Comparative analysis of cryptocurrency price tracker

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Abstract: In response to the growing allure of cryptocurrency as a compelling investment option, the necessity for adeptly monitoring a range of cryptocurrency values has become apparent. To address this challenge, Cryptochaser was conceived as a cryptocurrency tracker, incorporating React.js and interfacing with the CoinGecko API. This document offers an in-depth narrative of the evolution of Cryptochaser, outlines its unique features, and delves into potential applications for this inventive tool. Cryptochaser is intentionally crafted as an uncomplicated and user-friendly cryptocurrency tracker. Its user interface showcases a real-time dashboard that presents the current values of various cryptocurrencies. Users have the flexibility to choose their preferred cryptocurrencies and access detailed information about each one. Additionally, Cryptochaser enhances security by employing Firebase authentication, ensuring users have safe access to their personalised dashboard.

Keywords: Cryptocurrency, Cryptochaser, Blockchain, Market Cap, Bitcoin, CoinGecko, Security.

1. INTRODUCTION

In recent years, cryptocurrency has witnessed substantial popularity, with Bitcoin standing out as the pioneering and most widely recognized digital currency. Subsequently, the market has seen the emergence of thousands of new cryptocurrencies, posing a challenge for investors to monitor the value of their holdings. Addressing this issue, Cryptochaser was created as a cryptocurrency tracker, utilizing technologies such as React.js, Firebase authentication, Chart.js, and integrating with the CoinGecko API.

Cryptochaser is designed to provide a straightforward and user-friendly experience as a cryptocurrency tracker. Its personalized dashboard showcases real-time price information and in-depth data on various cryptocurrencies. With the integration of Chart.js, Cryptochaser enables user to analyze cryptocurrencies trend over time, empowering them to make informed decisions when it comes to investments. The creation of Cryptochaser exemplifies the capabilities of contemporary web development technologies in developing inventive and user-centric tools for the cryptocurrency sector.

React.js, a widely used front-end JavaScript library, was employed to construct a responsive user interface. Secure access to the user's personalized dashboard was ensured through the implementation of Firebase authentication. Chart.js, a robust charting library, was utilized for visualizing cryptocurrency trends over time.

Lastly, the CoinGecko API played a crucial role in obtaining real-time cryptocurrency data, encompassing prices, market caps, trading volumes, and other relevant information.

This paper provide an account of Cryptochaser's development, elucidate its features, and examine potential applications. Furthermore, this paper will explore the advantages that Cryptochaser offers to cryptocurrency investors, traders, and researchers. As the cryptocurrency market undergoes continuous evolution, tools like Cryptochaser are set to play an increasingly vital role in the tracking and analysis of market dynamics.

2. LITERATUTRE SURVEY

Cryptocurrency has emerged as a revolutionary decentralized virtual currency in India, presenting a novel investment opportunity akin to gold. Despite the absence of government-established regulations governing cryptocurrency trading, the Indian government has taken a stance against prohibition introduces various restrictions on the use of cryptocurrencies within Indian markets. The objective of this research is to delve into the essence of cryptocurrency and its repercussions on the Indian economy, considering both the current landscape and future prospects. Despite prevailing limitations, there is a positive outlook for the potential growth and significance of cryptocurrencies in India. [1]

This platform's primary goal is to make cryptographic data easily accessible to consumers. Our user interface has been created so that users may simply and hassle-free navigate through each page. The project is unique in the industry because of its graphical user interface's ease of use and its millisecond accuracy in tracking Bitcoin exchange activities. In order to give more detailed information about other cryptocurrencies, we are also thinking about introducing a few more challenges into the project. [2].

We have effectively created an extension for Google Chrome in this project that shows the real-time value of the top 10 cryptocurrencies. With the help of this extension, we can utilize a chart form in one location, which makes price tracking easier. There are numerous cryptocurrencies, and keeping track of them is hectic. Because the data is tabular and includes both historical highs and lows as well as current data, it is simpler to plot and create market hypotheses and prospective trends.[3]

In addition to defining cryptocurrencies, this article starts to address some of the most often asked beginning queries. The primary goal of this research is to offer details for people who are not familiar with cryptocurrency. It is appropriate for those who wish to engage in online investing while handling financial transactions including purchasing, selling, and trading. [4]

Investors dedicate considerable time searching for new coins, aiming to discover intriguing or undervalued cryptocurrencies. With numerous exchanges and apps available, investors seek tools to maximize their returns. Unfortunately, only a small fraction recognizes the critical role a digital currency price tracker plays in cryptocurrency trading. Below, we highlight the most frequently used websites and services for price monitoring, emphasizing their pivotal role in shaping the cryptocurrency trading experience.[9]

Bitcoin price trackers assess the cryptocurrency's value, enabling users to compare current prices with historical data. Some platforms extend this functionality to facilitate comparisons across various cryptocurrencies. The reliability of a chosen price tracker significantly influences investment decisions, timing, and overall transaction success. Opting for a user-friendly tracker with comprehensive support for diverse digital currencies, frequent updates, and additional tools and information is crucial for informed and successful cryptocurrency trading. CoinMarketCap, hailed as the "go-to price monitor" by Bitcoin.com, has been a leader in cryptocurrency tracking since 2013. It contains top 100 cryptocurrencies, providing essential features and metrics, including price, circulating supply, trading volume, market capitalization, value change, and a seven- day price graph for each digital currency.[10]

There are a few cost screens in expansion to CoinMarketCap for cryptocurrencies. Coinlib is a service that tracks prices that is not widely known, it offers unique features, including a "Bitcoin Dominance" indicator prominently displayed on its website due to Bitcoin's leading market capitalization. Refreshed every minute, this statistic, along with market capitalization and cryptocurrency data, provides users with real-time insights. Coinlib's tool allows comparison of up to four different tokens or currencies, while its price explorer aids investors in identifying exchanges with optimal buy and sell prices, along with arbitrage opportunities. Binance, founded in 2017 by Changpeng Zhao, stands as the preeminent cryptocurrency exchange, distinguished by its substantial transaction volumes. While accuracy and reliability are crucial factors in choosing a cryptocurrency price tracker, various other considerations, as highlighted above, play a significant role. Given the swift fluctuations in digital currency rates, the feasibility of examining numerous sites during transactions may be limited.[9][10]

3. BLOCKCHAIN

Blockchain is a novel technology that opens up new possibilities for distributed software systems. Without relying on a single point of integration that all framework components must be able to use, components may agree on their shared state enabling decentralized and value-based information exchange among a broad range of untrusted clients using blockchain to have faith.

The blockchain data structure is an ordered collection of blocks with a time stamp that documents and compiles information about all of the transactions that have ever taken place on the network. Because no transaction may be updated or deleted from the blockchain to avoid tampering or modification, the blockchain therefore offers an immutable data store that only permits the insertion of new transactions. A transaction is not added to the immutable data store until the whole network has reached a consensus. Different methods, such as proof-of-work or proof-of-stake, are used to choose who will write new entries on the immutable data store next. The initial iteration of blockchain serves as a public record for financial transactions and has very little capacity to accommodate programmable operations. Cryptocurrency applications are one common kind. Peer-to-peer networks and cryptography techniques are the foundation of cryptocurrency, a digital money.

In order to move virtual money or create new units of money, cryptocurrencies are inexpensive and intrinsically decentralized. The process of mining allows cryptocurrency users to create new money units. Peer-to-peer users can exchange virtual money without going through a reputable entity to make real-world purchases of products and services. First and foremost, Bitcoin is the most popular cryptocurrency.

Smart contract platforms	
Etheruem	https://www.ethereum.org/
Counterparty	http://counterparty.io/

Ledger platforms	
Factom	http://factom.org/
Ripple	https://ripple.com/
Eris	https://erisindustries.com/
MultiChain	http://www.multichain.com/
Enigma	http://enigma.media.mit.edu/

Cryptocurrencies	
Bitcoin [19]	https://bitcoin.org/
Peercoin	http://peercoin.net/
Colouredcoins	http://coloredcoins.org/
Omni	http://www.omnilayer.org/
Nxt	http://nxt.org/

Fig1: Illustrations of blockchain platforms and applications

Blockchain Platforms and Applications

Fig 1 gives a few illustrations of blockchain stages that utilize the blockchain at the center of their engineering.
1)Smart contract: Smart contracts, central to second-generation blockchains, establish programmable infrastructure by executing on the network. They enable trust-minimised agreements and issue resolution among blockchain-connected components.
Leveraging smart contracts streamlines problem-solving processes within the blockchain ecosystem.

Keen Contract could be a stage that permits clients to make self- executing contracts on the Bitcoin blockchain. These contracts can be updated before propagation, yet they are constrained by the limited expressiveness of Bitcoin's scripting language. As a result, smart contracts on the Bitcoin network lack support for complex control flow, limiting their functionality compared to other blockchain platforms.

Ethereum prioritizes smart contracts as a fundamental component of its blockchain platform. With its claim blockchain created from scratch, Ethereum coordinating a Turing-complete scripting dialect for shrewd contract creation.Smart contracts play a significant part in machine-to-machine communication inside IoT (Web of Things) systems and encouraging programmable exchanges.

2) Cryptocurrency: Bitcoin's blockchain, originating in 2009, allows for appending 40 bytes of data to transactions, extending its use beyond currency. Ascribe and similar platforms leverage this feature to register asset ownership securely. Digital creations like art and music benefit from timestamping and verification on the blockchain, ensuring authenticity. This demonstrates the blockchain's versatility, fostering trust and enabling secure transactions across diverse domains. Consequently, Bitcoin's blockchain has inspired the development of various cryptocurrencies and blockchain applications.

Some cryptocurrencies like colored coins overlay on Bitcoin, using subsets to represent real-world assets. Networks like Omni and Counterparty create new transaction formats. Others, like Nxt, establish independent blockchains from scratch. These approaches demonstrate the diversity in cryptocurrency design and implementation.

THE CONNECTOR OF BLOCKCHAIN

A)Software Connector: Software connectors serve as the fundamental components for enabling interactions within a software system. They act as mechanisms through which various components can communicate,taking the form of repositories,pipes and sockets, with middleware being an example of a connector facilitating communication between system components.Connectors are crucial to attaining critical system attributes like security, dependability, and performance in distributed systems. These connectors provide interaction services that are largely independent of the specific functionalities of the involved components. The services provided by software connectors are of four types: facilitation, conversion, coordination and communication. Communication services manage data transfer between components, coordination services oversee control transfer, conversion services adapt interactions for components not precisely tailored to each other, and facilitation services support and optimize components' interaction.
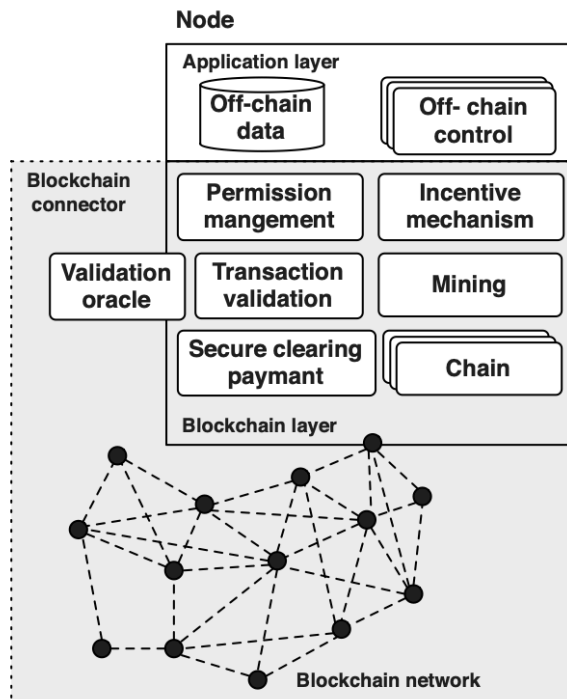

Fig2: Overview of Blockchain as connector

B) Summary: The blockchain operates as an intricate software connector within a network, offering facilitation services, communication and coordination. The validation oracle contributes to coordinating components within the network by utilizing an externally managed state that functions independently. Two layers make up each node in the blockchain network: the application layer and blockchain layer.The blockchain connector handles a portion of the application, particularly in terms of implementing smart contracts. The fragment of the application arranged exterior the blockchain connector may contain offline information and application rationale, locks in with the blockchain through exchanges.

A critical architectural decision for a software connector revolves around determining which functionalities are integrated into the connector and which are assigned to the component. With respect to blockchain, this conclusion revolves around specifying which information and computations should exist off-chain or on- chain. Although the blockchain provides a trustless network capable of validating partial computational results and reaching consensus on transaction outcomes, it is crucial to acknowledge the inherent limitations of data storage and computational power within the blockchain network.

C) Communication Service: Effective communication service is essential for the interaction between components, and the blockchain serves as a mediator for transferring data among them. Storing data on the blockchain can be done in two ways.

One approach involves incorporating data into transactions, resembling the Bitcoin model, while the alternative method includes adding data to contract storage, as seen in Ethereum. In both cases, data is stored by submitting transactions to the blockchain, potentially containing information like money transfers and random information.

Once the transaction is incorporated into the blockchain, the information becomes available to all part within the network.

Certain platforms of blockchain offer API for filtering and accessing historical transactions. Ethereum recommends caching all transactions to alleviate potential strain on the blockchain network caused by common inquiries. The MultiChain creators have intentions to create a connection between relational databases and blockchain.

Apart from transactions, blocks also hold the system's collective state post the application of those transactions. In Bitcoin, this state encompasses the sum of coins across all accounts that remain unspent. In Ethereum, the system's state is characterized by alterations in the entire contract storage. Each contract in Ethereum possesses its dedicated storage, exclusively writable by the contract itself, functioning essentially as a versatile key-value data repository. The information stored in contract repository can be modified by initiating transactions to the relevant contract with updated values. Contracts are identified by addresses, used for querying the associated contract storage. The state stored in a block is structured in a tree-like data arrangement.

4. METHODOLOGY

This section delineates the planning involved in creating the Crypto Currencies Performance Tracking and Data Visualization program, along with its methodology. The chosen technologies for this project represent the latest advancements in the industry, ensuring heightened functionality and productivity for the application. The project comprises numerous files, each serving a specific function within the application. As React is the principal technology, the project adopts the folder structure provided by React, encompassing a variety of files.

Fig3: Home Page

Fig4: Coin Page

The proposed development methodology for Cryptochaser adopts an agile approach, allowing for continuous iteration and improvement. The main phase in this process include:

Gathering requirements: Initially, the process entails documenting and gathering requirements for Cryptochaser, encompassing features, functionality, and the user interface. This step is pivotal for outlining the fundamental aspects of the Cryptochaser platform, ensuring clarity and alignment among stakeholders.

Integration of CoinGecko API: Users utilize CoinGecko, a widely-used cryptocurrency monitoring tool, to access up-to-date information on various digital assets. CoinGecko provides real-time data on cryptocurrency prices, market capitalizations, trading volumes, and additional metrics. It serves as a valuable resource for investors and enthusiasts seeking comprehensive insights into the crypto market.

Design: The first stage involves compiling and documenting essential prerequisites for Cryptochaser, which include features, functionality, and the user interface. This phase is crucial for delineating the core elements of the Cryptochaser platform, guaranteeing coherence and agreement among stakeholders. By detailing requirements comprehensively, Cryptochaser can establish a clear roadmap for development and ensure that all parties involved share a common understanding of the project's objectives and scope.

Development Sprints: The development process is structured into sprints, typically lasting two to four weeks. Within each sprint, the development team allocates its efforts to distinct tasks, including implementing new features, optimizing performance, and addressing bugs. This iterative approach allows for focused and manageable workloads while maintaining flexibility to adapt to changing requirements.

Ongoing Testing: Testing is seamlessly integrated into the development process, occurring consistently throughout each sprint. Automated tests are instrumental in verifying that new features and modifications uphold existing functionality. By incorporating testing into each iteration, potential issues are identified early, fostering smoother development cycles and enhancing overall software quality.

Continuous Integration and Deployment: The integration of new features and changes, once developed and tested, is seamlessly incorporated into the codebase and deployed to a staging environment for additional testing. After thorough testing, the changes are then deployed to the production environment.
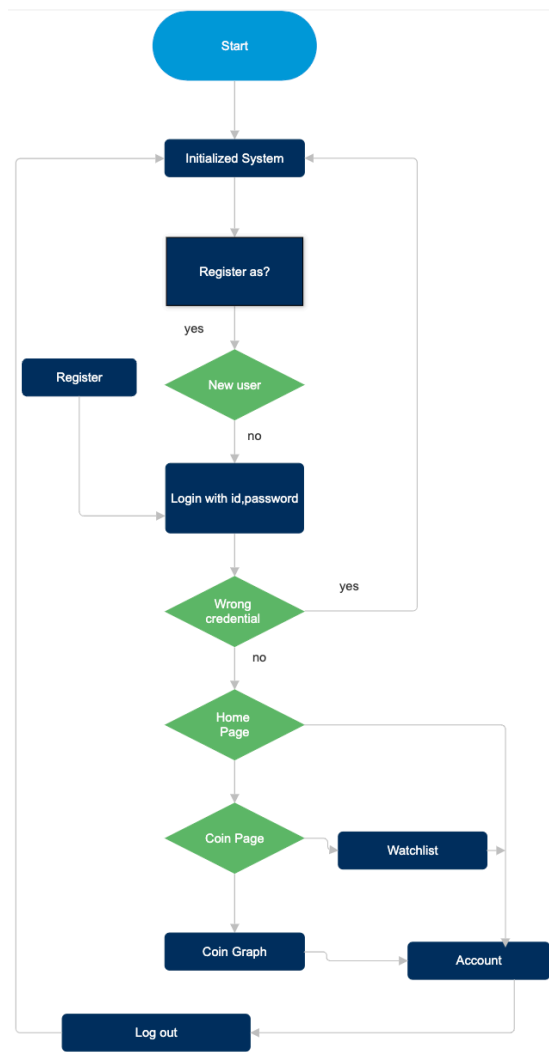

Fig5: Workflow

5. EVALUATION OF SYSTEM ANALYSIS

A full system analysis may be performed to analyze the efficiency and functioning of Cryptochaser. To measure its efficiency, the evaluation might concentrate on numerous critical variables, including:

User experience: To evaluate the user experience of Cryptochaser, it is essential to conduct user surveys, scrutinize user engagement metrics, and monitor user behavior. This analytical approach enables the identification of potential enhancements in both the user interface and the overall user experience. By delving into user feedback, interaction patterns, and metrics, valuable insights are gathered to pinpoint areas that may benefit from improvements. This comprehensive evaluation aims to refine Cryptochaser's design and functionality, ensure a more user-friendly and effective platform based on real user experiences and preferences.

Performance: Cryptochaser's effectiveness is measured by accessing its speed, responsiveness and scalability, employing tools like load testing and performance monitoring. This comprehensive evaluation allows for the identification of bottlenecks and areas that necessitate improvement. Through the strategic use of technologies, including load testing, Cryptochaser ensures that it operates efficiently and responsively, consistently refining its performance to deliver an enhanced user experience.

Security: Evaluating the security of Cryptochaser entails the implementation of penetration testing, vulnerability scanning, and code reviews. These rigorous processes aim to uncover any potential vulnerabilities or weaknesses in the application's security framework, providing valuable insights for targeted improvements. By systematically employing these security assessment techniques, Cryptochaser fortifies its defenses, ensuring a robust and secure environment that safeguards user data against potential threats.

Reliability: Evaluating the reliability of Cryptochaser, an assessment involves monitoring the application's uptime, availability, and the occurrence of errors or downtime. This scrutiny provides insights into potential areas for improvement in the stability and reliability of the application. By systematically analyzing these factors, Cryptochaser ensures a consistent and dependable user experience, minimizing instances of downtime and errors and contributing to the overall robustness and reliability of the platform.

Functionality: To gauge Cryptochasor's functionality, a comprehensive evaluation involves methodically testing each feature to confirm its seamless operation. During this testing phase, any bugs or issues that may arise are identified and promptly addressed, ensuring the application's complete and reliable functionality, by scrutinizing each feature individually, Cryptochaser aims deliver a user-friendly and fully operational platform, mitigating potential disruptions and ensuring a smooth and effective experience for its user.

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6. FUTURE SCOPE

In the near future, Cryptochaser envisions integrating advanced Al and ML algorithms to enhance currency statistics accuracy. Additionally, the project plans to conduct extensive tests with various technologies, evaluating their outcomes in comparison to existing ones. The evolution of cryptography is a crucial factor influencing the program's future, given its dependency on this field. The outlook for Cryptochaser is promising, with potential areas for development and expansion, shaping its trajectory for continued success.

Adding support for more cryptocurrencies: Cryptochaser presently supports a selection of popular cryptocurrencies, but there is a potential for broadening its scope by adding compatibility with a more extensive range of digital currencies. This expansion has the capacity to not only diversify the user base but also enhance the overall utility of the application, meeting the varied preferences and interests of a broader audience within the cryptocurrency landscape.

Adding more data analysis and visualization tools: Cryptochaser, using Chart.js for basic data visualization, has the potential to elevate its analytical capabilities by incorporating more advanced tools. This includes sophisticated charting options, enhanced data filtering, and the ability for users to conduct custom analysis, enriching the application's data exploration capabilities.

Integration with additional APIs: Cryptochaser, currently using the CoinGecko API for cryptocurrency data, has the potential to enhance its insights by integrating additional APIs, such as blockchain APIs. This expansion could provide users with more detailed information on transactions and network activity, broadening the application's data offerings.

Adding more advanced portfolio management features: Cryptochaser, currently providing basic portfolio management, envisions the addition of advanced features like automated rebalancing, tax reporting tools, and exchange integration, aiming to offer users a more comprehensive and sophisticated portfolio management experience.

Integration with Defi protocols: Cryptochaser acknowledges the growing importance of decentralized finance (Defi) protocols and envisions enriching user options chine user options by integrating with popular platforms like Uniswap or Aave, offering enhanced flexibility in managing cryptocurrency holdings within the platform.

Social features: Cryptochaser's potential expansion involves the incorporation of social features enabling users to connect, share insights, and engage in analysis. This could encompass user profiles, chat rooms, and social feeds, fostering a platform collaborative and interactive community within the platform.

Machine learning and AI: Cryptochaser looks to integrate machine learning and Al technologies for sophisticated data analysis, enabling functionalities like predicting cryptocurrency prices and identifying trading patterns, thereby elevating the platform's analytical process.

News and analysis: Cryptochaser's potential expansion involves introducing a dedicated news and analysis section, delivering users timely information and insights on the cryptocurrency market. This addition aims to keep users well-informed within the platform.

Expanding Cryptochaser's functionalities has the capacity to elevate it into a versatile cryptocurrency management platform, adept at fulfilling the diverse requirements of a wide user audience.

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7. CONCLUSION

In summary, the successful development of Cryptochaser, a robust crypto tracker app, utilized React.js, Coingecko API, and Firebase authentication. This cryptocurrency management platform offers a suite of powerful features for users. The comprehensive literature review informed key areas for development and improvement in the project.

By outlining a development methodology for Cryptochaser, we've highlighted potential avenues for future expansion, including adding support for more cryptocurrencies, integrating with Defi protocols, implementing machine learning and Al technologies, and incorporating social features and news analysis. Our system analysis underscores Cryptochaser's high performance, security, and reliability, offering users an intuitive experience. We foresee Cryptochaser evolving into a leading cryptocurrency management platform, empowering users to navigate the complexities of an ever-evolving market.

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