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Blockchain-Based KYC Model for Credit Allocation in Banking

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Abstract
The implementation of the Know Your Customer (KYC) strategy by banks within the financial sector enhances the operational efficiency of such establishments. The data gathered from the client during the KYC procedure may be applied to deter possible fraudulent activities, money laundering, and other criminal undertakings. The majority of financial institutions implement their own KYC procedures. Furthermore, a centralized system permits collaboration and operation execution by multiple financial institutions. Aside from these two scenarios, KYC processes can also be executed via a blockchain-based system. The blockchain's decentralized network would be highly transparent, facilitating the validation and verification of customer data in real-time for all relevant stakeholders. In addition, the immutability and cryptography of the blockchain ensure that client information is secure and immutable, thereby eradicating the risk of data breaches. Blockchain-based KYC can further improve the client experience by eliminating the requirement for redundant paperwork and document submissions. After banks grant consumers loans, a blockchain-based KYC system is proposed in this study to collect limit, risk, and collateral information from them. The approach built upon Ethereum grants financial institutions the ability to read and write financial data on the blockchain network. This KYC method establishes a transparent, dynamic, and expeditious framework among financial institutions. In addition, solutions are discussed for the Sybil attack, one of the most severe problems in such networks.
Index: KYC, Blockchain, Bank, Credit

Introduction

The Blockchain-Based KYC Model for Credit Allocation in Banking is to explore how blockchain technology can be utilized to enhance the efficiency, transparency, and security of the Know Your Customer (KYC) process in the banking sector, particularly in relation to credit allocation. Traditional KYC processes are often time-consuming, costly, and fragmented across financial institutions, leading to duplication of efforts and delays in credit approval. By leveraging the decentralized and tamper-proof nature of blockchain, banks can securely share verified customer data, ensuring faster and more reliable identity verification. This streamlined approach not only reduces operational costs but also enables more accurate assessment of a customer's creditworthiness. Furthermore, blockchain provides greater data privacy and control to customers, as access to personal information can be managed through consent-based mechanisms. Ultimately, this model aims to build a more secure, transparent, and efficient system for credit allocation, while ensuring compliance with regulatory standards.

KYC is typically a process carried out individually by banks. It is also possible for banks to share information and conduct the transaction centrally. Apart from this, a KYC procedure can be carried out using blockchain. The use of blockchain technology in the KYC process benefits consumer risk management by making it faster, more transparent, and decentralized. Following the use of a loan, a bank customer is obliged to make periodical loan payments to the bank. In the process, banks should measure their risks by sharing information with other banks on limits, risks and collateral. Banks can more quickly determine the risks related to their customers if they have this information. Conventional credit assessment relies on centralized credit bureaus. These entities gather customer

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financial information from banks and subsequently monetize it by selling it back to financial institutions. However, this approach raises concerns regarding data ownership and security, as credit bureaus possess the ability to manipulate the information. Furthermore, the data retrieval process is often delayed, as it typically occurs on an end-of-day basis. In contrast, a blockchain-based model fosters a decentralized environment where all participating banks hold identical copies of customer financial data. This shared ledger enables immediate data access for authorized institutions, eliminating the need for a centralized intermediary and associated fees. Decentralized blockchain technology has the potential to significantly enhance the overall efficiency of KYC processes. This can be achieved through several mechanisms: improved processing speed, minimized onboarding time for customers, reduced risk of fraud and money laundering, and a decrease in total costs incurred by financial institutions. In this study, the method of sharing the limit, risk and collateral information of bank customers using credit between banks using blockchain is explained. Using the Ethereum [6] network, a blockchainbased system was established with the help of a smart contract in the Solidity language. After a bank provides a loan to its customer, it enters the customer's limit, risk and collateral information into the system. At the same time, if that customer has used a loan from another bank, the bank also accesses the limit, risk and collateral information entered by that bank. Since this study is designed on a private blockchain network, it does not pose a problem with the Sybil attack.

Existing System

George et al. [8] recommends the use of a decentralized platform that eliminates the need for a central authority or intermediary and enables many organizations to securely and transparently communicate and assess KYC information. In order to accomplish this, the paper also outlines the development and deployment of a prototype application that makes use of smart contracts and encryption methods. According to the study, the suggested method can raise regulatory compliance, lower operating expenses, and improve customer experience.

The study by Roman [9] mentions problems with the data when calculating the credit score. One of the main problems is limited data sharing due to lack of trust between individuals and third parties. This results in insufficient data and inaccurately calculated results in credit scoring. To solve this problem, they introduced the ''Trusted Data Marketplace'' in their work. This system, which can be integrated with blockchain, contributes to credit scoring.

In his study, Karayılan [10] examined the blockchain infrastructure and studied the use of blockchain infrastructure for KYC solutions and the use of blockchain in financial applications.Within the scope of the project, two models were created and compared to create the information sharing network. In the first model, smart contracts are developed and data sharing and storage is provided on the blockchain. In the second model, the data is kept in an external database and keyed in the blockchain. Another study in the financial field is on blockchain, real-time accounting and credit risk modelling.

In his work, Byström [11] studied how blockchain will affect the way credit risk modeling is done and how trust and time can be improved with real-time accounting on blockchain. In the study, the feature that records in the blockchain can never be changed is emphasized. Blockchain, a reliable and constantly updated structure, has been applied to store the accounting records of a company using blockchain. Financial data is prepared at regular intervals and added to the company's ledger. An auditor expresses an opinion on the accuracy of the statements. When using this information, investors and credit risk managers must trust that the auditor provides accurate information and accurately records the firm's financial data in the ledger. In this process, the concept of trust is extremely important, from the preparation of financial statements to the approval of the auditor.To ensure this trust, Byström has worked to make blockchain a solution. In his study, the company voluntarily writes its financial data to the blockchain, which will immutably and timestamp the data. In this way, the entire financial data ledger created is visible and will prove the consistency of this data.

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A blockchain-based credit analysis infrastructure for credit risk management is proposed by Chakraborty [12] By using blockchain technology, the efficiency of financial systems is aimed by ensuring that lenders and debtors make transactions in a safe and transparent manner. The study used machine learning algorithms to determine credit scores of lenders and borrowers. It has been observed that the proposed infrastructure provides more accurate and faster results than traditional methods. A blockchain-based loan recommendation system for financial institutions, called KiRTi, is presented by Patel [13].

Wang et al. [15] present a systematic and comprehensive overview of self-executing contracts, also known as ‘‘smart contracts,’’ deployed on blockchain platforms like Ethereum and Hyperledger, are attracting increasing attention across diverse sectors, particularly within the financial domain. This appeal stems from their inherent ability to automate and enforce contractual stipulations without the need for centralized authorities. However, the widespread adoption of smart contracts is contingent upon addressing significant challenges, including those pertaining to security vulnerabilities and data privacy considerations. In this study, Rohitchandran et al. [16] proposes a system that offers a secure platform for storing and managing bank records. Smart contracts, self-executing code embedded within the blockchain, can govern data storage and access permissions. Additionally, robust cryptographic algorithms employed by blockchain ensure the confidentiality of sensitive financial information. Ali et al. [17] investigates the potential of green cryptocurrencies as a novel asset class for portfolio diversification, particularly within the context of environmental sustainability and adherence to UN SDGs. A four-step selection process is introduced to identify cryptocurrencies with lower environmental footprints.

Disadvantages

In an existing system, the system implemented Blockchain technology offers the financial sector a compelling solution for KYC validations. This approach enables selective data sharing while upholding tamper-proof data integrity.

Proposed System

In this paper, the application of blockchain technology presents a compelling opportunity for the secure and transparent storage and exchange of credit allocation data within the financial sector. This distributed ledger system fosters trust and transparency amongst all stakeholders involved in the credit allocation process, including banks, borrowers, and other relevant parties. Furthermore, blockchain technology can significantly enhance the efficiency of credit allocation procedures. By leveraging this technology for credit allocation data, banks can streamline the verification and validation of borrower information, resulting in a reduction in both the time and costs associated with traditional, manual processes.

Advantages

KYC process is very important in banking. There are potential security vulnerabilities in KYC processes traditionally carried out in banking. Additionally, it is not efficient for each bank to carry out the KYC process separately.

The Blockchain-based KYC model both speeds up the processes and offers a decentralized, secure environment. In addition, blockchain-based KYC processes allow banks to quickly make risk assessments. In this way, instant interbank data sharing occurs instead of end-of-day transactions.

Results

Within the scope of the study, both traditional and blockchain-based KYC models were examined. While Blockchain-based KYC is superior in terms of features such as technology and security, traditional method is stronger in terms of regulation. A comparison table based on the study results can be seen in Table 2. In addition to the Table 2, the transaction processing time for a single KYC request to be verified and recorded on the blockchain is faster than the traditional KYC process. Because in the traditional KYC process, each transaction is carried out separately by banks, while in

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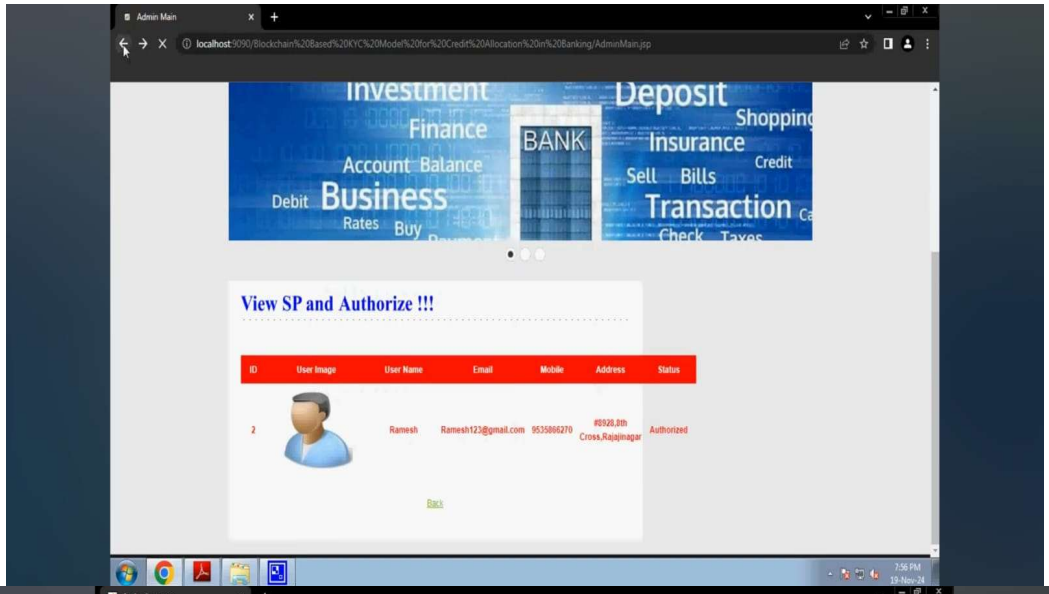
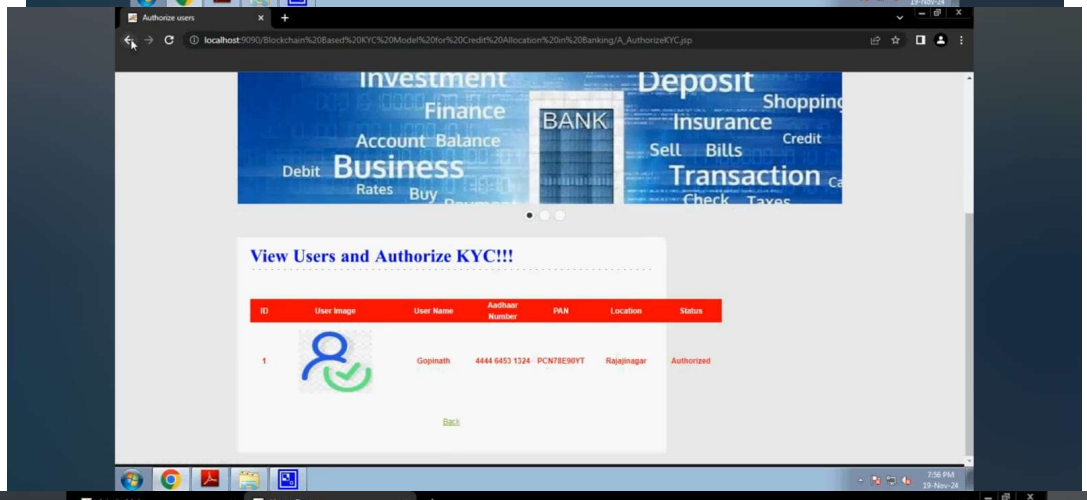
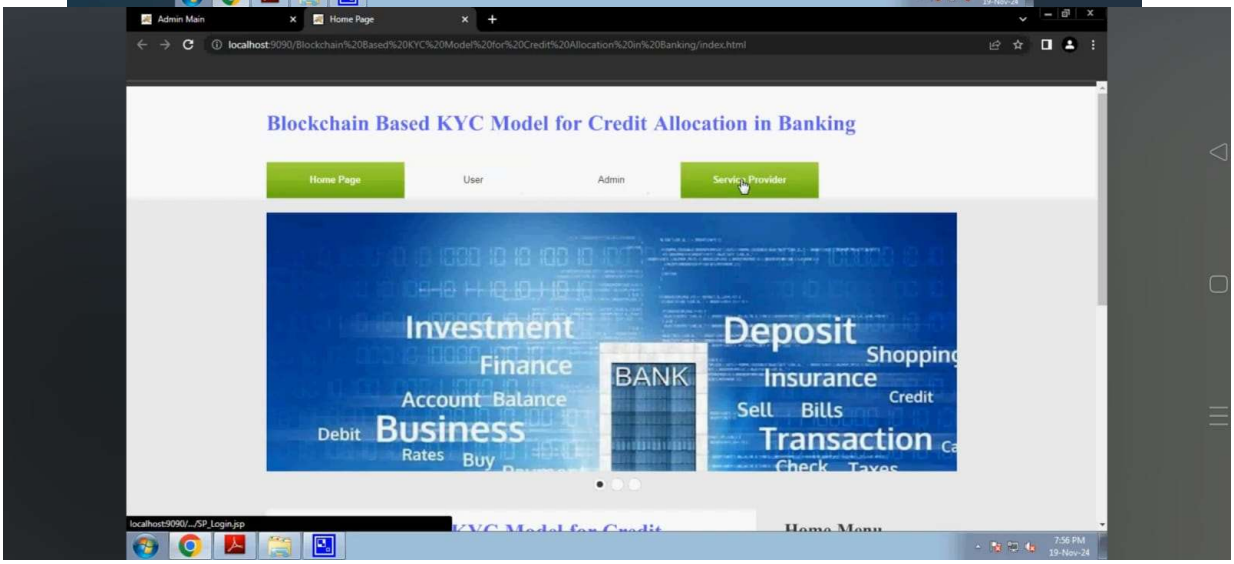
the blockchain-based KYC process, it is sufficient to do it only once on the blockchain network. In addition, PoS consensus mechanism discourages Sybil attacks by requiring participants to stake a certain amount of cryptocurrency, making it expensive to create and maintain a large number of fake identities.







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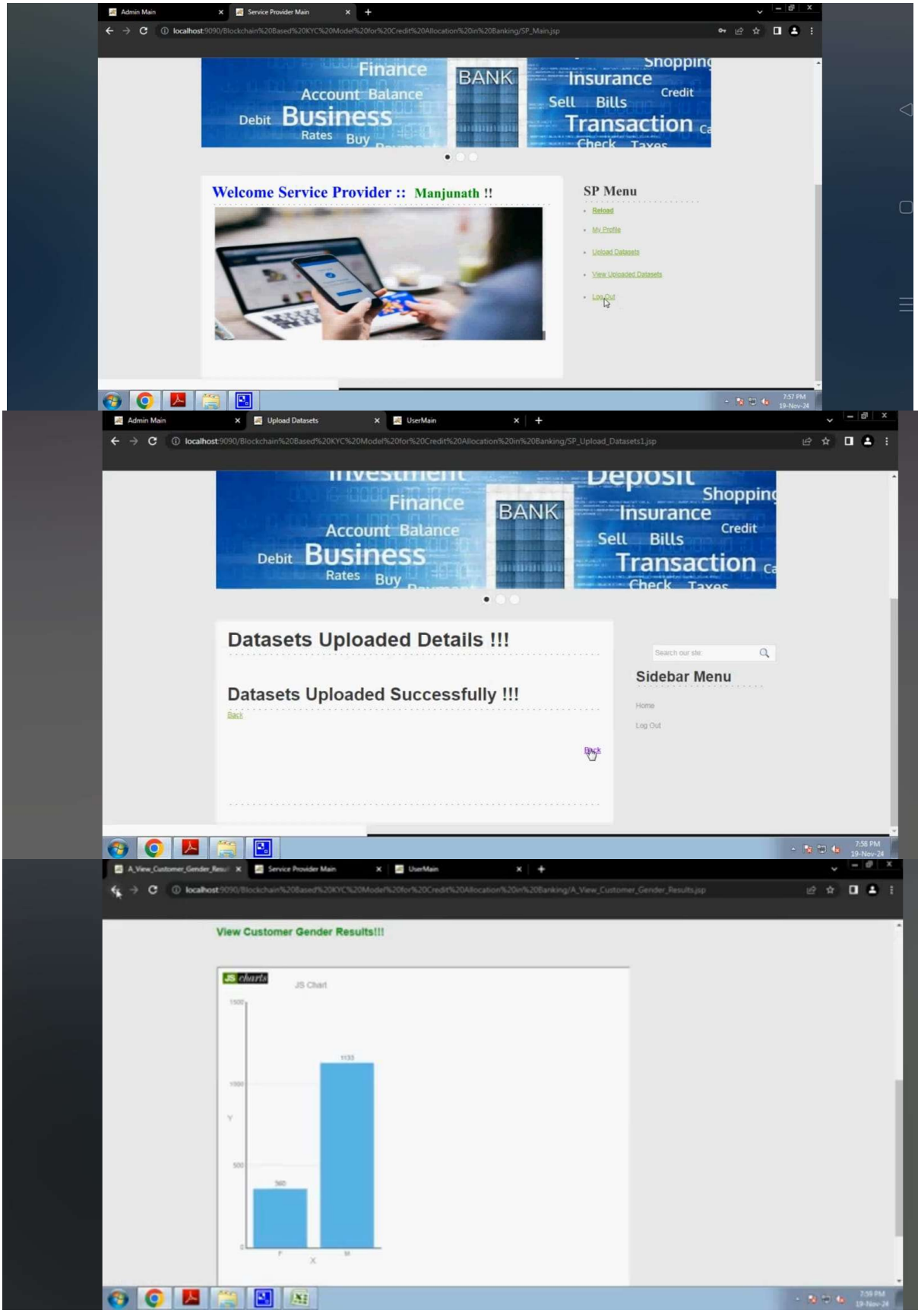

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Conclusion

This study, based on the Blockchain-based KYC model, demonstrates the sharing of loan allocation data of bank customers who have been allocated loans. Interbank data sharing is possible with a smart contract written in solidity language on the Ethereum network. The deployment of the prepared smart contract to the Ethereum network and then how to write and read data over this network are mentioned. In addition, it provides a safe environment against Sybil attacks thanks to its construction on a private blockchain network and PoS consensus method. The blockchain-based KYC model was designed considering the private Ethereum network and PoS consensus mechanism. In this way, blockchain technology offers a transformative solution to the shortcomings of traditional KYC in banking. A shared, immutable ledger streamlines onboarding, bolsters data security, and enables real-time risk assessment. Regulatory hurdles persist, but the potential for enhanced efficiency, collaboration, and risk management within a secure and transparent framework is undeniable. As blockchain matures and regulations evolve, it has the potential to revolutionize KYC, ushering in a new era for secure and efficient customer identification in banking.

The exponential growth of global data necessitates secure storage and efficient sharing among stakeholders. Blockchain technology emerges as a frontrunner in this domain, facilitating secure and transparent data exchange. This attribute is likely to drive increased adoption within the financial sector in the coming years. However, regulatory and compliance hurdles persist. Overcoming these challenges will unlock a multitude of use cases for financial institutions. One such scenario involves leveraging non-fungible tokens (NFTs) to store Letters of Guarantee (LoGs), a prevalent tool in banking. By tokenizing LoGs with NFTs, the technology inherently prevents duplication and counterfeiting, enabling banks to manage associated risks more effectively. The integration of NFTs within the financial ecosystem holds significant promise for fostering enhanced security, efficiency, and collaboration.

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