Software Requirements Specification

For

PRICE PREDICTION OF CRYPTOCURRENCY

30st December2021

Prepared by

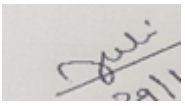
Specialization	SAP ID	Name
BAO	**500071245**	**Aashu Prashar**
BAO	**500068761**	**Hrithvik Sharma**
BAO	**500070404**	**Nisheet Agrawal**
BAO	**500070985**	**Ritik Karir**

Department of Informatics
School of Computer Science
UNIVERSITY OF PETROLEUM & ENERGY STUDIES,
DEHRADUN- 248007. Uttarakhand

Table of Contents

Topic		Page No
Table of Content		
Revision History		
1	Introduction	1
	1.1 Purpose of the Project	1
	1.2 Target Beneficiary	2
	1.3 Project Scope	2
	1.4 References	3-4
2	Project Description	4
	2.1 Reference Algorithm	4
	2.2 SWOT Analysis	5
	2.3 Project Features	6
	2.4 User Classes and Characteristics	6
	2.5 Design and Implementation Constraints	7
	2.6 Design diagrams	7-8
	2.7 Assumption and Dependencies	8
3	System Requirements	9
	3.1 User Interface	9
	3.2 Software Interface	9
	3.3 Database Interface	9
	3.4 Protocols	9
4	Non-functional Requirements	10
	4.1 Performance requirements	10
	4.2 Security requirements	10
	4.3 Software Quality Attributes	11
Appendix A: Glossary		12
Appendix B: Analysis Model		13
Appendix C: Issues List		13

Revision History

Date	Change	Reason for Changes	Mentor Signature
20/03/2022	In Synopsis	Content Improvisation	

1. INTRODUCTION

A huge growth in number of online users has activated virtual word concepts and created a new business phenomenon which is cryptocurrency to facilitate the financial activities such as buying, selling and trading. Cryptocurrency represent valuable and intangible objects which are used electronically in different applications and networks such as online social networks, online social games, virtual worlds and peer to peer networks. The use of virtual currency has become widespread in many different systems in recent years.

A cryptocurrency is a digital or virtual currency that is secured by cryptography, which makes it nearly impossible to counterfeit or double-spend. Cryptocurrency is the name given to a system that uses cryptography to allow the secure transfer and exchange of digital tokens in a distributed and decentralized manner. These tokens can be traded at market price for fiat currencies Many cryptocurrencies are decentralized networks based on blockchain technology—a distributed ledger enforced by a disparate network of computers. A defining feature of cryptocurrencies is that they are generally not issued by any central authority, rendering them theoretically immune to government interference or manipulation.

Bitcoin and other prominent cryptocurrencies have gained much attention since the last several years. The blockchain technology adopted in using the cryptocurrency has raised the eyebrows within the banking sector, government, stakeholders and individual investors. Cryptocurrency is anticipated as the future currency that might replace the current paper currency worldwide.

1.1 Purpose of the Project

In last decade, cryptocurrency has emerged in financial area as a key factor in businesses and financial market opportunities. Crypto is in high demand in the today's market and as it is difficult to learn and predict the pricing because it is dependent on various factors. Cryptocurrency price prediction is considered a very challenging task, due to its chaotic and very complex nature.

So, there is a need of accurate prediction model that is able to efficiently predict the pricing with good accuracy and can assist cryptocurrency investors towards right investing decisions and lead to potential increased profits.

Machine learning utilizes a number of models to create accurate predictions. We will propose a more practical strategy for predicting crypto trends with a greater level of accuracy through this project. Correct crypto trend predictions can result in large returns for both the seller and the broker. The proposed research aims to investigate and improve supervised learning systems for predicting crypto values.

Hence this project goal is to develop a prediction model that can effectively predict pricing and illustrate numerous aspects that might assist users understand crypto pricing trends and future predictions.

1.2 Target Beneficiary

- **Crypto currency forecasting**: It analyzes the prior history, seasonality, market-moving events, etc. to result in a realistic prediction of the demand & supply of crypto currency It can be applied to short-term, medium-term, or long-term forecasting.
- **Risk assessment:** It aims to build decision support system that can estimate which crypto currency are profitable & which are not.
- **Financial modelling:** It is about translating a set of hypotheses about market behavior or agents into numerical predictions. These predictive models are used for supporting firms in decision-making processes about investments or returns.
- Diversification, Greater Liquidity
- Potential for high returns
- We aim to propose a revolutionary way for crypto market prediction with the use of machine learning in this project.

1.3 Project Scope

In this project, we will be implementing Long Short-Term Memory (LSTM). It is an artificial recurrent neural network (RNN) architecture used in the field of deep learning. We are making use of it as it has higher chances of delivering more accurate results and since it doesn't affect the entire data set but rather modifies it gradually through multiplications and additions. With LSTMs, the information flows through a mechanism known as cell states. This way, LSTMs can selectively recall or forget things. With the help of LSTM, we are going to examine the feasibility and performance in crypto trends.

Long short-term memory networks are an extension of recurrent neural networks, which basically extend the memory. Therefore, it is well suited to learn from important experiences that have very long-time lags in between.

LSTMs enable RNNs to remember inputs over a long period of time. This is because LSTMs contain information in a memory, much like the memory of a computer. The LSTM can read, write and delete information from its memory.

In an LSTM you have three gates: input, forget and output gate. These gates determine whether or not to let new input in (input gate), delete the information because it isn’t important (forget gate), or let it impact the output at the current timestep (output gate).

Hence To find the best accurate result, the methodology we chose to be implement was LSTM

Goals

- The goal of this prediction model is to estimate how the value of crypto currency will change in the future. Investors will be able to make more money if they can accurately predict price change.
- This project will help to identify market trends in order to make impactful decisions for their business operations and enable FinTech revolution.

- In this project, we will be predicting prices of the cryptocurrency i.e., whether it is increasing or decreasing and accordingly getting the final cost after the change and analyzing the trend of the graph containing change in price of cryptocurrency.

Requirements

We must thoroughly explore algorithms that best suit our project because Machine Learning uses many prediction models and algorithms to predict and automate things that are required.

Machine learning has integrated itself into the picture for the deployment and prediction of training sets and data models. Various things came to our attention when reading all of the earlier works, thus we chose the LSTM algorithm.

This project requires the use of a dataset source (or collection), which we obtained at https://www.coindesk.com/coindesk20. Apart from that, there are software requirements that are windows should be implemented as the operating system, while Excel, Python, and Jupyter Notebook should be used as the technology.

1.4 References

- Rahman and Dawood(2019) in their Bitcoin and Future of Cryptocurrency focused on cryptocurrency as an imaginative and technically advanced alternative for globalization. It examined the possibility of an alternative for processing payments across geographical boundaries and if regulated effectively cryptocurrency could remove a lot of the financial challenges faced in the present.
- C.A. (Dr.) Pramod Kumar Pandey(2017) in his Bitcoin As Emerging Virtual Currency and Its Related Impact on India focused on the high returns and the high risk that comes along. He believed bitcoins aren't mature and investing in bitcoins would be like jumping in a dark well without knowing the depth, since bitcoin is not backed by anything. One of the challenges to be faced would be to establish it as a currency or commodity. If this is established as a currency, probably RBI will play a leading role in its regulation, while if this is a commodity, SEBI will initiate regulations.
- Arief Radityo,Qorib Munajat,Indra Budi (2017) in their Prediction of Bitcoin exchange rate to American dollar using artificial neural network methods this research studied variety of ANN method to predict the market value of one of the most used cryptocurrency, Bitcoin. The ANN methods will be used to develop model to predict the close value of Bitcoin in the next day (next day prediction). This study compares four ANN methods, namely backpropagation neural network (BPNN), genetic algorithm neural network (GANN), genetic algorithm backpropagation neural network (GABPNN), and neuro-evolution of augmenting topologies (NEAT). The methods are evaluated based on accuracy and complexity. The result of the experiment showed that BPNN is the best method with MAPE 1.998 ± 0.038 % and training time 347 ± 63 seconds.

- Shailak Jaini (2018) in his The Growth of Cryptocurrency in India focuses on aspects such as the impact of cryptocurrencies in India and the opportunities that come along with it. It also talks about the various aspects of other countries and their rules and legislature revolving around the Introduction of cryptocurrencies.
- (Marangoz & Coban, 2018) analyzed cryptocurrency, particularly Bitcoin Etherium, Ripple (XRP), Bitcoin Cash and EOS with Artificial Neural Network Method and compared prediction results. They found that ANN has better estimation results when series are stable. In other words, if a series has high volatility, ANN performs getting worse.
- (Sahin, 2018) estimated Bitcoin closing prices with ARIMA and ANN. He found the best-fitting model for ANN (6-3-1) and ARIMA (1-1-6) to estimate Bitcoin prices. As a result of his study, he explores the ANN model has better performance than the ARIMA model.

2. PROJECT DESCRIPTION

2.1 Reference Algorithm

Long remembering (LSTM) is a man-made recurrent neural network (RNN) architecture employed in the sphere of deep learning. These networks are a kind of recurrent neural network capable of learning order dependence in sequence prediction problems. this can be a behaviour required in complex problem domains like MT, speech recognition, and more. LSTM networks are well-suited to classify, processing, and make predictions supported by statistical data. LSTM works well in our project since we've well-defined and standardized data with no lag. After surfing various other papers, we observed that LSTMs have a grip over conventional feed-forward neural networks and RNN in many ways. it's due to their property of selectively remembering patterns for long durations of your time and also it doesn't affect the model size because it's the power to grind and vanish the information which makes it completely independent of the dimensions of the computer file.

2.2 SWOT Analysis

SWOT Analysis – Strength, Weakness, Opportunities, Threat

SWOT QUADRANT

Strengths • Cost Reduction • Immutability • Ownership • Real-time • Safety • Security • Third-party • Traceability • Transparency • Trust • Visibility	**Weakness** • Complexity • Challenges of cryptocurrencies • Non-acceptance of the Technology • Scalability • Immaturity of the Technology
Opportunity • Crowdfunding • Global possibilities • International • Markets • Business Model	**Threat** • Attacks • Cryptocurrency Volatility • Legal • Regulation • Mining issues • Disruptor

Figure 1: Swot Analysis

2.3 Project Features

- This prediction model is to estimate how the value of crypto currency will change in the future.
- Investors will be able to make more money if they can accurately predict price change.
- The prediction offers enormous profit potential and is a primary driver of research in this field; knowing crypto movements by seconds can result in large gains.
- This project will help to identify market trends in order to make impactful decisions for their business operations and enable FinTech revolution.
- The project will foresee the crypto trends for the desired days.
- The necessities and the usefulness of this project correspond to the class.
- The project will clearly foresee on day-to-day premise as the crypto values changes to world events.
- The model is ideal for a more manageable future evolution.
- The model has been created in such a way that a person with almost zero knowledge about crypto would be able to understand and enjoy it.

2.4 User Classes and Characteristic

- **Retailers (Medium Website / Person / Broker)** – A retailer will be a person or businessperson through which a cryptocurrency will be purchased. A retailer would need ample amount of information to get their business going.

- **Investors** – An investor is a person who commits capital with the expectation of receiving financial returns. Investors will need a firm prediction of the crypto-trend, also they need information and data to analyse opportunities from different angles to minimize risk while maximizing returns before investing in the cryptocurrency.

- **Viewer/Spectator** – A viewer/spectator is a person who is neither a selling medium nor an investor but someone who simply desires to view and learn more about crypto-trends.

- **Cryptocurrency Analysts** – Cryptocurrency Analysts study cryptocurrencies and recommend investment opportunities and general financial strategies to investors and customers. They will need a firm prediction of the crypto-trend in order to recommend the opportunities.

2.5 Design and Implementation Constraints

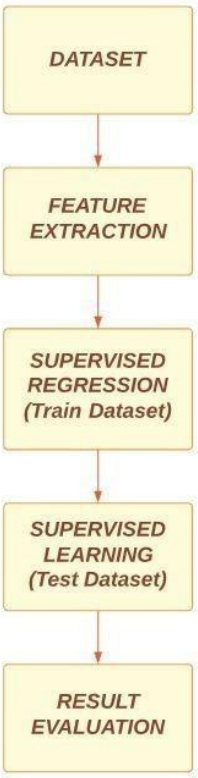


Figure 2: System Flow

2.6 Design diagrams

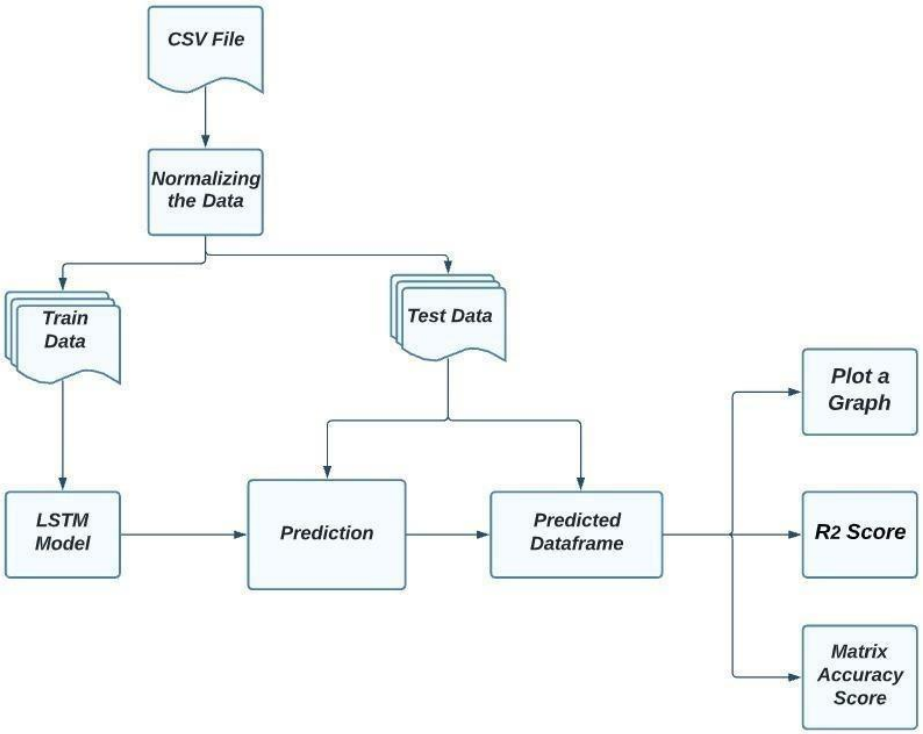


Figure 3: Application Workflow (Data Flow Diagram)

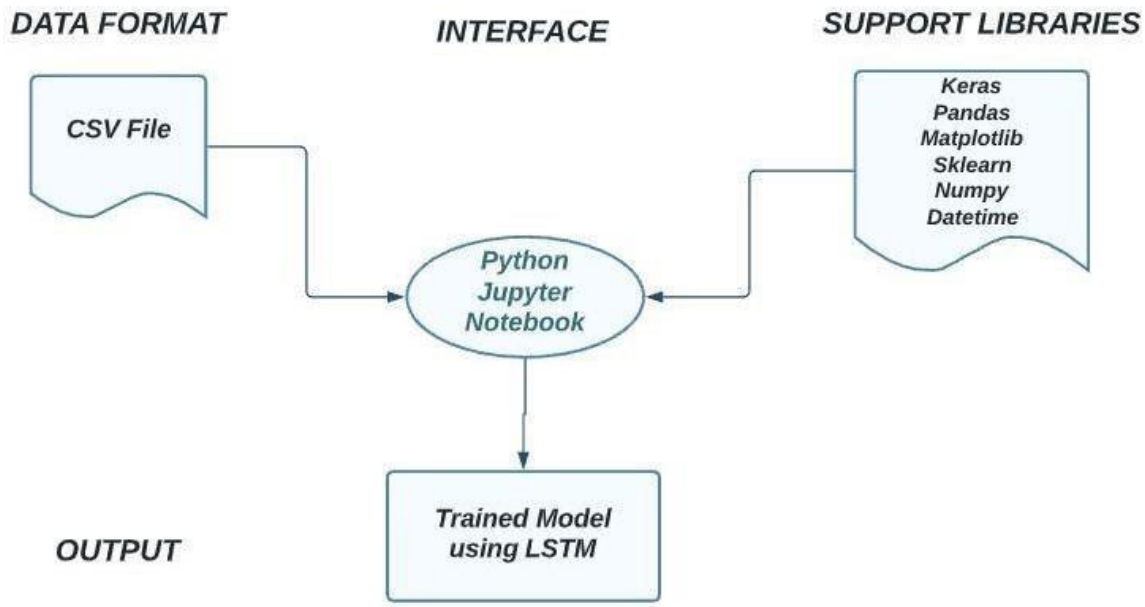


Figure 4: Architecture

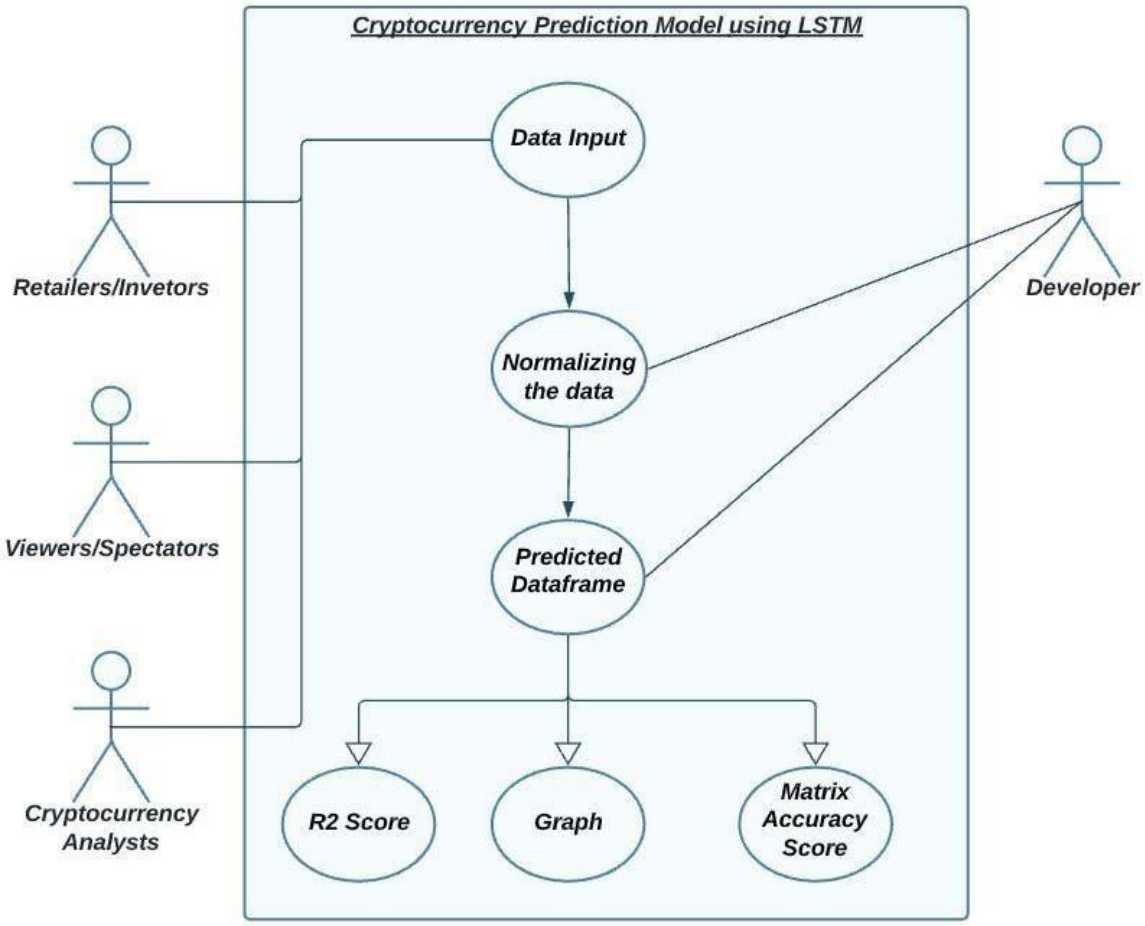


Figure 5: Use case diagram

2.7 Assumption and Dependencies

- Controlling risk is as considerable to a robust investment strategy project.
- The crypto market is virtually unpredictably volatile, making it difficult to predict market movement.
- The project is strongly reliant on the data used, and it will produce outcomes based on the data.

3. SYSTEM REQUIREMENTS

3.1 User Interface

User interfaces enable users to effectively control the computer or device they are interacting with. A successful user interface should be intuitive, efficient, and user-friendly. It is a reliable means through which users can become familiar with lements acting in a certain way, so choosing to utilize those elements will aid with task achievement, efficiency, and satisfaction.

In our project we shall be using Jupyter Notebook which is an interactive web application that allows the creation and sharing of documents with dynamic code. The product is widely used in the areas of data mining, facilitating its activities of visualization, cleaning and data exploration, in addition to allowing the mixing of code and text snippets, optimizing the creation of presentations and reports, allowing the construction of everything in a single location, as if it were an IDE (Integrated Development Environment) for the data scientist.

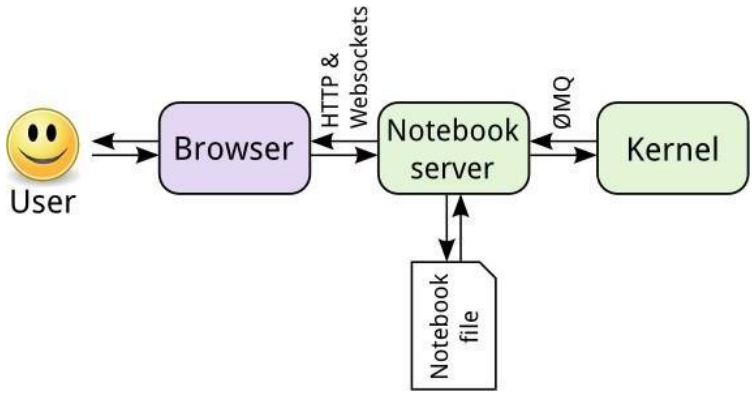


Figure 4: Interface working

3.2 Software Interface

We aim to make communication simple and straightforward through this proposed idea. Users may simply obtain the information they require, such as Bitcoin trends for certain dates or a periodical graph depicting the situation over the previous few years. This can also assist someone who is unfamiliar to the domain of cryptography and can use its features without difficulty. The large dependency set generates a prediction model that raises the expectancy. This brings the user closer to the crypto's approximate values.

In our project we shall be using Anaconda which is an open-source distribution for python used for data science, machine learning, deep learning, etc. With the availability of more than 300 libraries for data science. Anaconda helps in simplified package management and deployment. Anaconda comes with a wide variety of tools to easily collect data from various sources using various machine learning and AI algorithms. It helps in getting an easily manageable environment setup which can deploy any project with the click of a single button.

3.3 Protocols

Protocols are important in telecommunications systems and other systems because they create consistency and universality for the sending and receiving of messages.

In our project we shall be using Hypertext transfer protocol (HTTPS) which is secure is the secure version of HTTP, which is the primary protocol used to send data between a web browser and a website. HTTPS is encrypted in order to increase security of data transfer.

4. NON-FUNCTIONAL REQUIREMENTS

4.1 Performance requirements

- The requirements needed to predict the crypto movement should ensure that only high-quality securities & the accuracy should be very good, thus clean historical data should be used for training and testing to develop an accurate prediction model.
- The system must be interactive and the delays involved must be fewer. So, in every action-response of the system, there are no immediate delays.

4.2 Security requirements

Users' account information will be stored in that they can only view their own profile for confidentiality reasons and security reasons. Login information will be stored in a secured manner, lest should it be tampered with from foreign substances.
The language we are making use of – Django.
Django has built-in protection against most types of CSRF attacks. Cross-site request forgery allows a malicious user to execute actions using the credentials of another user without that user’s knowledge or consent.
It is possible to disable the CSRF module globally or for particular views. This would make sure that the stored data along with the login credential of users are secured and privacy is maintained.

4.3 Software Quality Attributes

Availability

It is the most accurate representation of constraint dependencies on one another. It makes it much easier for the user to comprehend and see the conversion. The project's goal is to employ machine learning to introduce and equalize the project for all users.

Interoperability –

Cryptocurrency forecasting is a fascinating task that involves determining what unusuality can be generated in a market under certain scenarios. The proposed model assists in the analysis of trends and the formation of rational decisions regarding crypto investments.

Performance –

The proposed research aims to investigate and improve supervised learning algorithms for predicting crypto trends. The topic's persuasion is to predict the optimum cryptocurrencies investment strategies.

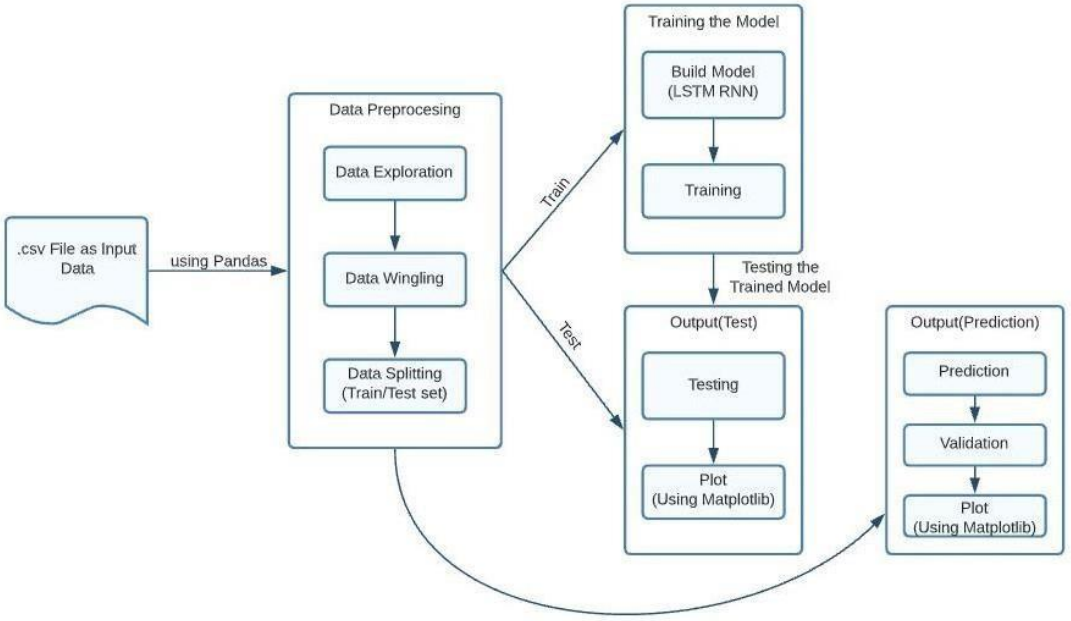
Usability –

Accurate predictions of crypto movements will allow investors to gain more profit. As a result, our work can benefit both those who are new to the market and those who are well- versed in it.

APPENDIX A: GLOSSARY

Cryptocurrency	A cryptocurrency, crypto-currency, or crypto is a collection of binary data which is designed to work as a medium of exchange wherein individual coin ownership records are stored in a ledger which is a computerized database using strong cryptography to secure transaction records, to control the creation of additional coins, and to verify the transfer of coin ownership.
Supervised learning	Supervised learning is a process of providing input data as well as correct output data to the machine learning model
Prediction model	Predictive modeling is the subpart of data analytics that uses data mining and probability to predict results.
Forecasting	Forecasting is a technique that uses historical data as inputs to make informed estimates that are predictive in determining the direction offuture trends.
Profit	Profit describes the financial benefit realized when revenue generated from a business activity exceeds the expenses
Robust	The robustness is the property that characterizes how effective your algorithm is while being tested on the new independent (but similar) Dataset
User Interface	User Interface (UI), which enables business domain experts to train ML models without requiring expertise in coding.
Financial modelling	It is about translating a set of hypotheses about market behavior or agents into numerical predictions.
Accuracy	Accuracy is the measurement used to determine which model is best at identifying relationships and patterns between variables in a dataset

IX B: ANALYSIS MODEL



APPENDIX C: LIST ISSUES

SR No	Issues
1	Work Planning – not having a proper business plan due to excessive workload.
2	Lack of communication and difference in opinions leads to wastage of time and energy.
3	Lack of research at points leading to repeated errors.
4	Technical issue – Breakdown of computer at numerous times leading to loss of data and information.
5	Failing to deliver a timely decision might lead derail the sequence of workethics.