A

Minor Project Report

on

BITCOIN PRICE PREDICTION

Submitted in Partial Fulfillment of
the Requirements for the Degree
of

Bachelor of Engineering

in

Computer Engineering

to

Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon

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2023 - 2024

SSBT's COLLEGE OF ENGINEERING AND TECHNOLOGY, BAMBHORI, JALGAON - 425 001 (MS)

DEPARTMENT OF COMPUTER ENGINEERING

CERTIFICATE

This is to certify that the minor project entitled *Bitcoin Price Prediction*, submitted by

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in partial fulfillment of the degree of *Bachelor of Engineering* in *Computer Engineering* has been satisfactorily carried out under my guidance as per the requirement of Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon.

Date: 26 April 2024
Place: Jalgaon

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Maheshwari Bhagwan Patil
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Abstract

The rapid evolution of cryptocurrency markets, particularly the emergence of Bitcoin, has sparked significant interest in developing accurate and reliable models for price prediction. This study explores the application of machine learning techniques to forecast Bitcoin prices, leveraging historical data and relevant features. Various algorithms, including but not limited to regression models, neural networks, and ensemble methods, are employed to analyze patterns and trends in the cryptocurrency market.The dataset used comprises historical Bitcoin prices, transaction volumes, market sentiment indicators, and macroeconomic factors. Feature engineering techniques are applied to enhance the model's ability to capture intricate relationships within the data. The study employs a comprehensive evaluation framework, considering metrics such as mean absolute error, root mean square error, and accuracy to assess the predictive performance of the models.Additionally, the research investigates the impact of external factors, such as regulatory developments, technological advancements, and macroeconomic conditions, on Bitcoin price movements. The findings aim to contribute valuable insights into the dynamics of cryptocurrency markets and the feasibility of utilizing machine learning for accurate price predictions.

Chapter 1

Introduction

Bitcoin is an innovative payment network and a new kind of money or a cryptocurrency.It is the first cryptocurrency was introduced in a paper published in 2008 by an author under pseudonym of SATOSHI and NAKAMOTO.It is free and open source software.More than 5000 cryptocurrency are available in all over the world except Bitcoin. Predicting the price of Bitcoin is a complex and challenging endeavor, influenced by a myriad of factors ranging from technological developments and regulatory changes to market sentiment and macroeconomic trends.

The organization of the chapter is as follows. Section 1.1 presents in Background. Motivation is presented is described in Section 1.2. Section 1.3 presents the Problem Definition.The scope is presented in Section 1.4. Section 1.5 presents Objectives. Identification of the Software Development Process Model presents the Section 1.6 . Section 1.7 presents the Organization of the report. The Summary last Present Section 1.8 .

1.1 Background

To comprehend the complexities and nuances of Bitcoin price prediction, it's essential to delve into the multifaceted background that forms the basis of this endeavor. The background involves a synthesis of technological, economic, and psychological factors, creating an intricate tapestry that influences the valuation of Bitcoin in the financial markets.Bitcoin operates on a decentralized ledger system known as blockchain. The integrity of transactions and the scarcity of Bitcoin (limited to 21 million coins) are fundamental aspects that impact its value. Innovations and upgrades in blockchain technology can affect the efficiency and security of the Bitcoin network, influencing its perceived value.The interplay of these factors creates an environment where accurate prediction requires a holistic and adaptive approach.

1.2 Motivation

The motivation behind Bitcoin price prediction stems from a combination of factors driven by the unique characteristics of this digital asset and the broader financial landscape. The Bitcoin price prediction is rooted in the practical needs of participants in the cryptocurrency ecosystem, ranging from individual investors seeking profitability to institutional entities managing risk and making strategic decisions. The dynamic nature of the cryptocurrency market and the potential for significant price movements create an environment where accurate predictions are not only desirable but also challenging and intellectually stimulating.

1.3 Problem Definition

Bitcoin Price Prediction to incorporate machine learning to analyse past fluctuations in currency prices, and attempt to decipher a trend in prices, this is because we can't predict accurately and sentiment analysis of bitcoin from twitter tweets.The web application which is the final software product of this project can provide numerous other applications on single site like - live sentiment analysis of bitcoin, tutorial to do trading using bitcoin crypto currency etc.

1.4 Scope

The scope for Bitcoin price prediction is vast and encompasses various domains, reflecting the interdisciplinary nature of cryptocurrency analysis.As the cryptocurrency landscape evolves, the scope for Bitcoin price prediction is likely to expand further, presenting new challenges and opportunities across various sectors. The integration of advanced technologies, data analytics, and interdisciplinary expertise will continue to shape the future of predictive analysis in the cryptocurrency market.

- The project will provide an efficient platform for the Bitcoin investment.

1.5 Objectives

The objectives for Bitcoin price prediction are diverse and depend on the specific context, goals, and stakeholders involved.
Here are several common objectives associated with predicting Bitcoin prices:

- Investment Decision-Making:- Assist investors in making informed decisions regarding the buying, selling, or holding of Bitcoin by providing insights into potential price movements.

- Trading Strategies :- Develop and optimize trading strategies, including algorithmic trading, based on anticipated Bitcoin price trends to maximize profits and minimize losses.

1.6 Selection of Life cycle model for development

The software development life cycle model selected for this project is the Waterfall Model. Waterfall approach was the first SDLC (Software Development Life Cycle) Model to be widely used in software engineering to ensure success of the project. It was developed by Winston W. Royce in 1970. In "The Waterfall" approach, the whole process of software development is divided into separate phases, typically the outcome of one phase acts as the input for the next phase sequentially. All the phases are cascaded to each other in which progress is seen as flowing steadily downwards (like a waterfall) through the phases. Re-quirements for this project are well documented and fixed.

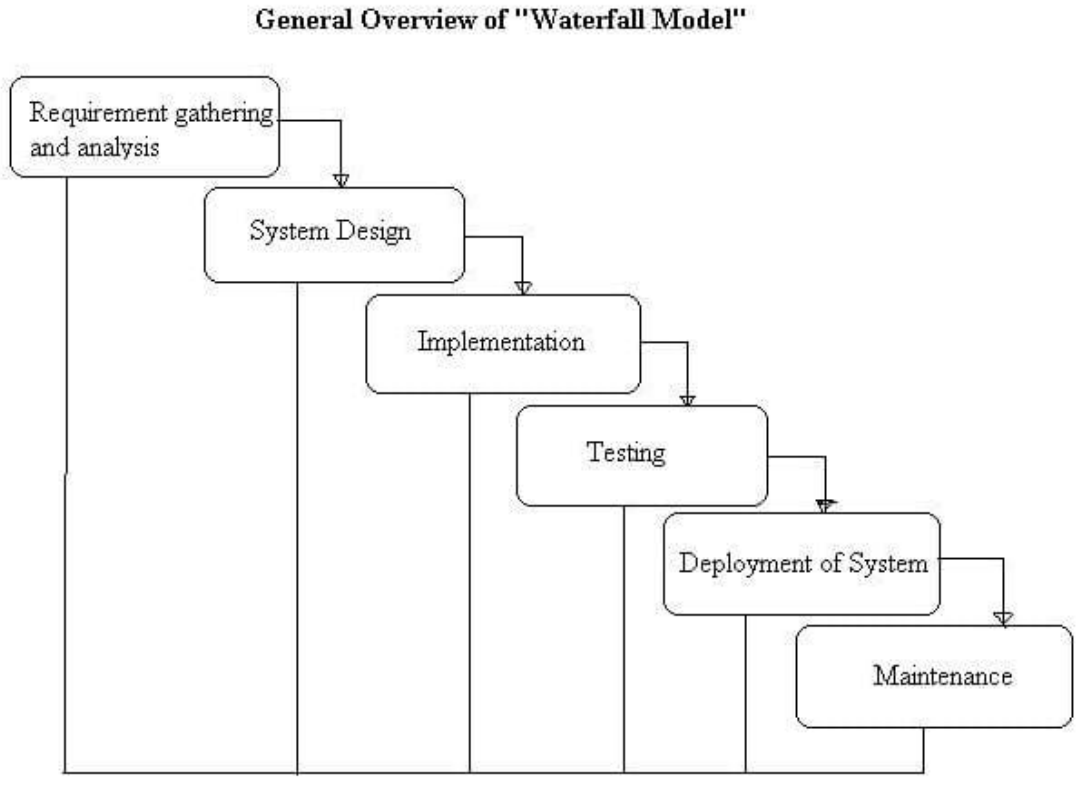

Figure 1.1: Waterfall Modell

Waterfall Model is best suited model for this project.

- Because requirements are easily understandable and defined

- We can define requirements in early stage of development
- User involvement in all phases is not necessary
- Limited user's participation

1.7 Organization of Report

Chapter 1: Entitled as Introduction describes the details about Background, Problem Definition, Scope and Objective of the project, Identification of Software Development Process Model and Organization of report.

Chapter 2: Entitled as Project Planning and Management consists of details about the Feasibility Study, Risk Analysis, Project Scheduling, Effort Allocation and Cost Estimation of the project.

Chapter 3: Entitled as Analysis describes in detail, the Requirement Collection and Identification, H/w and S/w Requirements, Functional and Non-Functional Requirements and a Software Requirements Specification(SRS).

Chapter 4: Includes design about System Architecture, Data Flow Diagram and various UML Diagrams.

1.8 Summary

In this chapter, an introduction is presented. In the next chapter project planning and management are described.

Chapter 2

Project Planning And Management

Project planning is a procedural step in project management. It is the practice of initiating, planning, executing, controlling and closing the work team to achieve specific goals. Project planning and management is important because it ensures that the right people do the right things, at the right time. It also ensures the proper project lifecycle.
The organization of this chapter is as below. Section 2.1 shows the Feasibility Study of the project. Risk Analysis of the project is represented in Section 2.2. section 2.3 describe the project scheduling. Effort Allocation and Cost Estimation respectively discribed the Section 2.4 and 2.5. Section 2.6 is mentioned is the Summary .

2.1 Feasibility Study

A feasibility study is an assessment of the practicality of a proposed project or system. A feasibility study aims to objectively and rationally uncover the strengths and weaknesses of an existing business or proposed venture, opportunities and threats present in the natural environment, the resources required to carry through, and ultimately the prospects for success. In its simplest terms, the two criteria to judge feasibility are cost required and value to be attained. Generally, feasibility studies precede technical development and project implementation.
A feasibility study evaluates the project's potential for success; therefore, perceived objectivity is an important factor in the credibility of the study for potential investors and lending institutions. It must therefore be conducted with an objective, unbiased approach to provide information upon which decisions can be based. Taking into consideration the technical, operational and economic feasibility as below, the project can be anticipated as feasible overall. There are few types of feasibility that exists. So, developers should take care of these feasibility and take them into consideration:

2.1.1 Technical Feasibility

This assessment is based on an outline design of system requirements, to determine whether the company has the technical expertise to handle completion of the project. At this level, the concern is whether the proposal is both technically and legally feasible (assuming moderate cost). It is an evaluation of the hardware and software and how it meets the need of the proposed system.

This project is built upon Jupyter Notebook, a simple Web-Application or CLI with Python as the programming language and can be easily hosted on cloud server. Also all the other technologies used are capable of building such a project and serve as well as maintain it for longer period of time. All the required hardware and software are easily available in the market. Hence the project is technically feasible.

2.1.2 Operational Feasibility

Operational feasibility is the measure of how well a proposed system solves the problems, and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of system development.

The operational feasibility assessment focuses on the degree to which the proposed development project fits in with the existing business environment and objectives with regard to development schedule, delivery date, corporate culture and existing business processes. The application is operationally feasible since it is build with the idea for integration with various existing applications and systems.

2.1.3 Economical Feasibility

Describes how much time is available to build the new system, when it can be built, whether it interferes with normal business operations, type and amount of resources required, dependencies, and developmental procedures with company revenue prospectus.

As the necessary hardware and the software are easily available in the market at low cost, the initial investment is the only cost incurred and does not need further enhancement. Hence it is economically feasible.

Redicting the future price of Bitcoin or any other financial asset is a challenging task, and it involves a high level of uncertainty. Economic feasibility for Bitcoin price prediction depends on various factors, and it's important to approach it with caution. It's important to note that Bitcoin and other cryptocurrencies are highly speculative assets, and investing in them carries inherent risks. Predictions are uncertain, and markets can be influenced by unexpected events. It's recommended to conduct thorough research, stay informed about

market developments, and, if necessary, consult with financial professionals before making investment decisions.

2.2 Risk Analysis

Risk Analysis and Management is a key project management practice to ensure that the least number of surprises occur while your project is underway. While we can never predict the future with certainty, we can apply a simple and streamlined risk management process to predict the uncertainties in the projects and minimize the occurrence or impact of these uncertainties.This project has a very slight window for experiencing failures not in technical aspects but those functionalities involving real life interaction might be affected.
Bitcoin is known for its extreme price volatility. Prices can experience rapid and unpredictable changes, leading to both significant gains and losses.Market sentiment plays a crucial role in the price of Bitcoin. It can be influenced by news, social media, and macroeconomic factors. Predicting and analyzing sentiment accurately is challenging and subject to sudden shifts.Compliance with local regulations and legal requirements is essential. Changes in laws or unexpected legal actions could impact the use and value of Bitcoin.

2.3 Project Scheduling

Generally, project scheduling can be stated as the estimated time required for any project from its time of beginning to the end of the project. In detail, for every task, there is a deadline because all the tasks for the completion of project are planned earlier. So that, each task is scheduled to certain time limit. 15 In short, in project management, listing of projects milestones, activities and all from starting to end date, are considered in the project scheduling. A schedule is generally used in the project planning and management of the project with some kind of attributes as budget, task allocation and duration, resource allocation and all.

Task	Start Date	End Date
Selection of title	20 Sept 2023	09 Oct 2023
Gathering information	09 Oct 2023	20 Oct 2023
Project discussion	21 Oct 2023	27 Oct 2023
Planning/ requirement gathering and analysis	27 Oct 2023	07 Nov 2023
Implementation	15 Jan 2024	30 Jan 2024
Documentation	16 Feb 2024	3 Mar 2024
Result	18 Mar 2024	20 April 2024

Table 2.1: Task Scheduling for the project

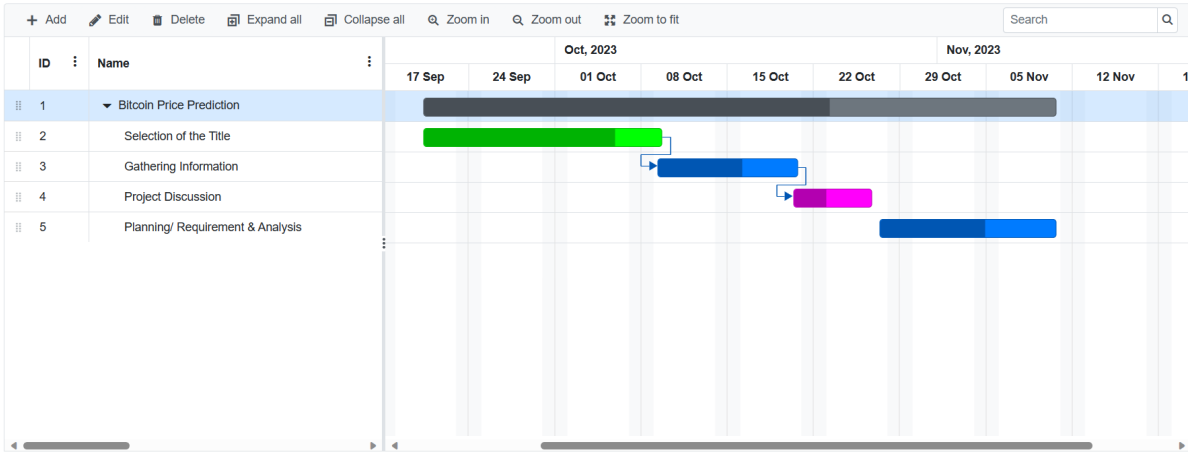

Figure 2.1: Gantt Chart

2.4 Effort Allocation

Effort Allocation is necessary so every team member can give its best to the project. Project was divided into smaller module and task form, for simplification and easy understanding of project overall. Some modules include every team associate's presence to take advantage of team decision taking skills, and some task include some individual member to work on it with precision. We divided the project into 6 modules.

- 1. Gathering of Information
- 2. Planning/Requirement Analysis
- 3. Selection of Life Cycle
- 4. Planning and Management
- 5. Analysis Design UML

	Maheshwari	Aarti	Divya
Gathering of information	✓	✓	✓
planning / requirement analysis		✓	✓
selection of life cycle	✓		
planning and management	✓	✓	
analysis and design			✓

Table 2.2: Effort Allocation

2.5 Cost Estimation

The basic COCOMO estimation model is given by the following expressions:
Effort = a1 x (KLOC) a2 PM ..... Eq.(1)
Tdev = b1 x (EF F ORT) b2 Months ..... Eq.(2)
Productivity = KLOC PM ..... Eq.(3)
Where, KLOC is the estimated size of the software product indicated in a1,a2,b1, and b2 are constants for each group of software products, T devis the estimated time to develop the software, expressed in months, Effort is the total effort required to develop the software product, expressed in person-months (PMs) in Table 2.3.
From eq.1 calculate the Effort required for software production.
Effort = a1 x (KLOC) a2 PM
= 2.5 x (1323)1.05
= 4737.81 PM

1	Total number of persons working on the project	3 Person
2	Time Taken (in months)	4 Month
3	Total Time Allocated per Day (in terms of hrs)	3 hrs
4	Actual Working Hours	430 hrs
5	Cost per hour	Rs 40
6	Total Estimated Project Cost for a Person	Rs 38,400
7	Total Estimated Project Cost For 3 Person	Rs 1,15,200
8	Total Estimated Project Cost For Total Project	Rs 1,53,800.80

Table 2.3: Task Scheduling for the project

2.6 Summary

In this chapter, the project Planning and Management of the project is described. In next chapter, the project analysis is described.

Chapter 3

Analysis

The development of computer-based information system includes the system analysis phase which produces or enhances the data model which itself is to creating or enhancing a database. There are a number of different approaches to system analysis. The analysis is the process which is used to analyze, refine and scrutinize the gathered information of entities in order to make consistence and unambiguous information. Analysis activity provides a graphical view of the entire System. System Analysis is the process of gathering and interpreting facts, diagnosing problems and using the facts to improve the system. System analysis chapter will show overall system analysis of the concept, description of the system, meaning of the system. System analysis is the study of sets of interacting entities, including computer system analysis.
The organization of this Chapter is as follows. Section 3.1 represents Requirement Collection and Identification. Software Requirement and Specification are described in the Section 3.2. Section 3.3 describes summary of the chapter.

3.1 Requirement Collection and Identification

Requirement collection is the process which is used to gather, analyze, and documentation and reviews the requirements. Requirements describe what the system will do in place of how. In practical application, most projects will involve some combination of these various methods in order to collect a full set of useful requirements. Requirements collection is initiated when the project need is first identified and the project "solution" is to be proposed. Requirements refinement continues after the project is "selected" and as the scope is defined, aligned and approved.The system will require only images of the road to be analysed which will be uploaded by user either through the web-application or CLI.

3.2 Software Requirements Specifications (SRS)

Software Specification will provide a broad understanding of the requirement specification of this system. Also, understand features of this system along with the requirements. Software Requirement Specification documents guide the developers in the development process and it will help to reduce the ambiguity of the requirements provided by the end-user. It's used to provide critical information to multiple teams — development, quality assurance, operations, and maintenance. This keeps everyone on the same page.

3.2.1 Product Feature

The product features are high level attributes of a software or product such as software performance, user-friendly interface, security portability, etc. These attributes are defined according to the product, in this case, a software product.
They are as follows:

- Provide up-to-the-minute predictions of Bitcoin prices.
- Integrate real-time data to ensure users have the latest insights.
- Utilize advanced analytics and machine learning algorithms for accurate predictions.
- Offer customizable models to accommodate different user preferences and risk tolerances.

3.2.2 Operating Environment

The software will operate within the following environment:

- Operating System: Windows 7 or later/Linux/MacOS
- FLASK environment required.
- Any system with at least 4GB RAM
- System with processor Intel CORE i3 or later

3.2.3 Assumption

- It is assumed that the web portal will load and render correctly and as expected on the operating machine.
- It is assumed that the user will have a working internet connection with sufficient internet speed.

- It is assumed that the user is able to either upload images through web interface or CLI.
- It is assumed that the user will upload the images within the given specifications.

3.2.4 Functional Requirements

Functional requirements are the functions which are expected from the software or platform. Functional requirements along with requirement analysis help identify missing requirements. They help clearly define the expected system service and behavior.
Functional requirements are as follows:

- Users must be able to create accounts and log in securely.
- Authentication ensures secure access to personalized features and data.
- Authentication ensures secure access to personalized features and data.
- Users should be able to choose and customize predictive models based on their preferences.

3.2.5 Non-Functional Requirements

Non-functional Requirement is mostly quality requirement. That stipulates how well the portal does, what it has to do. Other than functional requirements in practice, this would entail detail analysis of issues such as availability, security, usability and maintainability.
Non-functional requirements are as follows:

- The system must provide real-time predictions with a response time of less than two seconds.
- Users require quick access to updated information for timely decision-making
- The system should scale horizontally to handle increased user traffic and data volumes.
- The system should gracefully handle failures, and critical functions should have redundancy.

3.2.6 External Interfaces

- User interface

  The proposed system has several options for users to interact with. Following are the user interfaces available:

- Web-application (GUI)
- Command Line Interface (Terminal based interface)
  The web application will be available so that the users will be able to upload images through a simple GUI and the CLI will be available so that the user will be able to integrate it with other systems easily.

■ Software interface
The only software interface required for this project is the Application Programming Interface with the Jupyter Notebook which will then process the images. This software interface will run on local server along with the Jupyter server.

3.3 Summary

In this chapter, analysis is presented. In the next chapter, the design is described.

Chapter 4

Design

Design is the activity to design and model the various component of software system. The system design provides the understanding and procedural details necessary for implementing the system. Design is helpful for a better understanding of the project. It contains the UML diagrams, data flow diagrams. UML is a modeling language which is used to document the object-oriented analysis and design.
The organization of this Chapter is as follows. Section 4.1 describes the system architecture of the project. DFD of the project are represented in Section 4.2. Section 4.3 represents UML Diagrams (Use case, Class, Sequence, Component, Deployment, State chart, Activity diagram, Class Diagram, Component Diagram, etc.) of the project. Finally, the Summary is described in last Section 4.4

4.1 System Architecture

Systems Architecture is a generic discipline to handle objects (existing or to be created) called "systems", in a way that supports reasoning about the structural properties of these objects. The system architecture is the conceptual model that defines the structure, behavior and more views of a system.An architecture description is a formal description and representation of a system. It provides broad understanding of the portal. In the system architecture database provide the functionality like get information, select criteria, etc. to users.

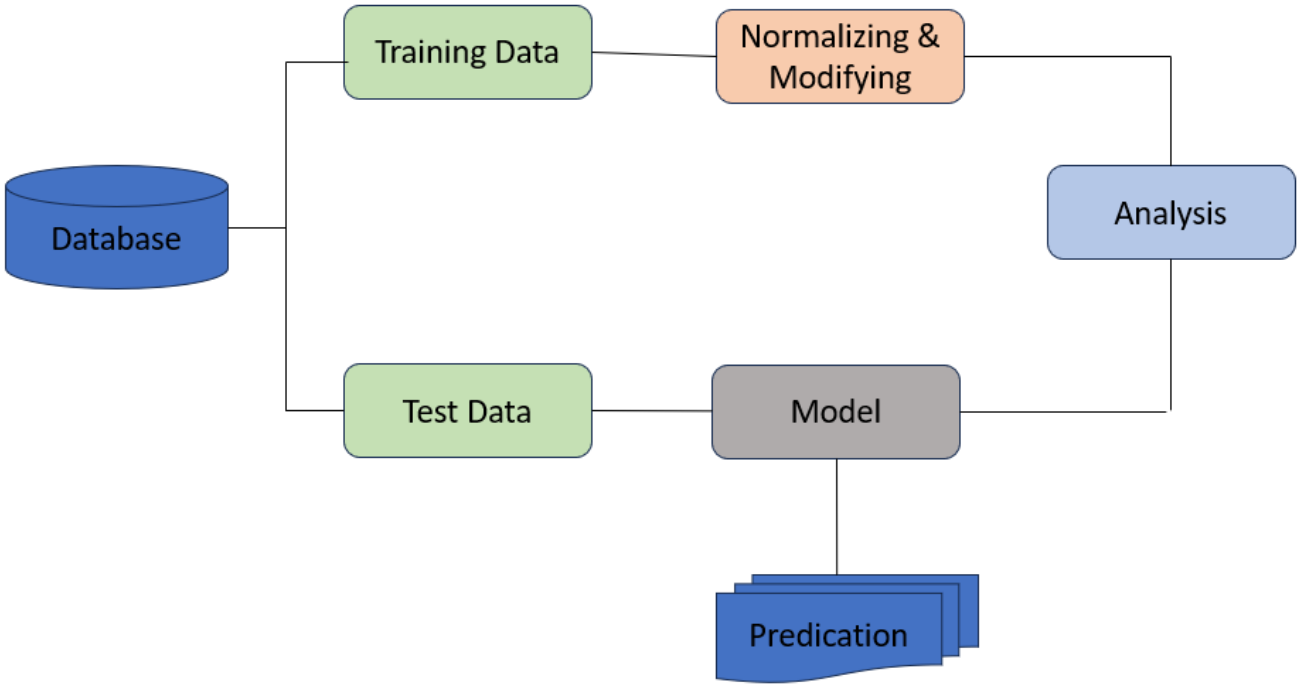

Figure 4.1: System Architecture

4.2 Data Flow Diagram

A data flow diagram (DFD) is a graphical representation of the 'flow' of data through an information system, modelling its process aspects. A DFD is often used as a preliminary step to create an overview of the system, which can later be elaborated. DFDs can also be used for the visualization of data processing (structured design). A DFD shows what kind of information will be input to and output from the system, where the data will come from and go to, and where the data will be stored.

4.2.1 Level 0 DFD

Level 0 contains one input and one output. The system provides information to the user means system is input and the user is output. Figure 4.2 shows Level 0 DFD of project.

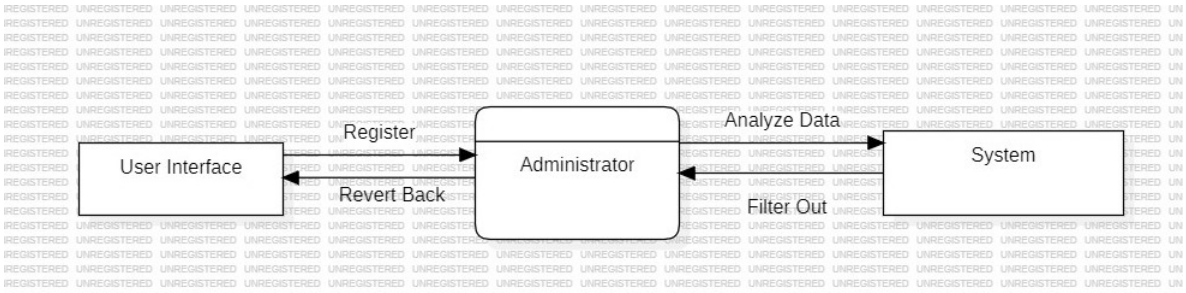

Figure 4.2: 0 Level Data Flow Diagram

4.2.2 Level 1 DFD

A level 1 DFD notates each of the main sub-processes that together form the complete system. We can think of a level 1 DFD as an "exploded view" of the context diagram. Figure 4.3 shows Level 1 DFD of project.

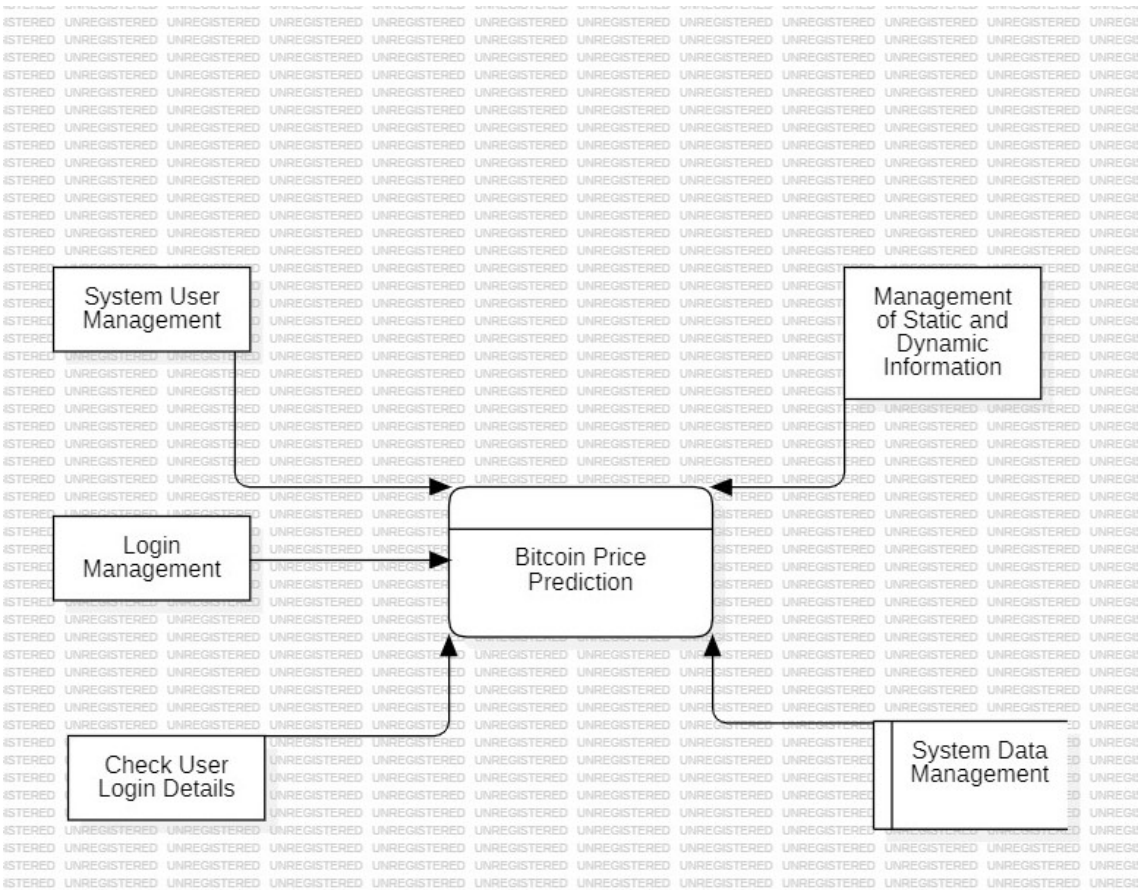

Figure 4.3: 1 Level Data Flow Diagram

4.3 UML Diagrams

A UML diagram is a diagram based on the UML (Unified Modeling Language) with the purpose of visually representing a system along with its main actors, roles, actions, artifacts or classes, in order to better understand, alter, maintain, or document information about the system.

4.3.1 Use Case Diagram

Use case diagram shows the interaction between Use case which represents system functionality and actor which represent the people or system. Fig 4.5 shows use case diagram.

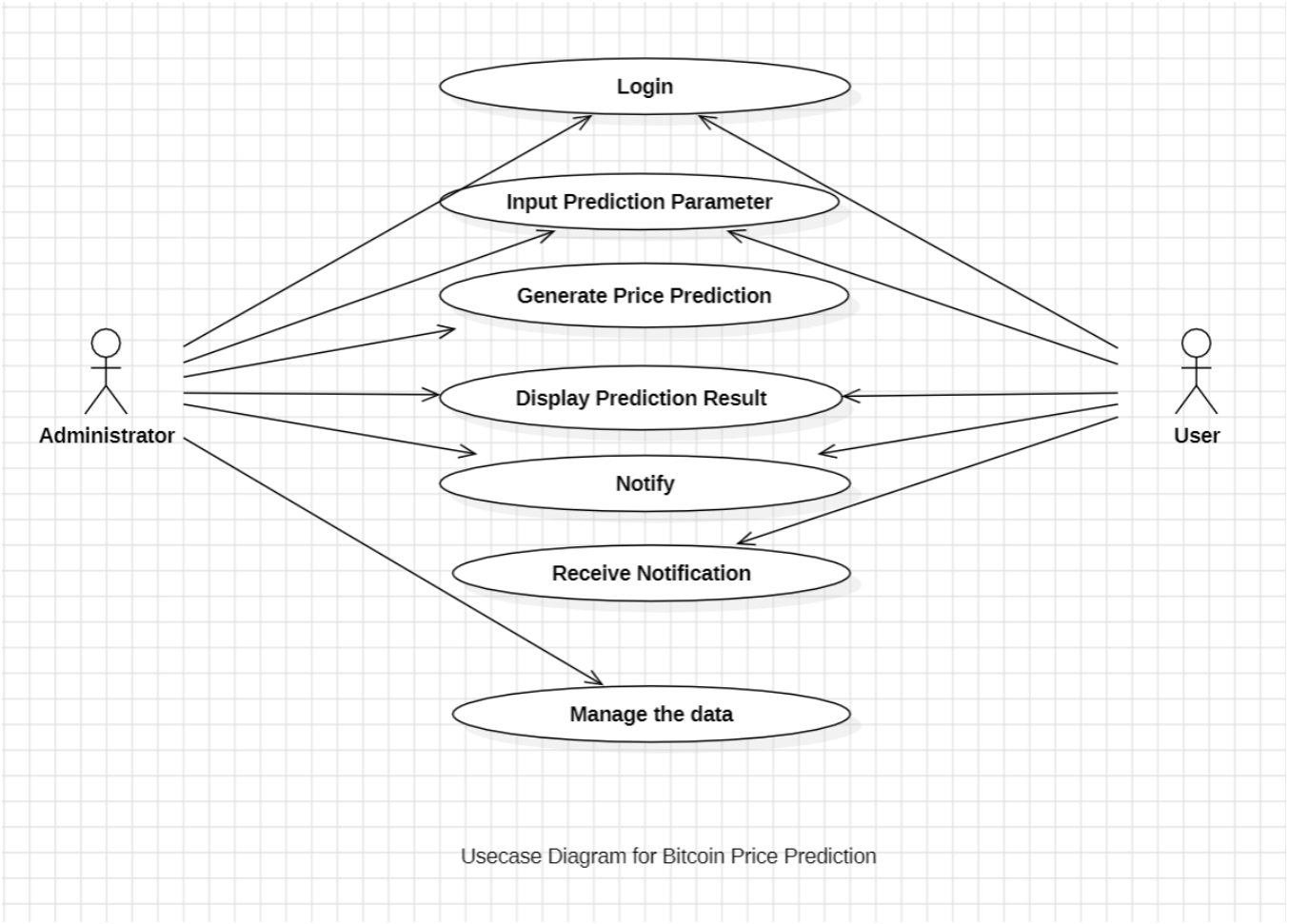

Figure 4.4: Use Case Diagram For Bitcoin price prediction

4.3.2 Sequence Diagram

The sequence diagram shows the flow of functionality through Use case. A sequence diagram is a type of interaction diagram because it describes how—and in what order—a group of

objects works together. These diagrams are used by software developers and business professionals to understand requirements for a new system or to document an existing process.Fig 4.6 shows sequence diagram.

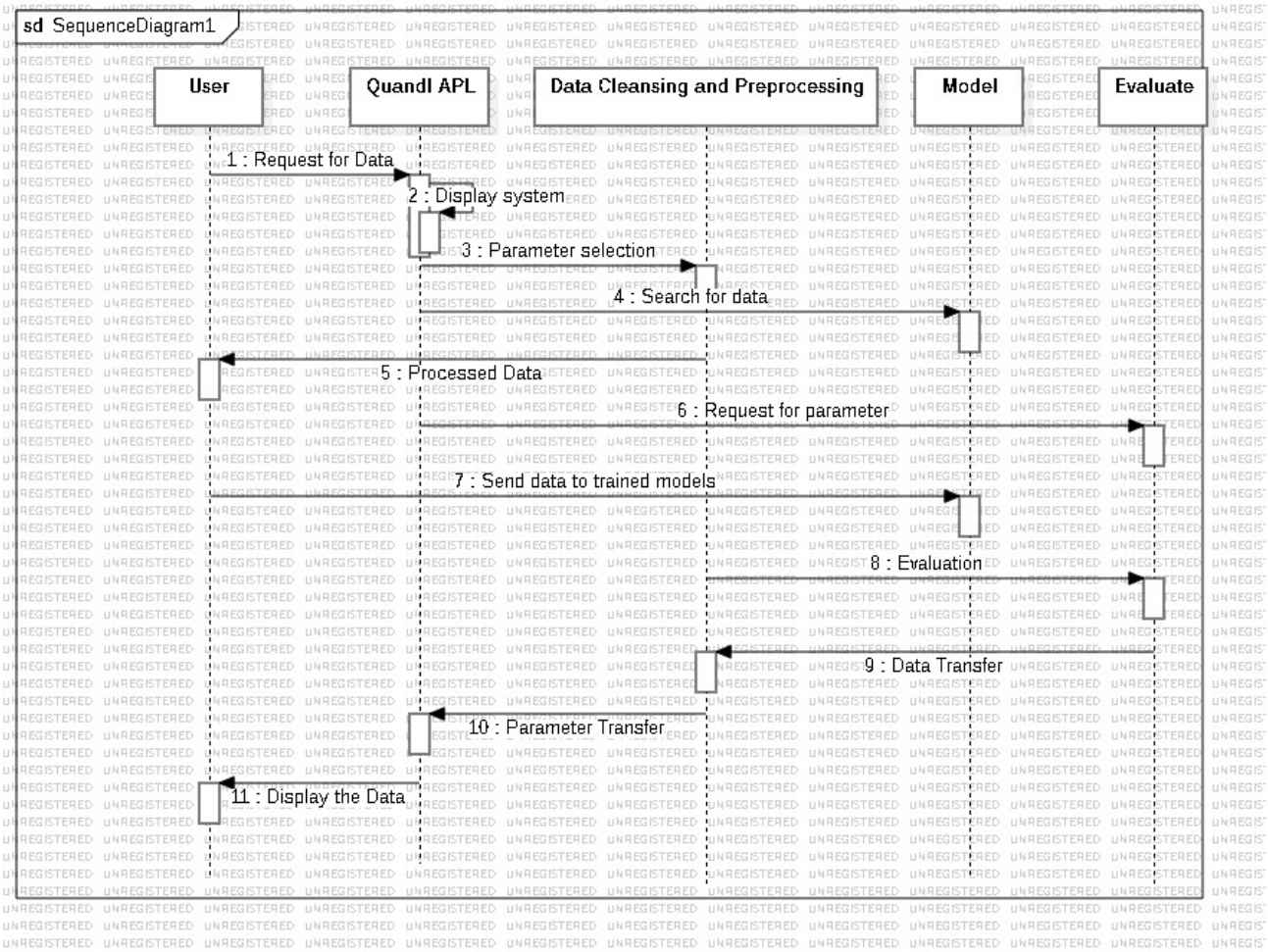

Figure 4.5: Sequence Diagram For User Object Bitcoin Price Prediction

4.3.3 Class Diagram

The class diagram is the main building block of object-oriented modeling. It is used for general conceptual modeling of the structure of the application, and for detailed modeling translating the models into programming code. Class diagrams can also be used for data modeling. Fig 4.8 shows class diagram.

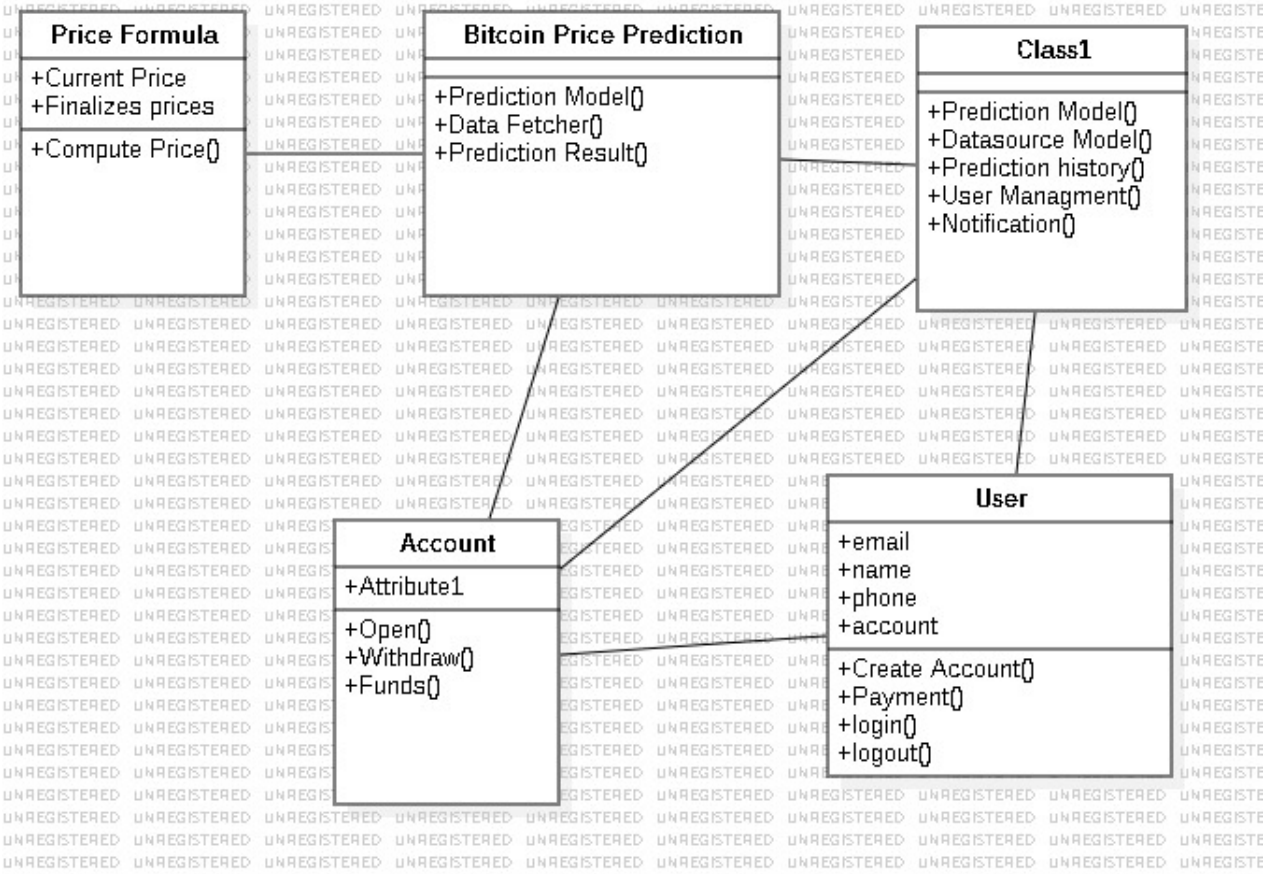

Figure 4.6: Class Diagram For Bitcoin Price Prediction

4.3.4 State Chart Diagram

A Statechart Diagram, also known as a State Machine Diagram, is a type of behavioral diagram in the Unified Modeling Language (UML) that depicts the dynamic behavior of a system. It is particularly useful for modeling the various states that an object or system can be in and how it transitions between these states based on events. Fig 4.8 shows state chart diagram.

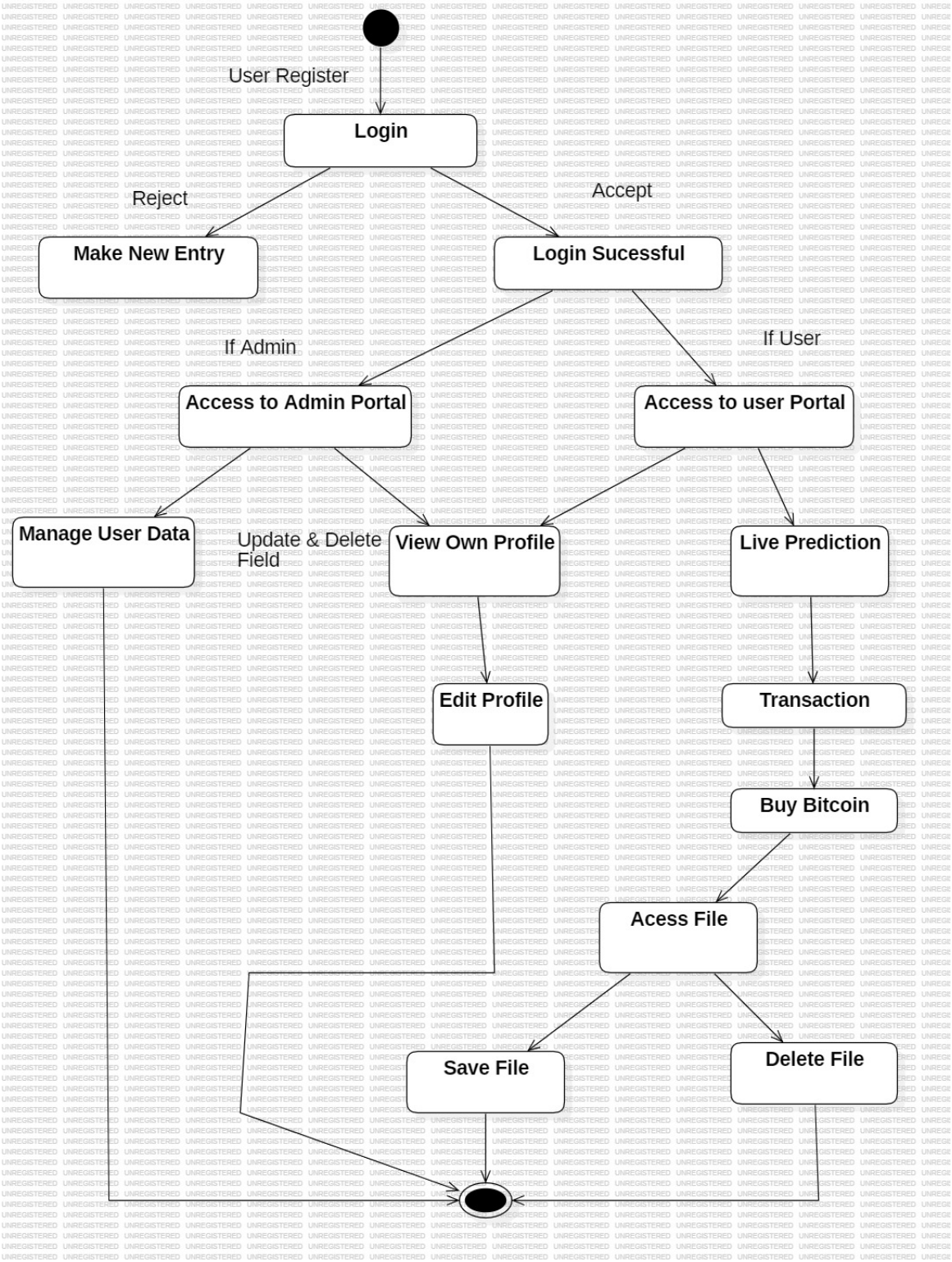

Figure 4.7: State chart Diagram For User Object Bitcoin Price Prediction

4.3.5 Component Diagram

A component diagram, also known as a UML component diagram, describes the organization and wiring of the physical components in a system. Component diagrams are often drawn

to help model implementation details and double-check that every aspect of the system's required function is covered by planned development.Fig 4.9 shows component diagram.

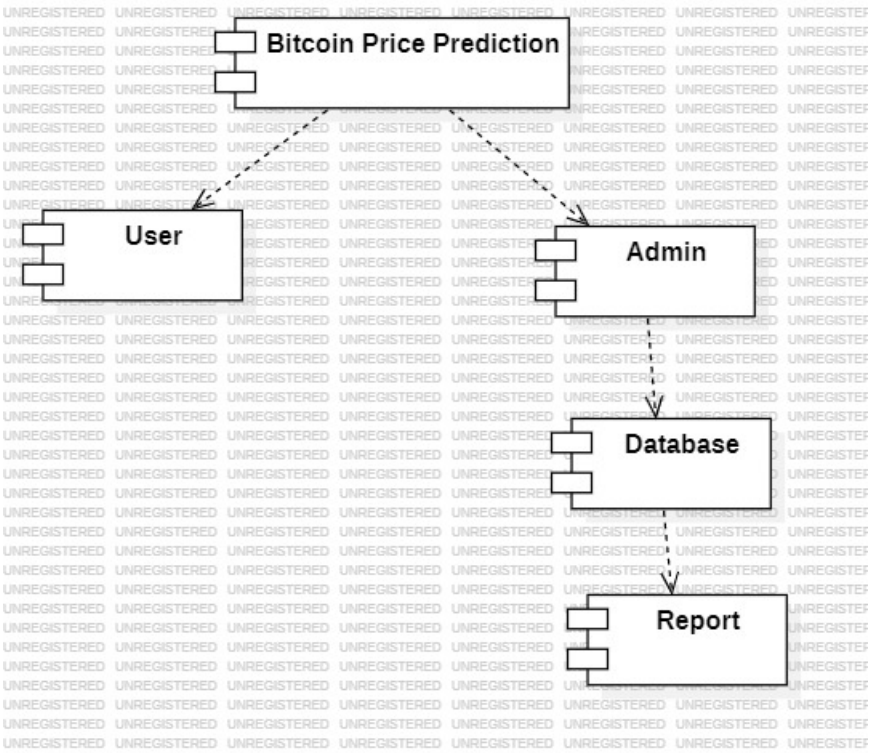

Figure 4.8: Component Diagram For Bitcoin Price Prediction

4.3.6 Deployment Diagram

A deployment diagram is a UML diagram type that shows the execution architecture of a system, including nodes such as hardware or software execution environments, and the middle ware connecting them. Deployment diagrams are typically used to visualize the physical hardware and software of a system. Fig 4.10 shows deployment diagram.

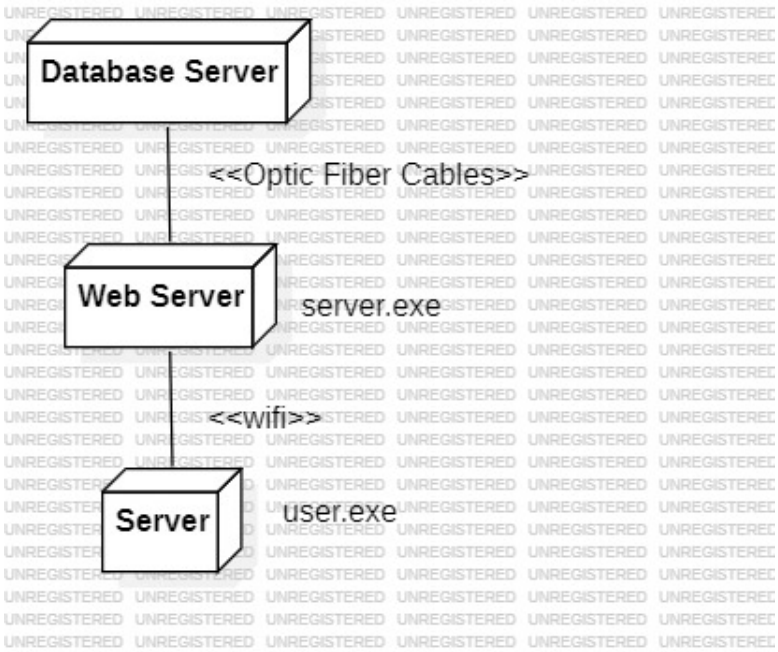

Figure 4.9: Deployment Diagram For Bitcoin Price Prediction

4.3.7 Activity Diagram

An Activity Diagram is a type of Unified Modeling Language (UML) diagram that visually represents the dynamic aspects of a system or business process. It focuses on the flow of activities, actions, and transitions between them, providing a clear and detailed depiction of the workflow. Activity diagrams are particularly useful for modeling the steps and decisions involved in a process, making them an effective tool for business process modeling, system analysis, and system design. Fig 4.10 shows deployment diagram.

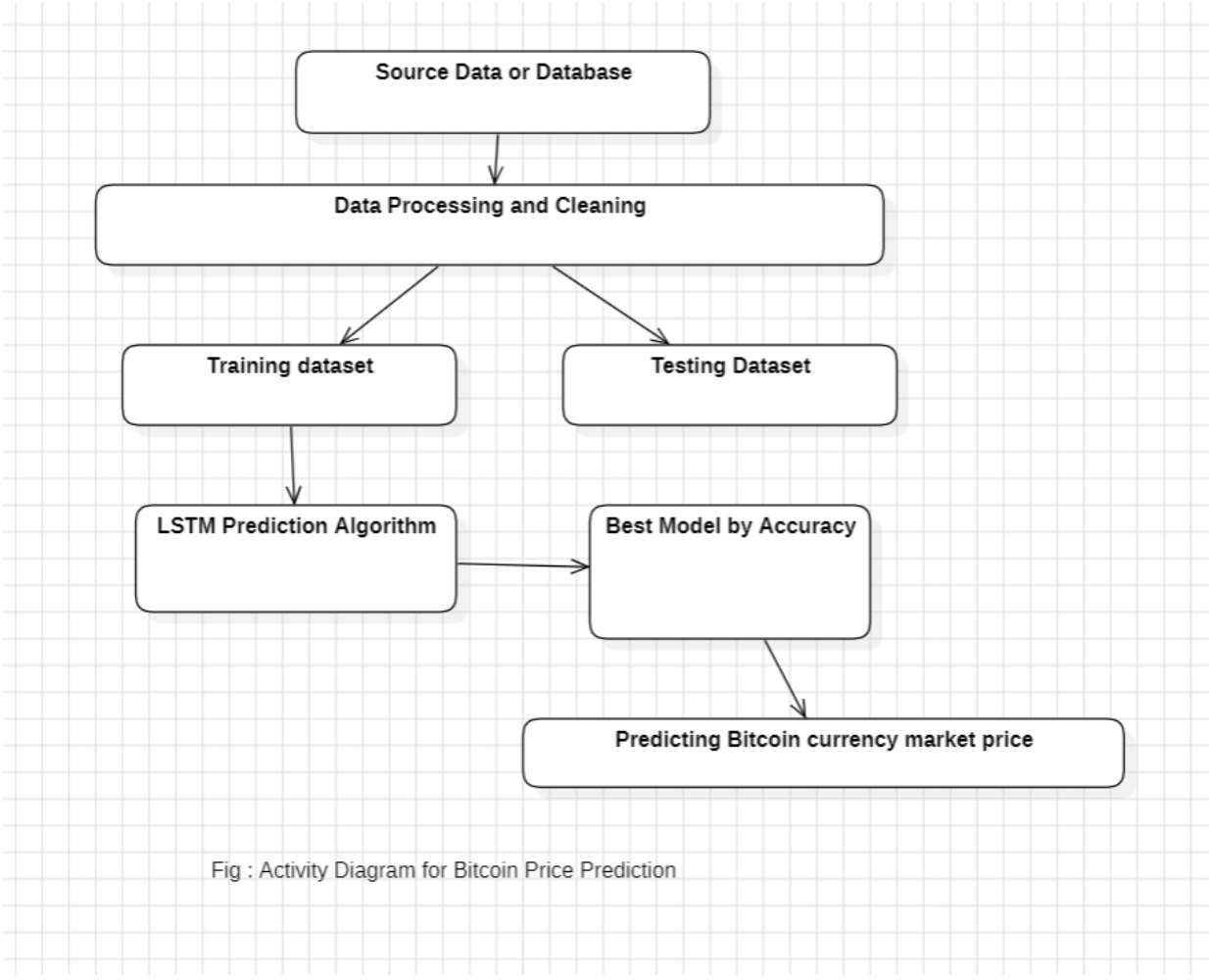

Figure 4.10: Activity Diagram For Bitcoin Price Prediction

4.4 Summary

In this chapter, system design is discussed. In the next chapter, the conclusion is presented.

Chapter 5

Implementation

Implementation phase is longest and most important phase in software development. When the designing of the software is completed, A group of developers starts coding of the design using a programming language. The interface of the software and all its internal working according to design phase is implemented in implementation phase.

The organization of the chapter is as follow. Section 5.1 describes the Implementation Steps. The Algorithm is described in Section 5.2 . Section 5.3 describes the Hardware and Software Requirements. Summary is described in Section 5.4.

5.1 Implementation Steps

Here are the steps which are followed to implement a project in python:

1. Data Collection: Gather historical Bitcoin price data from various sources like exchanges (e.g., Coinbase, Binance, Bitfinex) or financial data providers (e.g., Yahoo Finance, CoinMarketCap).Additionally, collect relevant fundamental data such as trading volume, market capitalization, hash rate, and on-chain metrics.

2. Data Preprocessing: Clean the data by handling missing values, removing outliers, and ensuring consistency.Normalize or scale the data to bring all features to a similar range, which helps the model converge faster.

3. Feature Selection/Engineering: Identify relevant features that might influence Bitcoin prices. These can include technical indicators (e.g., moving averages, RSI), on-chain metrics (e.g., transaction volume, number of active addresses), macroeconomic indicators, and sentiment analysis from news and social media.

4. Model Selection: Choose appropriate models based on the problem statement, data characteristics, and available computing resources. Commonly used models include:

Time-series models: ARIMA, SARIMA, Prophet. Machine learning models: Linear Regression, Random Forest, Gradient Boosting Machines, Long Short-Term Memory (LSTM) networks for deep learning.

5. Training and Evaluation: Split the data into training, validation, and test sets. Train the chosen models using the training set and tune hyperparameters using the validation set.

6. Model Optimization: Fine-tune the model parameters to improve performance. This might involve adjusting learning rates, adding regularization, or using different architectures (for neural networks). Explore techniques like cross-validation and grid search for hyperparameter tuning.

7. Prediction: Once the model is trained and validated, make predictions on the test set or on new, unseen data. Monitor the model's performance over time and consider retraining it periodically to adapt to changing market conditions.

8. Deployment: Deploy the model in a production environment where it can make real-time or batch predictions. Implement monitoring to track the model's performance and ensure it continues to provide accurate predictions.

9. Feedback Loop: Continuously gather feedback on the model's predictions and performance. Refine the model over time based on new data, updated features, or changes in market dynamics.

5.2 Algorithm

Following some steps of the algorithm as follows.

(a) Data Collection:Collect historical Bitcoin price data from reliable sources like cryptocurrency exchanges or financial data providers.

(b) Data Preprocessing: Handle missing values by imputation or removal. Normalize or scale the data to bring all features to a similar range.

(c) Feature Engineering: Select relevant features that might affect Bitcoin prices, such as technical indicators on-chain metrics, macroeconomic indicators.

(d) Model Selection: Choose a machine learning algorithm suitable for the task. Common choices include linear regression and random forest

(e) Model Training: Train the selected model using the training data. Tune hyper-parameters using techniques like grid search or random search.

(f) Model Evaluation: Evaluate the trained model using the test data set.Measure performance using appropriate evaluation metrics such as Mean Absolute Error.

(g) Prediction: Once the model is trained and evaluated, make predictions on new, unseen data.

(h) Deployment: Deploy the trained model in a production environment where it can make real-time or batch predictions.

(i) Risk Management: Remember that all predictions involve uncertainty, and trading decisions should not rely solely on model predictions.

The basic COCOMO estimation model is given by the following expressions:

- Effort = a1 x (KLOC) a2 PM ..... Eq.(1)
- Tdev = b1 x (EF F ORT) b2 Months ..... Eq.(2)
- Productivity = KLOC PM ..... Eq.(3)

Where, KLOC is the estimated size of the software product indicated in a1,a2,b1, and b2 are constants for each group of software products, T devis the estimated time to develop the software, expressed in months, Effort is the total effort required to develop the software product, expressed in person-months (PMs).

5.3 Software and Hardware Requirement

Following some requirements of hardware and software.

- Windows 7 or higher:-It seems like you're asking about the window size parameter commonly used in time-series analysis and forecasting models, such as ARIMA (AutoRegressive Integrated Moving Average) or LSTM (Long Short-Term Memory) networks.

- Python and Flask :-Python supports multiple programming paradigms, including procedural, object-oriented, and functional programming.Flask follows the WSGI (Web Server Gateway Interface) specification.

- HTML,CSS JAVASCRIPT :-HTML is the standard markup language for creating web pages and web applications.CSS is a style sheet language used to describe the presentation and layout.And Javascript is used for the interactivity.

- Visual Studio Code:-Visual Studio Code (VS Code) is a free, open-source code editor developed by Microsoft. It's designed to be lightweight, fast, and highly customizable, making it popular among developers for various programming tasks.

- Google Collab:- Google Colab, short for Google Colaboratory, is a free cloud-based platform provided by Google that allows users to write and execute Python code collaboratively. It's particularly popular among data scientists.

- Librarys-Pandas and numPy:-NumPy, short for Numerical Python, is a fundamental package for numerical computing in Python.Pandas is an open-source Python library built on top of NumPy that provides high-performance.

- 4 GB RAM 512 GB HDD:- Using 4GB RAM 512 GB HDD for Implementation and Execution.

5.4 Summary

In this Chapter, the Implementation part is discussed. In the next Chapter, Testing is presented.

Chapter 6

System Testing

The purpose of this chapter is to discuss the testing methodologies used in the development of the Bitcoin Prediction model. Testing is a critical aspect of the software development lifecycle, and it ensures that the system is free from defects and performs as intended. This chapter will provide an overview of the testing process, including the different types of testing performed, the tools used, and the testing results.

The organization of the chapter is as follow. Section 6.1 describe the type of Testing.Black box Testing is described in section 6.2 . Section 6.3 describes White Box testing. Manual Testing is described in Section 6.4 . section 6.5 describes present Summary.

6.1 Types Of Testing

The Bitcoin Price Prediction was subjected to different types of testing to ensure that it meets the requirements and performs as intended. The different types of testing performed are as follows:

- Unit Testing: This testing was done to test the individual units or components of the system. Each unit was tested separately to ensure that it functions correctly.

- Integration Testing: This testing was done to test the integration between the different components of the system. It ensured that the system functioned as a whole and that the individual components worked together seamlessly.

- Functional Testing: This testing was done to test the system's functional requirements.It ensured that the system met the requirements specified in the functional specification document.

- Performance Testing: This testing was done to test the system's performance under various conditions. It ensured that the system could handle the expected load and performed well under stress.

- User Acceptance Testing: This testing was done to ensure that the system meets the user's requirements and expectations. It ensured that the system was user-friendly and easy to use.

6.2 Black Box testing

Black box testing involves testing a system without knowing its internal workings. In the context of predicting Bitcoin prices, this would entail creating a model or algorithm to predict Bitcoin prices based solely on input-output relationships, without knowing the specifics of how the model arrives at its predictions.

- Incorrect or missing functions checks.

- GUI Interface error check.

- Error check in the database.

- Checks behavior or performance errors.

6.3 White Box testing

White box testing involves examining the internal structures or workings of a system. In the case of predicting Bitcoin prices, this would mean looking at the factors that influence Bitcoin's price and using that information to make a prediction.White box testing is also called as glass structural, open box or clear box testing. In this type of testing, the code is visible to the tester. It focuses primarily on verifying the flow of inputs and outputs through the application, improving design and usability, strengthening security.

Understanding Factors are Identify the key factors that historically influence Bitcoin's price.Gather historical data on these factors as well as historical Bitcoin price data.And Split the historical data into training and testing sets.

6.4 Manual Testing

In the manual testing test all the test cases and lines of code test manually. Manual testing is a type of software testing where testers manually execute test cases without using any automated testing tools. It involves human intervention to verify software applications for defects, bugs, or issues.Test one by one each and every line of code of the global data storage app.

6.5 Test case identification and execution

In order to identify test case scenarios, testers must understand the system's functional requirements. The main functional requirements of the project such as predict the price of bitcoin in the form of the graph plotation From the stored data of the previous year stored data. The test case is the set along with the expected output and actual output with some additional information. Table 2.5 shows Project test cases.

Table 2.5 Project test cases

ID	Scenario	Input	Expected o/p	Actual o/p	Result
1	To register	abc@gmail.com	registration not successful	Registration successful	Pass
2	To login	abc@gmal.com	login not successful	login successful	Pass
3	Stored files	Docs&Txt	Not successful	successful	Pass
4	Upload data	DOC &text	Not successful	successful	Pass
5	Actual price	File	Not successful	successful	Pass
6	Predicted Price	File	Not successful	Graph plot Successfully	Pass
7	Log Out	abc@gmail.com	Not Successful	Successful	Pass

6.6 Summary

In this Chapter, the System Testing part is discussed. In the next Chapter, the Result is presented.

Chapter 7

Result and Discussion

The results chapter discusses the results of the project, The project aims to provide a flexible system that can be integrated easily into existing Website.With the website interface, Bitcoin Price Prediction to perform actual price into predict price in the form of the Graph Plotation And share the file with the help URL generated.

The organization of the chapter is as follow. Section 7.1 describes the System Results. Discussion is described in Section 7.2. Section 7.3 describes the Advantages.Summary is described in the Section 7.4.

7.1 System Result

A system result for Bitcoin price prediction typically involves the Home Page,login ,market updates and etc.It presenting the output of the prediction model, along with relevant metrics to assess its performance.Plot the predicted Bitcoin prices alongside the actual prices to visually assess the model's performance. Highlight any trends, patterns, or discrepancies between predicted and actual prices.

- Home Page:-This is the home page and it performs many more features of bitcoin and Also the main feature of online prediction of Bitcoin.
- Login Page :-Before Predicting the Prices, User needs to authenticate himself/herself to keep Private their Accounts.
- Market Update :-Market Update for World-Wide Update Of Bitcoin And Other Cryptocurrency and also the user can compare Bitcoin with other cryptocurrency.
- Online Prediction:-This Online Prediction predict the prices Of Bitcoin daywise , monthwise and yearwise data Through Graph Plotation.

Figure.4.11 Home Page

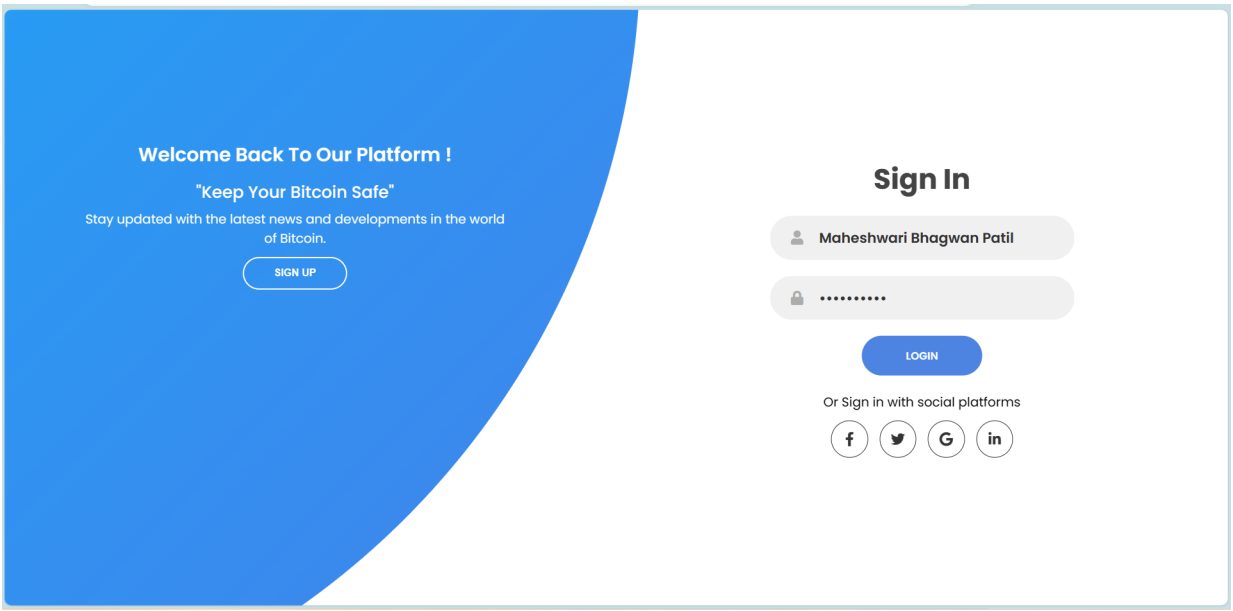

Figure.4.12 Login for Bitcoin Prediction

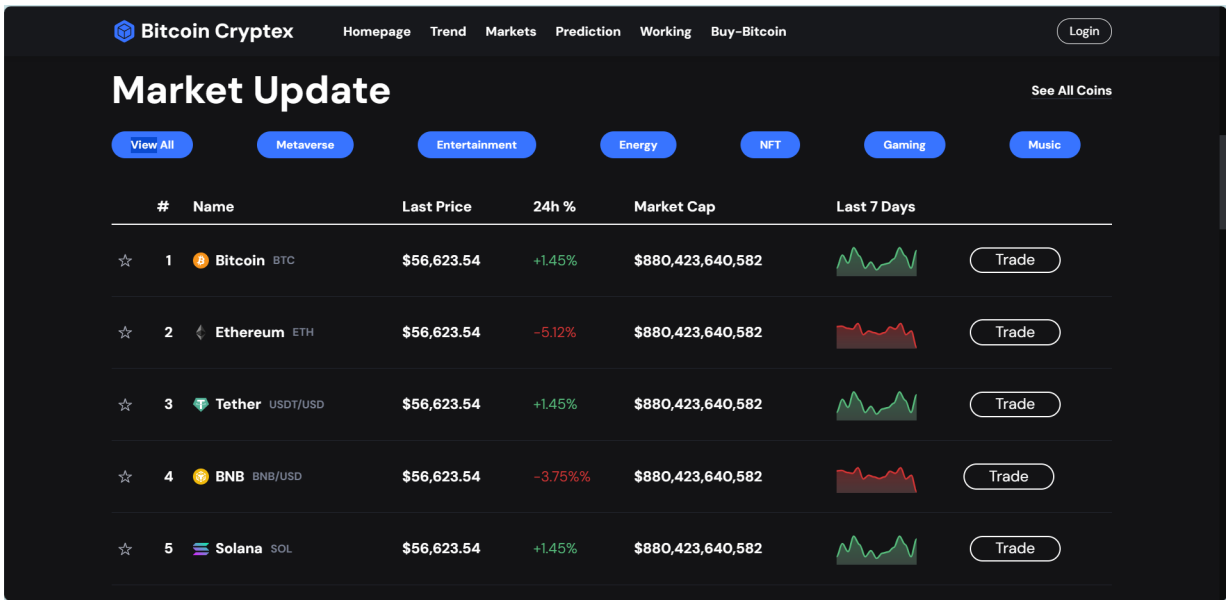

Figure.4.13 Market Updates

Figure.4.16 Online Prediction

7.2 Discussion

In the discussion section of a Bitcoin price prediction study, it's essential to delve into the significance of the results.Start by interpreting the results of the Bitcoin price prediction model. Discuss the accuracy of the predictions and how closely they align with actual price movements. Highlight any notable trends or patterns observed in the predicted prices compared to historical data.By structuring the discussion section in this manner, you can provide a comprehensive analysis of your Bitcoin price prediction study and its implications for both academics and real-world applications.

7.3 Advantages

- Accurate price predictions enable investors to make informed decisions about buying, selling, or holding Bitcoin, thus managing their investment risk more effectively.
- redictive models can help traders determine optimal entry and exit points in the market, enhancing their ability to execute profitable trades and minimize losses.
- Short-term traders can use price predictions to exploit short-lived price fluctuations and volatility in the Bitcoin market for profit.
- Predictive models provide valuable insights into the underlying factors driving Bitcoin price movements, contributing to a deeper understanding of market dynamics and the behavior of market participants.
- Price predictions facilitate the implementation of hedging strategies to protect against adverse price movements.

7.4 Summary

In this chapter, Results and Discussion is described. In the next chapter, Conclusion is presented.

Chapter 8

Conclusion

In conclusion, our Bitcoin Price Prediction model has provided insights into the potential future price movements based on historical data and market trends.This Model also predict the Online Prediction of Bitcoin.While the cryptocurrency market is as notoriously volatile and subject to various factors including regulatory changes, investor sentiment,and tecnological advancements, our analysis suggests that Bitcoin may experience [insert predicted price range within the [insert timeframe]. However, it's important to note that this prediction is based on available information.And past patterns, and actual prices may deviate due to unforeseen circumstances. Investors are advised to conduct their own research and consult with financial experts before update formation of making any investment decisions in the cryptocurrency market.

Chapter 9

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