

Research Paper

LEVERAGING BLOCKCHAIN TO TRANSITION SOCIAL MEDIA FROM CENTRALIZED TO DECENTRALIZED MODELS

K. VIJAYA LAXMI¹, BOGA GOURAV², NEELA AKHIL KUMAR³, YADLA CHETAN
KARTHIK⁴, RAVULA AYYAPPA DHEERAJ⁵

¹Assistant Professor, Dept. of CSE, Guru Nanak Institutions Technical Campus, Ibrahimpatnam,
Telangana, India

^{2, 3, 4, 5} B.Tech, Dept. of CSE, Guru Nanak Institutions Technical Campus, Ibrahimpatnam,
Telangana, India

ABSTRACT— Blockchain is having an impact on social media platforms because it promises to address today's most pressing problems, including content moderation and privacy issues, and it can offer a decentralized system for social media platform management using distributed structures and cryptographic techniques. Since there are more risks, such as identity theft and fake news spreading throughout these systems, social media systems are typically built on central architectures that may help address platform accountability and data privacy issues in an indirect manner. Blockchain has emerged as an anti-centralized platform that enables numerous users to conduct authentic and safe P2P transactions without the need for an

intermediary. In this survey, we give a systematic analysis of the related field and provide a quick summary of the most recent developments in blockchain protocols and their interactions with social media platforms. We specifically examine and expound upon the use case of blockchain's application to a variety of social media services, including content moderation platforms based on smart contracts, token economics-based user incentives, social media governance through decentralized autonomous organizations, and cross-chain relationships. We then go one step further and provide an extensive literature assessment of blockchain that includes the primary social media applications that cut across them, such as self-governance,

tokenization, and identity. We outline the current problems in the sector, such as scalability and adherence to current regulations, and recommend potential research directions in this constantly changing topic as we wrap up this survey.

Index Terms – Blockchain, decentralized social media, smart contracts, decentralized autonomous organizations (DAO), tokenization, content moderation, privacy preservation, identity management, peer-to-peer (P2P) networks, cross-chain interoperability, social media governance, blockchain applications.

I. INTRODUCTION

Social media has developed rapidly in the past few decades, drastically changing public sentiment, social relationships, and conventional wisdom. Social media used today, like Facebook, Twitter, and Instagram, are part and parcel of people's lives and have changed the way people interact and exchange information. Currently, there are 5.17 billion social media users globally, which is 63.7% of the world's population as of July 2024. The usage of social media leads to large quantities of data being generated. For example, about 402.74 million TB of data per day is produced; extrapolations show that

147 ZB of data will be created in 2024, which entails promotion of creativity and the involvement of persons in the management of public matters. Concerns over privacy are valid; a poll held and conducted in 2023 revealed that 38% of the users have scaled down use of social media because of privacy issues, and 31% are unsure that providers of social media can always protect user data efficiently. In addition, the monopoly of the most popular platform in creating algorithms that govern user information generates worries with regard to censorship. For instance, the social platform Facebook has 2.11 billion active users, which challenges the company to moderate more than around 500 million contents per day, which reveals the challenges of addressing free speech and implementing acceptable content moderation means. With these issues in mind, there is a growing concern about developing and deploying architectures and systems for building better private, sovereign, and better control over contents. The answer of decentralized social media platforms, which are based on technologies like blockchain, follows the same logic because such services induce less reliance on key persons, increased transparency, and distribution of power. Blockchain technology has recently been seen as a game-changer for enhancing the

security and effectiveness of several industries, including social media. The distributed ledger in a blockchain that is shared by all participants performs the validation of each chain's transactions [6]. Consensus techniques in blockchain, such as Proof of Work (PoW) and Proof of Stake (PoS), are employed to guarantee validity and reach a consensus over the ledger's state. Nodes check transactions, and once a consensus is reached among all nodes about a particular transaction's integrity, it is hardcoded into the blocks and cannot be altered. By taking advantage of these decentralized and cryptographic features, blockchain can also address other significant problems with social media, such as control over unauthorized access and data privacy influence. Due to the fast development of blockchain technology, there is much focus on research on the use of blockchain technology in social media platforms, particularly in security of communication, privacy and security of data, decentralized apps, and content control. To provide clarity, we have organized the comparison by grouping works according to their primary focus areas: secure communication, privacy preservation, governance models, and performance evaluation. For example, in the authors developed a framework for secure

communication using blockchain, cryptography algorithms, and hash functions. While treating encryption as well as the privacy of information, it failed to incorporate low overhead of encryption and provide a proper compromise between security and performance. In the same way, the authors proposed the design of a privacy-preserving blockchain architecture that uses zero-knowledge proof as well as decentralized identifiers to manage users' authentication and data sharing. However, they are associated with high implementation costs, and it proved to be difficult to be discrete across different platforms.

II. RELATED WORK

A. *How Many People Use Social Media*

With the rapid growth of internet access and digital communication, social media usage has increased significantly across the world. In this report, the author presents a detailed analysis of the number of social media users globally and highlights recent trends in user engagement. The study shows that billions of people actively use social media platforms for communication, content sharing, and online interaction. It emphasizes how social media has become an essential part of daily life for individuals, businesses, and organizations. The report also discusses the

rise in mobile-based usage, increased time spent on platforms, and the growing influence of social media on information sharing and public opinion. At the same time, it indirectly points to challenges such as data privacy concerns, misinformation, and centralized control of user data. The findings provide useful insights into the scale and impact of social media in the modern world. Overall, the study highlights the importance of developing more secure, transparent, and user-controlled systems, which supports the need for advanced solutions like blockchain-based social media platforms.

B. Amount of Data Created Daily

With the continuous advancement of digital technologies and internet usage, the amount of data generated daily has grown at an unprecedented rate. In this report, the author provides insights into the massive volume of data created every day across various platforms, including social media, online services, and connected devices. The study highlights that billions of users contribute to data generation through activities such as posting content, sharing media, messaging, and browsing. It emphasizes the challenges associated with managing, storing, and securing such large volumes of data. The report also points out concerns related to data privacy, data breaches, and the limitations of

centralized storage systems in handling this scale efficiently. Additionally, it discusses how the rapid growth of data demands more scalable, secure, and transparent solutions. The findings underline the importance of adopting advanced technologies like blockchain to ensure better data integrity, security, and decentralized control. Overall, the study provides a clear understanding of the scale of daily data generation and the need for improved data management approaches.

C. 79 Eye Opening Data Privacy Statistics for 2024

With the increasing use of digital platforms and online services, data privacy has become a major concern worldwide. In this report, the author presents a collection of important statistics that highlight the current state of data privacy in 2024. The study shows that a large number of users are worried about how their personal data is collected, stored, and used by organizations. It emphasizes the growing number of data breaches, unauthorized data access, and misuse of personal information across various platforms, especially social media. The report also points out that many users lack full control over their data and are often unaware of how their information is being handled. Additionally, it discusses the need for stronger data protection measures and more

transparent systems. The findings clearly indicate the limitations of traditional centralized systems in ensuring data privacy and security. Overall, the study supports the need for advanced solutions like blockchain-based systems to provide better privacy protection, user control, and data security.

D. Facebook User & Growth Statistics

With the widespread adoption of social media platforms, Facebook continues to be one of the most widely used platforms globally. In this report, the author provides detailed statistics on Facebook users and its growth over time. The study highlights the increasing number of active users, showing how the platform connects billions of people across different regions. It also discusses user engagement patterns, including time spent on the platform and interaction through posts, images, and videos.

The report emphasizes the significant role Facebook plays in communication, business promotion, and information sharing. At the same time, it brings attention to challenges such as data privacy concerns, centralized control of user data, and the spread of misinformation. The findings reflect the large-scale impact of social media platforms and the need for more secure and transparent systems. Overall, the study supports the

importance of developing improved solutions like blockchain-based social media platforms to enhance user trust, privacy, and data control.

III. PROPOSED METHODOLOGY

In the proposed system, a blockchain-based social media platform is developed to overcome the limitations of traditional centralized systems. The system uses blockchain technology to store user posts as blocks with unique hash values, ensuring data integrity and immutability. Cryptographic techniques such as encryption are applied to secure user data, allowing only authorized users to access the content. The platform introduces a decentralized approach where users have better control over their data and interactions.

Features like access control, token-based rewards, and reporting mechanisms are included to improve user engagement and content moderation. Media files such as images and videos are stored outside the database to enhance performance and scalability. The system also provides transparency through a blockchain explorer, allowing users to verify the authenticity of stored data. Overall, the proposed system focuses on security, privacy, and user control

by integrating blockchain concepts into social media.

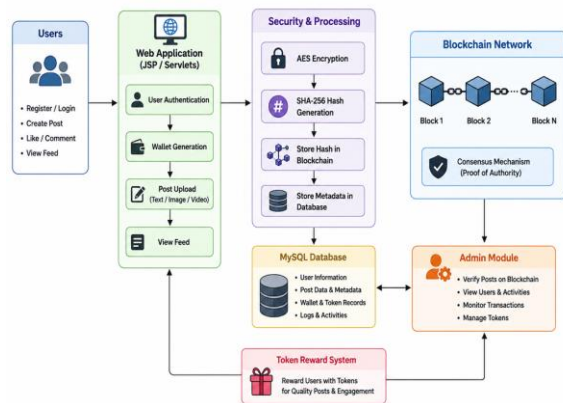
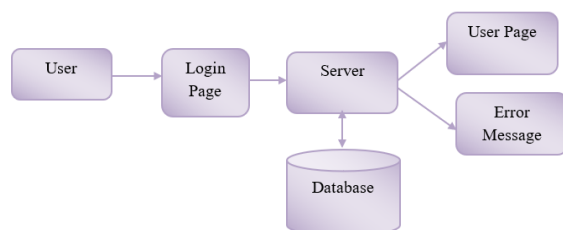


Fig. 1: System Overview

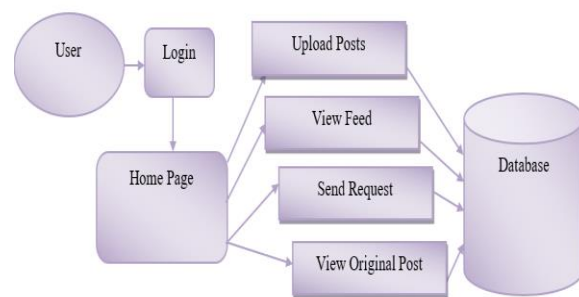
1. User Interface Design

To connect with server user must give their username and password then only they can able to connect the server. If the user already exists directly can login into the server else user must register their details such as username, password, Email id, City and Country into the server. Database will create the account for the entire user to maintain upload and download rate. Name will be set as user id. Logging in is usually used to enter a specific page. It will search the query and display the query.



2. User Module

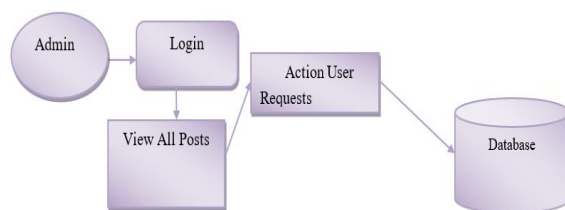
The User Module is the main part of the blockchain social media system where users interact with the platform. In this module, new users can register by providing their personal details, and a unique blockchain wallet address is automatically generated for them. Registered users can securely log in to the system and create posts containing text, images, or videos. Before storing the posts, the content is encrypted using AES encryption for privacy and security. Users can view the public feed, like posts, request access to encrypted posts, transfer tokens, and manage their profiles. The module also rewards users with blockchain tokens for posting content and receiving likes from other users. This module ensures secure communication, decentralized access control, and protected content sharing within the social media platform.



3. Admin Module

The Admin Module is responsible for monitoring and controlling the overall blockchain social media platform. The

administrator securely logs into the system and can access all user posts without any access restrictions. The admin can view encrypted and decrypted posts, including images and videos uploaded by users. This module also allows the admin to verify blockchain hashes, monitor user activities, manage feeds, and ensure the integrity of stored blockchain data. The admin helps maintain security, transparency, and proper functioning of the decentralized social media environment. This module acts as the supervisory component of the entire system.



4. JSP Dashboard

The JSP Dashboard provides the main user interface for both users and administrators in the blockchain social media system. It displays encrypted and decrypted posts, uploaded images and videos, blockchain hash details, token balances, user profiles, and access request information. Users can create posts, view feeds, like posts, request access to protected content, and transfer blockchain tokens through the dashboard. The admin dashboard allows monitoring of all users,

posts, blockchain records, and platform activities. It acts as the central interface for managing and viewing all project operations in a simple and secure way.

5. MySQL Database

The MySQL Database is used to store all important project data such as user registration details, login credentials, blockchain wallet addresses, encrypted posts, uploaded media files, blockchain hashes, likes, token balances, access permissions, and system logs. It supports secure storage and efficient retrieval of data required for the decentralized social media platform. The database works together with blockchain storage to maintain both security and system performance. This combination helps in managing user activities, maintaining blockchain integrity, and supporting smooth operation of the entire application.

IV. EXPERIMENTAL RESULTS AND ANALYSIS

The analysis shows that blockchain-based decentralized social media can improve privacy, security, and transparency compared to traditional centralized platforms. The integration of smart contracts, token-based incentives, DAOs, and decentralized identity management enhances content moderation, user governance, and data ownership.

However, challenges such as scalability, interoperability, and regulatory compliance remain..



Fig. 2: Home Page

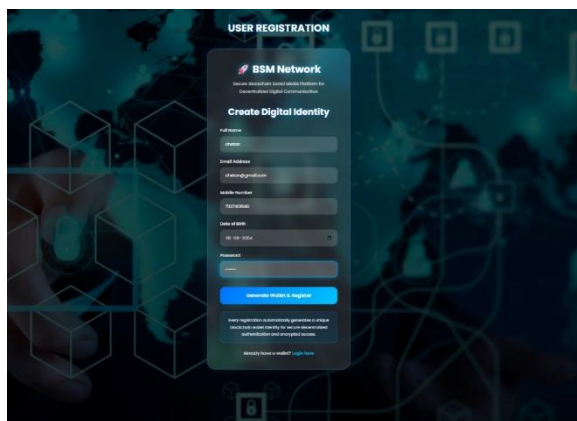


Fig. 3: Registration



Fig. 4: Explorer

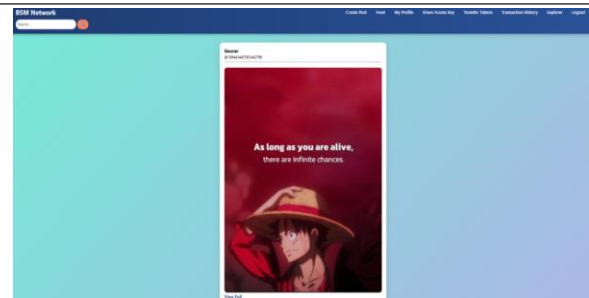


Fig. 5: BSM Network

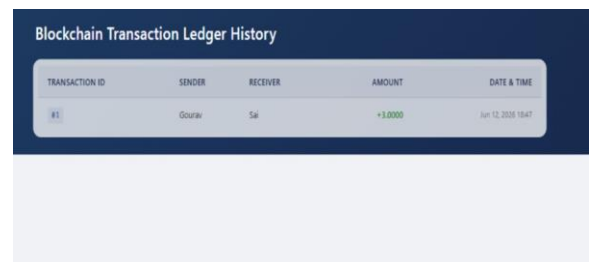


Fig. 6: History

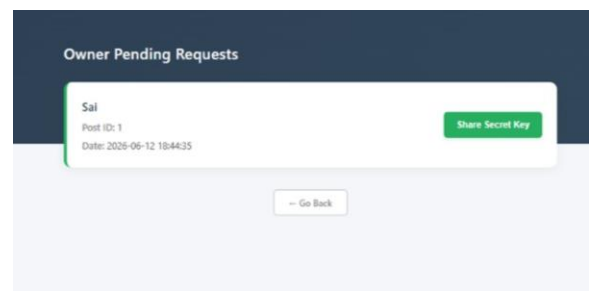


Fig. 7: Pending Request

V. CONCLUSION

This project presents a secure and decentralized blockchain-based social media platform that helps users share text, images, and videos safely without depending completely on centralized systems. The system uses blockchain technology to store posts securely and prevent unauthorized modification of data. AES encryption is used to protect user content, while SHA-256

hashing helps maintain blockchain integrity and security. The platform also provides wallet generation and token reward mechanisms to encourage user participation and engagement. Access control features ensure that only authorized users can view protected content. The project successfully supports secure media sharing, blockchain verification, decentralized identity management, and transparent user interaction. Compared to traditional social media systems, the proposed platform provides better security, privacy, transparency, and data ownership for users. Overall, the project offers an effective and practical solution for transitioning social media from centralized models to decentralized blockchain-based communication systems.

REFERENCES

- [1] S. Singh. (Sep. 2024). How Many People Use Social Media. [Online]. Available: <https://www.demandsage.com/social-media-users/>
- [2] F. Duarte. (Jun. 2024). Amount of Data Created Daily. [Online]. Available: <https://explodingtopics.com/blog/data-generated-per-day>
- [3] O. Husain. (Feb. 2024). 79 Eye Opening Data Privacy Statistics for 2024 (updated!). [Online]. Available: <https://www.enzuzo.com/blog/data-privacy-statistics>
- [4] B. Team. (Sep. 2024). Facebook User & Growth Statistics. [Online]. Available: <https://backlinko.com/facebook-users>
- [5] B.Guidiand A.Michienzi,“The decentralization of social media through the blockchain technology,” in Proc. 13th ACMWebSci.Conf.,Jun.2021, pp. 138–139.
- [6] Maturi, S. Y. (2022). Vulnerabilities in the 802.11 wireless client selection mechanism. International Journal on Recent and Innovation Trends in Computing and Communication, 10(1), 106–117.
- [7] Bhagwat, V. B. (2024). A simplified transition from EBS Payroll to Cloud Payroll: Benefits and Drawbacks. Journal of Computational Analysis and Applications, 33(6).
- [8] Adabala, P. K. (2024). Utilizing predictive analytics to improve efficiency and decision-making in ERP-connected supply chains. International Journal of

Intelligent Systems and Applications in Engineering, 12(22s), 2465.

- [9] P. Rani, V. Jain, J. Shokeen, and A. Balyan, “Blockchain-based rumor detection approach for COVID-19,” J. Ambient Intell. Humanized Comput., vol. 15, no. 1, pp. 435–449, Jan. 2024.
- [10] L. Ante, “Non-fungible token (NFT) markets on the Ethereum blockchain: Temporal development, cointegration and interrelations,” Econ. Innov. New Technol., vol. 32, no. 8, pp. 1216–1234, Nov. 2023.
- [11] Akinapalli, S. (2024). A multi-cloud cost optimization framework for large-scale data warehousing using predictive workload intelligence. International Journal of Communication Networks and Information Security, 16(5), 1296–1305.
- [12] Boyapati, P. K. Building a centralized data operations hub for healthcare enterprise integration. IJSAT-Int. J. Sci. Technol. 16 (2). <https://doi.org/10.71097/IJSAT.v16.i2.32>
- 19

AUTHORS Profile



Ms. K. VIJAYA LAXMI received her B. Tech degree in Computer Science & Engineering from JNTUH, Hyderabad in 2015 and her M. Tech degree in Computer Science from JNTUH, Hyderabad in 2017. She is currently pursuing her Ph.D. degree in Computer Science & Engineering from Guru Nanak University, Hyderabad. She has been dedicated to the teaching field for the last 7 years. Her research area is Deep Learning. At present, she is working as an Assistant Professor in the CSE Department at Guru Nanak Institutions Technical Campus, Ibrahimpatnam, Telangana, India.



Mr. BOGA GOURAV pursuing B.Tech degree in Computer Science and Engineering at Guru Nanak Institutions Technical Campus affiliated to JNTUH in 2022-2026.



Mr. NEELA AKHIL KUMAR pursuing B.Tech degree in Computer Science and Engineering at Guru Nanak Institutions

Technical Campus affiliated to JNTUH in 2022-2026.



Mr. YADLA CHETAN KARTHIK

pursuing B.Tech degree in Computer Science and Engineering at Guru

Nanak Institutions Technical Campus affiliated to JNTUH in 2022-2026.



Mr. RAVULA AYYA-PPA DHEERAJ

pursuing B.Tech degree in Computer Science and Engineering at Guru

Nanak Institutions Technical Campus affiliated to JNTUH in 2022-2026.