



# Crypto Trading Web Application

Ms. Feon Jaison<sup>1</sup>, Christy Theresa Regi<sup>2</sup>

Assistant Professor, Department of CS & IT, Jain (Deemed-to-be) University, Bengaluru, India<sup>1</sup>

Student, Department of CS & IT, Jain (Deemed-to-be) University, Bengaluru, India<sup>2</sup>

**Abstract** Bitcoin was initially introduced by Nakamoto in 2008. Since 2008, the market for digital crypto currencies has expanded in terms of the quantity of new coins as well as the market capitalization and transaction volume as determined by the Poisson and Binominal distributions. These digital crypto currencies include Bitcoin, Litecoin, Ripple, Monero, Ethereum, and Shiba. Cryptocurrencies only exist as a decentralised blockchain-based shared record of ownership. Users send bitcoin units to one another's digital wallets when they want to exchange them. A platform that enables users to purchase, sell, and trade cryptocurrency is known as a crypto trading application. A user interface, an application server, a trading engine, crypto exchange APIs, a database, and a security layer are typical components of an application. Users may see their portfolio, track market activity, and place trades using the user interface in an easy and straightforward way. The application server manages business logic, handles user requests, and interacts with the backend and trading engine. The trading engine performs trades on behalf of users by matching buy and sell orders. To gather market information and complete deals, the software connects to several cryptocurrency exchanges via their APIs. Both user and market data are stored in the database. The software is shielded from illegal access, data breaches, and fraud thanks to a strong security layer, which also keeps user data safe. To give consumers a dependable and safe trading experience, a well-designed crypto trading application architecture must be scalable, fault-tolerant, and secure.

**Keywords** – Crypto Trading, Cryptocurrency, Bitcoins, Smart Contracts.

## I. INTRODUCTION

Bitcoin was initially introduced by Nakamoto in 2008. These digital crypto currencies include Bitcoin, Litecoin, Ripple, Monero, Ethereum, and Shiba. Cryptocurrency markets are decentralised, which indicates that cryptocurrency is not issued or supported by a central authority such as a government. Rather, they run across a network of computers. However, cryptocurrencies can be bought and sold via exchanges and stored in 'wallets'. Contrasting to conventional currencies, cryptocurrencies only exist as a decentralised blockchain-based shared record of ownership. Users send bitcoin units to one another's digital wallets when they want to exchange them. Mining is the a procedure that adds it to the blockchain, which is used to verify the transaction and before it is deemed complete. Additionally, this is how new bitcoin tokens are typically produced. A blockchain is a shared digital register of recorded data.

For cryptocurrencies, this is the transaction history for every unit of the cryptocurrency, which shows how ownership has changed over time. Blockchain records transactions in units called "blocks," with fresh blocks being added to the chain at the beginning. Blockchain technology provides special security measures that are not present in regular computer files. Instead of being kept in a single location, a blockchain file is always kept on several computers throughout a network and is typically accessible to everyone on the network. With no single weak point exposed to hacks, human or software error, it is both transparent and incredibly difficult to change. Cryptography, a branch of mathematics and computer science, connects blocks. Any effort to change data breaks the cryptographic connections between blocks, and computers in the network can rapidly detect this as fraud. New blocks are added to the blockchain and recent cryptocurrency transactions are verified through the process of mining.

A pool of pending transactions is chosen by mining machines, which then verify that the sender has enough money to finish the transaction. In order to do this, the transaction information must be compared to the blockchain's transaction history. By a second check, the use of the sender's private key to authorise the transfer of funds is verified. In an effort to create the cryptographic connection to the previous block, mining computers assemble legitimate transactions into a new block and attempt to solve a challenging algorithm. The block is added to the computer's copy of the blockchain file and the update is sent out through the network when a machine successfully creates the link. Technical analysis is a method for choosing how and when to trade an asset and for predicting upcoming price movements by looking at past market data. Contrary to fundamental analysis, technical analysis does not aim to determine an asset's "true price." Instead, it makes advantage of previous variations in the item's pricing.



Dow Theory: Charles Dow created the Dow Theory, which serves as the basis for technical analysis. This theory is composed of six main ideas.

- Everything in the market is on sale. According to this hypothesis, the price of an object already accounts for all important information, including trader expectations and market sentiment. There are three types of market trends. Price movement is more consistent than unpredictable. The duration of primary or significant trends might range from a few months to more than a year. Within major trends, secondary trends can be found, which are usually corrections to primary trends and continue for a few weeks. Not to mention, there are short-lived or minor trends that just endure a week or two.
- The following are the three key trend stages. Each major trend passes through these three phases in this order:
  - Accumulation - Due to their scarcity, the price does not change significantly.
  - Public engagement - When more traders start to recognize and follow a new trend, the price starts to move fast.
  - Dispersion: As speculation picks up steam, seasoned traders start to liquidate their holdings.
- Indices need to be in sync with one another. Signals coming from one index must confirm those coming from another. In the context of the cryptocurrency market, this idea may be seen in the correlation between the movements of cryptocurrency pairings.
- The trend must be supported by volume. The price is going in the trend's direction when there is an increase in volume combined with a price change. The price departs from the trend as the volume decreases. Technical analysis approaches come in a variety of forms, however they often fall into one of two groups:
  - Volume and other transaction statistics;
  - Candlestick analysis
  - Chart layouts
  - Levels of support and opposition
  - Statistical tools

## II. PROBLEM STATEMENT

Due to their extreme volatility and potential for large gains, cryptocurrencies have become a popular investment choice for traders. The volatile and intricate nature of the cryptocurrency market, however, makes it challenging for traders to make wise investing choices. A thorough cryptocurrency trading application is required, one that can give users real-time data and sophisticated trading tools to aid in making winning deals. Since, existing bitcoin trading platforms do not offer thorough market research or complex trading tools, users are at risk of making misinformed judgements. Also, it is challenging for traders to diversify their portfolios because the majority of these tools offer just limited support for several cryptocurrencies and trading pairings. In order to solve these challenges, the research study designs and develops a cryptocurrency trading application that offers real-time market data, sophisticated trading capabilities, and support for a variety of cryptocurrencies and trading pairs. To help traders execute winning trades, the programme will leverage machine learning algorithms and data analytics technologies to give traders with predictive analytics and trading signals.

In order to determine how well the application performs in generating lucrative trades, the research study will do simulation and back testing studies using historical market data. In order to get user input on the application's usability and efficiency in helping users make wise investment decisions, the paper will also conduct a user survey. In general, the suggested cryptocurrency trading application would offer users a complete trading environment that may aid in successful trading and boost profits on investments.

## III. LITERATURE SURVEY

[1] During the COVID - 19 pandemic, Conlon, Corbet, and McGee (2020) looked at a wide range of cryptocurrencies, including Bitcoin, Ethereum, and Tether, as safe places to invest. Using their CM reference rates, coinmetrics has provided the data. The market capitalization of Bitcoin is the highest, and all other cryptocurrencies were compared to the US dollar and various resources.

[2] Shahzad, Bouri, Roubaud, Kristoufek, and Lucey, (2019), also looked into whether or not Bitcoin is a safe place to invest during the chaos and high fluctuations of the stock market, as well as whether or not its change-behavior is comparable to or dissimilar from that of gold and the general commodity index.



- [3] Corina Sas and Irni Eliana Khairuddin (2015) stressed the significance of the fact that bit coin is a cryptocurrency, which is a type of digital currency that is very different from traditional forms of money in a number of important aspects. Identities from digital wallets are not necessary. In this study, the researcher referred to cryptocurrency as a model of trust that is intended to investigate the problems with trust brought on by bit coin technology.
- [4] Chinmay A. Vyas and Munindra Lunagaria's (2014) study focuses on the distinctive features of Bitcoin as a cryptocurrency and significant security vulnerabilities relating to the currency's mining and transaction processes. In order to manage their commercial activities in the financial sectors, the researcher underlined that security is one of the main concerns for all transactions involving the exchange of money.
- [5] Adrian et al. (2015) highlighted the fact that cryptocurrency has been viewed as a phenomena and has experienced quick growth due to significant swings that have been used to regulate commercial activities in the financial sectors. Cryptocurrency, according to Fang Dai et al. (2018), is a type of digital payment that relies on a decentralised distributed database system to handle data. The researchers also stressed how reliable this system is for ensuring data integrity, security, and anonymity without the aid of a third party.
- [7]Vovchenko et al. (2017) highlighted the fact that cryptocurrencies are a subset of virtual currencies that have contributed to the growth of risks and threats to national security, as well as cases of money laundering, criminal funding, and terrorism funding. The study proposed using crypto-currency as a management hub in the infrastructure for virtual currencies with no detrimental impact.
- [8] According to Mohammed Amine Ferrag et al. (2019), block chain technology protocols for the Internet of Things (IoT) play a significant role in the financial sectors by facilitating simple transactions. The researcher was attentive to the basic patterns of Internet of Things (IoT) that are related to Inter of Energy, Internet of Clouds, Edge computing and others areas which are important for the security point of view for financial transactions in business Industries. The researcher paid close attention to the fundamental IoT patterns that link to the Internet of Energy, the Internet of Clouds, Edge computing, and other areas that are crucial from a security perspective for financial transactions in commercial industries.
- [9] According to Kimchai Yeow et al. (2019), the Internet of Things (IoT) is designed to deliver high bandwidth, low latency, and increased connection. It is oriented at a large number of devices.
- [10] The technique of enhancing cryptocurrency at a certain period for trusting web-based services that employ a decentralised distributed database was explored by Bela Gipp et al. (2015). To record anonymous, tamper-proof timestamps for digital consent, use block chain technology.
- [11] Irwin and Milad (2016) stressed the role of cryptocurrency in the financing of terrorism as well as its role as a new kind of payment technology. The study also stressed the current use of cryptocurrency as a means of transfer to enable finance, planning, smooth execution, and its major role in preventing terrorist acts.
- [12] Kirillova, et al. (2018) investigated the legal status of virtual currencies such bit coin, life coin, web money, and ripple. According to the researcher, bit coin licence in digital currency is important in the financial sectors. In order to stop the misuse of virtual currencies for money laundering and terrorism funding, this research study is being undertaken on global crypto-trading mining.
- [13] Karl Sigler (2018) underlined that cryptocurrency is a mysterious experiment that has become one of the most popular subjects in the financial and technology fields. Cryptocurrency is being stolen from the target computer via mining malware.
- [14] A. Yu. Simanovskiy (2018) stressed the economics of cryptocurrencies, the dangers associated with their usage for electronic turn over servicing, and the effects of divergent viewpoints on portable legalisations. Ponzi schemes are the main form of crypto-currency existence in order to reduce the unfavourable economic and social effects of cryptocurrency use.
- [15] Block chain is the fundamental technology of cryptocurrency, according to Ruizhe Yang et al. (2019), and it is having a big influence on commercial transactions like smart grid and Internet of Things. the expansion of block chain technology's scalability, as well as its capacity for self-organization, integration, resource management, and widespread adoption.



IV. METHODOLOGY

For the development of a Crypto Trading React application that integrates ERC20 tokens, real time smart contract data fetching, and Metamask pairing.

Technology research: The first phase is to carry out research on the various technologies needed to create the application. This covers the React framework, Alchemy, MetaMask, and Cranq. This will make it easier to comprehend each technology's advantages and disadvantages as well as how they might work together.

Design and development: The architecture of the application must be designed, and the code must be written, next. Setting up Cranq, MetaMask, and Alchemy as well as developing unique hooks and utility methods to control the application's state are required for this. Moreover, React and packages from usedapp must be used to create the application's front end.

Testing: When the application has been created, it must go through a rigorous testing process to make sure it satisfies the criteria for security, functionality, and usability. This involves testing several situations, like MetaMask pairing, obtaining live smart contract data, trading ERC20 tokens, etc.

Deploying the application on the internet is the last stage. The React application will be deployed using Netlify in this case. To guarantee that the program is usable by everyone and functions properly, the deployment procedure must be carefully prepared.

Analysis: When the program has been launched, it is crucial to evaluate the user ratings and performance. This will make it easier to see any problems and potential improvement areas. Understanding how the program is being used and which features are most used may also be helpful.

In conclusion, research on technologies, design and development, testing, deployment, and analysis are all part of the process for developing a Crypto Trading React application with Metamask pairing, real-time smart contract data fetching, and integration of ERC20 tokens. This process will aid in developing a reliable and straightforward application that anybody interested in trading cryptocurrencies may use.

3.1 System Architecture

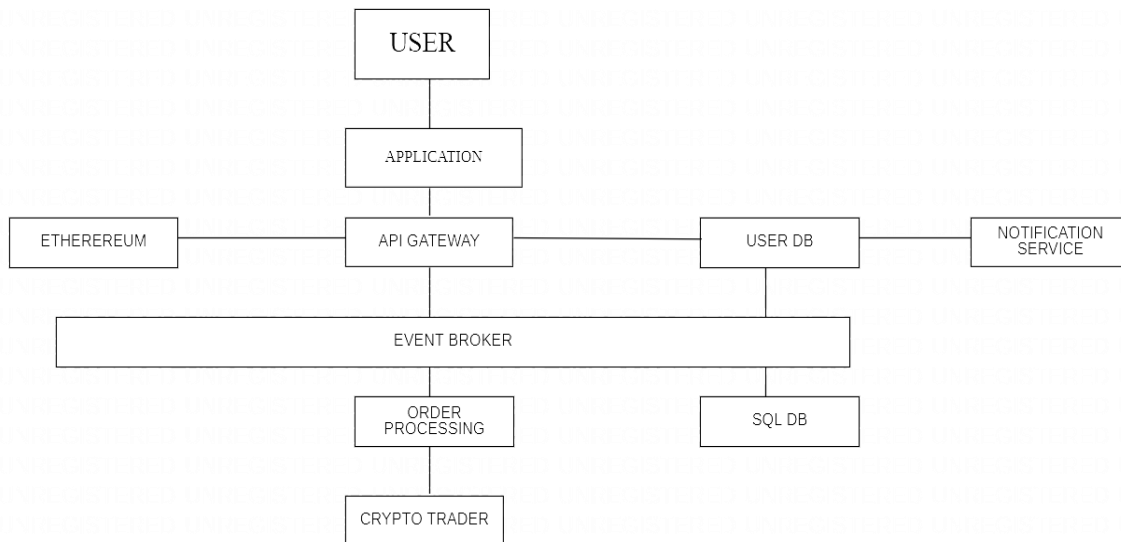


Fig. 1 System Architecture

An application for trading cryptocurrencies is often made up of a number of parts that work together to give consumers a seamless and safe trading experience. An overview of the architecture of a typical crypto trading application is given below:



1. Interface for users: The front end of the program that users interact with is the user interface. A online or mobile application that enables users to see their portfolio, purchase and sell cryptocurrencies, check trading charts, and keep tabs on market activity is generally what it consists of.
2. Server for applications: The middle layer of the program, the application server, manages user requests, executes business logic, and interacts with the backend. To carry out transactions, it connects with the trading engine after receiving user requests from the user interface.
3. Trading engine: The fundamental element of the program that matches buy and sell orders and carries out transactions is the trading engine. To get market information and complete deals on behalf of users, it interfaces with a number of cryptocurrency exchanges.
4. Crypto exchange APIs: To retrieve market data, place orders, and complete transactions, the trading engine interacts with different crypto exchanges via their APIs. The APIs provide users access to a number of trading features, including the ability to retrieve market prices, place orders, and check account balances.
5. Database: The application's back-end database is where user data, including user profiles, trading history, and transaction data, is kept. Moreover, it keeps track of market information including trading, order book, and historical price data.
6. Security layer: Since that cryptocurrency trading applications handle sensitive user data and sizable sums of money, security is an essential part of every one of them. To guard against fraud, data breaches, and unauthorised access, the application has to have a strong security layer. Measures like encryption, multiple-factor authentication, and secure communication protocols are frequently included on this layer.

To give consumers a dependable and safe trading experience, a well-designed crypto trading application architecture must be scalable, fault-tolerant, and secure.

#### REFERENCES

- [1] Adrian, W. K., Cheung, E. R., & Su, J. J. (2015). Crypto-currency bubbles: a usage of the Phillips–Shi–Yu (2013) technique on Mt. Gox bit coin costs. *Journal Applied Economics*, 47(23), 2348-2358.
- [2] Bela, G., Norman, M., & André, G. (2015). *Decentralized Trusted Time stamping using the Crypto Currency Bitcoin, Cryptography and Security*. Newport Beach, CA, USA.
- [3] Berentsen, Aleksander. (2019). Aleksander Berentsen Recommends “Bitcoin: A Peer-to-Peer Electronic Cash System” by Satoshi Nakamoto. 10.1007/978-3-030-17740-9\_3.
- [4] Bouri, Elie & Shahzad, Jawad & Roubaud, David & Kristoufek, Ladislav & Lucey, Brian. (2020). Bitcoin, gold, and commodities as safe havens for stocks: New insight through wavelet analysis. *The Quarterly Review of Economics and Finance*. 77. 10.1016/j.qref.2020.03.004.
- [5] Chinmay, A., Vyas, M. L. (2014). Security Concerns and Issues for Bitcoin, *International Journal of Computer Applications@ (IJCA) (0975-8887)*. National Conference cum Workshop on Bioinformatics and Computational Biology, NCWBCB-2014.
- [6] Corina, S., & Irni, E. K. (2015). Exploring Trust in Bit coin Technology: A Framework for HCI Research, Oz CHI '15 Proceedings of the Annual Meeting of the Australian Special Interest Group for Computer Human Interaction, ACM New York, NY, USA. <https://doi.org/10.1145/2838739.2838821>
- [7] Dai, F. F., Yue, S., Nan, M., Liang, W., & Ye, Z. G. (2018). From Bitcoin to digital security: A close to examination of square chain application and security issues, 2017 fourth International Conference on Systems and Informatics (ICSAI), IEEE Xplore. <https://doi.org/10.1109/ICSAI.2017.8248427>
- [8] Hin, Lim. (2020). Critical Review: Current Research Issues on Crypto-currency and its Application in Financial Sectors. *International Journal of Business and Management*. 15. 139. 10.5539/ijbm.v15n3p139.
- [9] Irwin, A., & Milad, G. (2016). The use of crypto-fiscal structures in sponsoring severe jihad. *Journal of Money Laundering Control*, 19(4), 407-425. <https://doi.org/10.1108/JMLC-01-2016-0003>
- [10] Karl, S. (2018). Crypto-jacking: how advanced guilty parties are abusing the crypto-currency impact. *Computer Fraud and Security*, 9, 12-14. [https://doi.org/10.1016/S1361-3723\(18\)30086-1](https://doi.org/10.1016/S1361-3723(18)30086-1)
- [11] Kimchai, Y., Abdullah, G., Raja, W. A., Joel, J. P. C., Rodrigues, K. K. O. (2019). Decentralized Consensus for Edge-Centric Internet of Things: A Review, Taxonomy, and Research Issues, *Internet-of-Things (IoT) Big Data. Trust Management*, 6, 1513-1524. <https://doi.org/10.1109/ACCESS.2017.2779263>
- [12] Kirill, O., Elena, A., Pavlyuk, A. V., Mikhaylova, I. A. Zulfugarzade, T. E. Z. (2018). Bitcoin, Lifecoin, Name coin: The Legal Nature of Virtual Currency, Sergey. *Journal of Advanced Research in Law and Economics*, 9(1), 119-126. [https://doi.org/10.14505/jarle.v9.1\(31\).16](https://doi.org/10.14505/jarle.v9.1(31).16)
- [13] Mohamed, A. F., Makhlof, D., Mithun, M., Abdelouahid, D., & Leandros, M. (2019). Square chain Technologies for the Internet of Things: Research Issues and Challenges. *IEEE Internet of Things Journal*, 6(2), 2188-2204. <https://doi.org/10.1109/JIOT.2018.2882794>



- [1] Rejeb, Abderahman & Rejeb, Karim & Keogh, John. (2021). Cryptocurrencies in Modern Finance: A Literature Review. *ETIKONOMI*. 20. 93-118. 10.15408/etk.v20i1.169111.
- [14] Vovchenko, N. G., Tishchenko, E. N., Epifanova, T. V., & Gontmacher, M. B. (2017). Electronic currency: the potential perils to national security and methods to restrain them. *European Research Studies Journal*, 20(1), 36-48.
- [15] Yang, R. Z., Yu, F. R., Si, P. B., Yang, Z. X., & Zhang, Y. H. (2019). Integrated Block chain and Edge Computing Systems: A Survey, Some Research Issues and Challenges. *IEEE Communications Surveys and Tutorials*, 21(2), 1508-1532. <https://doi.org/10.1109/COMST.2019.2894727>
- [16] Yu, A. S. (2018). On the issue of crypto-currency money related nature, *Prosy Ekonomiki, N. P. Redaktsiya zhurnala. Voprosy Ekonomiki*.