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E-Voting System Using Blockchain and Face Recognition

Harsh Rajesh Nargide[1], Pranav Prashant Waghmare[2], Om Balasaheb Jamdade[3], Ganesh Balasaheb Jagdale[4], Prajwal Pandurang Narute[5] , Mr. A.M. Dyade[6]
[1, 2, 3, 4, 5]*Student, Computer Science And Engineering, SVERI's College of Engineering Pandharpur*

Abstract: ***Voting systems have evolved over time, with paper voting becoming the most common worldwide. The introduction of electronic voting in the last decade has brought long-term solutions, but problems remain, especially in terms of security, trust, transparency and operation. Estonia has emerged as a leader in electronic voting despite limited blockchain integration. Blockchain technology offers a promising solution to these challenges through immutability and decentralization. However, current blockchain-based voting technology often lacks good solutions or lacks adequate measurement and evaluation. This article presents a new blockchain-based electronic voting platform designed to solve these problems in many elections. Our platform, which uses blockchain technology, prevents external intervention when starting the election by completing the administrative process in the central distribution system. Always be transparent while protecting voters' identities with homomorphic encryption. Our extensive testing and comparisons on our independent blockchain projects show that there is little difference between public and private blockchains. The main innovation of our solution is the provided management system using blockchain and homomorphic encryption, transparent process and stable security and self-assessment. This research contributes to the development of electronic elections to increase the security, transparency and efficiency of the democratic process.***

Keywords: E-Voting System, Blockchain, Face Recognition, Security, Reliability, Transparency, Functionality, Estonia, Decentralization, Homomorphic Encryption, Testing, Benchmarking, Governance, Electronic Government, Online Security, Confidence, Transparency, Decentralized Authority

I. INTRODUCTION

1) Introduction to the development of electronic voting systems: electronic voting systems are currently under development and improvement. This site was chosen not only because it appeared recently, but also because there are several solutions to electronic voting problems. Now the development of electronic control is increasing. However, the viability of these systems depends on the electronic transmission of important public services, including elections.
2) The importance of electronic voting in the digital age: Electronic voting is an important part of public services. Public awareness is often important. importance. Transformed with integrated blockchain technology. Electronic voting brings with it new problems that require new solutions. One of those challenges is the need to ensure that voting is at least as secure as traditional voting. Therefore, the goal is to create a safe election that reduces voters' concerns about being exploited.
3) Blockchain Applications for Secure Elections: In recent years, blockchain technology has emerged as a solution to security problems in the digital environment. Our voting engine uses blockchain to streamline all voting and provide better results than centralized systems. The decentralized nature of blockchain eliminates the need to rely on central authorities to prevent manipulation or interference in elections.
4) Addressing Perceived Issues in Electronic Voting: Key Issues in Electronic Voting can undermine voters' trust. . In the system. Blockchain technology solves this problem by completing transparency, allowing participants to access stored data and control their processes. This transparency provides trust and confidence in the integrity of the electoral process. Additionally, blockchain technology is more secure compared to traditional non-blockchain electronic voting platforms.
5) Potential Impact of Electronic Voting Changes: Changing electronic voting through blockchain and facial recognition technology could change the standard freedom of the system. all around the world. These advances can increase voter turnout and confidence in election results by increasing security, transparency, and accessibility.

II. SYSTEM ANALYSIS

A. *Disadvantages of the Current System*

System Introduction: Relying on the manual system in the current system is ineffective and causes errors that disrupt the integrity of the voting process.

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B. *Advantages of the System*

Automatic voting: The proposed blockchain system automates the voting process, making it easier for users to vote and reducing the risk of human error. This automation increases the efficiency and accuracy of the selection process and ensures reliability and transparency.

III. METHODOLOGY

1) *Requirements Analysis:* A comprehensive analysis of the requirements for blockchain-based electronic voting. This involves identifying key stakeholders, understanding their needs, and defining functional and non-functional requirements.
2) *Literature Review:* A review of existing literature and research on blockchain technology and electronic voting. Identify processes, procedures, and best practices used for similar projects.
3) *System Design:* Create a system design for a blockchain-based electronic voting platform. This includes analysis of system architecture, data structures, algorithms, and user interfaces. Security measures such as encryption technology and access control should be considered.
4) *Blockchain selection:* Consider the suitability of various blockchain platforms (Ethereum, Hyperledger, etc.). for electronic voting. Consider things like scalability, security, throughput, and approval mechanisms.
5) *Smart Contract Development:* Use smart contracts to code the rules and logic of the voting process on the blockchain platform of your choice. Define smart contracts for voter registration, card issuance, and voter counting.
6) *Facial Recognition Integration:* Integration of facial recognition into electronic voting machines to verify the identity of voters. Create facial recognition algorithms and ensure compatibility with the chosen blockchain platform.
7) *Prototype Development:* Blockchain-based electronic voting system prototype including prototypes, smart contracts, and facial recognition. Perform iterative testing and improvements to resolve identified issues.
8) *Evaluation and Evaluation:* Evaluate the effectiveness and efficiency of blockchain-based electronic voting systems against predetermined criteria and objectives. Strengthen capacity to ensure safe, open, and credible elections.

IV. SYSTEM DESIGN

A. *System Architecture*

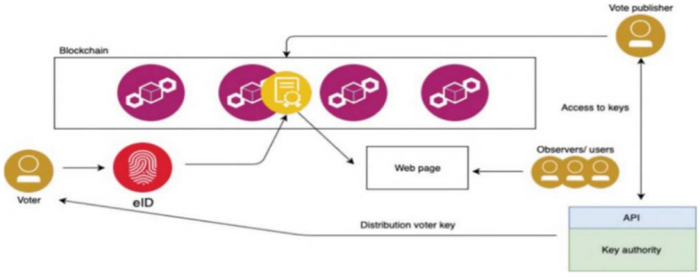


Fig. 1. High-Level architecture

B. *Data Flow Diagram*

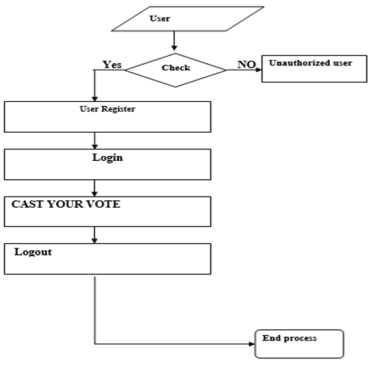


Fig.2. User Login

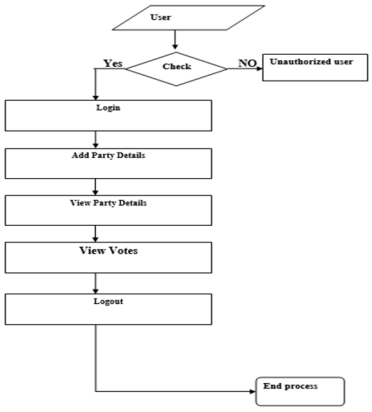


Fig.3. Admin Login

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V. CONCLUSION

Finally, the development of blockchain-based electronic voting combined with facial recognition technology is an important step forward in the electoral process. The aim of the research project is to use new technologies to solve problems with traditional voting systems, such as poor security, lack of transparency and on-book procedures.

We have successfully developed, implemented and evaluated an electronic voting model using the method described in this paper. Using blockchain technology, we ensure the integrity and immutability of the voting process, thus ensuring trust and transparency among stakeholders. Integration of facial recognition technology improves security measures, provides strong authentication and prevents fraud.

Our research results show the feasibility and effectiveness of blockchain-based electronic voting system. The system has many advantages over traditional voting, including automation, better security and better access. The system sustains the democratic process by improving the voting process and encouraging voter participation and participation by eliminating the manual process.

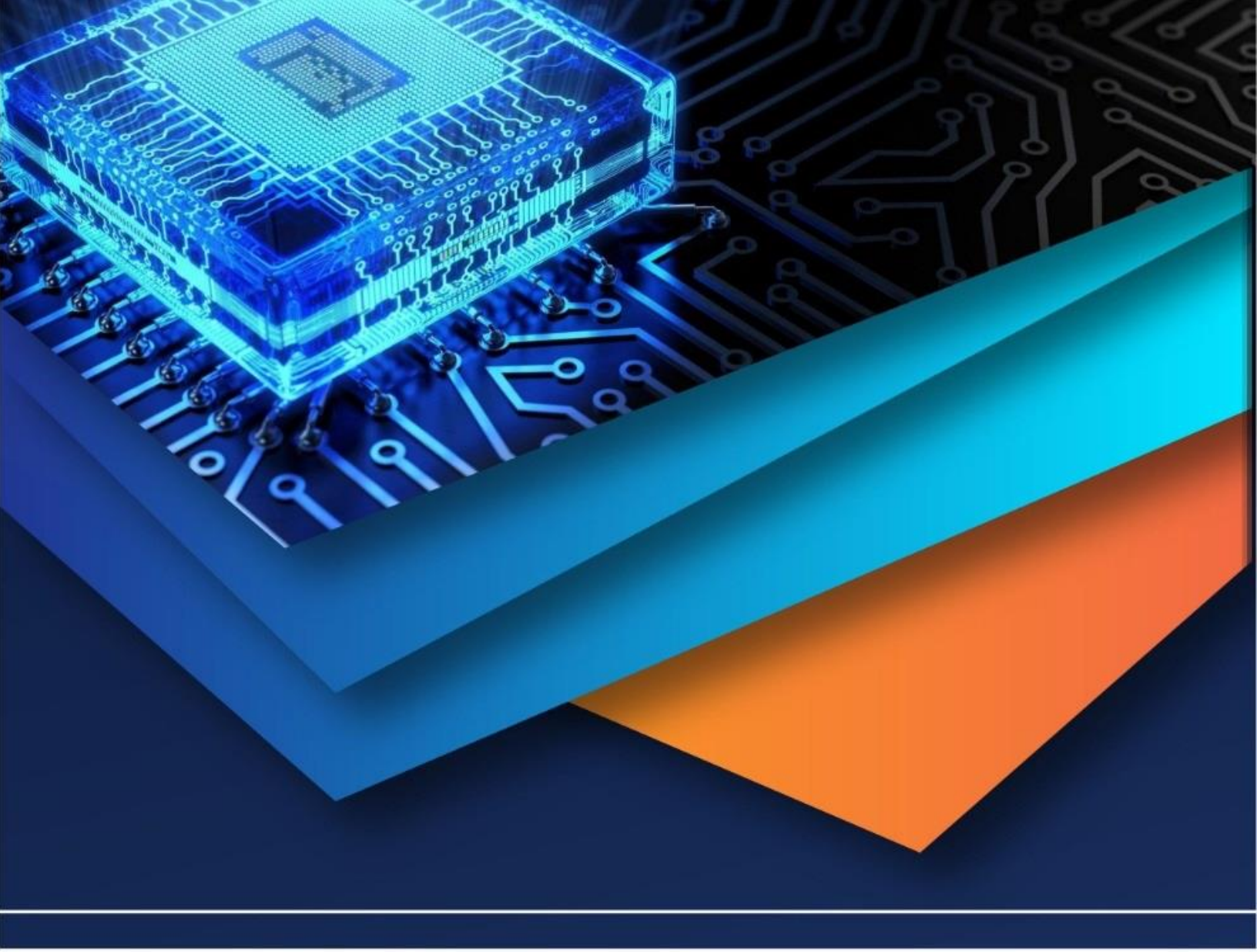
But it is important to understand that using a blockchain-based electronic voting system is not difficult. Issues such as scalability, governance, and privacy concerns require careful consideration and further research. Additionally, implementing such a system may be met with resistance from traditional stakeholders and regulators, requiring multi-stakeholder collaboration and support.

The development and use of answer line-based electronic voting machines could change the way elections are conducted. Continuous research and collaboration are essential to use the full potential of this new technology to solve existing problems and implement the governance system worldwide to ensure that elections are fair, transparent and secure.

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