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Crypto Scan Pro For Cryptocurrency Prediction

Faraz Shaikh[1], Mobin Raja[2], Hafeez Sayyed[3], Tabrej Ansari[4]

[1]*Faraz Shaikh Department of Computer engineering, Keystone School of Engineering*
[2]*Mobin Raja Department of Computer engineering, Keystone School of Engineering*
[3]*Hafeez Sayed Department of Computer engineering, Keystone School of Engineering*
[4]*Tabrej Ansari* Department of Computer engineering, Keystone School of Engineering

Abstract: The Cryptocurrency Price Prediction System is an innovative software solution developed to assist users in making informed decisions in the volatile world of cryptocurrency trading. This system is built using AngularJS for the front end and Node.js for the back end, providing an intuitive user interface for accessing cryptocurrency data and predictions. At its core, the system leverages historical and real-time data on three prominent cryptocurrencies: Bitcoin (BTC), Ethereum (ETH), and Polkadot (POL). A comprehensive dataset, rich in features, is used as the foundation for prediction and analysis, with the understanding that a higher level of data granularity contributes to improved prediction accuracy. The user interface encompasses various modules, including a product list that showcases the available cryptocurrencies, product details providing in-depth information, and a work checkout feature allowing users to select specific cryptocurrencies for analysis. A key feature is the integrated chatbot window, enabling users to interact with the system and seek guidance on their cryptocurrency-related queries.

Key Words: Cryptocurrency Price Prediction System, AngularJS, Node.js, User Interface, Historical and Real-time Data, Bitcoin (BTC), Ethereum (ETH), Polkadot (POL), Dataset, Data Granularity.

I. INTRODUCTION

Cryptocurrencies have gained substantial popularity and prominence in the global financial landscape, captivating the interest of both seasoned traders and newcomers seeking to harness the potential of digital assets. As the cryptocurrency market continues to evolve and expand, so does the complexity of making investment decisions within this dynamic environment. The Cryptocurrency Price Prediction System is designed to address the ever-present challenge of predicting cryptocurrency price movements, providing users with a powerful tool for informed decision-making. This project represents the fusion of cutting-edge technology, data analysis, and user-friendly interface design. It leverages the strengths of AngularJS and Node.js to deliver an integrated platform for cryptocurrency enthusiasts and investors.

1.1 Objectives

The Cryptocurrency Price Prediction System sets out to achieve a holistic set of objectives, starting with the development of a user-friendly interface for accessing comprehensive data on key cryptocurrencies like Bitcoin (BTC), Ethereum (ETH), and Polkadot (POL). Employing advanced data analysis techniques and algorithms, the system aims to provide real-time predictions, offering users actionable recommendations grounded in meticulous analysis. In addition to enhancing user experience through a chatbot feature, the system emphasizes the speculative nature of cryptocurrency predictions, underscoring the importance of user discretion in investment decisions.

1.2 Purpose

The primary purpose of the Cryptocurrency Price Prediction System is to provide users with a sophisticated toolset for making informed decisions in cryptocurrency trading. This encompasses real-time data analysis, historical trend assessments, and the integration of machine learning models for predictive analytics. By offering a user-friendly interface, advanced technical analysis, and a chatbot for user interaction, the system seeks to bridge the gap between the complexity of cryptocurrency markets and the need for accessible, data-driven insights. The ultimate goal is to empower users to navigate the cryptocurrency landscape with confidence and strategic acumen.

1.2 Software Requirements

- **Operating System**: Windows, macOS, or Linux-based operating system is required for development and deployment.
- **Development Environment:** Visual Studio Code This IDE provides a powerful and lightweight environment for coding, debugging, and version control. It supports various programming languages and extensions, making it suitable for a diverse range of projects.
- **Front-end Framework:** AngularJS :As a JavaScript-based front-end framework, AngularJS facilitates the development of dynamic and interactive web web(App)lications.
- **Back-end Runtime:** Node.js This JavaScript runtime enables the execution of server-side code. It is known for its non-blocking, event-driven architecture, making it efficient for handling concurrent requests.
- **Integrated Development Environment (IDE):** Visual Studio Code serves as the primary IDE for coding and debugging. It supports multiple languages, offers extensions for additional functionality, and integrates seamlessly with Git.

1.4 Hardware Requirements

- **Server:** A dedicated server is necessary to host the Node.js back-end and deploy the Cryptocurrency Price Prediction System. The server specifications should be determined based on the anticipated load and performance requirements of the web(App)application. Factors to consider include the number of concurrent users, data processing demands, and expected traffic.
- **Data Storage:** Sufficient storage capacity is crucial for maintaining historical cryptocurrency data. The storage requirements will be influenced by factors such as the frequency of data updates, the volume of historical data to be stored, and any additional data processing needs. Consideration should be given to employing scalable and reliable storage solutions. Department of Computer Engineering, KSOE Pune Crpto Scan Pro 6.
- **Internet Connection:** A reliable and high-speed internet connection is essential for several aspects of the system's functionality. Real-time data retrieval, user interaction, and updates depend on a stable internet connection. The server hosting the back end should also have a robust internet connection to ensure smooth operations

2. System Architecture

The architecture of the Cryptocurrency Prediction System is intricately designed to provide users with a comprehensive and insightful analysis of selected cryptocurrencies. The Crypto Selector serves as the entry point, enabling users to choose specific cryptocurrencies for evaluation. This selection triggers a sequence of interconnected components, beginning with the retrieval of historical data from the Historic Data module. The Technical Analysis component then processes this data, employing various technical indicators to discern price trends and patterns. Simultaneously, the Naive Bayes Analysis component utilizes probabilistic methods, potentially incorporating sentiment analysis from the News API, to offer additional insights. The results from both analyses converge at the Prediction Graph, which visually represents the predictions and trends. Real-time updates are facilitated by the Update UI, ensuring the user interface remains current. Finally, the Show UI component integrates all elements, displaying user-selected cryptocurrencies and presenting the combined analysis results. This architecture aims to deliver a holistic and user-friendly system, where data flows

seamlessly through each module, providing users with valuable information for informed decision-making in the dynamic realm of cryptocurrency trading.

1. Architecture:

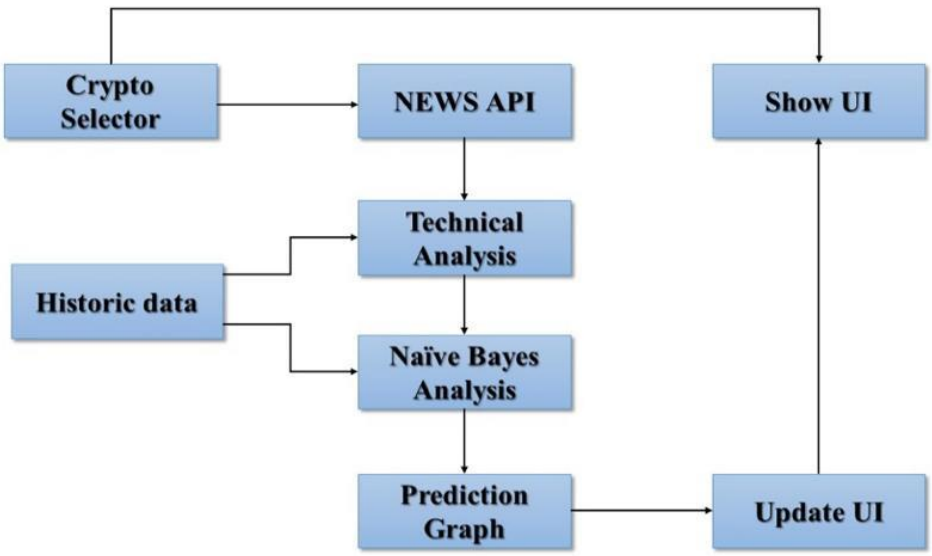

Fig – 1-: System Architecture

3. ALGORITHM

Step 1: Data Collection Cryptocurrency Historical Data: Gather historical price data (e.g., Bitcoin, Ethereum) including opening, closing, high, low prices, and volume. News Data: Collect relevant news articles, headlines, or sentiment analysis data related to cryptocurrencies.

Step 2: Preprocessing Data Cleaning: Handle missing values, normalize numeric data, and preprocess text data (if using news). Feature Engineering: Create features such as moving averages, technical indicators (RSI, MACD), sentiment scores, or embedding for news data.

Step 3: Data Splitting Train-Test Split: Divide the data into training and testing sets. Ensure time-based splitting to maintain temporal order.

Step 4: Model Building Design LSTM Architecture: Create an LSTM neural network architecture. Input sequences may include historical price data and sentiment data from news articles. Model Configuration: Define layers, activation functions, loss function, optimizer, and parameters. Training: Train the LSTM model using the training dataset. Use backpropagation to update weights and optimize hyper parameters.

Step 5: Prediction Use Trained Model: Apply the trained LSTM model to predict future cryptocurrency prices based on historical and news data. Generate Predictions: Obtain predictions for the test dataset and evaluate the model's performance.
Step 6: Evaluation Model Evaluation: Assess the model's performance using metrics like Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), or accuracy. Back testing: Compare predicted prices against actual market movements to gauge model effectiveness.

Step 7: Integration with News Data Sentiment Analysis Integration: Incorporate sentiment analysis or keyword analysis from news data to further refine predictions. Feature Fusion: Combine price and sentiment features to enhance the model's predictive power.

Step 8: Deployment Department of Computer Engineering, KSOE Pune Crpto Scan Pro 26 API Development: Create an API for the prediction model to be accessible to users. User Interface: Develop a user-friendly interface allowing users to input data and receive predictions.

Step 9: Continuous Improvement Model Updates: Periodically retrain the model with new data to adapt to changing market conditions. Feedback Loop: Incorporate user feedback or model performance metrics to refine the algorithm.

Step 10: Risk and Caution Educational Material: Emphasize the speculative nature of cryptocurrency markets despite predictions. Transparency: Clearly communicate the model's limitations and potential risks associated with using predictions for financial decisions.

4.RESULT:

Implementing an improved cryptocurrency price prediction model incorporating sentiment analysis from news data involves several steps:

1.Data Collection: Utilize APIs to gather both historical cryptocurrency price data and news articles related to cryptocurrencies. APIs like CoinGecko or CoinMarketCap can provide price data, while news APIs like News API or Bing News Search API can fetch relevant news articles.

2. Sentiment Analysis: Process the collected news articles to extract sentiment. Natural Language Processing (NLP) techniques can be employed for sentiment analysis. Tools like VADER (Valence Aware Dictionary and sEntiment Reasoner) or sentiment analysis APIs can assign sentiment scores to each news article.

3.Feature Engineering: Integrate sentiment scores as features into the cryptocurrency price prediction model. These sentiment scores can serve as additional input alongside traditional features like historical prices, trading volumes, and technical indicators.

4. Model Training: Train a machine learning or deep learning model using the augmented feature set. Popular models for cryptocurrency price prediction include Long Short-Term Memory (LSTM) networks, Random Forests, or Gradient Boosting Machines.

5. Evaluation: Evaluate the performance of the model using appropriate metrics such as Mean Absolute Error (MAE), Mean Squared Error (MSE), or Root Mean Squared Error (RMSE). Compare the performance of the model with and without incorporating sentiment analysis to demonstrate the impact on predictive accuracy.

6. Illustration: Visualize the results through comparative metrics such as line charts showing the predicted cryptocurrency prices against the actual prices. Additionally, demonstrate how integrating news sentiment positively influences the predictive performance of the model by comparing accuracy metrics before and after incorporating sentiment analysis.

7. Insights: Provide insights into how investors can leverage the improved model for constructing a profitable portfolio. For example, identify periods where sentiment analysis contributes significantly to accurate predictions and suggest potential trading strategies based on these insights.

By following these steps, you can create an enhanced cryptocurrency price prediction model that leverages sentiment analysis from news data, providing more accurate forecasts and valuable insights for cryptocurrency investors.

5. CONCLUSIONS

The cryptocurrency prediction project explored various models and data analysis techniques to forecast crypto prices. Through this process, it was observed that while some models showed promising predictive capabilities over certain periods, the inherent volatility of the crypto market posed significant challenges for accurate long-term predictions. Factors such as market sentiment, regulatory changes, and technological advancements greatly influenced price movements, making precise forecasting a complex task. Despite limitations in achieving consistently accurate predictions, the project underscores the importance of continuous research in refining models, incorporating additional data sources, and adopting more sophisticated approaches to navigate the dynamic nature of cryptocurrency markets.

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BIOGRAPHIES (Optional not mandatory)

Faraz Shaikh
Department of Computer engineering, Keystone School of Engineering

Mobin Raja
Department of Computer engineering, Keystone School of Engineering

Hafeez Sayed
Department of Computer engineering, Keystone School of Engineering

Tabrej Ansari
Department of Computer engineering, Keystone School of Engineering