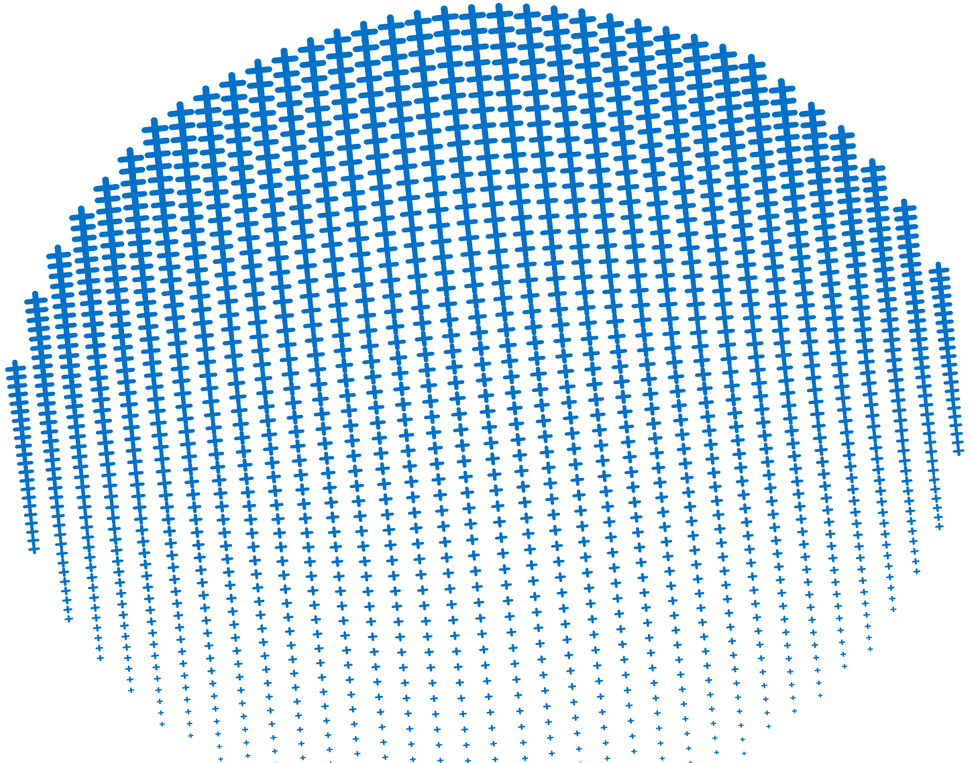
CryptoPre: CryptoCurrancy price Prediction



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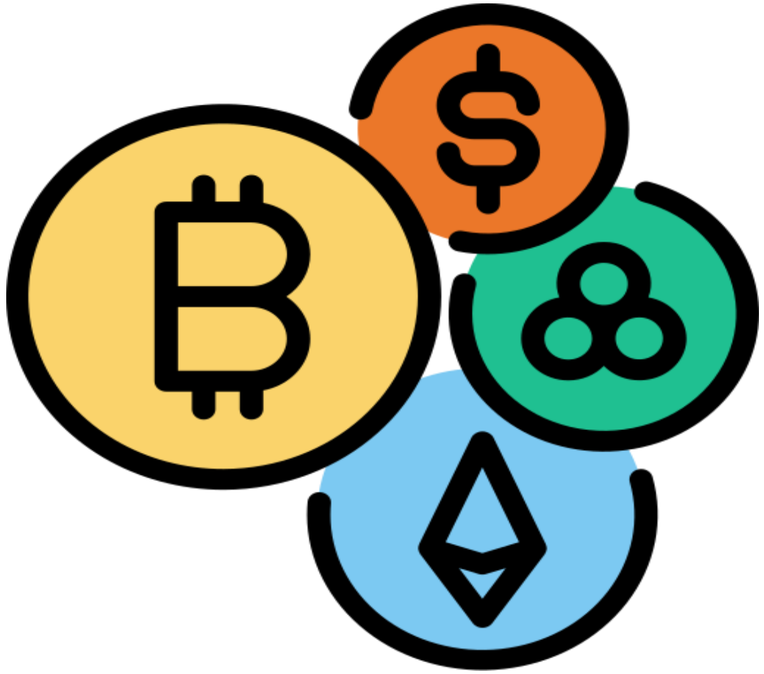
Agenda

- Introduction
- Problem statement
- Aims and Objectives
- Suggested solution
- Related work
- Methodology
- Design
- implementation
- Testing
- Website(frontend&backend)
- Tools and Technology
- Time plan
- References

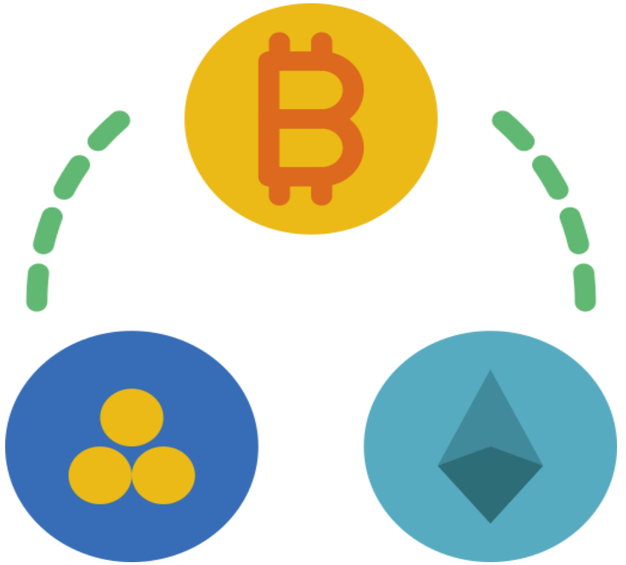



Planning
Design
Analysis
SDLC
(Software
Development
Life Cycle)
Implementat
ion
Testing
Deployment

Introduction

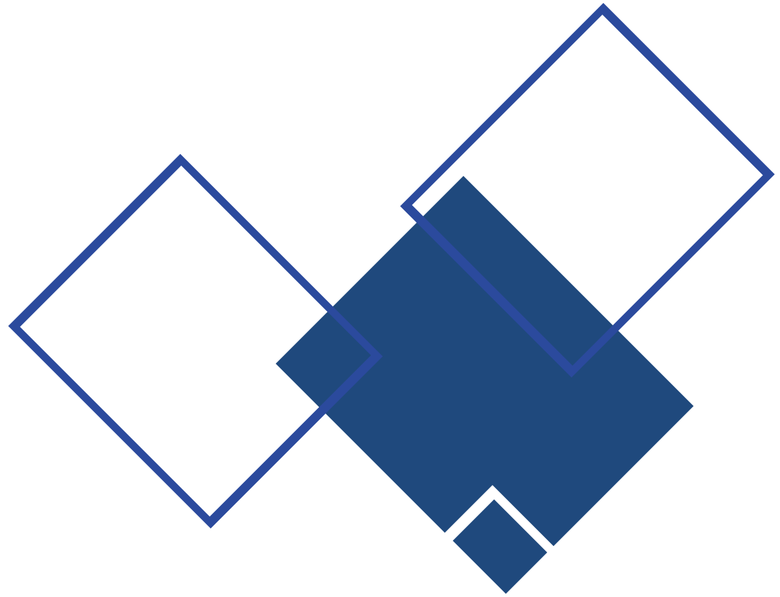
Introduction

- Cryptocurrency price prediction can provide a lending hand to cryptocurrency investors for making proper investment decisions in order to acquire higher profits while it can also support decision-making and financial researchers for studying cryptocurrency markets behavior.



Analysis

Problem statement



•**Market Volatility:** Cryptocurrency markets are highly volatile, making it challenging for investors to predict price movements and optimize their investment strategies.

•**Risk Management:** Investors lack effective tools to assess and manage risks associated with cryptocurrency investments, leading to potential financial losses.

•**Decision Support lack:** There is a need for a reliable prediction model to provide investors with timely and accurate information, aiding in decision-making and portfolio management.

Aims and Objectives

- **Provide accurate price forecasting**
- **Enabling informed decision-making**
- **Predicting risks**
- **Minimizing financial losses**
- **Enhancing transparency and trust**

Suggested solution

we build a system based on machine and deep learning models to predict cryptocurrency price, our system provide website interface to help in market decision support.

Related work

Researchers conducted a detailed study on cryptocurrency price forecasting, exploring traditional statistical methods, machine learning models, and deep learning models like LSTM and GRU. The dataset, encompassing Bitcoin(BTC) - Litecoin(LTC) - Ethereum(ETH) - Monero (XMR) and Ripple (XPR) over a five-year period from 2017 to 2022, was sourced from Binance.com and Investing.com. Evaluation using metrics such as Mean absolute percentage error(MAPE) ,Root mean absolute error(RMSE) and Mean absolute error(MAE)

These findings position LSTM-based on models as effective tools for forecasting cryptocurrency prices, providing valuable insights for researchers and practitioners navigating the complexities of this dynamic market [1].

Table 2. The average performance of individual models ranked by RMSE in ascending order.

Model	RMSE	MAE	MAPE	R2	Train (s)	Inference (ms)
LSTM	0.02224	0.0173	3.862%	0.735	173.765	1.862
GRU	0.02285	0.0176	3.939%	0.720	254.520	1.550
HYBRID	0.02295	0.0177	3.959%	0.717	461.967	2.383
KNN	0.02332	0.0179	4.003%	0.711	<0.01	0.074
TCN	0.02334	0.0180	4.021%	0.711	40.475	1.219
ARIMA	0.02343	0.0180	4.010%	0.708	4.035	0.109
TFT	0.02353	0.0181	4.062%	0.707	105.913	8.842
RF	0.02402	0.0184	4.095%	0.697	2.121	0.586
SVR	0.02452	0.0189	4.240%	0.681	<0.01	0.008

Related work

Researchers conducted a detailed study on cryptocurrency price forecasting, exploring traditional statistical methods, machine learning models, and deep learning models like LSTM and GRU. The dataset, encompassing Bitcoin (BTC) – Litecoin(LTC) - Ethereum(ETH) – Monero (XMR) and Ripple (XPR) over a five-year period from 2017 to 2022, was sourced from Binance.com and Investing.com. Evaluation using metrics such as Mean absolute percentage error (MAPE), Root mean absolute error(RMSE) and Mean absolute error(MAE).

These findings position LSTM-based models as effective tools for forecasting cryptocurrency prices[5].

Table 5.2: Average performance by time series model

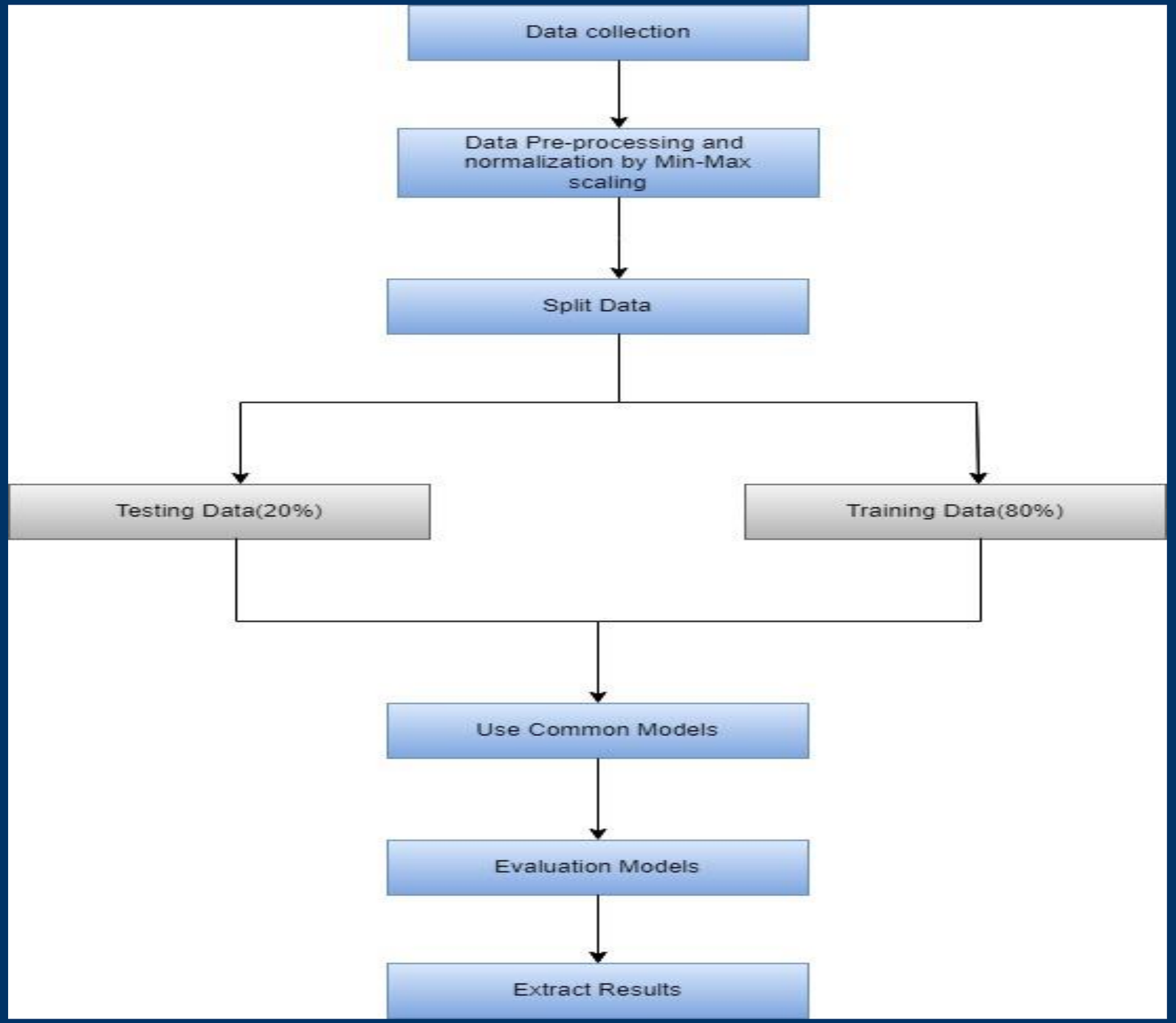
Model	Excess profit*	Trades**	AUC ROC**	Accuracy**
OLS/Logit	67.48 %	52.7	0.6782	0.8025
XGBoost	126.12 %	44.0	0.6998	0.8057
MLP (FNN)	138.61 %	47.4	0.6797	0.8065
LSTM	83.88 %	12.0	0.6526	0.8028
TFT	11.13 %	4.2	0.5653	0.7971

* Profit exceeding buy-and-hold strategy

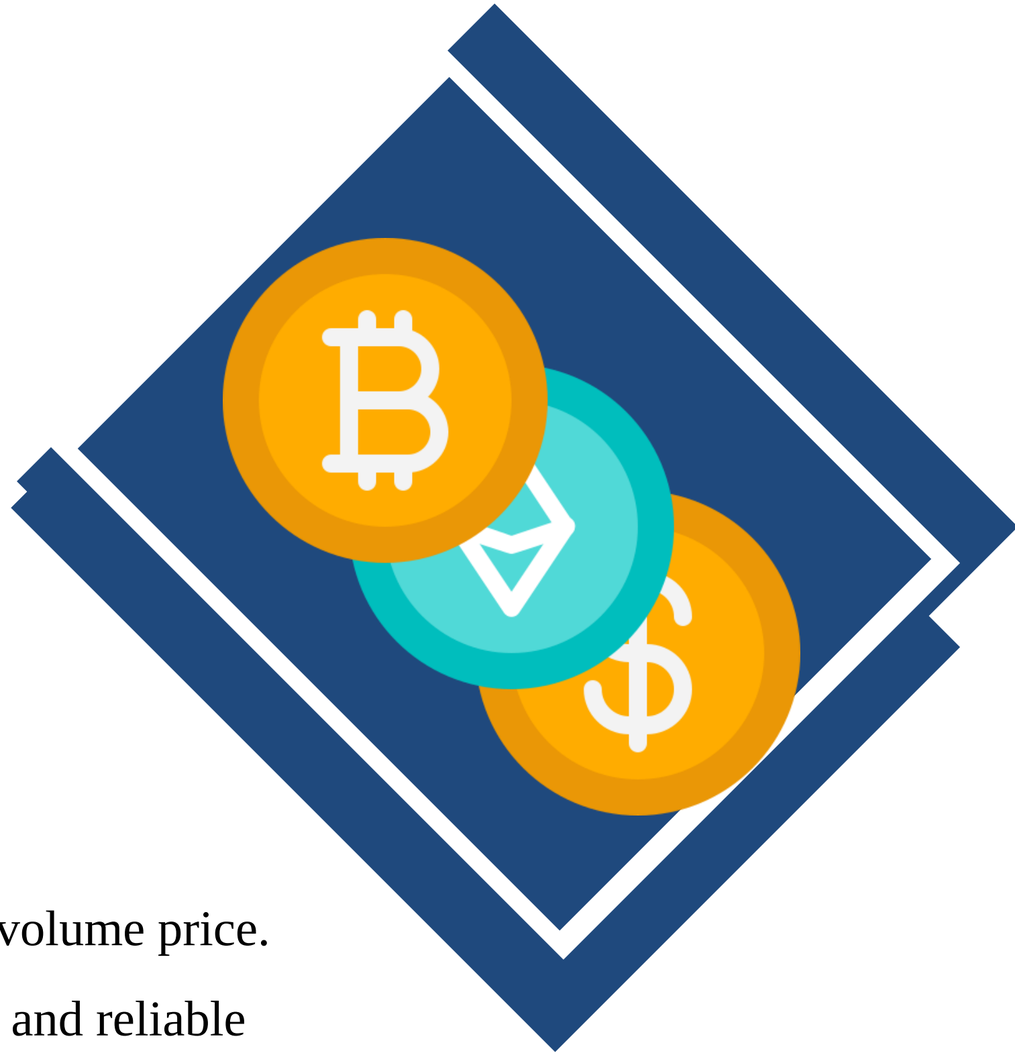
** All metrics are averages of 7-fold cross-validation and were aggregated across all target variables

Methodology

- Data collection
- Data preprocessing
- common models
- Model Evaluation
- Build website



❑ Data Collection



➢We gathered Data from **Yahoo. Finance**

Datasets contain four coins:-

1) Bitcoin (btc)

2) Litecoin (ltc)

3) Ethereum (eth)

4) Monero (xmr)

➢Columns contains Date ,Close price, open price, Low price, High price, volume price.

➢each dataset contains over 2500 raw from 2017 to 2023 and it’s accurate and reliable data .

❑ Data Collection

We gathered Data from kaggle.com and we choose two datasets:

1)Bitcoin (Bitcoin Tweets.csv)

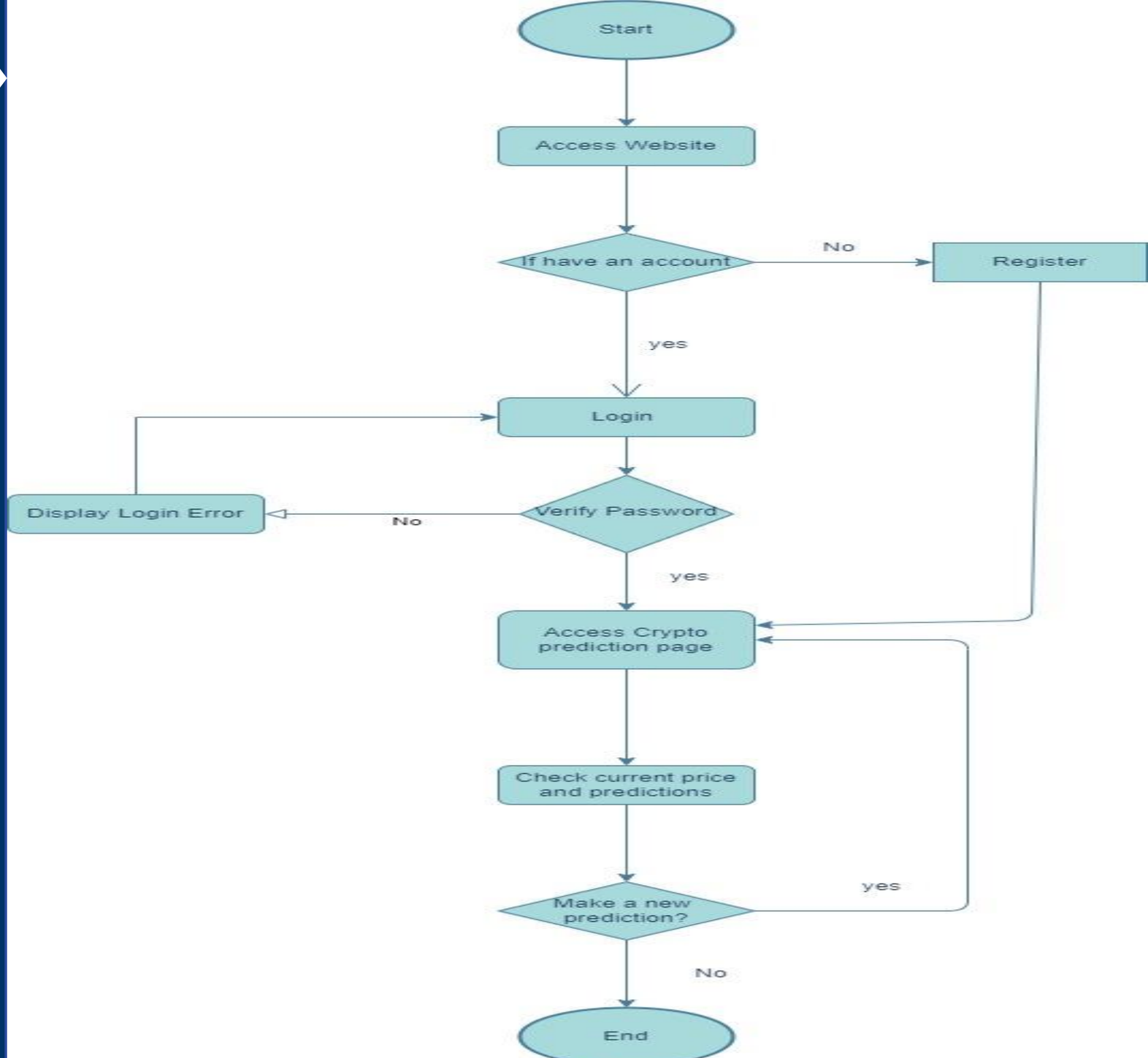
2) Ethereum (Ethereum Tweets.csv)

Information regarding the data:
The data totally consists of 13 columns.Columns:-
user_name, user_location, user_description, user_created, user_followers, user_friends, user_favourites, user_verified, date, text, hashtags, source and is_retweet.

Design

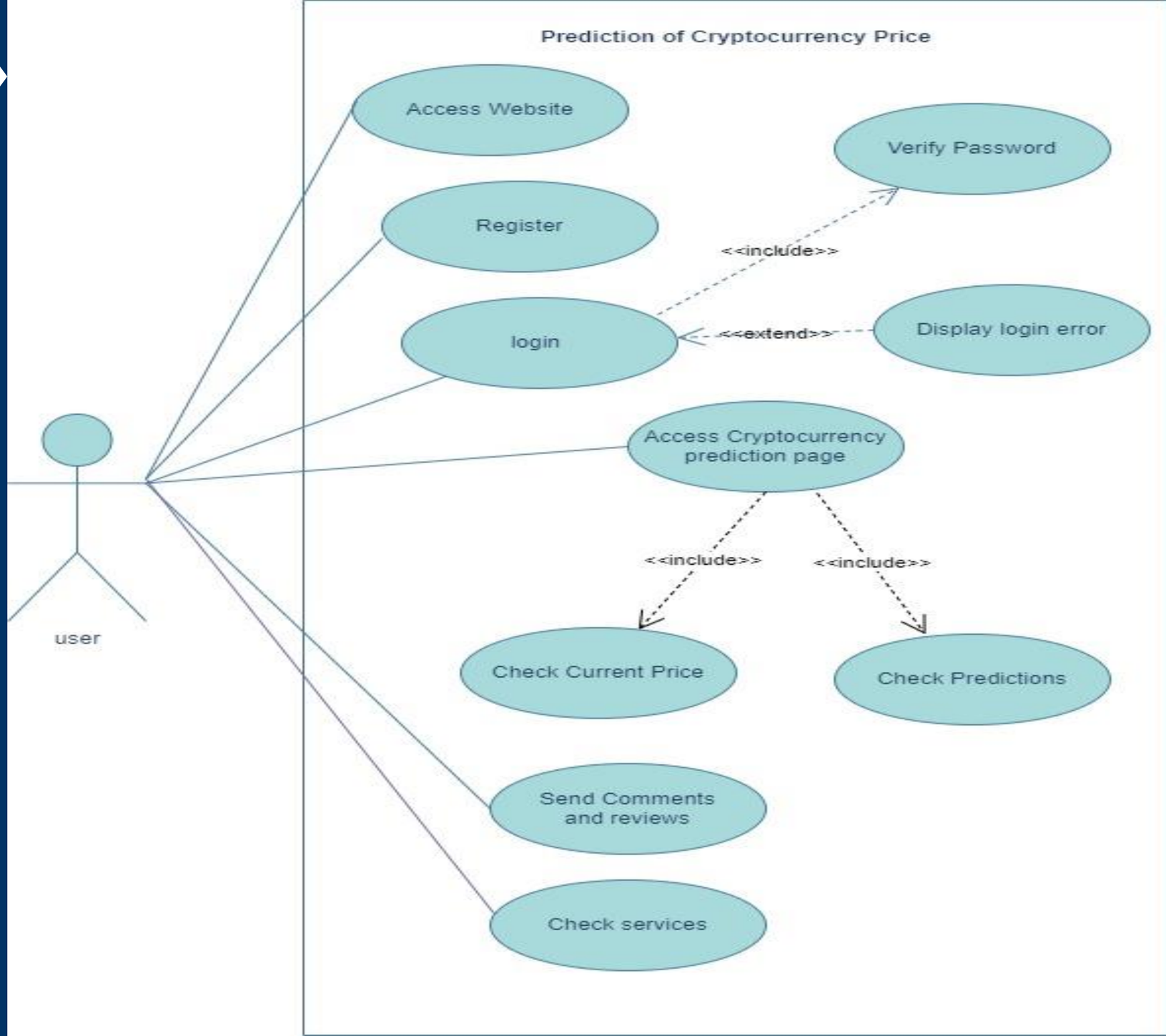
Design

Flow chart



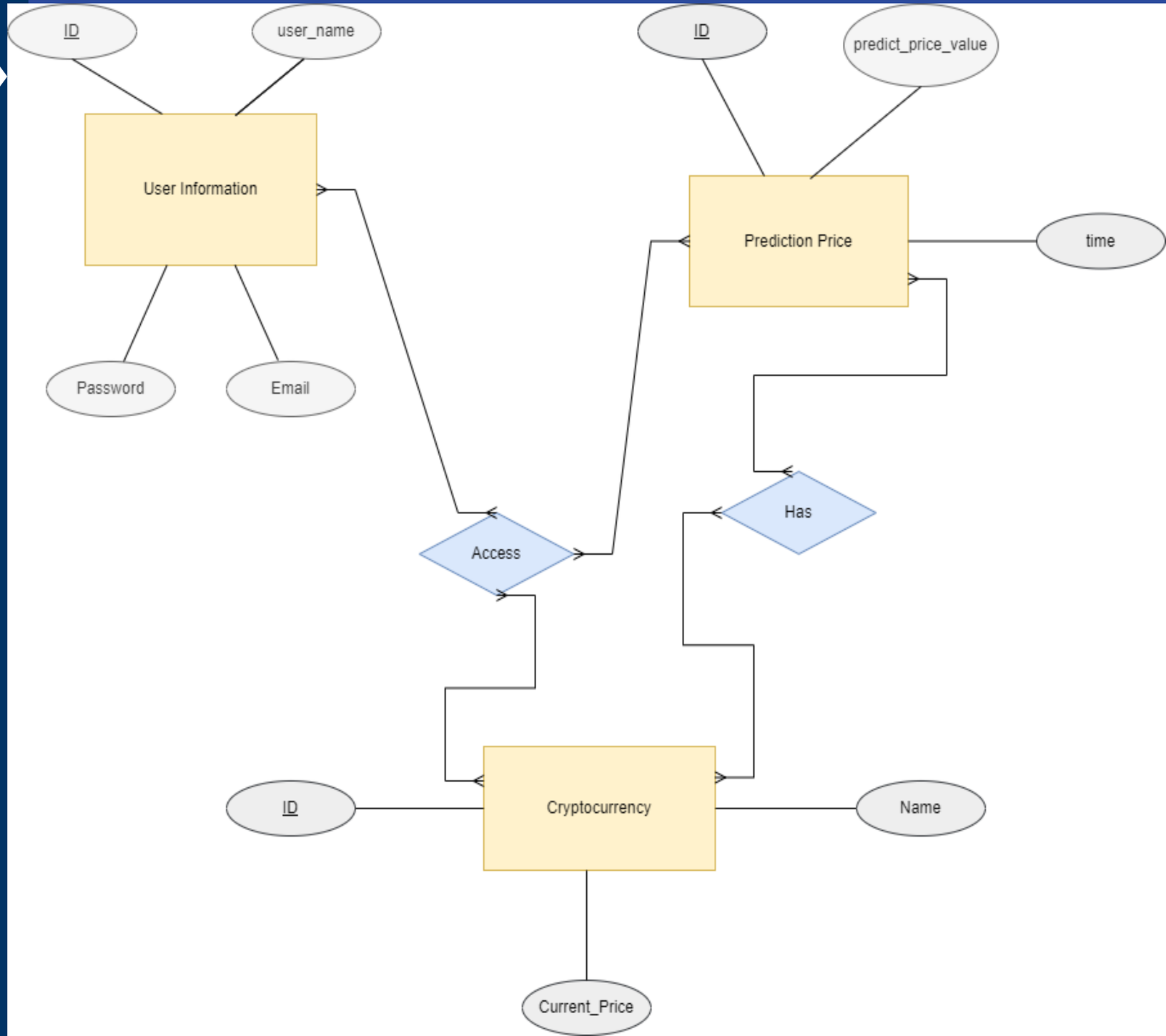
Design

Use Case



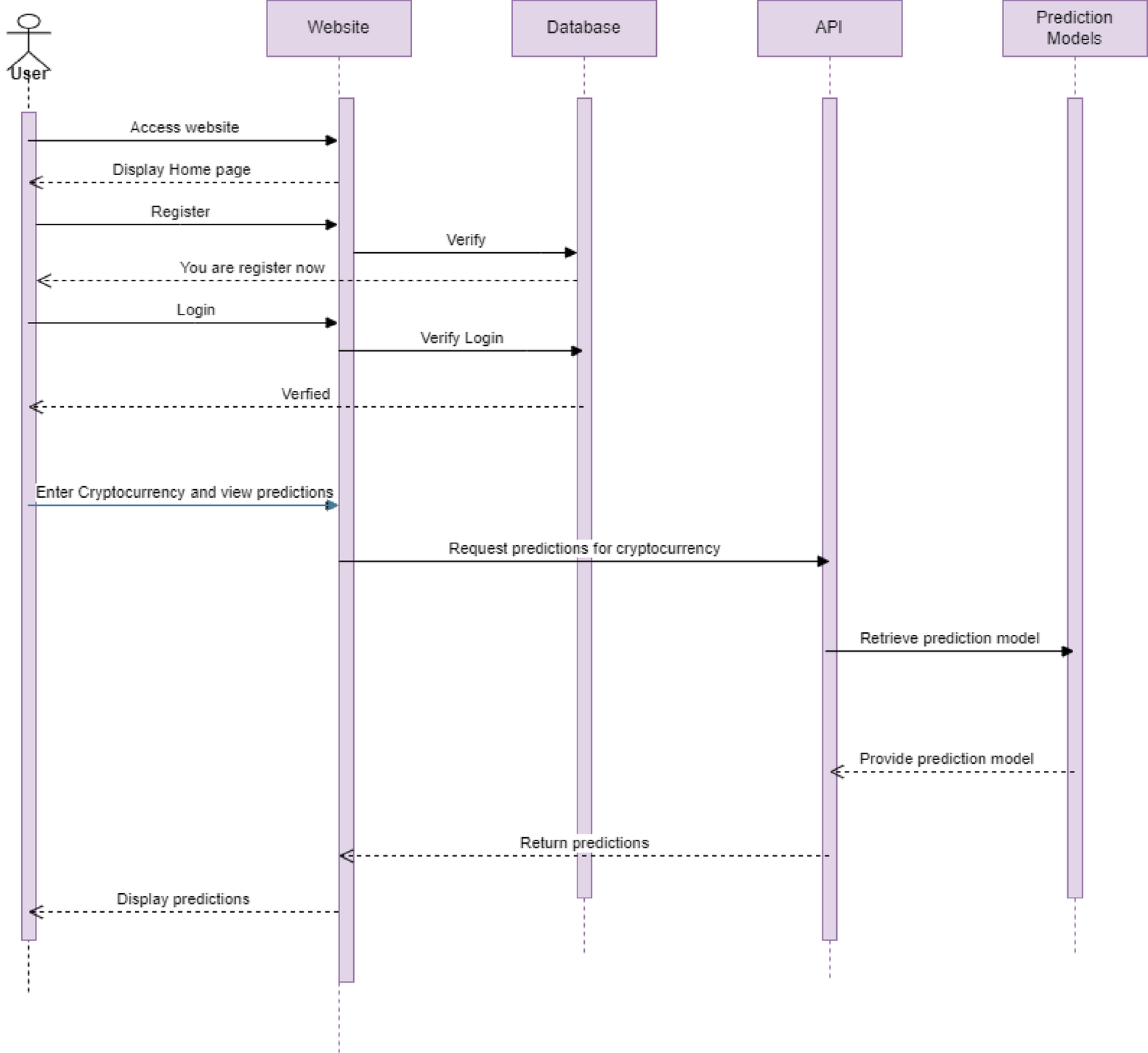
Design

ERD


ID
user_name
User Information
Password
Email
ID
predict_price_value
Prediction Price
time
Has
Access
ID
Cryptocurrency
Name
Current_Price

Design

Sequence Diagram



Implementation

❑ Data preprocessing

- We used MinMaxScaler to scale dataset, bringing them into a standardized range between (0 , 1). This is vital for models that are sensitive to the scale of input features.

- We split dataset as 80% training and 20% testing

❑ Common Models

- ❑ Support Vector Regression (SVR)
- ❑ AutoRegressive Integrated Moving Average (ARIMA)
- ❑ Long Short Term Memory (LSTM)
- ❑ Gated Recurrent Units (GRU)

Support Vector Regression (SVR)	AutoRegressive Integrated Moving Average (ARIMA)	Long Short Term Memory (LSTM)	Gated Recurrent Unit (GRU)
SVR model is a type of support vector machine (SVM) that is used for regression tasks. It was applied to a variety of time series tasks such as predictions in the financial market. it can use different types of kernels, which are functions that determine the similarity between input vectors.	ARIMA model is a predictive model used to analyze temporal data to predict future values. The model analyzes the temporal pattern and trends in the data to generate forecasts Temporal data: ARIMA relies on analyzing temporal data, and time is an essential element in estimating cryptocurrency expectations. Relative stability: The cryptocurrency market is characterized by high volatility and rapid changes, but ARIMA can be used to identify general trends and the time pattern behind these fluctuations.	LSTM model is a deep learning, It is a special type of Recurrent Neural Network which is capable of handling the vanishing gradient problem faced by RNN. It excels at capturing long-term dependencies, making it ideal for sequence prediction tasks Unlike traditional neural networks, LSTM incorporates feedback connections, allowing it to process entire sequences of data	GRU model is a type of recurrent neural network (RNN) is a simpler alternative to Long Short-Term Memory (LSTM) networks. Like LSTM, GRU can process sequential data such as text, speech, and time-series data. The key innovation in GRUs lies in the use of gating mechanisms. These mechanisms help control the flow of information within the network, enabling it to selectively update and forget information based on the input data. The two of gates in a GRU are the update gate and the reset gate

Twitter Sentiment Analysis

Twitter Sentiment analysis plays an important role in decoding public perception and emotions surrounding cryptocurrencies. By analyzing tweets opinions and discussions, it gauges market sentiment, impacting trading decisions. By analyzing tweets related to specific cryptocurrencies, you can gauge overall market sentiment whether it's positive, negative, or neutral. This can help predict price movements based on whether sentiment is improving or deteriorating.

❑ Data preprocessing

Preprocessing for tweets Data:
A tweet contains a lot of opinions about the data which are expressed in different ways by different users. Preprocessing of tweet include following points:

- ❑ Remove all URLs and hash tags.
- ❑ Replace all the emoticons with their sentiment.
- ❑ Remove all punctuations, symbols, numbers and marks.
- ❑ Remove Stop Words.
- ❑ Remove Extra Spaces.
- ❑ Remove everything other than text.

VADER

Vader (Valence Aware Dictionary and sentiment Reasoner) is a rule-based sentiment analysis tool that is specifically designed for analyzing social media texts. Vader is a pre-trained sentiment analysis model that provides a sentiment score for a given text. VADER is able to detect the polarity of sentiment (how positive or negative) of a given body of text when the data being analysed is unlabelled.

Twitter Sentiment analysis

A decision tree is a flowchart-like tree structure where each internal node denotes the feature, branches denote the rules and the leaf nodes denote the result of the algorithm.

Linear Discriminant Analysis (LDA), also known as Normal Discriminant Analysis or Discriminant Function Analysis, is a dimensionality reduction technique primarily utilized in supervised classification problems. It facilitates the modeling of distinctions between groups.

Flask

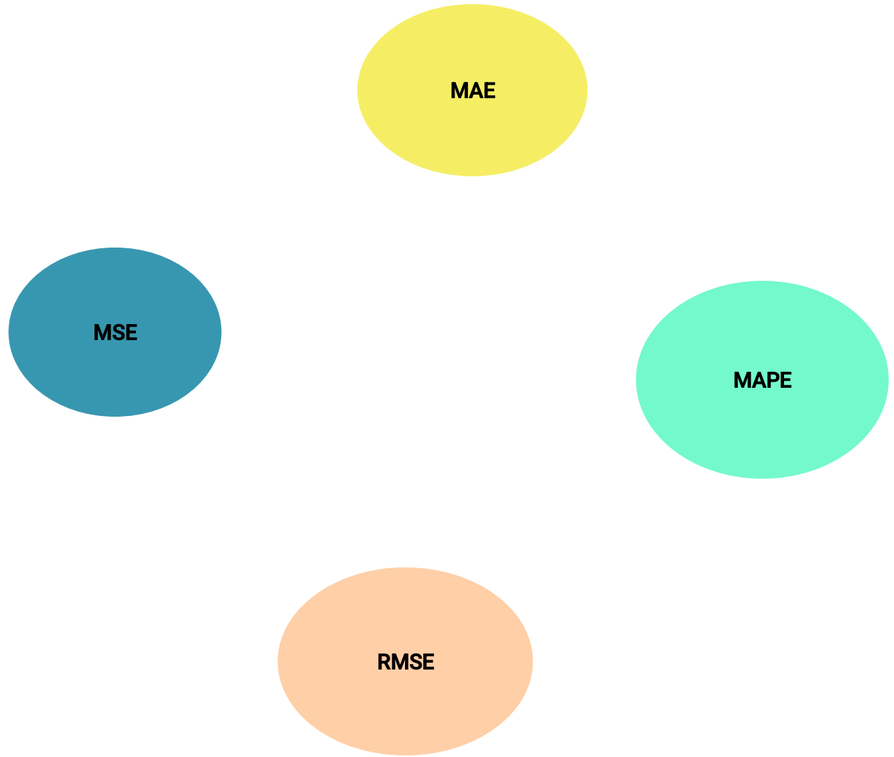
Flask is a web framework that allows developers to build lightweight web applications quickly and easily with Flask Libraries. A Flask API is a web application interface created using the Flask framework, which allows clients to interact with a server-side application via HTTP requests. Flask is a micro-framework for Python that provides the tools needed to create a web server and define endpoints, handle requests and responses, and manage data.

Testing

Model evaluation

Error Metrics to evaluate models:-

- Mean Absolute Error (MAE)
- Mean Square Error (MSE)
- Mean Absolute Percentage Error (MAPE)
- Root Mean Square Error (RMSE



Comparison between Models

In comparing the models, we used data as two methods:-

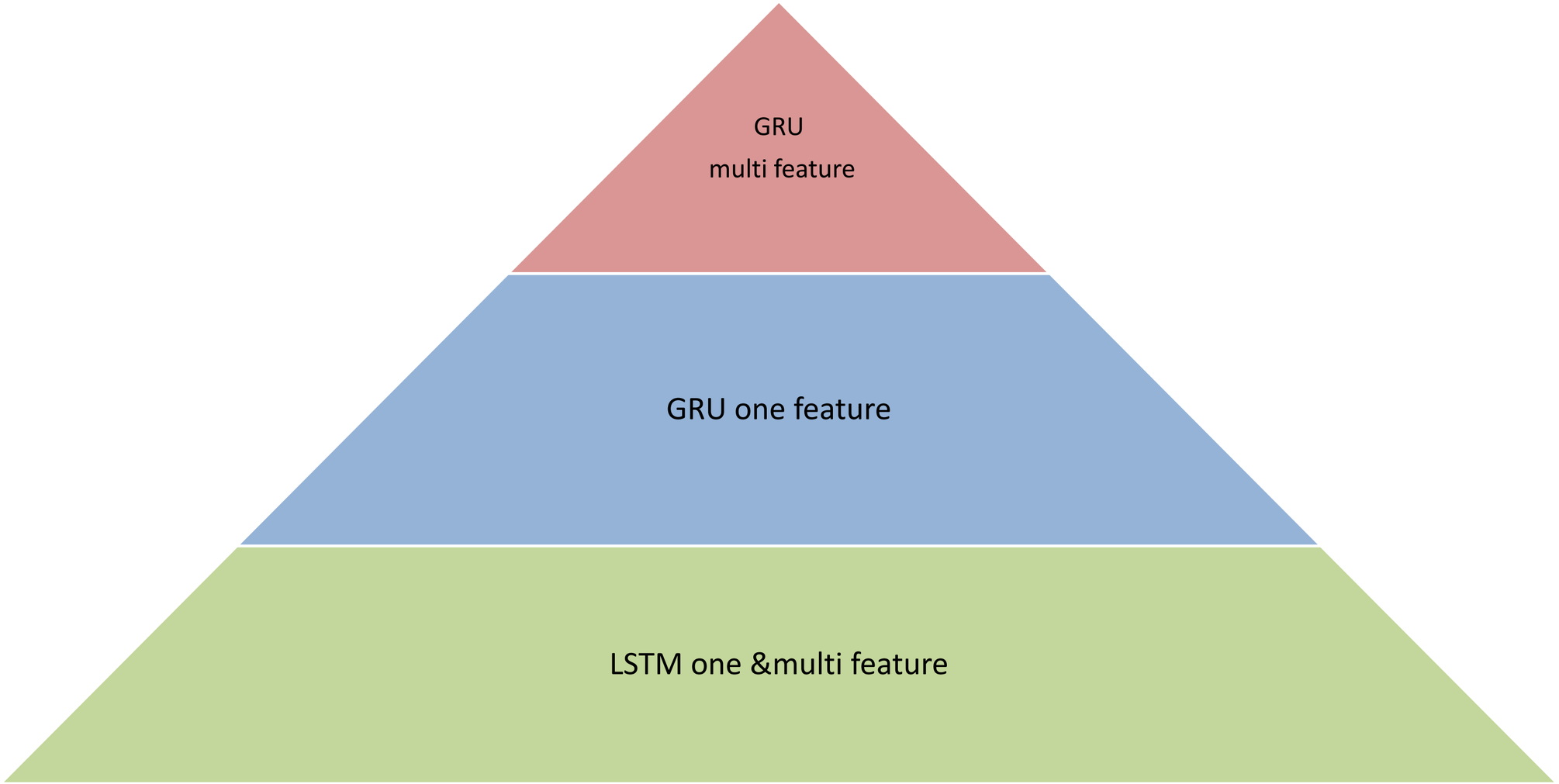
- One Feature prediction (Close price)
- Multi features prediction(Close price-Open price-High price –Low price)

One feature prediction (Close price)

Error Metric	*MAE*				MSE				MAPE				RMSE			
Coin / Model	BTC	ETH	LTC	XMR	BTC	ETH	LTC	XMR	BTC	ETH	LTC	XMR	BTC	ETH	LTC	XMR
LSTM	0.0108	0.01002	0.0071	0.0182	0.00019	0.0001	9.9821e-05	0.0004	0.0309	0.0317	0.03581	0.0703	0.01380	0.01309	0.00999	0.0200
GRU	0.0077	0.00729	0.0060	0.0056	0.00011	0.0001	7.841e-05	6.877e-05	0.0226	0.0236	0.03027	0.0216	0.01054	0.01027	0.00885	0.0082
ARIMA	0.2103	0.22984	0.1699	0.2591	0.062	0.1061	0.0570	0.1012	0.9897	1.0136	1.19994	0.9669	0.24931	0.32585	0.23882	0.3182
SVR	0.0436	0.03718	0.0536	0.0478	0.004	0.0048	0.0100	0.0067	0.2550	0.2390	0.49978	0.2419	0.08142	0.06429	0.10049	0.0819

Multi features prediction (Close price-Open price-High price –Low price)

	Error Metrics	MAE				MSE				MAPE				RMSE			
	Coin / Model	BTC	ETH	LTC	XMR	BTC	ETH	LTC	XMR	BTC	ETH	LTC	XMR	BTC	ETH	LTC	XMR
One feature	LSTM	0.0108	0.0100	0.007	0.0182	0.0001	0.0001	9.9821e-05	0.0004	0.0309	0.0317	0.0358	0.070	0.0138	0.0130	0.0099	0.020
	GRU	0.0077	0.0072	0.0060	0.0056	0.0001	0.0001	7.841e -05	6.877e -05	0.0226	0.0236	0.0302	0.021	0.0105	0.0102	0.0088	0.008
multi features	LSTM	0.0146	0.0213	0.008	0.006	0.0002	0.00055	0.00012	9.51e-05	0.0438	0.0658	0.0450	0.026	0.0169	0.0234	0.0113	0.009
	GRU	0.0071	0.012	0.012	0.005	0.0001	0.0002	0.0002	6.60e-05	0.021	0.038	0.0633	0.020	0.0103	0.0149	0.0160	0.008

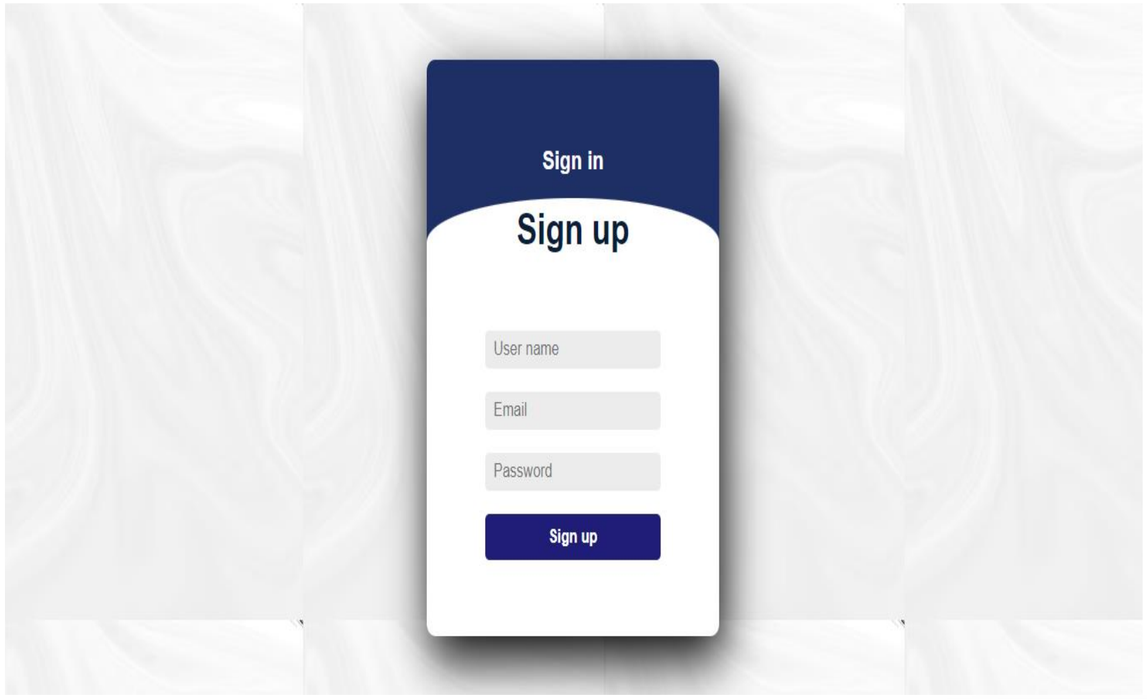

GRU
multi feature
GRU one feature
LSTM one &multi feature

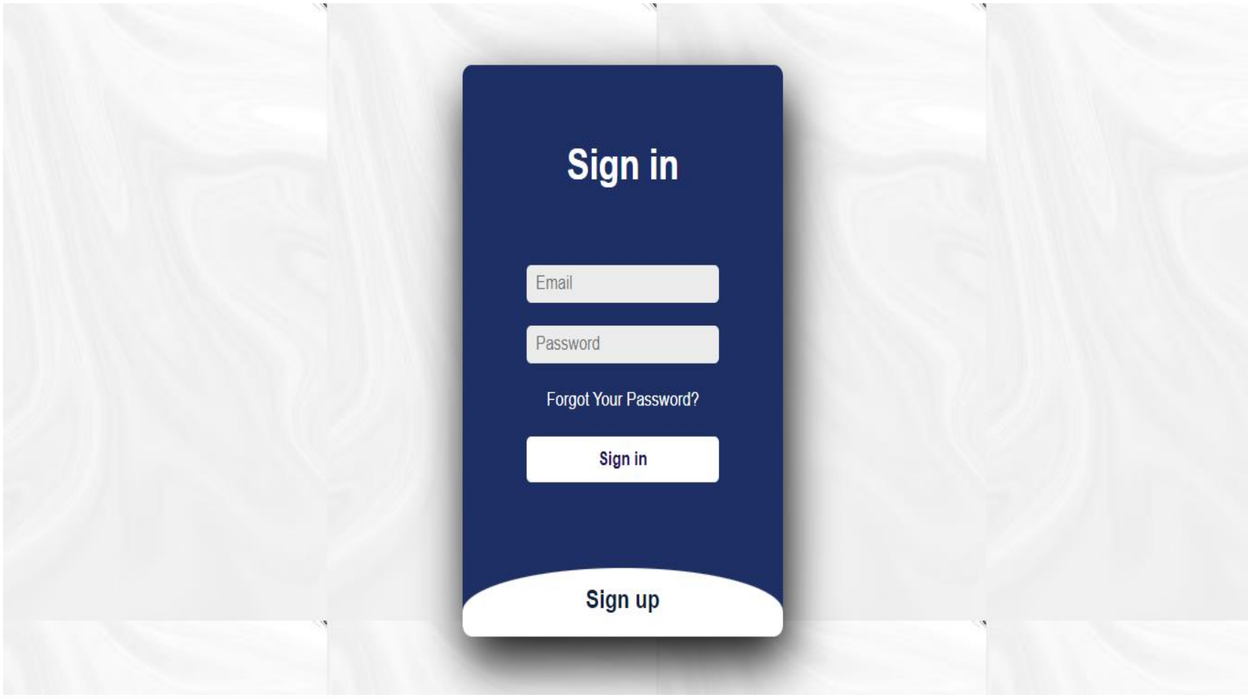
Twitter Sentiment Accuracy

Twitter Sentiment Analysis:

- The accuracy of Decision Tree is about 97.4
- The accuracy of Linear Discriminant Analysis is about 97.7.

Website (Frontend&Backend)


Sign in
Sign up
User name
Email
Password
Sign up


Sign in
Email
Password
Forgot Your Password?
Sign in
Sign up


Reset Password
Email
New Password
Confirm Password
Reset Password
Log In

Bitcoin

predict price Now

Ethereum

predict price Now

Litecoin

predict price Now

Monero

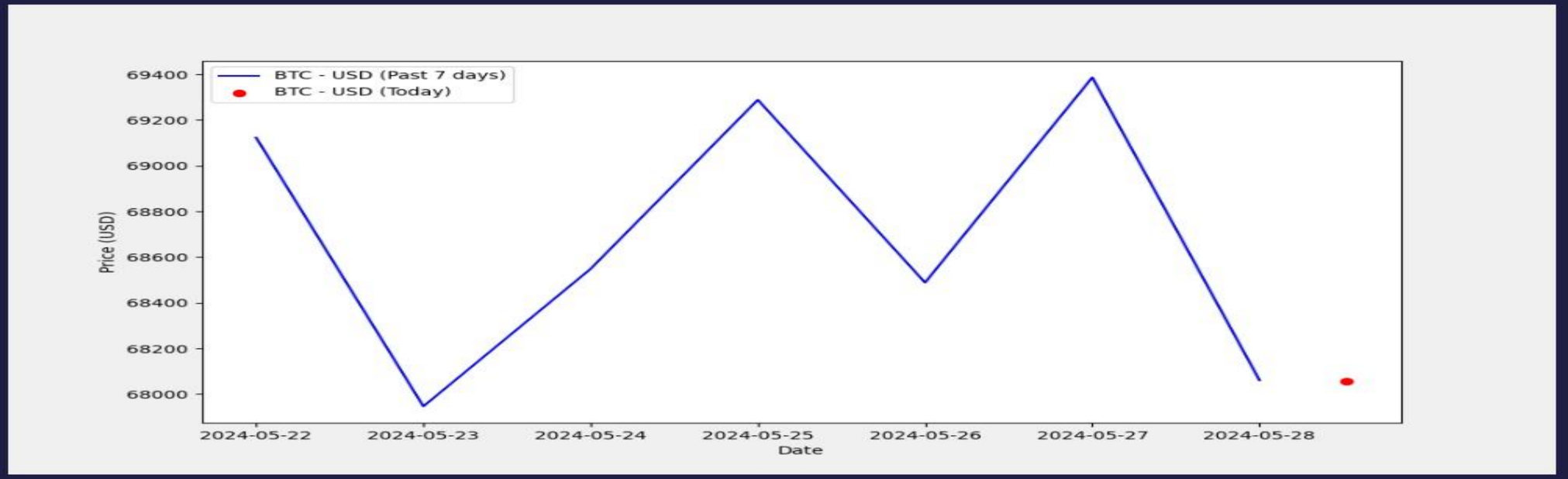
predict price Now

Bitcoin (BTC) USD

current price

68047.25$

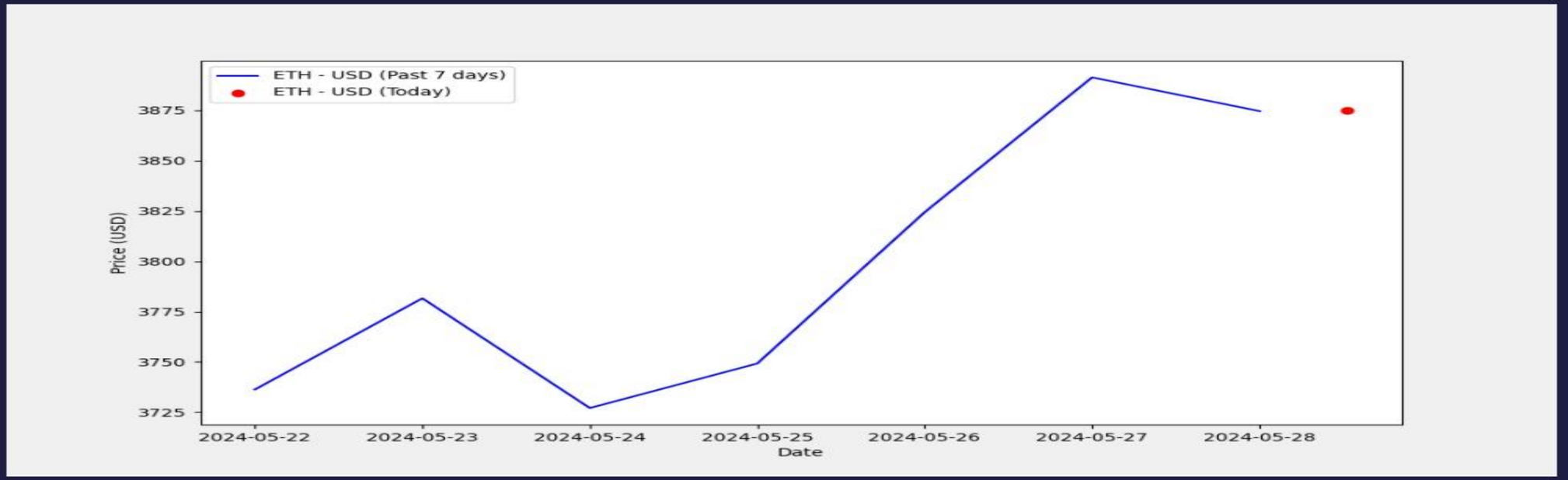
Next Day Price	Next 3 Day Price	Next 7 Day Price
58275.805$	58279.85$	58258.72$



Ethereum (ETH) USD
current price

3883.63$

Next Day Price	Next 3 Day Price	Next 7 Day Price
2969.7898$	2970.2078$	2969.8696$

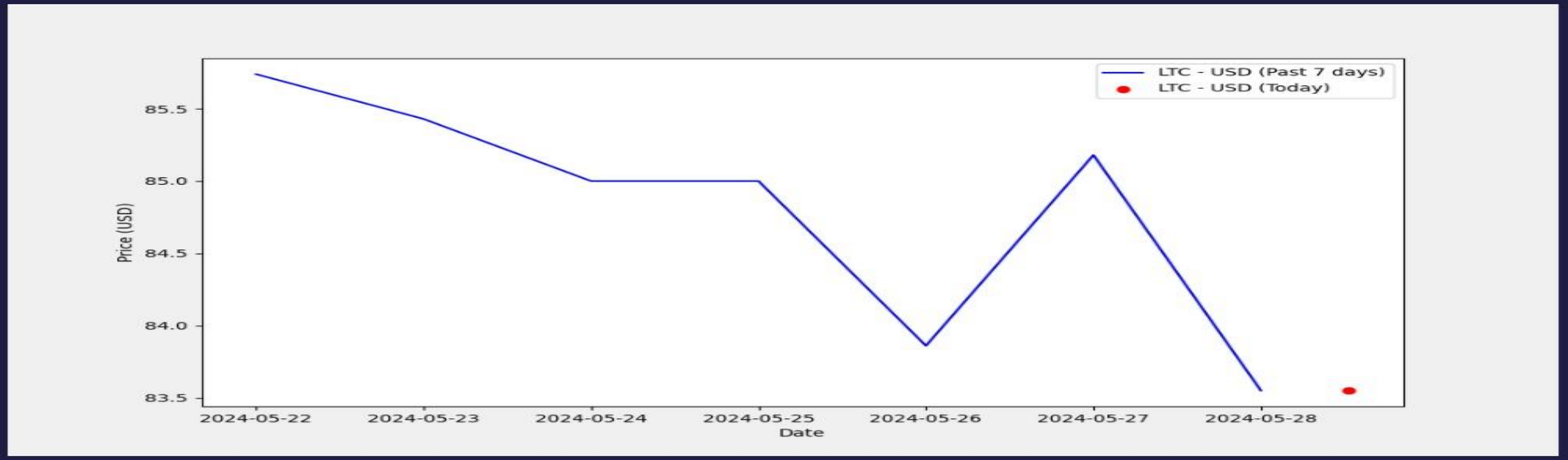


Litecoin (LTC) USD

current price

83.52$

Next Day Price	Next 3 Day Price	Next 7 Day Price
77.67106$	77.65672$	77.64684$

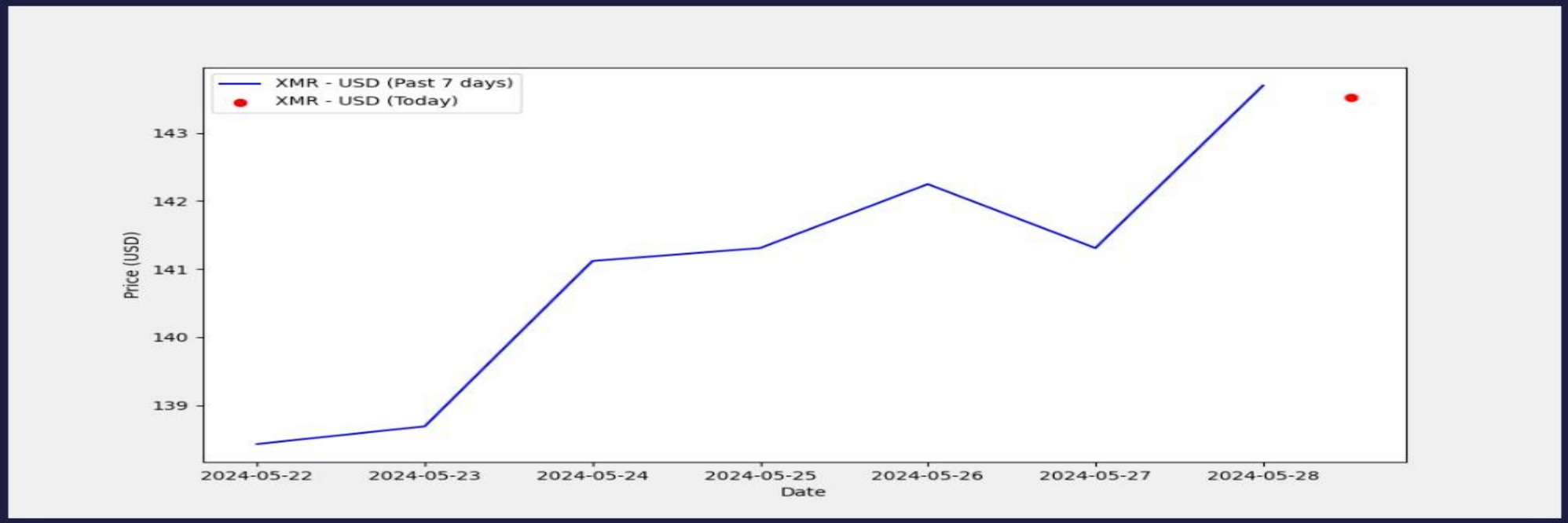


Monero (XMR) USD

current price

143.81$

Next Day Price	Next 3 Day Price	Next 7 Day Price
115.91478$	115.88895$	115.784386$



Explore

Explore

Explore

Explore

Cryptocurrency Price Prediction

Aptos Price Prediction 2024, 2025, 2030: Is APT A Good Investment For The Upcoming Bull Run?

Author: Elena R May 21, 2024 14:00

Reviewed by: Sohrab Khawas

Top Price Prediction

Filecoin Price Prediction 2024, 2025, 2030: Is FIL Price Worth Investing?

Cronos Price Prediction 2024, 2025, 2030: Will CRO Price Hit $0.15 In Q2?

Axie Infinity Price Prediction 2024, 2025, 2030: Will AXS Price Regain $15 Soon?

EOS Price Prediction 2024, 2025: Should You Still Buy EOS?

UMA Price Prediction 2024, 2025, 2026-2030: Is UMA Coin A Good Investment?

Let's get in touch

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Contact us

Username

Email

Phone

Message

Send

Let's get in touch

"We value your feedback and inquiries. If you have any questions, suggestions, or concerns, please don't hesitate to reach out to us. You can contact us via email at [email address], call our customer service hotline at [phone number], Our team is dedicated to providing prompt and helpful assistance to ensure your experience with us is smooth and satisfactory."

Contact us

Ahmed Hesham

ahmedheshama852@gmail.com

5151251

that's a good project

Send

cryptopre2025... 2:59 PM

to me

From cryptopre2025@gmail.com

To cryptopre2024@gmail.com

Date May 28, 2024, 2:59 PM

Standard encryption (TLS).

View security details

Name: Ahmed Hesham

Email: ahmedheshama852@gmail.com

Hide quoted text

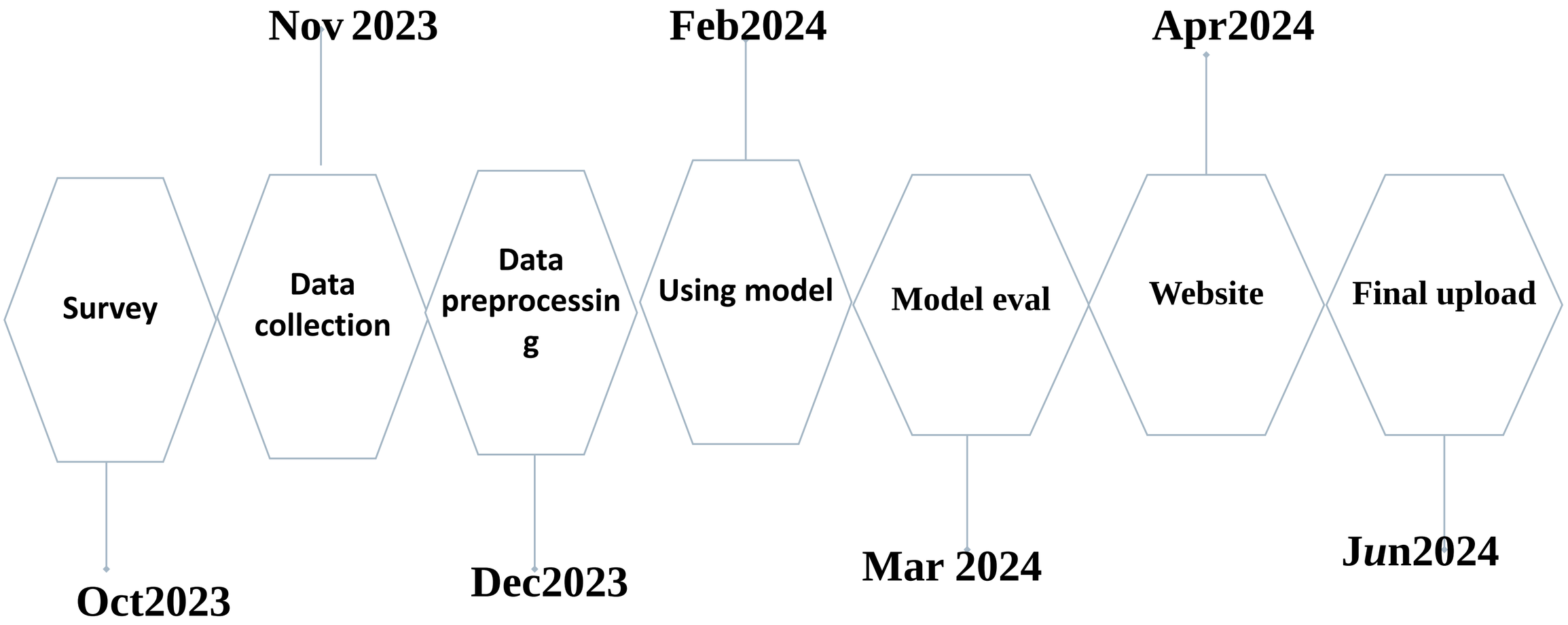
Phone: 5151251

Message: that's a good project

Tools and Technology

- Python
- pandas
- Keras
- sklearn
- numpy
- LSTM,SVR,GRU,ARIMA
- Figma
- Bootstrap
- Flask API
- Node js
- Draw.io

Time plan


Survey
Oct2023
Nov 2023
Data collection
Data preprocessing
Dec2023
Feb2024
Using model
Model eval
Mar 2024
Apr2024
Website
Final upload
Jun2024

References

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4) Article On Forecasting Cryptocurrency Prices: A Comparison of Machine Learning, Deep Learning, and Ensembles for Kate Murray , Andrea Rossi , Diego Carraro and Andrea Visentin 2023,5,196-209
5) FORECASTING CRYPTOCURRENCY PRICES USING DEEP LEARNING: INTEGRATING FINANCIAL, BLOCKCHAIN, AND TEXT DATA by Vincent Gurgul, Stefan Lessmann and Wolfgang Karl Härdle.
6) CRYPTOCURRENCY PRICE PREDICTION USING LSTM Mrs. S. Mounika, B. Aravind, K. Sai Charan and B. Kiran e-ISSN: 2582-5208
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9) Beginning Node.js (Book)by Basarat Ali Syed

Thank you