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# Blockchain Enabled E-Voting Application

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**ABSTRACT—**

The security and integrity problems with traditional voting systems can be solved using blockchain-enabled electronic voting, which is a promising approach. In this work, we present a blockchain-enabled e-voting application that makes use of the security and transparency of blockchain technology to offer a safe and hacker-proof e-voting platform. Our application uses cutting-edge cryptographic methods to preserve voter privacy and guarantee the anonymity of their ballots. Smart contracts are also used to automate voting and lower the possibility of human error. Our suggested solution provides a decentralised and open environment for holding elections, enabling all participants to confirm the accuracy of the voting procedure. We explain our system's possible benefits and drawbacks as we examine its security and performance. The benefits of using our proposed blockchain-based e-voting system include.

***Keywords—Blockchain, E-Voting, Security, Privacy, Smart Contracts, Transperency, Cryptography***

## I. INTRODUCTION

An innovative technology that has the potential to completely change how elections are conducted is blockchain-enabled electronic voting. Concerns concerning the security, openness, and integrity of the voting process are more urgent than ever due to the rising popularity of e-voting. In order to address these issues, blockchain technology offers a platform for electronic voting that is safe, decentralised, and impenetrable.In this work, we suggest a blockchain-enabled e-voting application that makes use of blockchain technology's security and transparency to guarantee the fairness of the voting process. Our solution makes use of a distributed ledger that is available to voters, election officials, and auditors as well as other players in the voting process. Every vote is recorded in this ledger, which makes sure that it can't be changed or removed once it's been cast.

Furthermore, our application incorporates advanced cryptography techniques to protect the privacy of voters and ensure that their votes remain anonymous. With the use of smart contracts, the voting process can be automated, reducing the risk of human error and increasing the efficiency of the process.

## II. Methodology

**Designing the system architecture:** The first step involves designing the system architecture of the blockchain-enabled e-voting application. This includes deciding on the blockchain platform to be used, the consensus mechanism, the smart contracts, and the network topology.

**Developing the smart contracts:** Smart contracts are self-executing contracts with the terms of the agreement between the parties being directly written into code. In the case of blockchain-enabled e-voting applications, smart contracts are used to automate the voting process and ensure its security and integrity. The smart contracts can be developed using various programming languages, such as Solidity.

**Implementing the blockchain network:** Once the smart contracts are developed, the next step involves implementing the blockchain network. This includes deploying the smart contracts onto the blockchain network and configuring the network settings, such as the consensus mechanism, network topology, and access controls.

**Developing the user interface:** The user interface is a crucial component of the blockchain-enabled e-voting application, as it enables voters to cast their votes and election officials to manage the voting process. The user interface can be developed using various technologies, such as HTML, CSS, and JavaScript.

**Testing and deployment:** The final step involves testing the blockchain-enabled e-voting application to ensure its functionality and security. Once the application is tested and approved, it can be deployed to the production environment for the actual election.

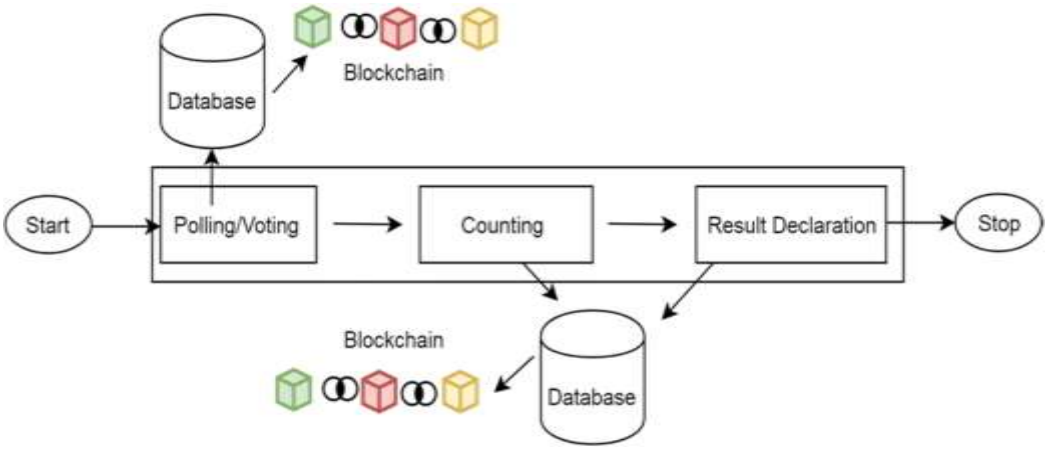


Fig.2.1Architecture

## III. Literature survey

**P. Tarasov and H. Tewari et al [1]** discusses the current state of electronic voting (e-voting) systems and the potential for their future development. It explores the advantages and disadvantages of e-voting, such as increased accessibility and convenience for voters, but also concerns over security and the potential for fraud.The authors analyze the various types of e-voting systems currently in use, including internet-based systems, and propose a new hybrid system that combines the benefits of different approaches.They also discuss the importance of transparency, accountability, and user trust in e-voting systems.Overall, the article provides an in-depth analysis of e-voting systems and their potential future development, highlighting the challenges and opportunities associated with implementing these systems in democratic processes.

**N. Kshetri and J.Voas et al [2]** Describes the potential use of blockchain technology in electronic voting (e-voting) systems. It discusses the advantages of blockchain, such as its ability to provide transparency, security, and immutability, and how these properties can be applied to e-voting.They analyze the various challenges associated with e-voting, including the risk of cyber-attacks, manipulation of data, and voter fraud, and propose the use of blockchain as a solution to these challenges. They suggest that blockchain technology can be used to create a secure and transparent voting system, where each vote is recorded on the blockchain and is immutable, tamper-proof, and transparent.

**F.P. Hjalmarsson and G. K . Hreioarsson et al [3]** Describes the process of blockchain-based e-voting system that utilizes a permissioned blockchain to ensure the security and privacy of the voting process. The system employs smart contracts to automate the voting process and ensure the integrity of the results. The proposed system allows voters to cast their votes electronically while maintaining anonymity and preventing double-spending and vote manipulation . They also discuss the challenges associated with the adoption of blockchain-based e-voting systems, such as the need for a robust and secure blockchain infrastructure, the potential for cyber-attacks, and the legal and regulatory challenges related to the adoption of such systems.

## IV. Applications

**Secure and Transparent Voting**: Blockchain E-Voting offers a tamper-proof, decentralized, and transparent voting system. It ensures that each vote is recorded accurately and is impossible to change or tamper with once it has been recorded on the blockchain.

**Increased Participation:** With blockchain E-Voting, voters can cast their votes from anywhere at any time. This eliminates the need for voters to physically go to polling stations, thereby increasing voter turnout and participation.

**Lower Costs:** Blockchain E-Voting eliminates the need for expensive voting equipment, polling stations, and personnel. It can significantly reduce the costs associated with traditional voting methods.

**Efficient and Fast Results:** Blockchain E-Voting offers a fast and efficient way of counting votes. The results of the election can be tallied in real-time, eliminating the need for manual counting and reducing the time required to announce the results.

**Prevention of Voter Fraud:** Blockchain E-Voting can prevent voter fraud by ensuring that each vote is unique and recorded accurately. It can also eliminate the possibility of double voting or fraudulent voting.

## V. Future Scope

**Adoption by governments:** Governments around the world are beginning to recognize the potential of blockchain e-voting. As more countries adopt this technology, we could see a shift away from traditional voting methods.

**Integration with other technologies:** Blockchain e-voting could be integrated with other technologies such as biometrics, facial recognition, and AI to enhance security and accuracy.

**Increased accessibility:** Blockchain e-voting could become more accessible to voters with disabilities, allowing them to cast their votes independently and confidentially.

**Expansion of blockchain networks:** The development of blockchain networks specifically designed for e-voting could further enhance the security and reliability of the system.

## VI. Results

Blockchain voting, if implemented properly, can boost voter turnout and offer more accessible and transparent elections. Citizens can easily cast their votes via their personal computers or mobile phones after completing identity verification. Voting records are easily verifiable and vote tallying is conveniently confirmed in real-time on the network. Blockchain voting saves time, reduces costs, and paves a path for direct democracy. However, blockchain voting is not yet ready. Votes cast via a blockchain-based voting system are not entirely anonymous, as voters can show proof of how they voted through the transaction data. This type of voting system is also vulnerable to denial-of-service attacks that delay voters from submitting their votes on time. The blockchain technology underpinning this platform allows voters to verify that their votes are counted, and that the votes are recorded correctly without compromising their own anonymity allow independent vote-monitoring bodies to audit the vote counting and codes used to make sure that the system is free from fraud.

## VII. Conclusion

blockchain e-voting has the potential to revolutionize the way we conduct elections and voting processes. By leveraging the security and transparency of blockchain technology, we can create a tamper-proof and decentralized voting system that is accessible to all.With blockchain e-voting, we can increase voter turnout, reduce costs, and ensure that each vote is recorded accurately and transparently. It can also prevent voter fraud and improve accessibility for voters with disabilities and those living in remote areas.

The blockchain e-voting is vast, with potential developments such as integration with other technologies, expansion of blockchain networks, and the emergence of decentralized autonomous organizations (DAOs). As governments and organizations around the world continue to recognize the potential of blockchain e-voting, we could see a shift away from traditional voting methods towards a more secure, transparent, and efficient system.

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