Crypto Currency Analysis

PROJECT REPORT

Submitted by

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in partial fulfilment for the award of the degree of

Bachelor of Technology

IN

Department of Computer Science and Engineering (Data Science)

KOLHAPUR INSTITUTE OF TECHNOLOGY'S

COLLEGE OF ENGINEERING (AUTONOMOUS), KOLHAPUR

NOVEMBER 2024

APPENDIX 2

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CERTIFICATE

This is to certify that the Project report entitled, **"CRYPTO CURRENCY ANALYSIS"** submitted by **"Samrat Madake, Raviraj Patil, Atharv Bhosale, Uddhav Borgalli"** (15,19,20,26), in partial fulfillment for the award of the degree of **"Bachelor of Technology"** in **"Computer Science and Engineering (Data Science)"** at KIT's College of Engineering, Kolhapur, Maharashtra, INDIA, is a record of her own work carried out under our supervision and guidance.

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DECLARATION

I hereby declare that the Project entitled, **"CRYPTO CURRENCY ANALYSIS"** submitted to KIT's College of Engineering, Kolhapur, Maharashtra, INDIA in the partial fulfilment of the award of the Degree of **"Bachelor of Technology"** in **"Computer Science and Engineering (Data Science)"** is a bonafide work carried out by us. The material contained in this Project has not been submitted to any University or Institution for the award of any degree.

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Raviraj Patil (19)
Atharv Bhosale (20)
Uddhav Borgalli (26)

Place: Kolhapur
Date:22/11/2024

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Thank You.

Samrat Madake (15)
Raviraj Patil (19)
Atharv Bhosale (20)
Uddhav Borgalli (26)

Place: Kolhapur
Date:22/11/2024

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Chapter 1: Abstract

It is getting more and harder to manually assess price movements in the quickly changing world of cryptocurrency due to the high levels of volatility and massive data output. To address this, we came up with a system that uses historical data to assess cryptocurrency prices efficiently.

This project uses data analytics and ML models such as (LSTM) to identify trends and correlations in historical price data. This approach eliminates the need for an extensive amount of manual effort and provides traders with data-driven insights to help in decision-making.

Our methodology, includes data preprocessing, model selection, and evaluation. By automating analysis and improving decision-making reliability and market accessibility, our project simplifies Bitcoin research.

Chapter 2: Introduction

The term "cryptocurrency refers to a decentralized digital currency that is protected by cryptographic methods and operates independently of any central authority, like banks. Utilizing blockchain technology.
Example: Bitcoin was started in 2009 by a man; people say that his name was Satoshi Nakamoto. Since then, the cryptocurrency market has rapidly transformed, utilizing blockchain technology and many cryptocurrencies to completely transform the financial sector. Because of their extreme volatility, cryptocurrencies present both lucrative opportunities and challenging analytical issues for investors and traders.
Today there are many popular cryptocurrencies like Bitcoin, Ethereum, Solana, Doge Coin, Tether, etc.

Our project uses data analytics using Python and machine learning models such as Long short-term memory (LSTM) is a type of recurrent neural network (RNN) that's designed to learn and predict sequential data to identify trends and relations in historical price data. Also, we have made a user-friendly website, which simplifies the process.

Our methodology includes data collection, data preprocessing, model selection, model training, and evaluation.
This approach reduces the need for an extensive amount of manual effort, like reading historical charts and data, and provides crypto traders with simplified analysis to help in decision-making.

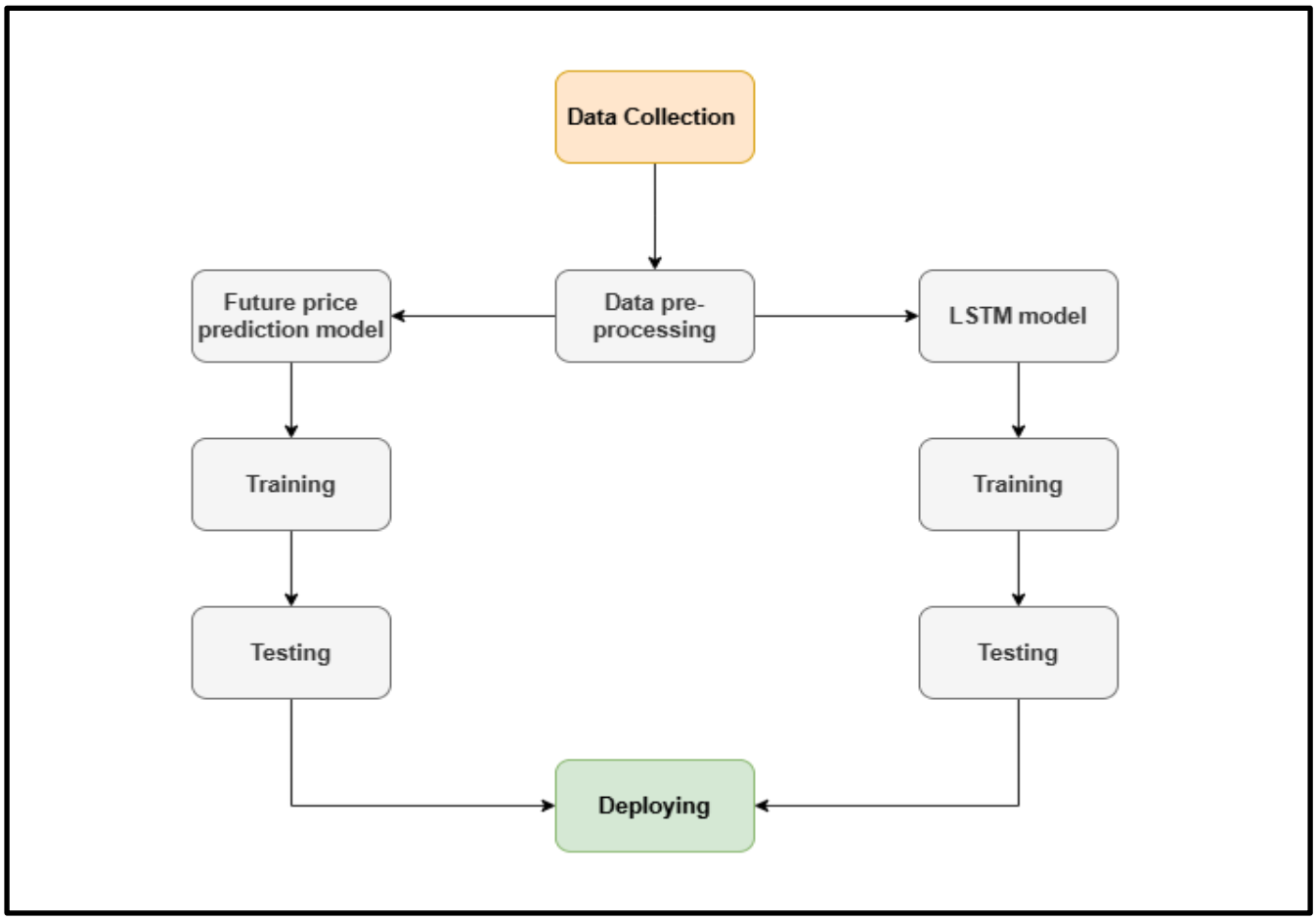
Chapter 3: Literature Review

Year	Author	Title	Methodology
2023	Sumesh Eratt Parameswarana, Vidhyalavanya Ramachandran, Swati Shukla.	Crypto Trend Prediction Based on Wavelet Transform and Deep Learning Algorithm	Analyzed SHIB cryptocurrency data from Yahoo Finance, applying wavelet transforms for feature extraction.
2024	Ahmed Bouteska, Mohammad Zoynul Abedin, Petr Hajek, Kunpeng Yuan	Cryptocurrency price forecasting – A comparative analysis of ensemble learning and deep learning methods [3]	The analysis includes trading data up to August 31, 2023, and considers the impact of the COVID-19 pandemic by splitting the data into pre- and post COVID-19 periods. Various machine learning models, including LSTM, GRU, and ensemble methods like Light GBM are evaluated against traditional models like ARIMA and SVM.
2023	Gaurang Sonkavde, Deepak Sudhakar Dharrao, Anupkumar M. Bongale , Sarika T. Deokate, Deepak Doreswamy and Subraya Krishna Bhat.	Forecasting Stock Market Prices Using Machine Learning and Deep Learning Models: A Systematic Review, Performance Analysis and Discussion of Implications.	The paper provides a systematic review of various machine learning (ML) and deep learning (DL) models used for stock price prediction. It also analyzes their performance and discusses future research directions.
2022	Malti Bansal, Apoorva Goyal, Apoorva Choudhary	Stock Market Prediction with High Accuracy using Machine Learning Techniques. [5]	The paper explores machine learning (ML) algorithms for predicting stock prices of 12 major Indian companies using 7 years of historical data.
2012	K. Solanki, P. Aggarwal, A. Swamy.	Cryptocurrency Analysis, Visualization and Prediction. [6]	Analyze historical cryptocurrency prices, visualize trends, and predict future prices using machine learning and Utilized datasets from coinmarketcap.com, performed data visualization and applied LSTM models for price prediction.

Chapter 4: Objective

- To utilize Long Short-Term Memory (LSTM), a type of neural network designed for processing sequential data.
- To reduce data fluctuations using the moving average technique.
- To ensure the highest level of accuracy in predicting cryptocurrency prices.
- To make a user-friendly website.

Chapter 5: Methodology



BLOCK DIAGRAM

1. **Data Collection**
    - Historical Price Data: Gather data (open, close, high, low, volume) of different cryptocurrencies from Yahoo Finance.

2. **Data preprocessing**
    - Handle Missing Values
    - Feature Engineering: Moving Averages- Simple moving average (SMA).
    - Normalize the Data.
    - Train-Test Split: Split data while maintaining temporal order (e.g., 80% train, 20% test)

3. **Sequence Preparation**: Creates sequences of 100 previous values (x) to predict the next value (y).

4. **Model Definition**: Stacks multiple LSTM layers with increasing complexity.

I. First LSTM Layer

- 50 neurons
- Input shape: (100, 1)
- return_sequences=True: Outputs sequences for stacking more LSTM layers.
- Dropout: 20% to reduce overfitting.

II. Second LSTM Layer

- 60 neurons
- return_sequences=True: Keeps output as sequences for further stacking.
- Dropout: 30% for additional regularization.

III. Third LSTM Layer

- 80 neurons
- return_sequences=True: Continues sequence output for deeper layers.

- Dropout: 40%, increasing regularization as the model deepens.

IV. Fourth LSTM Layer

- 120 neurons
- return_sequences=False: Outputs a single value (final layer).
- Dropout: 50%, as the layer is highly complex.

V. Dense Layer

- 1 neuron for the final output (predicted value).

5. **Model Compilation**

- Configures the model with the Adam optimizer (for adaptive learning rates) and Mean Squared Error (MSE) as the loss function to minimize prediction errors.

6. **Model Training**

- Trains the model for 50 epochs with a batch size of 32, iteratively updating weights using backpropagation to minimize the MSE, and displays training progress via logs.

7. **Data Preparation**

- Combines the last 100 training data points with test data.

8. **Model Prediction:**

- Uses the trained model to generate predictions for test data.
- Rescales both predictions and actual values back to their original range.

9. Visualization:

- Plots predicted vs. actual prices to evaluate model performance.

10. Model Saving:

- Saves the trained model for future use.

❖ **Libraries Used:**

1. numpy: For numerical operations and handling arrays.
2. pandas: For data manipulation and handling structured data (e.g., DataFrames).
3. matplotlib.pyplot: For plotting graphs and visualizing data.
4. yfinance: For downloading historical stock/cryptocurrency data from Yahoo Finance.
5. sklearn.preprocessing.MinMaxScaler: For scaling the data to a specified range, commonly used in machine learning to normalize data.
6. keras.layers: For defining layers in a neural network (e.g., Dense, Dropout, LSTM).
7. keras.models.Sequential: For building a sequential neural network model.

Chapter 6: Additional Features

1. API integration: The CoinGecko API integration fetches live cryptocurrency prices (Bitcoin, Ethereum, Tether, Solana, Dogecoin) in USD. The data is mapped to table rows and updated every 60 seconds. Error handling is included, along with a function for page redirection.

2. User friendly website: Build a simple website to show real-time cryptocurrency prices, project results, and updates, with easy navigation and clear information.

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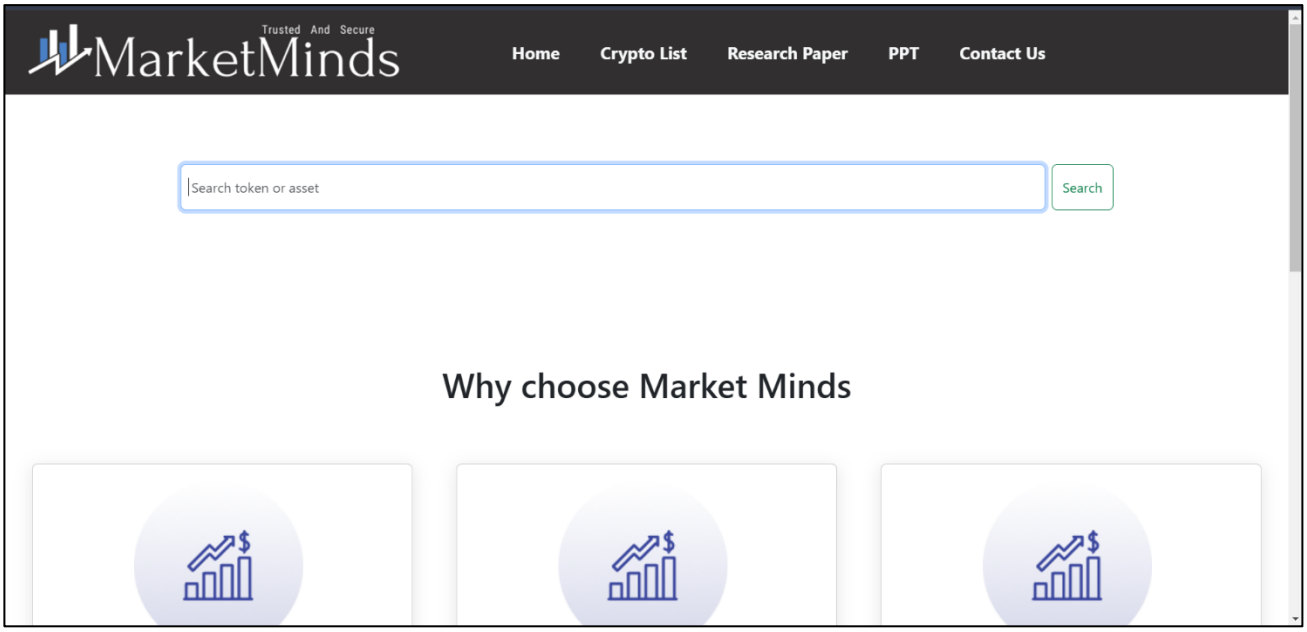
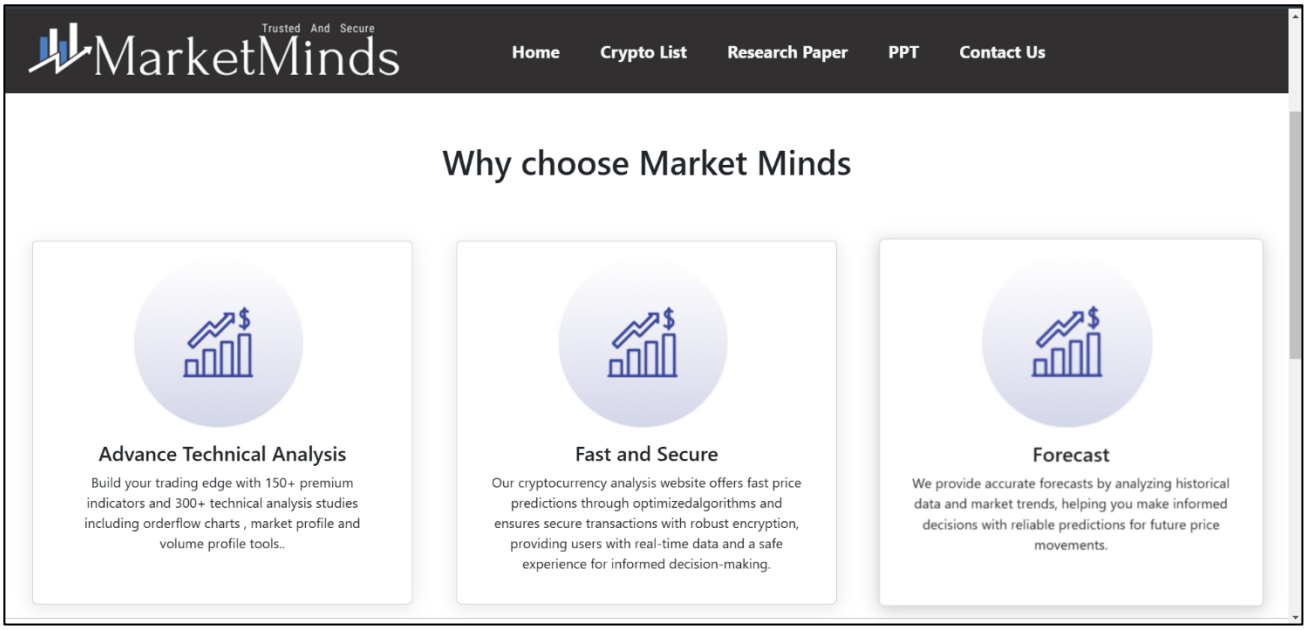
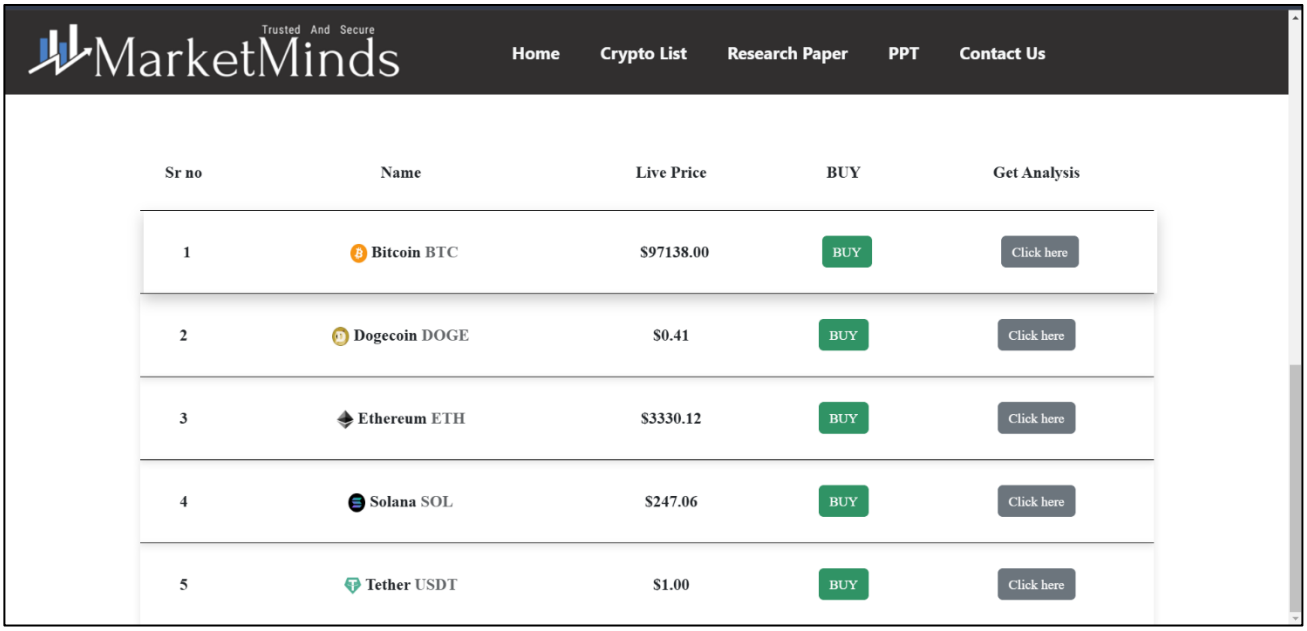
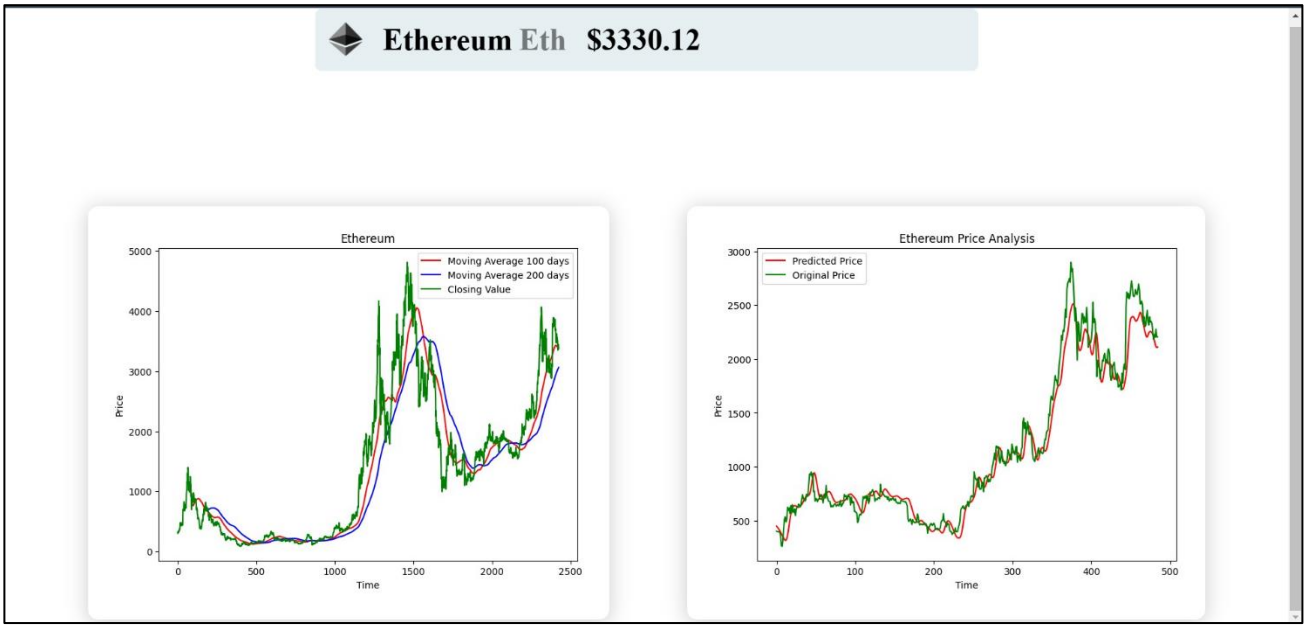
Chapter 7: Results









For detailed description:
https://github.com/Samrat-Madake/Crypto-Analysis

Visit our website:
https://samrat-madake.github.io/Crypto-Analysis/

Chapter 8: Conclusion and Future scope.

This project uses historical data and machine learning to predict the price of bitcoin. We preprocess the data and train an LSTM model by collecting information from Yahoo Finance. Also, we integrated an API named CoinGecko to fetch the real-time price of cryptocurrencies. The accuracy of the model is evaluated by comparing the real and anticipated prices through the visualization of the results. Our accuracy is more than 90%. Our project shows how machine learning can be applied to the finance domain, particularly in cryptocurrency markets.

Our future scope is to increase accuracy in predicting prices. Include more cryptocurrencies. Use different ML models to see which model is best fit. Also to implement a model/technique that can predict prices in the future, which will actually be a game changer for traders.

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