e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:05/May-2025 Impact Factor- 8.187 www.irjmets.com

LEVERAGING ETHEREUM BLOCKCHAIN FOR ENHANCED CUSTOMER VERIFICATION IN BANKING

Ms. Shaik Pujitha*1, Bishal Danuwar*2, Abhishek Bishal*3, Roshan Kumar Sah*4

*1Assistant Professor, Department Of Computer Science & Engineering, Guru Nanak Institute Of Technology, Ibrahimpatnam, RR District, Telangana, India.

*2,3,4Student, Department Of Computer Science & Engineering, Guru Nanak Institute Of Technology, Ibrahimpatnam, RR District, Telangana, India.

DOI: https://www.doi.org/10.56726/IRJMETS76214

ABSTRACT

The Know Your Customer (KYC) process is a crucial requirement for financial institutions to meet regulatory standards, ensuring the authenticity and security of customer identification. Blockchain technology presents a transformative solution to enhance the KYC process by providing transparency, security, and immutability. By leveraging decentralized platforms like Ethereum, blockchain enables more efficient and cost-effective management of customer data, significantly reducing the time and resources required for compliance. This paper proposes a blockchain-based approach to address the challenges faced by banks during KYC implementation and customer onboarding. Additionally, it introduces a system where KYC identification is required for customers making heavy transactions exceeding a predefined limit, ensuring that large transfers are closely monitored and verified. The proposed framework involves a central regulatory body overseeing a comprehensive register of financial institutions, enforcing strict adherence to KYC regulations. This solution not only strengthens security, reduces fraud, and ensures compliance but also provides a streamlined, efficient process for handling both routine and large-scale transactions securely.

Keywords: KYC, Blockchain, Ethereum, Authenticity, Identification, Security, Fraud, Transactions, Banks.

I. INTRODUCTION

The central banks and other governmental financial institutions face significant challenges in effectively tracking money laundering activities, particularly those that are linked to terrorism and other criminal activities. Money laundering (ML) has become a global issue, and it is estimated that approximately $2 trillion is laundered each year. The failure to tackle this issue poses a serious threat to national security. It can harm the economy and undermine the financial system's integrity. The methods used by money launderers have become increasingly sophisticated, making it difficult for regulators and financial institutions to detect them. Criminals often use complex financial structures and multiple transactions to conceal their activities. Moreover, money laundering is often linked to other criminal activities, such as drug trafficking, human trafficking, and corruption. Given the complexities involved in detecting and preventing money laundering, it is imperative that regulators and financial institutions collaborate closely to implement effective measures to combat this issue. Such measures may include increased transparency and reporting requirements, enhanced due diligence procedures, and improved information sharing. Financial institutions must also ensure that their staff are adequately trained to identify and report suspicious activity. Failure to tackle the issue of money laundering could result in significant reputational and financial damage to businesses and countries alike. Hence, it is vital that all stakeholders work together to combat this global menace and safeguard the integrity of the global financial system. The International Monetary Fund (IMF) recommends allocating resources in a targeted manner to prevent money laundering and terrorist financing effectively. To achieve this, focusing on areas where resources will be most impactful is essential. Figure 1 provides a visual representation of such areas. By prioritizing these areas, organizations can ensure that their resources are used effectively and efficiently to combat financial crimes. This necessitates a thorough analysis and understanding of the risks associated with ML and terrorist financing (TF) in the country. This analysis should consider a wide range of factors, such as the types of financial services and products available, the vulnerabilities of different sectors and industries to ML/TF, and the prevalence of different ML/TF methods and techniques. Armed with this information, authorities can devise and implement targeted measures to address these risks, such as enhanced due diligence

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:05/May-2025 Impact Factor- 8.187 www.irjmets.com

requirements, increased monitoring and reporting obligations, and stricter enforcement measures. A risk-based approach focusing on the most significant threats is crucial for effective ML/TF prevention. To safeguard the financial system's integrity and prevent its exploitation for illicit purposes, countries must also stay ahead of the evolving tactics and techniques of those who engage in ML/TF. This requires ongoing analysis and adjustment of strategies to address new threats. Additionally, inappropriate land-based funds (LBF) and low net monthly income (NMI) can also lead to rejection. Another common reason for rejection is inadequate credit history. Banks may also decline financing proposals if the business has weak cash flow or profitability, suggesting it may struggle to meet its financial obligations. A risky business model or a subpar business plan can also contribute to a proposal being rejected. In addition to these factors, banks may also consider external elements such as economic conditions or industry trends before approving or rejecting financing proposals. For instance, if the economy is experiencing a downturn, banks may be more cautious about extending credit to businesses. Similarly, they may be less likely to approve financing for businesses operating in sectors that are experiencing a decline. However, businesses can take several measures to improve their chances of securing financing from banks. By building a strong credit history, businesses can demonstrate their financial stability and credibility to banks. Optimizing cash flow and developing a sound business plan can also help businesses present themselves as viable and attractive candidates for financing. Furthermore, businesses must stay informed about economic conditions and industry trends, allowing them to tailor their financing proposals to align with market realities. By addressing these factors proactively, businesses can overcome obstacles, increase their chances of securing bank financing, and ultimately achieve their financial objectives.

II. LITERATURE SURVEY

[1] **TITLE:** "Blockchain-based KYC model for credit allocation in banking."

AUTHOR: B. Karadag, A. Halim Zaim, and A. Akbulut.

YEAR: 2024

DESCRIPTION: 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.

[2] **TITLE:** "Recalibrating the banking sector with blockchain technology for effective anti-money laundering compliances by banks."

AUTHOR: A. Thommandru and D. B. Chakka.

YEAR: 2023

DESCRIPTION: The banking sector is identified as the main means for laundering illicit money, these banks generally have access to both banking mechanism and legal authority to make decisions. Money launderers and those financing terrorism are conveniently accessing financial institutions and its mechanism. These institutions provide all financial funds transfers both domestic and international range. Anti-money laundering (AML) laws and other data protection laws that keep getting stricter have forced many financial institutions to put in place long, expensive processes to stay in compliance. To bridge the gap, emerging technology can help in mitigating money laundering and other financial crimes. Blockchain is considered one of the world's best-

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:05/May-2025 Impact Factor- 8.187 www.irjmets.com

known examples of Distributed Ledger Technology. In the financial sector, this type of technology has been hailed as the key to future success. Emerging technology can be used in many ways in Financial Services. It can change many processes, payments between peer-to-peer, trade agreements and tracking of supply chains. Emerging technology can be used in many ways in financial services and can change many processes, peer-to-peer payments, trade agreements, and the tracking of supply chains. These use cases depend on the participants or users being identified and verified. "Know Your Customer" is the term for this (KYC). Before making a transaction, one of the most basic ways to build trust between the people involved is to check out the user.

[3] **TITLE:** "A decentralized KYC based approach for microfinance using blockchain technology."

AUTHOR: D. S. Sai, R. Nikhil, S. Prasad, and N. S. Naik,

YEAR: 2023

DESCRIPTION: Financial inclusion is seen as a dynamic tool for achieving multifaceted microeconomic stability, (and) sustainable economic growth, job creation, poverty reduction, and income equality for both developed and developing nations. The needy segments of the population must be provided with financial services to accomplish this inclusion. Still, the traditional financial market is unavailable due to its lack of collateral and shallow income. Thus, they go to local moneylenders, also known as "loan sharks," who charge exorbitant interest rates. Introduction to microfinance came as a new and refreshing light to these needy segments of the population as it provides small valued loans (micro-credit) to support their micro-scale businesses and engage in productive activities. As emerging technology started to be incorporated into every aspect of society, thus microfinance also needed to be incorporated into the technology. An application is required to protect data integrity and smoothly influence the microfinance sector. As the databases are vulnerable to data manipulation, this can affect the transaction history of the loan. Blockchain technology can be used to solve this problem, as data in the Blockchain is stored immutably. So, we designed a microfinance application that uses blockchain technology with decentralised KYC architecture to reduce multiple KYC verification and easy access to micro-credit.

III. SYSTEM ARCHITECTURE

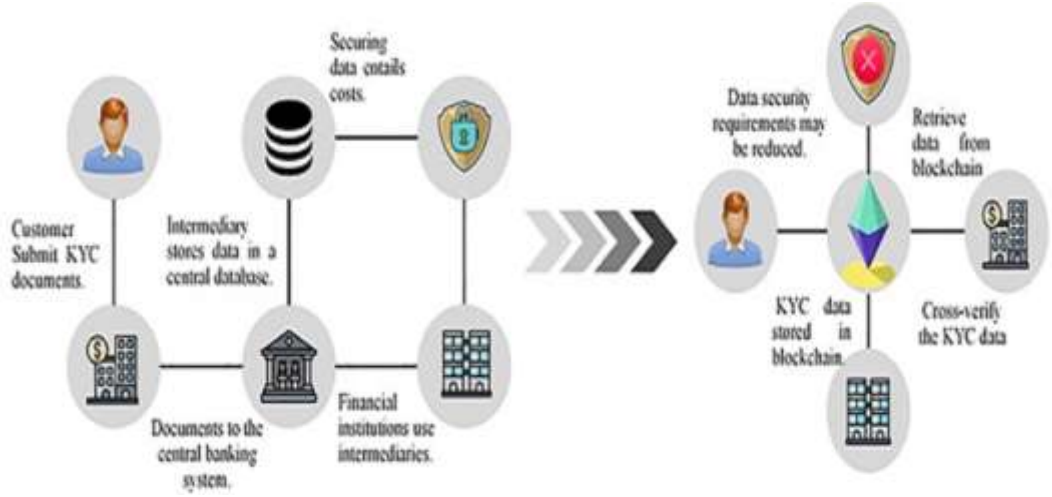


Fig 1: SYSTEM ARCHITECTURE

3.1 Methodologies

3.1.1 Module Overview

The system is organized into key modules, each designed to handle distinct aspect of Leveraging Ethereum Blockchain for Enhanced Customer Verification in Banking. The modules are as follows:

- User Interface Design
- Admin
- Bank
- Customer
- Transaction

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:05/May-2025 Impact Factor- 8.187 www.irjmets.com

- KYC

3.1.2 Module Descriptions

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 exits 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. Admin

This is the third module in our project is Admin. Here admin will login with his password and Id who has created by the BC operator. After admin login directly will navigate into admin home page. The purpose of an administrator is to oversee and manage the operations and functionality of an organization, system, or project. Administrators are responsible for coordinating tasks, enforcing policies, and ensuring that processes run smoothly and efficiently.

3. Bank

Banks play a vital role in the financial system by providing essential services that facilitate economic activity and personal financial management. They offer a secure place for individuals and businesses to deposit and manage their money, ensuring the safekeeping of funds against theft or loss.

4. Customer

This is the fourth module in our project is Customer. Customers must provide accurate, complete, and up-to-date personal information, address, as requested by the bank. They are also required to submit the necessary documentation promptly and update their details if there are any changes, such as a new address or a name change. Customer bank transactions encompass a range of financial activities performed by account holders through their banking institution. These transactions include deposits, where customers add funds to their accounts; withdrawals, where they remove money; transfers, where they move funds between accounts or to other individuals or institutions. Each transaction is recorded and monitored by the bank to ensure accuracy and to maintain a comprehensive account history.

5. Transaction

This is the Fifth module in our project is Transactions. Credit and deposit transactions are fundamental activities in banking where customers interact with their accounts. A credit occurs when funds are added to a customer's account, such as through a pay check deposit, loan disbursement, or a transfer from another account. Deposits, on the other hand, involve customers placing money into their accounts, which can be done through various methods including cash deposits, checks, or electronic transfers. Banks record these transactions meticulously to ensure account balances are accurately updated and to provide customers with a clear and detailed account of their financial activity.

6. KYC

Know Your Customer (KYC) is a crucial process employed by financial institutions to verify the identity of their clients and assess potential risks of illegal activities, such as money laundering or fraud. Through KYC procedures, banks and other financial entities collect and analyze personal information from customers, including identity documents, proof of address, and financial history.

3.4 Technique Used

1. Ethereum blockchain Technology

Ethereum is a blockchain based computing platform that enables developers to build and deploy decentralized applications—meaning not run by a centralized authority. You can create a decentralized application for which the participants of that particular application are the decision-making authority.

Ether (ETH) is Ethereum's crypto currency. It is the fuel that runs the network. It is used to pay for the computational resources and the transaction fees for any transaction executed on the Ethereum network. Like Bitcoins, ether is a peer-to-peer currency. Apart from being used to pay for transactions, ether is also used to buy gas, which is used to pay for the computation of any transaction made on the Ethereum network.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:05/May-2025 Impact Factor- 8.187 www.irjmets.com

2. Smart Contracts

Smart Contracts are revolutionizing how traditional contracts work, which is why you need to use the tutorial to become more familiar with them. A smart contract is a simple computer program that facilitates the exchange of any asset between two parties. It could be money, shares, property, or any other digital asset that you want to exchange. Anyone on the Ethereum network can create these contracts. The contract consists primarily of the terms and conditions mutually agreed on between the parties (peers).

4.2 Design and Workflow Modeling

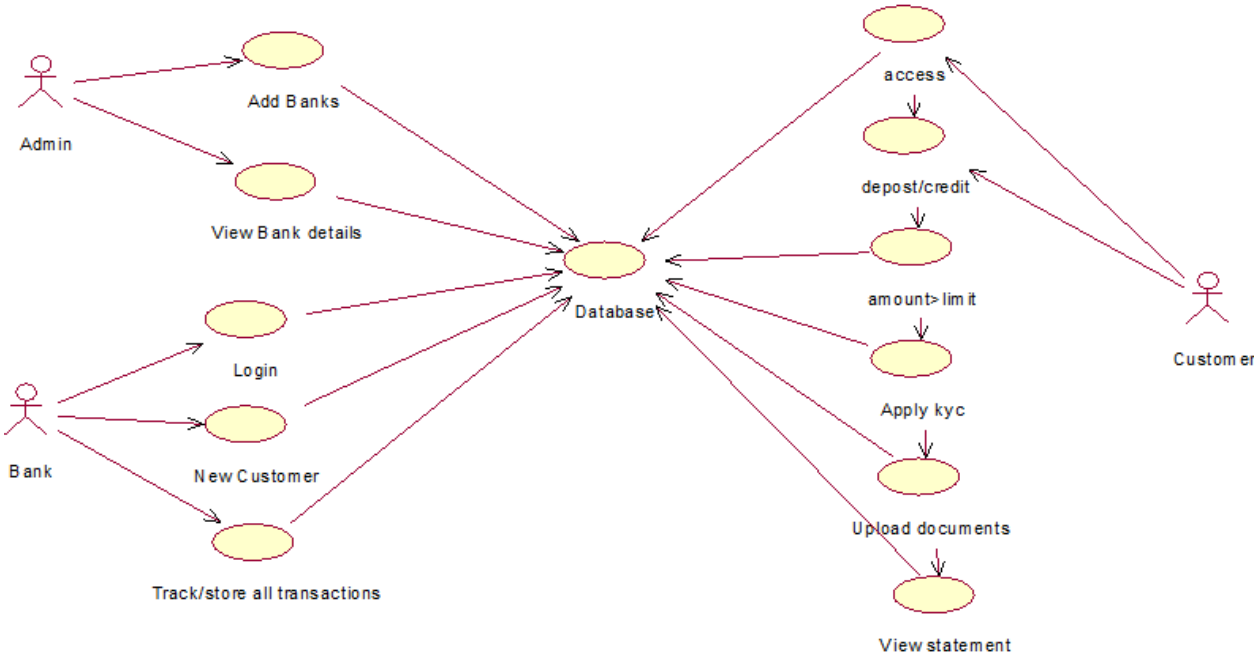


Fig 2: USE CASE DIAGRAM

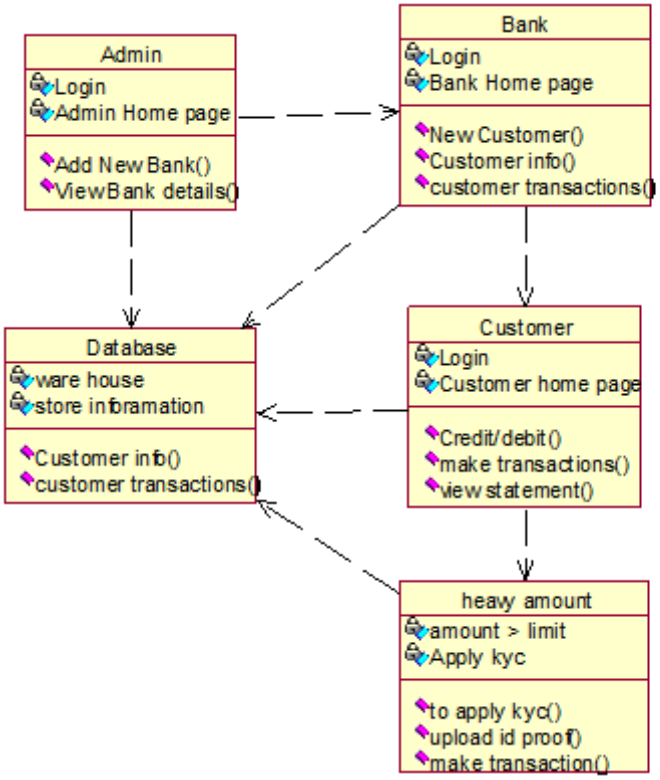


Fig 3: CLASS DIAGRAM

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:05/May-2025 Impact Factor- 8.187 www.irjmets.com

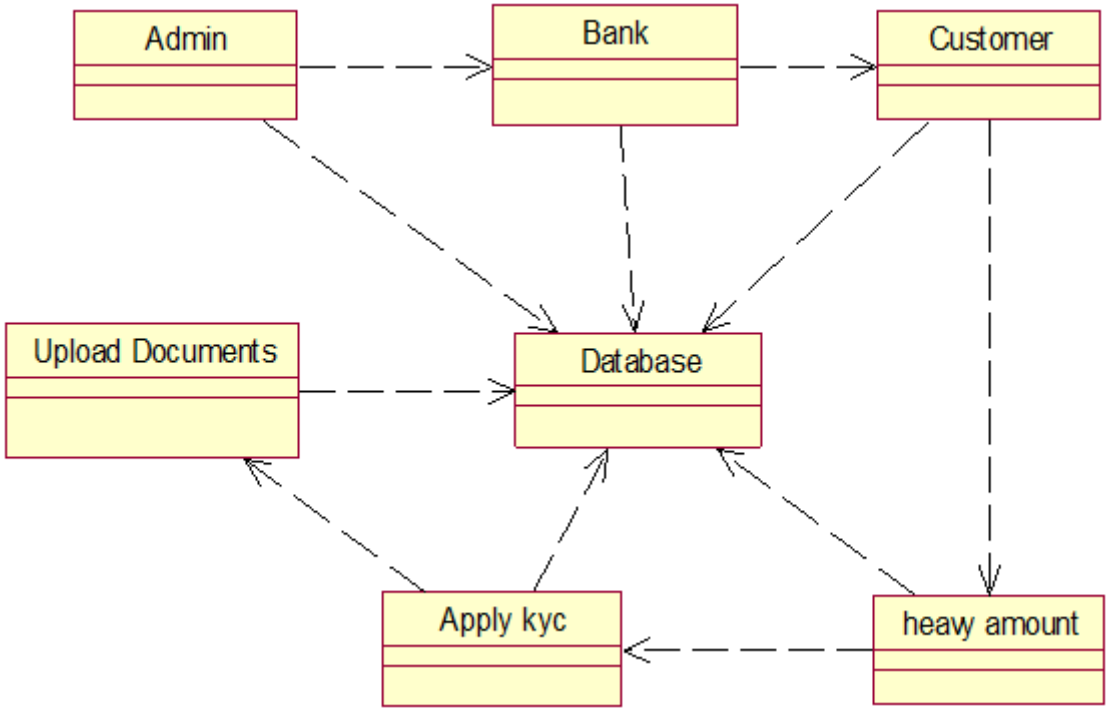


Fig 4: OBJECT DIAGRAM

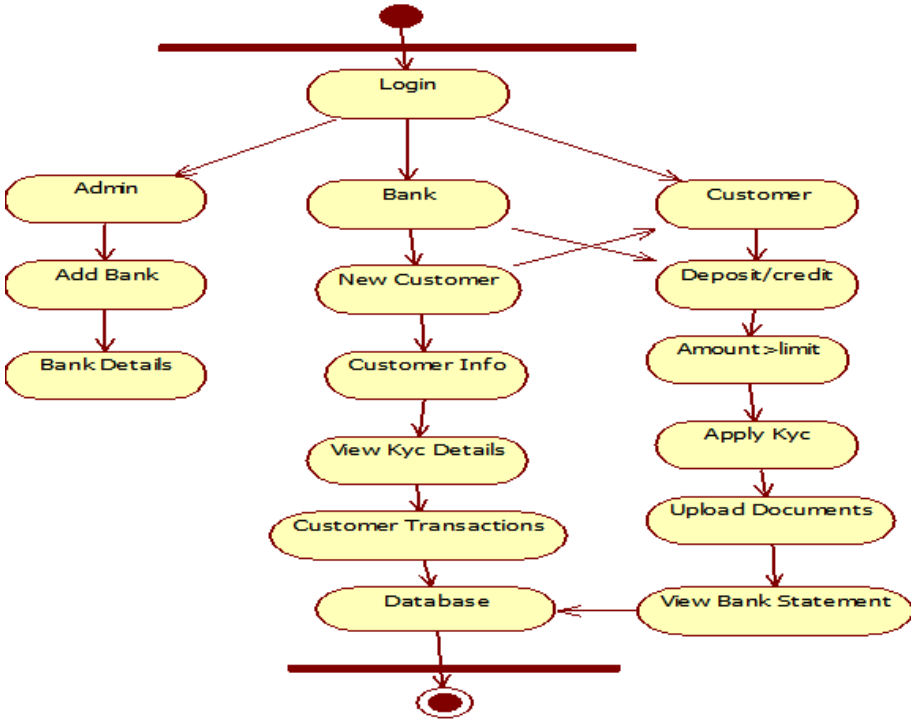


Fig 5: ACTIVITY DIAGRAM

Design Engineering deals with the various UML (Unified Modeling Language) diagrams for the implementation of project. Design is a meaningful engineering representation of a thing that is to be built. Software design is a process through which the requirements are translated into representation of the software.

In the USE CASE DIAGRAM, it shows what system functions are performed for which actor. Roles of the actors in the system can be depicted. The above diagram consists of user as actor. Traditional KYC is a process that necessitates a face-to-face interaction to verify a customer's identity. As part of this process, customers provide physical identification documents, such as ID cards or passports, to a financial institution for verification purposes.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:05/May-2025 Impact Factor- 8.187 www.irjmets.com

In CLASS DIAGRAM, it represents the structure of a system by showing its classes, attributes, methods (or operations), and the relationships between the classes. It's one of the most commonly used diagrams for modeling object-oriented systems. The primary objective of ‘‘Traditional KYC’’ is to ensure that the customer is who they claim to be and to prevent identity theft or fraud.

In OBJECT DIAGRAM, the flow of objects between the classes. It is a diagram that shows a complete or partial view of the structure of a modeled system. Additionally, there is a notable absence of universally accepted security standards within this process. During the process, the customer’s physical documents are thoroughly examined and evaluated to ensure that the information provided is accurate.

ACTIVITY DIAGRAM, are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. An activity diagram shows the overall flow of control.

IV. RESULTS AND DISCUSSSION

This project is implements like web application using COREJAVA and the server process is maintained using the SOCKET & SERVERSOCKET and the design part is played by cascading style sheet.

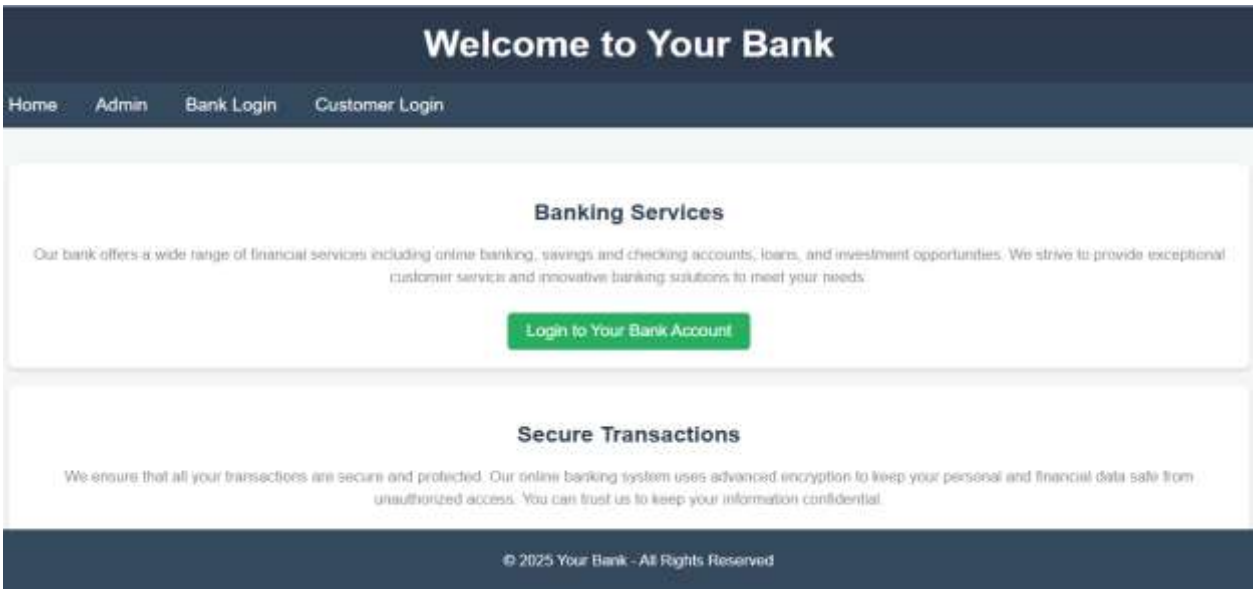


Fig 5: HOME PAGE OF AN ONLINE BANKING SYSTEM

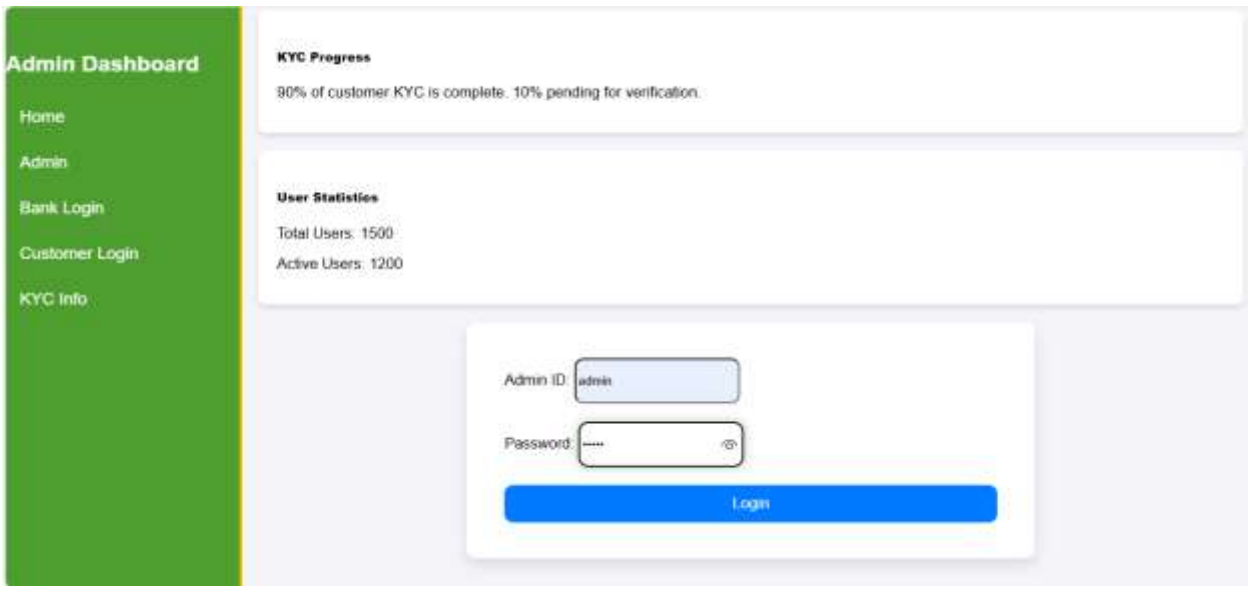


Fig 6: ADMIN DASHBOARD LOGIN INTERFACE

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:05/May-2025 Impact Factor- 8.187 www.irjmets.com

Fig 7: ADMIN HOME PAGE

Fig 8: BANK REGISTRATION PAGE

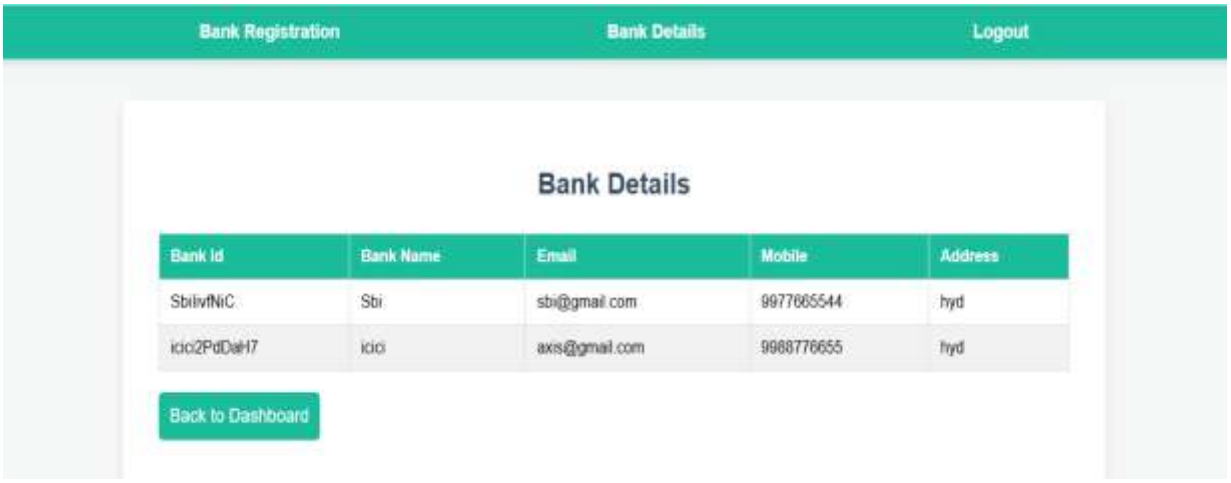


Fig 9: BANK DETAILS PAGE

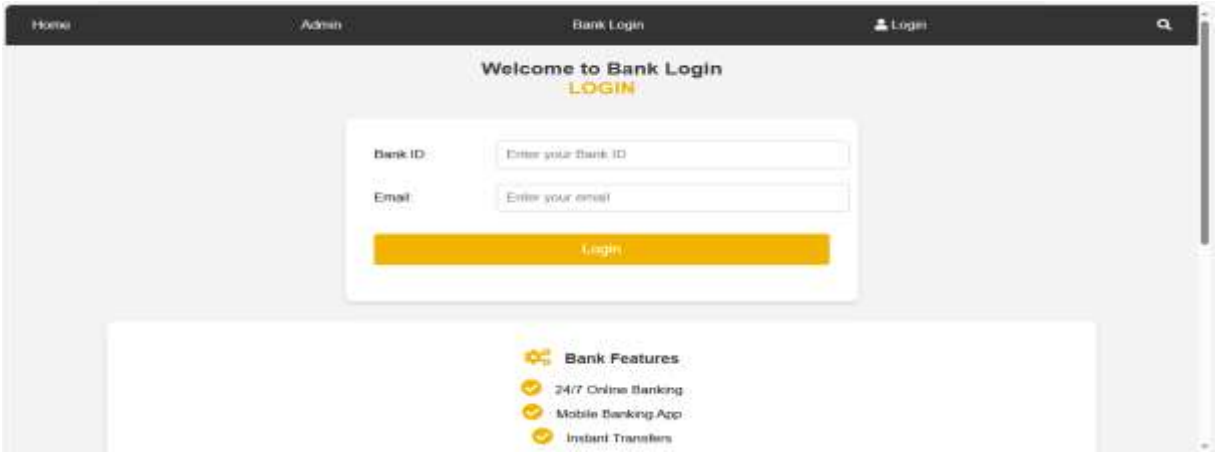


Fig 10: BANK LOGIN PAGE

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:05/May-2025 Impact Factor- 8.187 www.irjmets.com

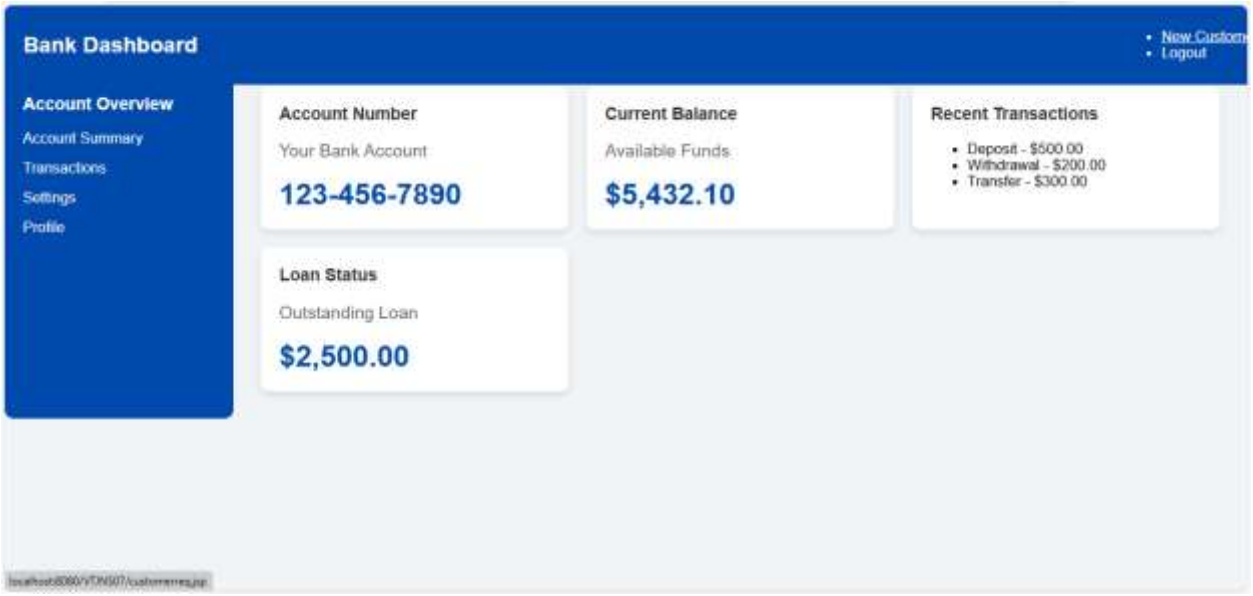


Fig 11: BANK HOME PAGE

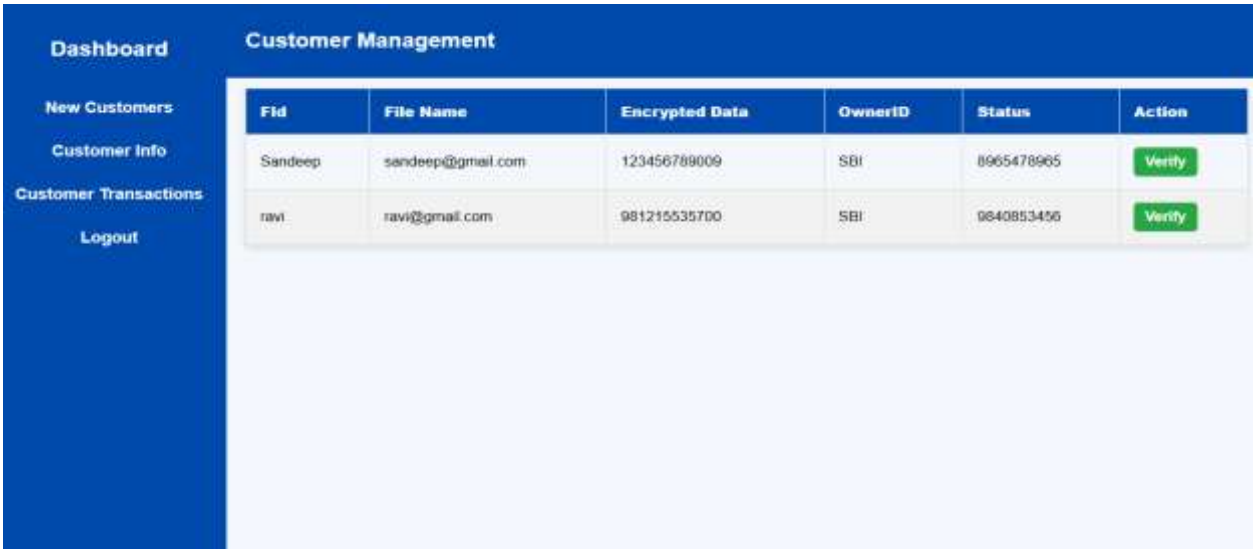


Fig 12: CUSTOMER MANAGEMENT PAGE

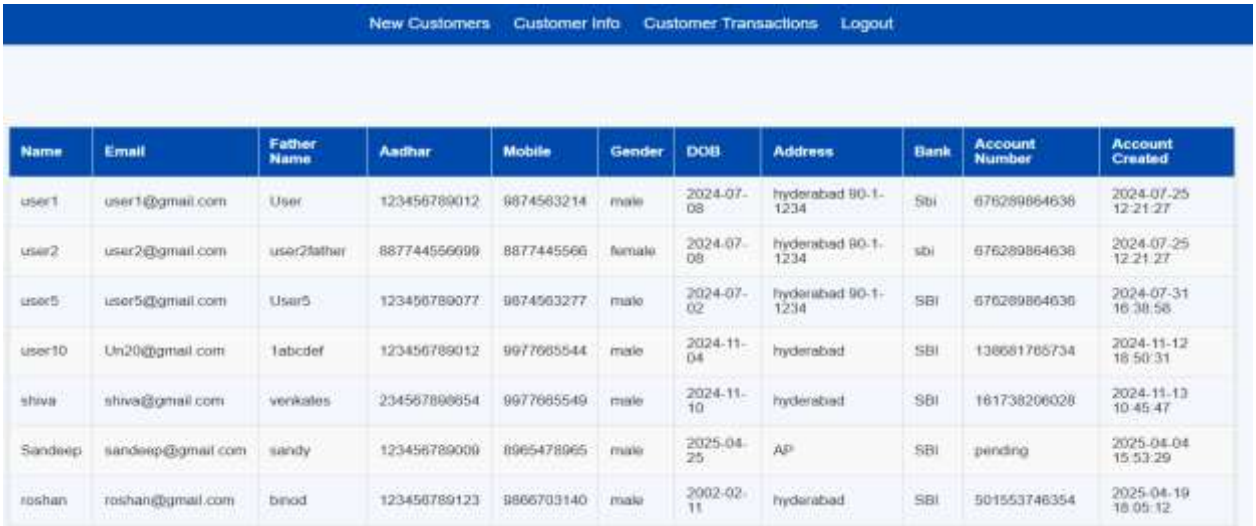
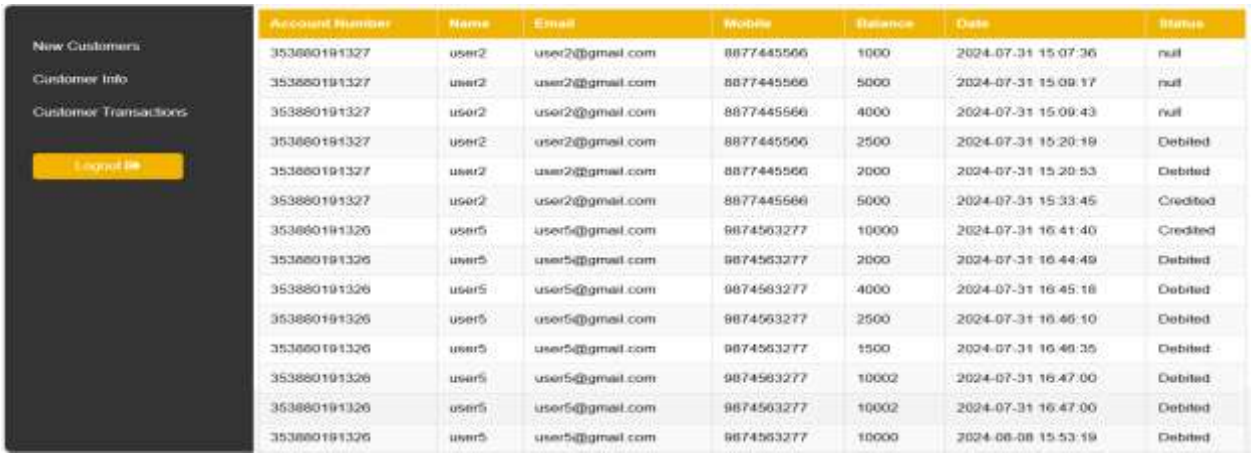


Fig 13: CUSTOMER DETAILS PAGE

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:05/May-2025 Impact Factor- 8.187 www.irjmets.com



Account Number	Name	Email	Mobile	Balance	Date	Status
353880191327	user2	user2@gmail.com	8877445566	1000	2024-07-31 15:07:36	null
353880191327	user2	user2@gmail.com	8877445566	5000	2024-07-31 15:09:17	null
353880191327	user2	user2@gmail.com	8877445566	4000	2024-07-31 15:09:43	null
353880191327	user2	user2@gmail.com	8877445566	2500	2024-07-31 15:20:19	Debited
353880191327	user2	user2@gmail.com	8877445566	2000	2024-07-31 15:20:53	Debited
353880191327	user2	user2@gmail.com	8877445566	5000	2024-07-31 15:33:45	Credited
353880191326	user5	user5@gmail.com	9874563277	10000	2024-07-31 16:41:40	Credited
353880191326	user5	user5@gmail.com	9874563277	2000	2024-07-31 16:44:49	Debited
353880191326	user5	user5@gmail.com	9874563277	4000	2024-07-31 16:45:18	Debited
353880191326	user5	user5@gmail.com	9874563277	2500	2024-07-31 16:46:10	Debited
353880191326	user5	user5@gmail.com	9874563277	1500	2024-07-31 16:46:35	Debited
353880191326	user5	user5@gmail.com	9874563277	10002	2024-07-31 16:47:00	Debited
353880191326	user5	user5@gmail.com	9874563277	10002	2024-07-31 16:47:00	Debited
353880191326	user5	user5@gmail.com	9874563277	10000	2024-08-08 15:53:19	Debited

Fig 14: CUSTOMER TRANSACTION DETAILS PAGE

Fig 15: CUSTOMER LOGIN PAGE

Fig 16: CUSTOMER AMOUNT TRANSFER PAGE

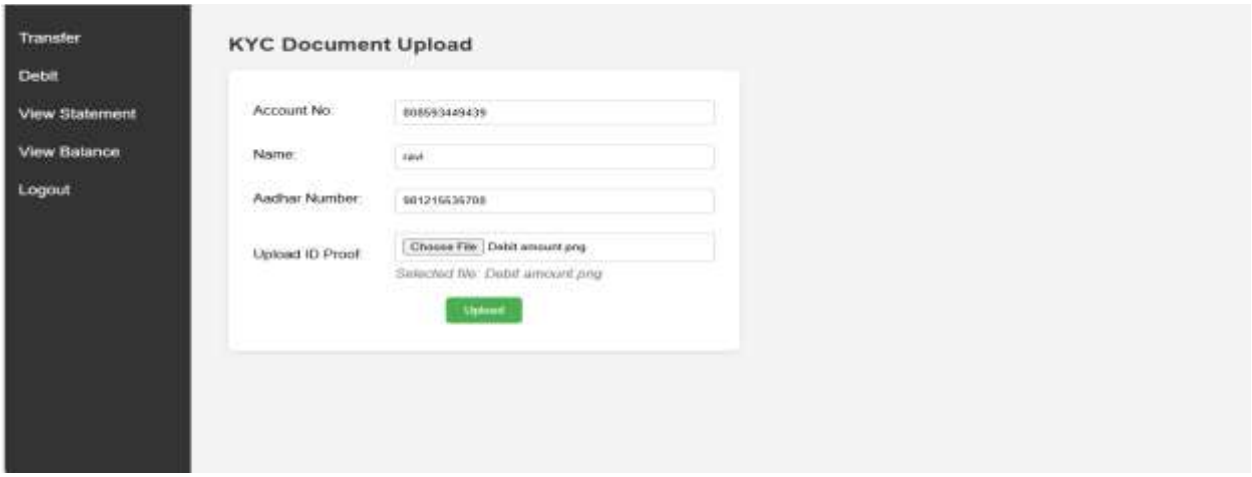


Fig 17: CUSTOMER KYC DOCUMENT UPLOAD PAGE

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:07/Issue:05/May-2025 Impact Factor- 8.187 www.irjmets.com

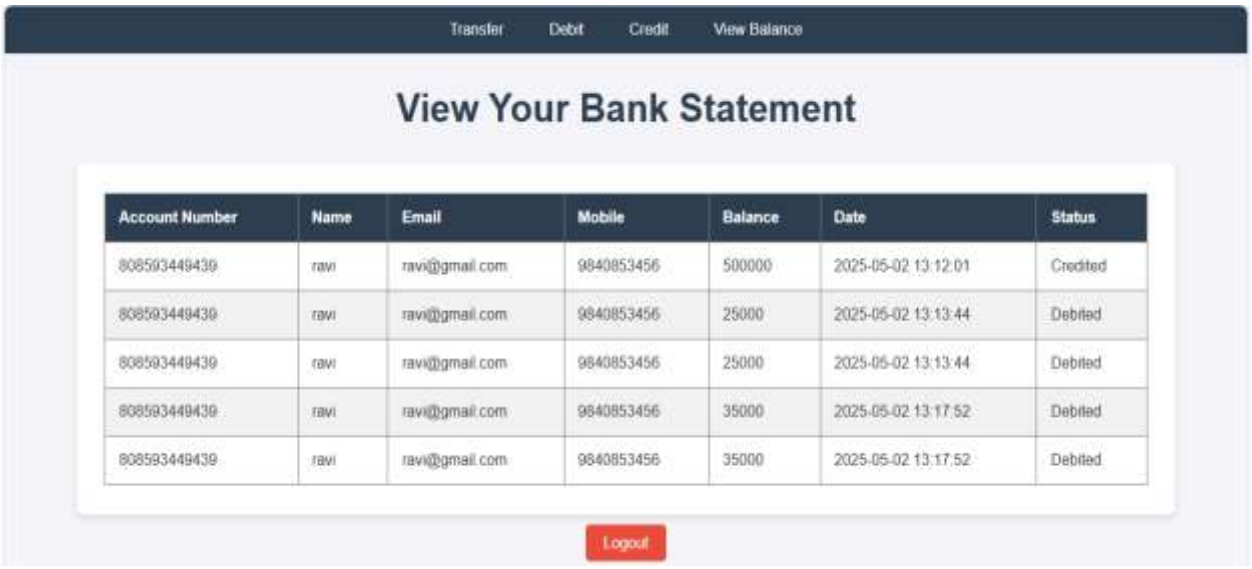


Fig 18: CUSTOMER BANK STATEMENT PAGE

V. CONCLUSION

In this paper, we have presented a revolutionary solution to the long-standing problem of KYC using blockchain technology. The proposed KYC process is designed to meet the requirements of modern businesses. Utilizing the strengths of blockchain, such as distributed ledger and immutability, we have created a solution far superior to existing ones. Therefore, this blockchain-based solution ensures that unauthorized entities cannot modify sensitive KYC data, which is an advantage over existing solutions. Moreover, it is cost-effective for the companies, significantly reducing infrastructure costs.

The solution from the proposed work ensures that authorized entities always validate the KYC process and that the data remains unaltered. With our blockchain-based KYC solution, Ethereum Customers businesses can ensure that their KYC process is secure, efficient, and cost-effective. In the foreseeable future, our objective is to deploy and conduct testing of our solution on the real ethereum network. Moreover, we aim to develop a comprehensive, fully operational decentralized application (DApp). This would entail a meticulous examination of the technical feasibility of the proposed solution on the ethereum network, an evaluation of the potential for adoption, and a thorough assessment of the security and privacy implications of the DApp. The ultimate goal is to establish a robust and reliable DApp that can deliver a seamless user experience while ensuring transparency, security, and efficiency.

VI. REFERENCES

[1] H. Alanzi and M. Alkhatib, ‘‘Towards improving privacy and security of identity management systems using blockchain technology: A systematic review,’’ Appl. Sci., vol. 12, no. 23, p. 12415, Dec. 2022.

[2] Y. Chen, Y. Lu, L. Bulysheva, and M. Y. Kataev, ‘‘Applications of blockchain in Industry 4.0: A review,’’ Inf. Syst. Frontiers, vol. 24, pp. 1–15, Feb. 2022.

[3] M. N. M. Bhutta, A. A. Khwaja, A. Nadeem, H. F. Ahmad, M. K. Khan, M. A. Hanif, H. Song, M. Alshamari, and Y. Cao, ‘‘A survey on blockchain technology: Evolution, architecture and security,’’ IEEE Access, vol. 9, pp. 61048–61073, 2021.

[4] J. Dorminey, A. S. Fleming, M.-J. Kranacher, and R. A. Riley, ‘‘The evolution of fraud theory,’’ Issues Accounting Educ., vol. 27, no. 2, pp. 555–579, May 2012.

[5] F. C. Hui, V. C. Koneru, N. M. Ali, and S. Harun, ‘‘Implementing peer group analysis within a track and trace system to detect potential frauds,’’ Int. J. Supply Chain Manage., vol. 3, pp. 52–56, Jan. 2014.

[6] R. Patel, M. Migliavacca, and M. E. Oriani, ‘‘Blockchain in banking and finance: A bibliometric review,’’ Res. Int. Bus. Finance, vol. 62, Dec. 2022, Art. no. 101718.

[7] Q. Gan, R. Y. K. Lau, and J. Hong, ‘‘A critical review of blockchain applications to banking and finance: A qualitative thematic analysis approach,’’ Technol. Anal. Strategic Manage., vol. 33, pp. 1–17, Sep. 2021.