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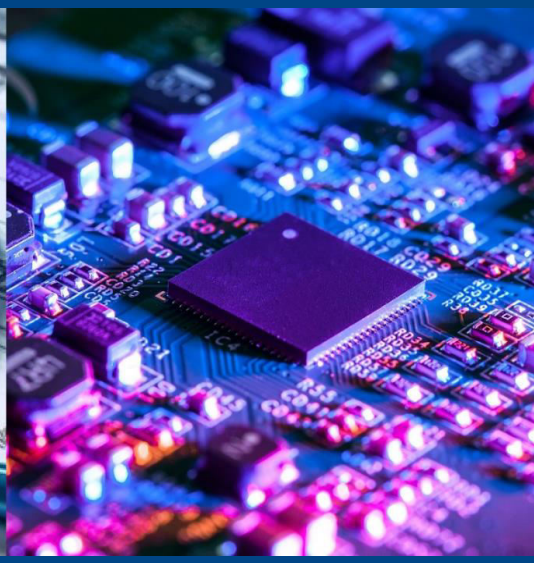

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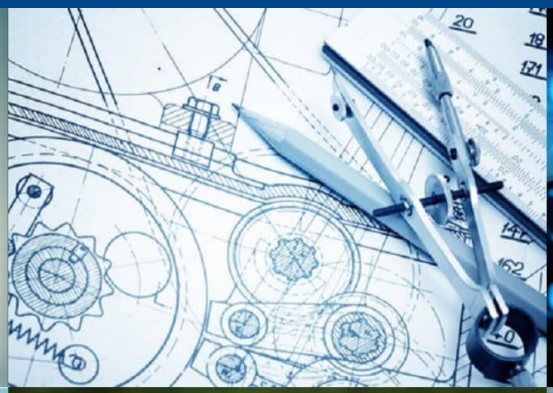

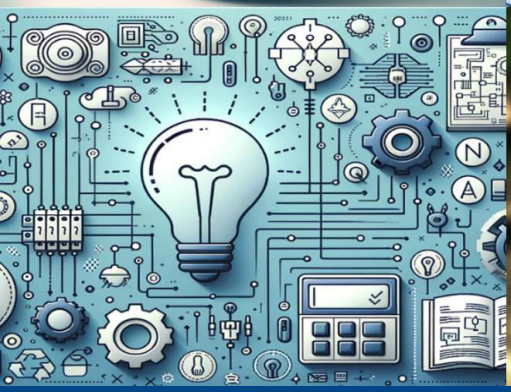

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Blockchain Based Loan System

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ABSTRACT: "The discovery of fraudulent activities in financial institutions, such as the Punjab National Bank, has highlighted vulnerabilities in traditional financial systems, particularly concerning systemic failures and human error. Blockchain technology offers a potential solution by providing a transparent and immutable ledger. Traditional information settlement mechanisms, like SWIFT, often utilize isolated ledgers, which can lead to inefficiency. In contrast, blockchain-based ledgers can distribute information across participants—including transacting parties, auditors, and regulators—enhancing transparency.

This paper presents a decentralized loan management web application (DApp) developed on the Ethereum blockchain. The DApp aims to mitigate fraudulent loan activities by decentralizing loan sanctioning processes and providing a system that is open and accessible, thereby promoting decentralization. Security features such as user identity authentication, bank official authentication, and multi-level verification using Public Key Infrastructure (PKI) are incorporated. Financial institutions play a crucial role in providing capital; therefore, financial systems must be reliable, secure, efficient, and cost-effective. Existing loan management systems often lack transparency, operate in a single-service mode, and may have inadequate data privacy protection against cyberattacks. To address these issues, this paper proposes a loan on blockchain (LoC) system, a financial loan management system based on Ethereum smart contracts, designed with openness, accessibility, and decentralization in mind. The system employs digital signatures and oracles to enhance data privacy."

KEYWORDS: Blockchain, Loan Management System, User Privacy, Smart Contracts.

I. INTRODUCTION

"The introduction of a blockchain technology-based bank loan management system represents a significant shift in the financial sector. This system leverages the decentralized and secure attributes of blockchain to redefine loan management processes within banking. Smart contracts are used to automate the execution and enforcement of loan agreements, reducing the need for intermediaries and increasing efficiency. Blockchain-based asset tokenization introduces new possibilities for loan management, such as fractional ownership and increased liquidity. A decentralized ledger provides an immutable and transparent record of loan transactions, which can significantly lower the risk of fraud and errors. Blockchain technology can also improve identity verification, credit scoring, and asset valuation, contributing to more reliable decision-making. Furthermore, blockchain integration can facilitate real-time, auditable compliance with regulations, offering enhanced transparency and accountability compared to traditional banking systems. In summary, blockchain-based bank loan management systems have the potential to increase security, efficiency, and accessibility in financial services."

PUPOSE:

"The implementation of a bank loan management system using blockchain technology is driven by the need to address persistent challenges in the traditional banking framework. The decentralized and tamper-resistant nature of blockchain offers a transformative approach to improving the efficiency, security, and transparency of loan management. Traditional loan systems are often characterized by cumbersome paperwork, delays, and a lack of transparency. Blockchain technology can mitigate these inefficiencies by automating processes through smart contracts, streamlining loan processes from application to disbursement."

OBJECTIVE OF SYSTEM:

- "Enhance data security and integrity using blockchain's cryptographic features to protect against fraud and unauthorized access.
- Increase trust among participants by reducing the reliance on intermediaries and establishing a tamper-proof record of loan agreements and repayments.

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- Enable direct interaction between borrowers and lenders on a decentralized platform to promote financial inclusion.
- Maintain the integrity of borrower data and loan terms throughout the loan lifecycle.
- Enable direct interaction between borrowers and lenders on a decentralized platform to promote financial inclusion.

II. LITERATURE SURVEY

- "Hao Wang, Chaonian Guo, Shuhan Cheng et al. noted that current financial loan management systems often operate in a single-service mode with limited transaction transparency and traceability. They also highlighted the vulnerability of these systems to cyberattacks due to inadequate data privacy protection mechanisms. To address these issues, they proposed a loan on blockchain (LoC) system, a financial loan management system based on smart contracts on the Hyperledger Fabric permissioned blockchain. Their research included a case study of the Chinese poverty alleviation loan program. They developed a digital account model for asset transfer between centralized and decentralized ledgers and introduced locking and unlocking algorithms for smart contracts, along with digital signatures and oracles for data privacy. Performance evaluations indicated the system's potential applicability in real-world financial loan settings."
- "Arikumar K. S., Deepak Kumar, Gowtham C, Sahaya Beni Pratibha et al. highlighted the discovery of fraudulent activities in the Punjab National Bank as an example of vulnerabilities in traditional systems due to systemic failures and human error. They pointed out that information settlement mechanisms like SWIFT are often separate from payment settlement mechanisms. They suggested that using a ledger that distributes information settlement across participants (e.g., transacting parties, auditors, regulators) could enhance transparency. Their paper focused on a decentralized loan management web application (DApp) built on the Ethereum blockchain to prevent fraudulent loan activities by decentralizing processes. The DApp incorporates security features such as user identity authentication, bank official authentication, and multi-level verification using Public Key Infrastructure (PKI)."
- "Kwame Omono Asamoah, Adjei Peter Darko, Collins Opoku Antwi, Seth Larweh Kodjiku et al. discussed the challenge of funding higher education in developing countries. They noted that many talented but impoverished students are unable to pursue higher education due to parental unemployment and poor economic conditions, which prevents them from reaching their full potential. To address this, governments often provide student loans. However, the COVID-19 pandemic and the Russia-Ukraine war have contributed to a global economic crisis, increasing government spending. The authors proposed using blockchain and crowdsourcing to revolutionize student loan programs and alleviate the financial burden on governments."
- "Tianqi Jia and Cuiying Wang explored the use of formal concept analysis for knowledge discovery in prescriptions. Their research focused on prescriptions of GuiZhi Decoction. They constructed a database, generated a formal context, and used structural partial-ordered attribute diagrams to visualize and analyze the relationships between prescriptions and herbs."

PROPOSED SYSTEM:

- The bank loan management system needs to integrate with existing legacy banking systems to ensure a smooth transition and coexistence with traditional banking processes.
- To assess the creditworthiness of borrowers, the system may need to connect with external credit bureaus, financial institutions, or data providers to gather relevant information for decision-making.
- Seamless integration with payment systems is crucial for handling fund transfers, repayments, and other financial transactions. This includes compatibility with traditional banking payment systems as well as emerging blockchain-based payment solutions.

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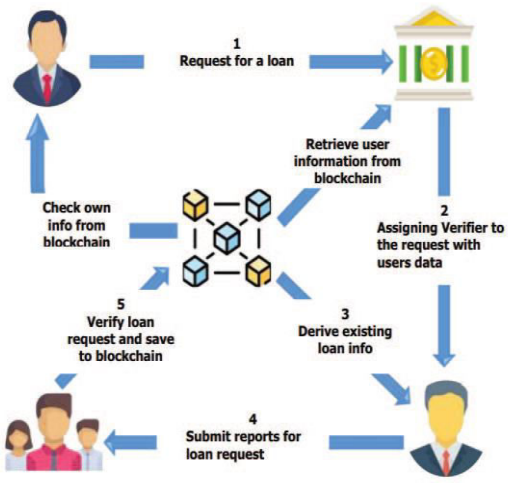
USE CASE DIAGRAM:



III. ALGORITHMS:

1. Proof Of Work:

The consensus method known as Proof of Work is mostly utilized in blockchain systems such as Bitcoin. It guards against fraud like double-spending and guarantees that all participants (nodes) agree on the blockchain's current state.

Steps:

Step 1: Gather Transactions.

Gather a collection of transactions from the mempool that have not been verified.

Step 2: Create a Block.

Create a candidate block using the following:

1) The hash of the previous block
2) Time stamp
3) Transaction list
4) Merkle root
5) The first nonce value, such as 0

Step 3:Hash the Block Header.

As with Bitcoin, apply the SHA-256 hash function to the block header twice.

Step 4: Check the Target Difficulty.

1) Check the generated hash against a target value that the network has specified.
2) This goal must be met or exceeded by the hash.

Step 5: If Not Valid.

1) Repeat step 3 after increasing the nonce.
2) This procedure could require billions of attempts.

Step 6: If Valid (Winning Hash Found).

1) The network receives a broadcast of the block.
2) Other nodes block data and validate the hash.
3) The block gets appended to the blockchain if it is legitimate.

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Step 7: Reward:
The miner who succeeds gets:

1) Block reward (freshly produced currency).
2)Fees for transactions.

2. Proof Of Stake:
Blockchain networks employ Proof of Stake (PoS), a consensus technique, to approve transactions and append new blocks. The amount of cryptocurrency that validators stake (lock up) as collateral determines which ones are chosen, as contrast to Proof of Work (PoW), which depends on processing power.

Steps:
Step 1: Staking Coins.
1) A specific quantity of cryptocurrency is locked up by users within the network.
2) The likelihood of being chosen as a validator increases with the number of coins invested.

Step 2: Validator Selection.
1) The network selects a validator using an algorithm (such as age of stake, random selection, or another technique).
2) While some PoS systems elect validators by voting, others use delegated PoS (DPoS).

Step 3: Block Proposal.
A fresh block of transactions is created and proposed by the selected validator.

Step 4: Block Validation.
1) The block is validated by additional validators.
2) The block gets appended to the blockchain if it is legitimate.

Step 5: Reward Distribution.
1) A reward (in cryptocurrencies or transaction fees) is given to the validator.
2) Those that transferred their share are also rewarded by certain networks.

Step 6: Slashing (Penalties).
A validator may lose all or a portion of the coins they have staked if they behave maliciously or remain offline.

IV. CONCLUSION

In real-time, the proposed system securely shares transaction details by organizing the network, effectively preventing fraud. Our proposed system also maintains the privacy of valuable customers by eliminating attackers or fraudsters who inject vulnerable data. This system could enable banks in India to become fully digitalized, free from concerns about hackers and attackers. The integration of blockchain into the loan management system offers easier, faster, and more cost-effective solutions that existing banking systems can adopt to achieve high-level security and privacy. Ultimately, the "Bank Loan Management System using Blockchain Technology" presents a revolutionary solution to the limitations of current loan management systems. By leveraging the power of blockchain, it ensures transparency, security, efficiency in loan processing, and is open to anyone, offering accessibility and decentralization, ultimately benefiting both borrowers and financial institutions.

REFERANCES

1. Nimit Jain, Tarushi Agrawal, Pranav Goyal, and Vikas Hassija. A blockchain-based distributed network for secure credit scoring. In 2019 5th International Conference on Signal Processing, Computing and Control (ISPCC), pages 306–312. IEEE, 2019.
2. Rui Wang, Zhangxi Lin, and Hang Luo. Blockchain, bank credit and sme financing. Quality & Quantity, 53(3):1127–1140, 2019.

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

3. Milon Biswas, Atanu Shome, Md Ashraful Islam, Arafat Jahan Nova, and Shamim Ahmed. Predicting stock market price: A logical strategy using deep learning. In 2021 IEEE 11th IEEE Symposium on Computer Applications & Industrial Electronics (ISCAIE), pages 218–223. IEEE, 2021.
4. Sm Al-Amin, Shipra Rani Sharkar, M Shamim Kaiser, and Milon Biswas. Towards a blockchain-based supply chain management for eagro business system. In Proceedings of International Conference on Trends in Computational and Cognitive Engineering, pages 329–339. Springer, 2021.
5. Prodipta Promit Mukherjee, Arika Afrin Boshra, Mallik Mohammad Ashraf, and Milon Biswas. A hyper-ledger fabric framework as a service for improved quality e-voting system. In 2020 IEEE Region 10 Symposium (TENSYMP), pages 394–397. IEEE, 2020.
6. Md Parvez Hossain, Md Khaled, Shahjahan Ahamed Saju, Shanto Roy, Milon Biswas, and Muhammad Aminur Rahaman. Vehicle registration and information management using blockchain based distributed ledger from bangladesh perspective. In 2020 IEEE Region 10 Symposium (TENSYMP), pages 900–903. IEEE, 2020.
7. Papon Datta, Avishek Bhowmik, Atanu Shome, and Milon Biswas. A secured smart national identity card management design using blockchain. In 2020 2nd International Conference on Advanced Information and Communication Technology (ICAICT), pages 291–296. IEEE, 2020.
8. Milon Biswas, Md Mahi, Julkar Nayeen, Rakib Hossen, Uzzal Kumar Acharjee, and Whaiduzzaman Md. Buvots: A blockchain based unmanipulated voting scheme. Rakib and Acharjee, Uzzal Kumar and Md, Whaiduzzaman, BUVOTS: A Blockchain Based Unmanipulated Voting Scheme (November 23, 2020), 2020.
9. Shahed Ahamed, Moontaha Siddika, Saiful Islam, SadiaSaima Anika, Anika Anjum, and Milon Biswas. Bps: Blockchain based decentralized secure and versatile light payment system. Asian Journal of Research in Computer Science, pages 12–20, 2025
10. Jiin– Chiou Cheng and Narn – Yih Lee. Blockchain and Smart Contract for Digital certificate 21, 2017.
11. S. Hema Kumar, J. UdayKiran, V.D.AKumar, G.Saranya, Ramalakshmi V. Effective Online Medical Appointment System. International Journal of Scientific & Technology Research, Volume 8, Issue 09, September 2019, Pages 803 – 805.
12. V. D. Ambeth Kumar, Dr. M. Ramakrishnan, V. D. Ashok Kumar and Dr. S. Malathi (2015). Performance Improvement using an Automation System for Recognition of Multiple Parametric Features based on Human Footprint for the International Journal of kuwait journal of science & engineering, Vol 42, No 1 (2015), pp:109-132.
13. Kyoung-Jin Kim, Seng-Phil Hong, "Design and Implementation of System for Reliable Application using Blockchain A Case Study in P2P Crowdfunding", December 2017, 10.14257/ ijgdc.2017.10 .12.08.
14. Vijaya Kittu Manda, Satya Yamijala, "Peer-to-Peer Lending using Blockchain", March 2019.
15. Mudit Kumar, oodles blockchain, https://blockchain.oodles.io/blog/p2p-lending-platform-blockchain, Oct 8,2020
16. Vikas Hassija, Vinay Chamola," BitFund: A Blockchain-based Crowd Funding Platform for Future Smart and Connected Nation",May 2020, 10.1016/j.scs.2020.102145
17. Thulya Palihapitiya, Blockchain in Banking Industry, October 2020.
18. Stephen Grider, Ethereum and Solidity: The Complete Developer's Guide.
19. Omkar S Hiremath, "Ethereum Smart Contract – How to execute a Smart

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