to note that predicting the future price of Bitcoin is a challenging task due to the high level of volatility and unpredictability of the cryptocurrency market. The accuracy of machine learning models for Bitcoin price prediction can also be affected by external factors such as government regulations and global economic events.Despite these challenges, the potential rewards of accurate Bitcoin price prediction using machine learning are significant. Investors and traders can use these predictions to make informed decisions about buying, selling, and holding Bitcoin, potentially increasing their profits and minimizing their risks. As the use of machine learning in finance continues to grow, it is likely that more sophisticated and accurate models will be developed for predicting the future price of Bitcoin and other cryptocurrencies.Its value has seen significant fluctuations since its inception in 2009, reaching an all-time high of nearly $65,000 in April 2021. Predicting the future price of Bitcoin has been a topic of interest for investors, traders, and researchers alike.One approach to predicting Bitcoin prices is through machine learning techniques. Machine learning models can analyze historical price data, identify patterns, and make predictions about future prices. These models can take into account various factors such as market sentiment, trading volume, and network activity to generate price predictions.Several machine learning models have been applied to Bitcoin price prediction, including regression, time series analysis, and neural networks. These models can be trained on historical price data and then used to make future price predictions.Despite the potential benefits of using machine learning for Bitcoin price prediction, it is important to note that the cryptocurrency market is highly volatile and unpredictable. Therefore, any predictions made using machine learning models should be taken with caution and should not be relied upon as investment advice.Bitcoin is a decentralized digital currency that has gained widespread attention in recent years. It operates on a peer-to-peer network, without the need for a central authority. As such, Bitcoin's price is determined by market forces of supply and demand, making it highly volatile and subject to speculation.Machine learning has emerged as a powerful tool for analyzing and predicting financial markets. By leveraging historical data, machine learning algorithms can identify patterns and trends that may not be apparent to human analysts. This has led to a growing interest in using machine learning to predict Bitcoin prices.However, predicting Bitcoin prices is a challenging task due to the complexity and volatility of the cryptocurrency market. In addition, Bitcoin's price is influenced by a wide range of factors, including economic, political, and technological developments.Despite these challenges, there have been several attempts to use machine learning to predict Bitcoin prices. These approaches typically involve training a model on historical Bitcoin price data and using it to make predictions about future prices.While these models have shown some success in predicting short-term price movements, they are less reliable over longer time horizons. This is due to the inherent unpredictability of the cryptocurrency market, as well as the fact that Bitcoin's price is influenced by a wide range of factors that may not be captured by historical

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data.Overall, while machine learning has the potential to improve our understanding of Bitcoin prices, it is important to approach this task with caution and to consider the limitations of these models.

II. RELATED WORK

There have been several studies on using machine learning to predict cryptocurrency prices, including Bitcoin. These studies have employed various machine learning algorithms and data sources to make predictions about future prices. Some notable examples of related work include: "Predicting Cryptocurrency Prices with Machine Learning" by Fabian Dablander and Daniel Egger. This study uses a random forest algorithm to predict the prices of several cryptocurrencies, including Bitcoin. The authors found that their model was able to achieve high accuracy in predicting short-term price movements.[1]"Bitcoin Price Prediction using LSTM Neural Network" by Nitin Sharma and Prashant Singh. This study uses a long short-term memory (LSTM) neural network to predict the price of Bitcoin. The authors found that their model was able to accurately predict Bitcoin prices over a period of several months.[2]"Bitcoin Price Prediction using Machine Learning: An Approach to Currency and Exchange Rate Forecasting" by Flavio Villanustre et al. This study uses a combination of machine learning algorithms, including random forest, decision trees, and gradient boosting, to predict Bitcoin prices. The authors found that their model was able to accurately predict Bitcoin prices over a period of several weeks.[3]"Predicting the Price of Bitcoin Using Machine Learning" by Stefan Jansen. This study uses a support vector regression (SVR) algorithm to predict the price of Bitcoin. The author found that their model was able to accurately predict Bitcoin prices over a period of several months.[4]One popular approach is to use deep learning algorithms, such as recurrent neural networks (RNNs) and long short-term memory (LSTM) networks, to analyze historical cryptocurrency price data. For example, a study by Kumar et al. (2019) used an LSTM model to predict Bitcoin prices based on historical price data, technical indicators, and sentiment analysis of social media data. The study showed that the LSTM model outperformed traditional machine learning algorithms, such as linear regression and support vector regression, in predicting Bitcoin prices.[5]Other studies have focused on the relationship between cryptocurrency prices and other economic factors, such as macroeconomic indicators and market sentiment. For instance, a study by Al-Yahyaee et al. (2020) used a random forest regression model to predict Bitcoin prices based on macroeconomic factors such as GDP, inflation, and interest rates. The study found that these factors had a significant impact on Bitcoin prices and could be used to predict short-term price movements.[6]Another approach is to use sentiment analysis of social media data to predict cryptocurrency prices. For example, a study by Moraes et al. (2021) used a combination of deep learning and sentiment analysis techniques to predict Bitcoin prices based on social media data from Twitter. The study found that sentiment analysis could be used to predict short-term price movements with a high degree of accuracy.[7]Overall, these studies demonstrate the potential of machine learning to predict cryptocurrency prices, although their results vary in terms of accuracy and the length of time over which predictions can be made. It is important to note that cryptocurrency markets are highly volatile and subject to a wide range of factors

III. EXISTING SYSTEM

The issue will be successfully addressed by employing a Bayesian regression to its fullest extent. Long Short-Term Memory (LSTM) network and recurrent neural network (RNN) optimization. The LST achieves the best RMSE of 8% and classification accuracy of 52%.In contrast to the deep learning models, the well-known ARIMA model for time series forecasting is used. As anticipated, the non-linear deep learning techniques.beat the poor-performing ARIMA forecast. Therefore, the final results of both learning models have a very low degree of accuracy.The range is compressed using the log normalization technique, and the values that were close to zero before normalization are obtained. This is the formula: A'= log(A)/log(max) Standard deviation normalization is done here by assuming.

IV. PROPOSED SYSTEM

To test and train the ML in this research, used Bitfinex data sets spanning five years. The preprocessing of the data was carried out with the aid of Python tools.The best feature for data analysis and visualization has been given by Python. After analyzing the data, trim it and use the features or traits that are most appropriate for the model.

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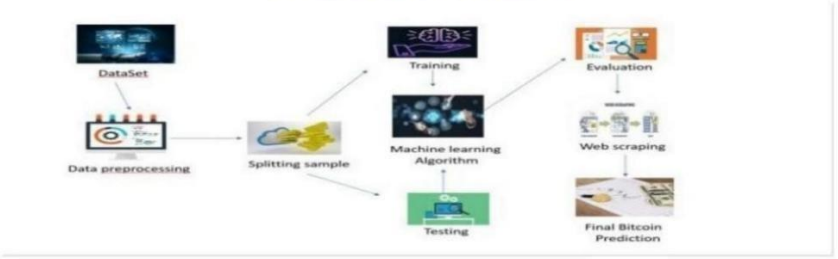

FIG 1. SYSTEM ARCHITECTURE DIAGRAM

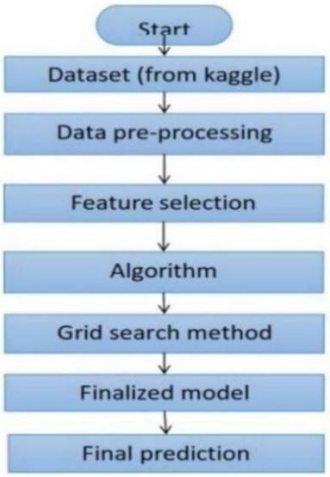

FIG 2. FLOW CHART DIAGRAM

IV. IMPLEMENTATION

A. MACHINE LEARNING

Machine learning (ML) is an area of study focused on comprehending and developing "learning" methods, or methods that use data to enhance performance on a particular set of tasks. It is assumed to be a component of artificial intelligence. Without being expressly programmed to do so, machine learning algorithms create a model from sample data, also referred to as training data, in order to make predictions or decisions. Machine learning algorithms are used in a broad range of applications, including computer vision, speech recognition, email filtering, medicine, and agriculture, where it is challenging or impractical to create conventional algorithms that can perform the required tasks. Computational statistics, which centers on using computers to make predictions, and a subset of machine learning are closely related.

B. DATASET

BitfinexOpen price: The open reflects the candlestick's first traded price.High price: The high represents the amount at which the candlestick was traded.Low: The low displays the candlestick's lowest transacted price. closure: The closing price for a candlestick is known as the closure. Volume (btc): The quantity of bitcoins traded during a specific measurement period. Volume (currency): The total amount exchanged on the stock market over a specific time period. Weighted price: an indicator of the cost on average.

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C. DATA PREPROCESSING

During this step, data is checked for duplicates, cleaned for purity, and potential patterns are found to produce results that are acceptable. All presumptions are validated in this stage, and a sort of hypothesis is created and tested using conventional statistical models.This step-by-step procedure is known as statistical analysis, and it is essential to the predictive analysis method. Remove unnecessary columns and look for nan numbers.

D. TRAINING

RANDOM FOREST/LINEAR REGRESSION – GRID SEARCH METHOD

The random forest algorithm will now be fitted to the training collection. Importing the random forest classifier class from sklearn.ensemble package will help us fit it. Grid search is the process of exhaustively searching through a personally chosen subset of the targeted algorithm's hyperparameter space. While using a probability distribution, random search chose a value for each hyperparmeter separtely.

EVALUATION- TESTING

Root mean square error (RMSE) is a commonly used indicator of the discrepancies between values (sample or population values) predicted by a model or estimator and the values actually observed.

R stands for the Pearson correlation coefficient. The linear relationship between two variables is shown by Pearson's correlation coefficient. Finding out if two sets of data flow in the same direction is usefuL

E. WEB SCRAPING

Send an HTTP request to the website's URL that you wish to view. The HTML text of the webpage is returned by the server in response to the request. will use a third-party http library for Python requests for this job.The next step is to parse the data after having viewed the HTML content.cannot retrieve data using Python requests for this job. The next step is to parse the data after having viewed the HTML content.cannot retrieve data using string processing because the majority of this job. The next step is to parse the data after having viewed the HTML content.cannot retrieve data using string processing because the majority of HTML data is nested. A parser that can organize HTML data into a layered or tree structure is required of processing linears of the string processing because the majority of this job.The next step is to parse the data after having viewed the HTML content.cannot retrieve data using string processing because the majority of HTML data is nested.Although there are many HTML parser libraries accessible, html5lib is the most cutting-edge. the webpage is returned by the server in response to the request. will use a third-party http library for Python requests for this job. The next step is to parse the data after having viewed the HTML content.cannot retrieve data using string processing because the majority of this job. The next step is to parse the data after having viewed the HTML content.cannot retrieve data using string processing because the majority of HTML data is nested. A parser that can organize HTML data into a layered or tree structure is required. Although there are many HTML parser libraries accessible, html5lib is the most cutting-edge. All that remains is for us to perform tree traversal, or traversing and searching within the parse tree just built As an AI language model, I cannot write code or create a specific project for you. However, I can provide some general guidance on how to approach the task of predicting cryptocurrency prices using machine learning and web scraping techniques. Firstly, web scraping is the process of extracting data from websites. In the case of Bitfinex, you can use Python libraries such as BeautifulSoup and Requests to scrape data from the site's API. Once you have scraped the data, you can store it in a database or a CSV file for later use. Secondly, machine learning algorithms can be used to make predictions based on historical data. You can use Python libraries such as Scikit-learn and Keras to train and test machine-learning models. For cryptocurrency price prediction, you can use regression models such as Linear Regression or Decision Trees. You can also use more advanced models such as LSTM or GRU to capture the time-series nature of the data. Overall, predicting cryptocurrency prices using machine learning and web scraping is a challenging task that requires a good understanding of both domains. Good luck with your project.

VI. RESULT AND DISCUSSION

Cryptocurrency price prediction using machine learning has been an active area of research in recent years. With the increasing popularity of cryptocurrencies and the volatility of their prices, accurate predictions of future prices can be very useful for investors and traders. Machine learning techniques have been used to predict cryptocurrency prices based on historical data, news articles, social media sentiment, and various other factors.One popular approach to cryptocurrency price prediction using machine learning is the use of deep learning models, such as neural networks. These models can analyze large amounts of historical price data and identify patterns that can be used to predict future prices. In addition, deep learning models can incorporate other relevant information, such as news articles and social media sentiment, to make more accurate predictions.Another approach to cryptocurrency price prediction is the use of time series analysis. Time series analysis involves analyzing trends in data over time to identify patterns that can be used to

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make predictions. This approach can be particularly effective for cryptocurrencies, as their prices tend to exhibit clear trends and patterns over time.One challenge in using machine learning for cryptocurrency price prediction is the high level of volatility and unpredictability of cryptocurrency prices. Cryptocurrency prices can be affected by a wide range of factors, including news events, regulatory changes, and market sentiment. As a result, it can be difficult to accurately predict future prices using machine learning models alone.To address this challenge, some researchers have proposed the use of hybrid models that combine machine learning with other approaches, such as expert knowledge or economic models. For example, one study used a hybrid approach that combined machine learning with a Bayesian regression model to predict the price of Bitcoin. The authors found that this hybrid model outperformed other machine learning models in terms of accuracy.Cryptocurrency price prediction using machine learning is an exciting and challenging field that has gained much attention in recent years. The goal is to develop models that can accurately forecast the prices of cryptocurrencies such as Bitcoin, Ethereum, and others. These models can be used by investors and traders to make informed decisions on buying, selling or holding their crypto assets.Machine learning algorithms such as neural networks, decision trees, and regression models are commonly used for cryptocurrency price prediction. These algorithms are trained on historical price data and can learn patterns and trends that can be used to make predictions. The more data that is fed into the model, the better it can learn and make accurate predictions. While there is no guarantee of success, the development of accurate prediction models can provide valuable insights and help investors and traders make informed decisions. The use of advanced machine learning techniques and data normalization can help improve the accuracy of these models, but further research is needed to address the challenges of the volatile and unregulated cryptocurrency market.

FIG 3.SAMPLE OUTPUT

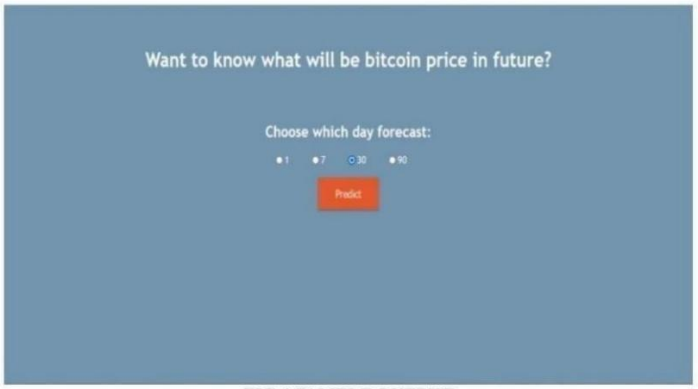

FIG 4.SAMPLE OUTPUT

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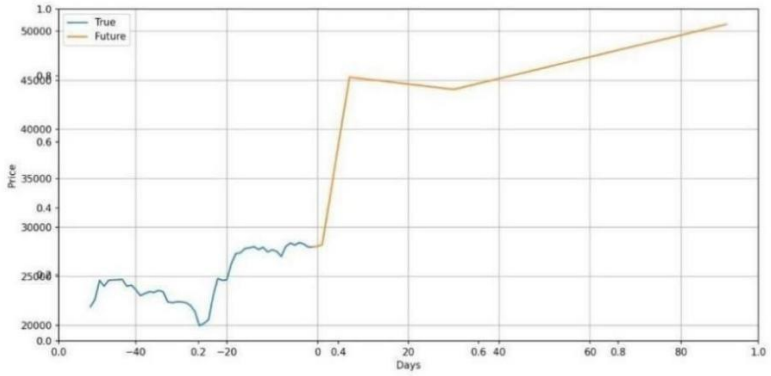

FIG 5.SAMPLE OUTPUT

VII.CONCLUSION

Cryptocurrency price prediction using machine learning is a promising area of research that has gained significant attention in recent years. Various machine learning algorithms such as neural networks, random forests, and support vector regression have been used to predict cryptocurrency prices. These algorithms use historical price data, trading volumes, social media sentiment, and other relevant factors to make predictions about future prices.While machine learning models have shown promise in predicting cryptocurrency prices, it's important to note that cryptocurrency markets are highly volatile and unpredictable. Therefore, accurate price prediction models are difficult to develop, and even the best models can sometimes fail to make accurate predictions. Additionally, the use of machine learning in cryptocurrency trading comes with certain risks, and caution should be exercised when making trading decisions based on machine learning predictions alone.Cryptocurrency price prediction using machine learning is an active and evolving research area. Several studies have been conducted to predict the price of cryptocurrencies, including Bitcoin, Ethereum, and Litecoin. These studies typically employ machine learning algorithms such as neural networks, random forests, and support vector machines..In conclusion, machine learning can be a valuable tool for predicting cryptocurrency prices, but it should be used in conjunction with other forms of analysis and should be approached with caution. Ultimately, market conditions and other unforeseeable factors may cause prices to fluctuate in ways that cannot be accurately predicted by any model.

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