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Monitoring Accounting Process in Organization with Blockchain Technology

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Abstract: ***Blockchain has been well conceded for its implicit uses in the financial and banking industries. As a decentralized and distributed technology, blockchain, on the other hand, may be used as an important tool for a wide range of everyday operations. Among the multitudinous operations sectors where blockchain is anticipated to have a significant influence, finance, and banking are some of the most important. In the contemporary financial and banking systems, it produces a broad variety of options and possibilities.***

As a result, the purpose of our design is to use blockchain technology in present financial and banking systems and give a transparent and secure system for so. In addition, we will be outlining the hurdles and roadblocks that must be overcome in blockchain technology that can be successfully used in financial and banking institutions. In this, we will be erecting the smart contract for blockchain-predicated financial systems, which will be helpful for associations and institutions for better translucence in their association to reduce fraud.

Keywords: Blockchain, Blockchain in Finance, DAPP, Hyperledger Fabric, Finance Monitoring System, Solidity, Smart Contract, Web Application, Consensus, Voting

I. INTRODUCTION

Expense tracking, also known as Financial tracking, is the practice of keeping track of one's income and spending on a daily basis. It is accomplished by recording receipts, invoices, and business expenses into some type of accounting ledger. It complements budgeting and is a useful tool for keeping track of business finances. Our blockchain-based Expense Tracking System will provide a clear idea of expenses and allow the organization to forecast finances, identify cost-cutting opportunities, and identify growth opportunities. Blockchain is a decentralized storage system that stores data in a sequence of blocks connected by cryptographic hashing of previous blocks**.**

II. LITERATURE SURVEY

There was a thorough discussion of 5 research publications that are linked to Monitoring and Managing Blockchain Technology. The papers were carefully selected from the internet database, IEEE, Journal of Physics, based on how well they could be used in actual situations.

The research paper we searched by using keywords like “Expense tracker in blockchain technology”, “Ethereum blockchain system”, ”Transparent system”, ”Decentralized blockchain based transaction system” which produced roughly (45,000 approx.) results .Companies like Deloitte, PwC , Ernst & Young, excreta, all have focused on domain of Blockchain Technology, Transparency, Decentralization techniques which garnered significant attention in the literature.

Our literature survey explores the spectrum of methods and strategies employed to apply the characteristics of blockchain technology like decentralization, distributed, immutability, transparency within our application. Researchers and practitioners have highlighted the application and use case of blockchain technology in Accounting Industry, Auditing systems.

1) Title: Blockchain-based Transparency Framework for Privacy Preserving Third-party Services.
Author: Runhua Xu
Publisher: IEEE. Published in: IEEE Transactions on Dependable and Secure Computing (Early access). Date of Publication: 02 June 2022. This paper proposes TAB framework that provides transparency and trustworthiness of third-party authority and third-party facilities using blockchain techniques for emerging crypto-based privacy-preserving applications. TAB employs the Ethereum blockchain as the underlying public ledger and also includes a novel smart contract to automate accountability with an incentive mechanism that motivates users to participate in auditing, and punishes unintentional or malicious behaviors.

2) Title: A blockchain based approach for improving transparency and traceability in silk production and marketing.
Author: Abhilash Sharma and Mala Kalra
Publisher: IOP publishing Ltd. Published in: Journal of Physics: Conference Series, Volume 1998, 3rd International Conference on Smart and Intelligent Learning for Information Optimization (CONSILIO 2021) 9-10 July 2021, Hyderabad, India. Date of Conference: 20-22 November 2020. With Blockchain, government, farmers, weavers, and sellers can collaborate on a single system without any inconvenience. They create an immutable chain of transactions which can be verified by any of the parties. There is an immutable shared ledger that no one can modify. This research presents a private and permissioned application that uses Blockchain and aims to automate the shipping processes among different participants in the supply chain ecosystem.

3) Title: Blockchain, an enabling technology for transparent and accountable decentralized public participatory GIS
Author: Mahdi Farnaghi , Ali Mansourian. Publisher: IOP publishing Ltd.
Published in: https://www.sciencedirect.com/science/article/pii/S0264275120311987. Date of Conference: Version of Record 20 June 2020. This research paper demonstrates how effectively increase the openness, transparency, and accountability of the participatory planning processes. A prototype system for participatory site selection in cities was developed. The feasibility of the approach was demonstrated through a case study. The opportunities and challenges of using blockchain technology for PPGIS applications were discussed.

4) Title: Applications Research of Blockchain technology in Accounting System.
Author: Ruirui Zheng
Publisher: IOP publishing Ltd. Published in: Journal of Physics: Conference Series, Volume 1955, 2021 4th International Symposium on Big Data and Applied Statistics (ISBDAS 2021) 21-23 May 2021, Dali, China. Date of Publication: 2021. This paper studies the necessity and feasibility of the application of blockchain technology in the accounting industry, discusses the working principles of the accounting information system of the seller and the buyer, and constructs the vertical and horizontal application models of blockchain technology in the accounting system.

5) Title: A blockchain based approach for improving transparency and traceability in silk production and marketing.
Author: Uzma Jafar, Mohd Juzaiddin Ab Aziz and Zarina Shukur.
Publisher: MDPI. Published in: Faculty of Information Science and Technology, The National University of Malaysia, Bangi 43600, Malaysia. Date of Conference: 31 August 2021. The following article gives an overview of electronic voting systems based on blockchain technology. The main goal of this analysis was to examine the current status of blockchain-based voting research and online voting systems and any related difficulties to predict future developments. This study provides a conceptual description of the intended blockchain-based electronic voting application and an introduction to the fundamental structure and characteristics of the blockchain in connection to electronic voting. As a consequence of this study, it was discovered that blockchain systems may help solve some of the issues that now plague election systems.

III. APPLICATION OF BLOCKCHAIN

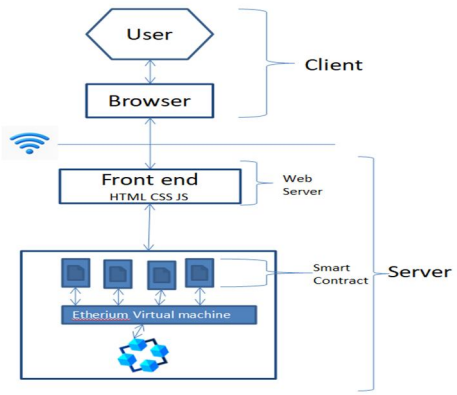

Figure 1: Architecture of Project

A decentralized application refers to an application that is constructed on a decentralized network, integrating a smart contract and a front-end user interface. This particular application belongs to the category of distributed open-source software applications, operating on a peer-to-peer blockchain network.

The utilization of blockchain technology in decentralized applications enables the processing of data across distributed networks and the execution of transactions. Furthermore, decentralized applications are open-source in nature, meaning that any necessary modifications are agreed upon by a consensus of the majority of users. These applications provide decentralized storage capabilities and incorporate cryptography. The validation and verification of the decentralized data blocks is ensured, thus establishing their authenticity.

1) Etherium Blockchain: It establishes a network that is peer-to-peer in nature and ensures the secure execution and verification of application code, which is commonly known as smart contracts. These decentralized applications, or DApps, have their backend code, which consists of smart contracts, running on a network that is decentralized rather than being centralized on a server. The Ethereum blockchain serves as a means for data storage for these DApps.

2) Smart contracts play a vital role in the functioning of DApps. They are utilized to define the state changes that occur on the blockchain. A smart contract is essentially a combination of code and data that is located at a specific address on the Ethereum Blockchain and operates within the Ethereum blockchain.

3) The Ethereum Virtual Machine (EVM) is an encompassing virtual computer that executes the prescribed logic within the smart contracts and facilitates the processing of state alterations occurring within this Ethereum network.

4) The front-end, constituting the visible aspect of DApps, enables users to perceive and engage with the graphical user interface (GUI). Furthermore, the front-end establishes communication with the application logic delineated within the smart contracts.

IV. METHODOLOGY

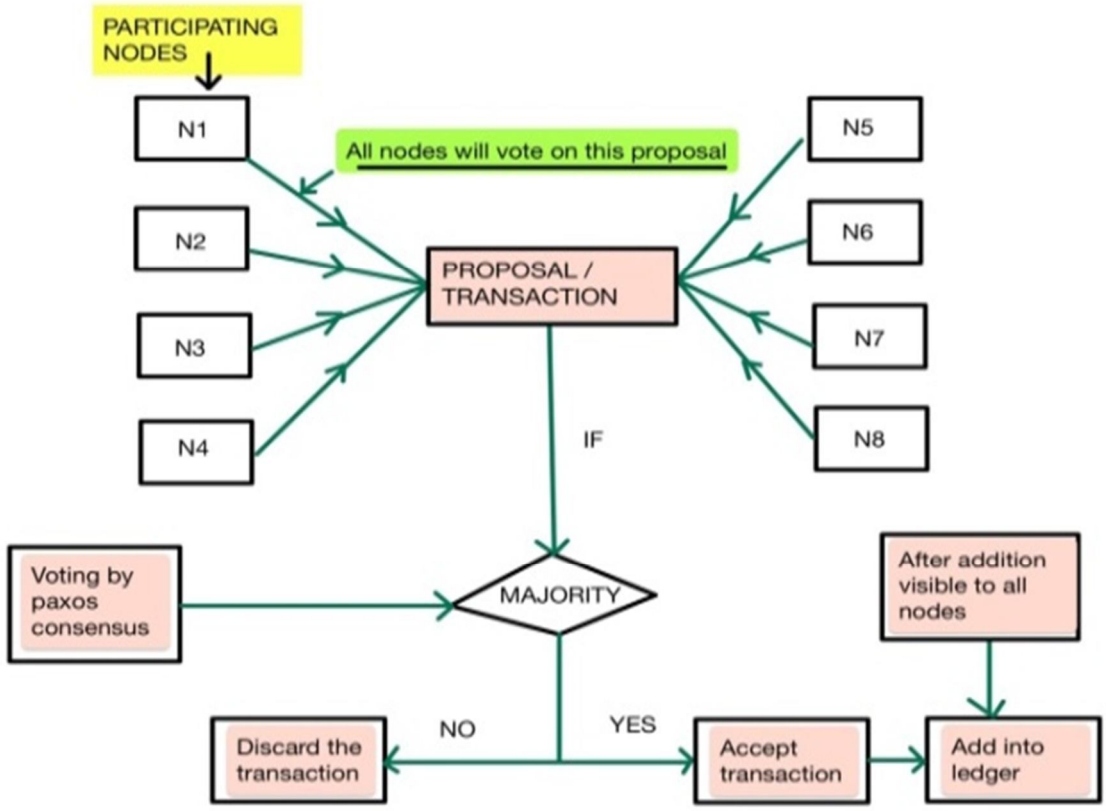

Figure 2: Overall flowchart of methodology (1)

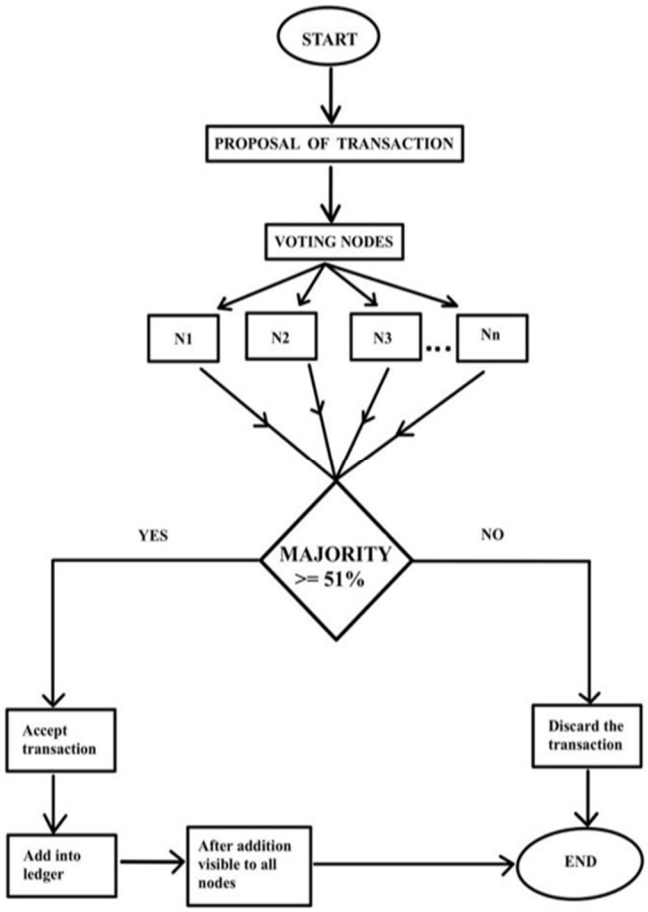

Figure 3:Overall flowchart of methodology (2)

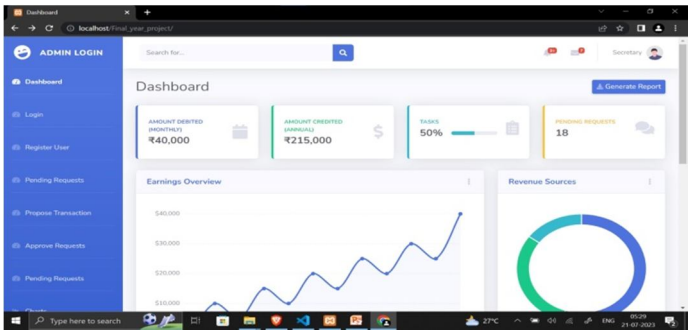

Figure 4:Simulation process of Project

1) *Node:* A node, which constitutes an integral part of the blockchain network, is essentially a computer or device. The distributed and decentralized structure of a blockchain system relies heavily on these nodes.
2) *Transaction:* When referring to a blockchain transaction, it denotes a data transfer involving multiple parties. Alternatively, it can be described as an exchange, agreement, contract, or transfer of assets. Typically, these assets comprise money or real estate.
3) *Ledger:* In the context of blockchain technology, a ledger refers to a decentralized database that records and verifies transactions through a computer network.. This ledger is interchangeably known as a blockchain.
4) *Blockchain Voting:* Within a private blockchain context, voting pertains to the process of achieving consensus. This consensus is reached through the validation and acceptance of a transaction by a limited number of pre-approved nodes or businesses.

V. SIMULATION

1) The very first step starts with the user sending transaction request to the system .
2) Once the transaction request is received there are nodes which have to authorize whether to accept the transaction or not .
3) The nodes authorize the transaction by an voting system in which all the nodes has to vote in order to accept or reject the transaction .
4) In these voting system if the voting percentage is more than or equal to 51% then the transaction is accepted else it will be rejected .
5) Whether the transaction is accepted or rejected it will be added to the ledger and will be visible to all the nodes

Ethereum constitutes a computing platform founded upon blockchain technology, thereby facilitating the construction and implementation of decentralized applications. By decentralized, it is meant that these applications operate without the oversight of a central governing entity. Consequently, developers possess the capability to establish a decentralized application, wherein the participants of said application assume responsibility for decision-making processes.

VI. SOFTWARE MODEL

Blockchain, with its inflexible sequences of data blocks, offers a tally of verity that can serve as a foundational element within each Waterfall phase. In the environment of conditions and design, blockchain can give a empirical record of opinions and changes, a chronicle that's as incommutable. As the design cascades down the phases of development and testing, blockchain stands as a guard, icing that each step is recorded with the permanence of a chiseled necrology on gravestone. The integration of blockchain into the Waterfall methodology imbues it with a new dimension of responsibility and traceability. It's akin to a operative strictly logging each piece of substantiation, knowing that the integrity of the disquisition hinges upon the unimpeachable nature of the records kept.

VII. RESULT

In this project, we propose a decentralized financial management system for organizations based on blockchain technology and smart contracts. The system utilizes a voting mechanism among organizational nodes to ensure transparency, accountability, and secure financial transactions. The core components of the system include a smart contract that manages the distribution of funds among nodes and a voting mechanism that allows nodes to approve or disapprove transaction requests. The system offers several benefits, including decentralized authority, enhanced security, improved efficiency, and enhanced auditability. By implementing this system, organizations can enhance accountability, improve transparency, reduce fraud, and streamline financial processes.

VIII. FUTURE SCOPE

The future scope of this decentralized financial management system for organizations is vast and promising. Here are some potential directions for future development:

1) *Integration with Existing Financial Systems:* To ensure seamless integration with existing organizational workflows, the system can be designed to interface with traditional financial systems, enabling organizations to manage their finances holistically.
2) *Enhanced Voting Mechanisms:* Advanced voting mechanisms, such as weighted voting based on node reputation or contribution, can be explored to refine decision-making processes.
3) *Multichain Support:* The system can be extended to support multiple blockchain networks, allowing organizations to leverage the benefits of different blockchain protocols and ecosystems.
4) *Privacy-preserving Transactions:* Implementing privacy-enhancing techniques, such as zero-knowledge proofs, can ensure that sensitive financial information remains confidential while maintaining transparency.
5) *Integration with AI and Machine Learning:* By incorporating AI and machine learning algorithms, the system can analyze transaction patterns and provide real-time insights to inform financial decisions.
6) *Exploration of Alternative Consensus Mechanisms:* Investigating alternative consensus mechanisms, such as Proof-of-Stake (PoS) or Proof-of-Authority (PoA), can optimize the system's performance and energy efficiency.
7) *Exploration of Decentralized Identity Management:* Implementing decentralized identity solutions can enhance user authentication and privacy protection within the system.

These future advancements can further enhance the capabilities of this decentralized financial management system, empowering organizations to manage their finances with greater efficiency, security, and transparency

IX. CONCLUSIONS

The proposed decentralized financial management system offers a secure, transparent, and efficient solution for organizations to manage their finances. By leveraging blockchain technology and smart contracts, the system eliminates the need for centralized authority and ensures that all financial decisions are made through a transparent voting process. The system also provides enhanced security and auditability, as all transaction records are stored on the blockchain and cannot be tampered with. With its potential to revolutionize organizational financial management, this decentralized system is poised to play a significant role in the future of finance.

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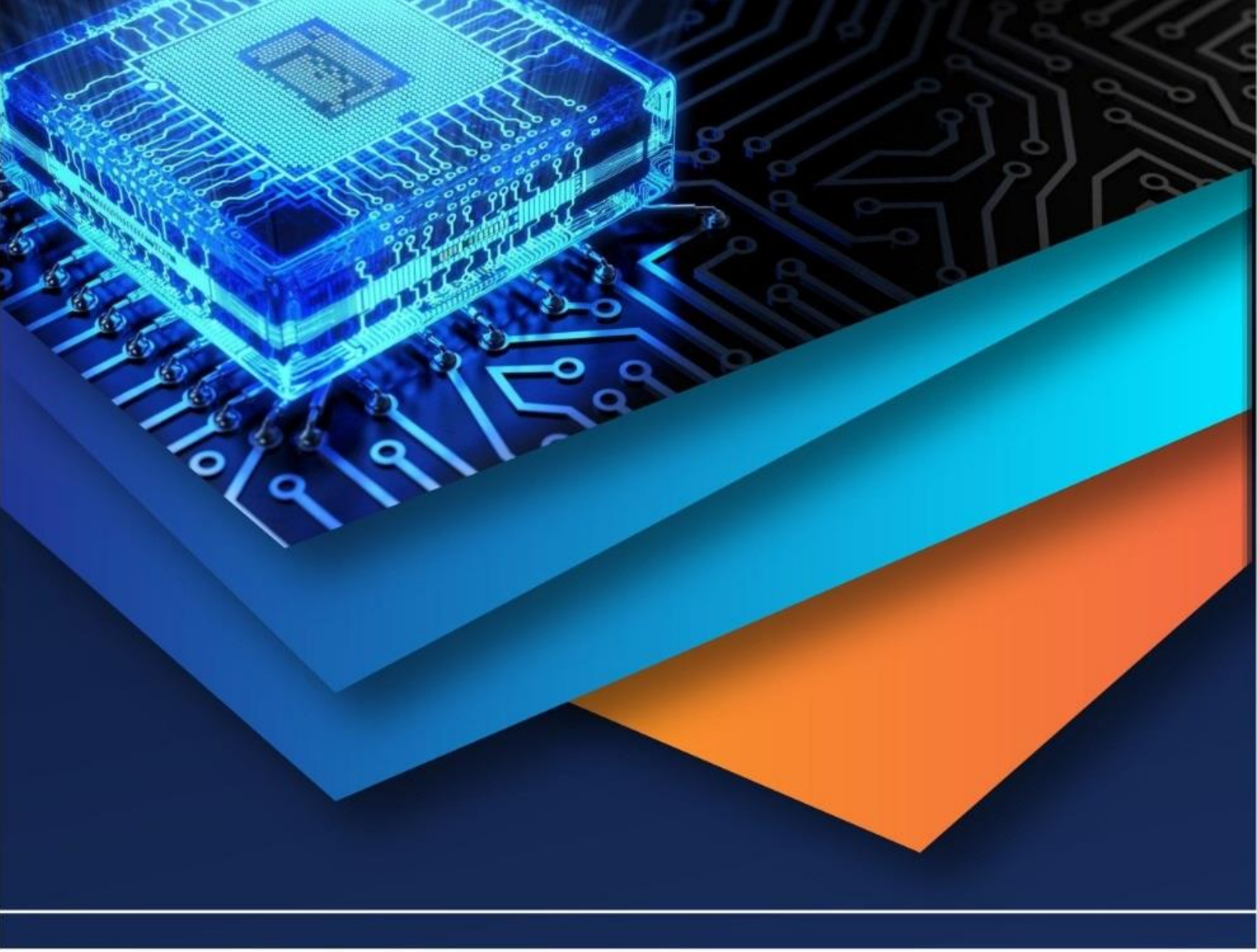

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