

Electronic -Voting System Using Blockchain

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ABSTARCT

Online voting is a trend that is gaining momentum in modern society. It has great potential to decrease organizational costs and increase voter turnout. It eliminates the need to print ballot papers or open polling stations—voters can vote from wherever there is an Internet connection. Despite these benefits, online voting solutions are viewed with a great deal of caution because they introduce new threats. A single vulnerability can lead to large-scale manipulations of votes. Electronic voting systems must be legitimate, accurate, safe, and convenient when used for elections. Nonetheless, adoption may be limited by potential problems associated with electronic voting systems. Blockchain technology came into the ground to overcome these issues and offers decentralized nodes for electronic voting and is used to produce electronic voting systems mainly because of their end-to-end verification advantages. This technology is a beautiful replacement for traditional electronic voting solutions with distributed, non-repudiation, and security protection characteristics. The following article gives an overview of electronic voting systems based on blockchain technology. The main goal of this analysis was to examine the current status of blockchain-based voting research and online voting systems and any related difficulties to predict future developments. This study provides a conceptual description of the intended blockchain-based electronic voting application and an introduction to the fundamental structure and characteristics of the blockchain in connection to electronic voting. As a consequence of this study, it was discovered that blockchain systems may help solve some of the issues that now plague election system

INTRODUCTION

In every democracy, the security of an election is a matter of national security. The computer security field has for a decade studied the possibilities of electronic voting systems, with the goal of minimizing the cost of having a national election, while fulfilling and increasing the security conditions of an election. From the dawn of democratically electing candidates, the voting system has been based on pen and paper. Replacing the traditional pen and paper scheme with a new election system is critical to limit fraud and having the voting process traceable and verifiable.

Electronic voting machines have been viewed as flawed, by the security community, primarily based on physical security concerns. Anyone with physical access to such a machine can sabotage the machine, thereby affecting all votes cast on the aforementioned machine.

Electronic voting (also known as e-voting) is voting that uses electronic means to either aid or take care of casting and counting votes.

A worthy e-voting system must perform most of these tasks while complying with a set of standards established by regulatory bodies, and must also be capable to deal successfully with strong requirements associated with security, accuracy, integrity, swiftness, privacy, auditability, accessibility, cost-effectiveness, scalability and ecological sustainability.

Electronic voting technology can include punched cards, optical scan voting systems and specialized voting kiosks (including self-contained direct-recording electronic voting systems, or DRE). It can also involve transmission of ballots and votes via telephones, private computer networks, or the Internet.

The scope of our project is to provide the users with a secure and authenticated portal where they can cast their votes through a decentralised voting portal. This eliminates the need for authorities to monitor and paperwork that is done during elections. The scope of the system is very vast as it can be implemented in any organization where elections play a major role in electing their representatives. The system can be adapted as per the need and the number of participants using the system. The techniques and concepts used in providing a base to the system uses strong encryption techniques to provide privacy to the votes and tamper free results.

Types of Blockchains:

1. **Public Blockchain:-** No accessing restrictions are there. Anyone who has an Internet connection can send Transactions to it as well as become an Administrator. Networks offer Financial Incentives to those who are Securing the Network. Renowned Public Blockchains are the Bitcoin Block chain and the Ethereum Blockchain.
2. **Private Blockchain:-** A Private Block chain is permission ed. To join the Block chain, Invitation by the Administrator is Mandatory. Participant and Validator Access is Restricted Strictly. For Private Block chains Distributed Ledger Technology (DLT) is used.
3. **Hybrid Blockchains:-** As the name suggests, it is a Combination of Centralized and Decentralized Features.

BLOCK-CHAIN: The Blockchain Structure is also known as an append-only data structure, such that new blocks of data can be written to it, but cannot be altered or deleted. Private blockchain limits the read and write access, only specific participants can verify their transactions internally. That makes the transaction on a private network cheaper, since they only need to be verified by a few nodes that are trusted and with guaranteed high processing power. Nodes are very well-connected and faults can quickly be fixed by manual intervention, allowing the use of consensus algorithms which offer finality after much shorter block times. In our Research we will use Permissioned Blockchain which will use the Proof of Authority (PoA) consensus Algorithm. A Consensus Algorithm is used to set restrictions on selected known entities to certify and validate Transactions on Blockchain. Here, this will help us to stop adding new People without Administrators Permission. This Algorithm Proves to be Helpful because it does not leak the Voter's Information and Voting Data.

Will of people forms the basis of democracy. However is of utmost importance to protect the anonymity of voters and allow complete privacy to cast their votes. The current methodology may sometimes fail to protect the fundamental right of privacy of the voters. The master key to build an electronic voting system is to find out a secure underlying platform which provides the required features that overcomes the drawbacks of the current system.

KEY FEATURES OF BLOCKCHAIN:

- **TRANSPARENCY:** The blockchain ledger is public and transparent, which means that anyone can access and view the transactions on the network. This makes it a highly transparent system that is resistant to fraud and corruption.
- **IMMUTABILITY:** Immutability means that the blockchain is a permanent and unalterable network. Blockchain technology functions through a collection of nodes. Once a transaction is recorded on the blockchain, it cannot be

modified or deleted. This makes the blockchain an immutable and tamper-proof ledger that provides a high degree of security and trust.

- **DISTRIBUTED LEDGERS:** All network participants have a copy of the ledger for complete transparency. A public ledger will provide complete information about all the participants on the network and transactions. The distributed computational power across the computers ensures a better outcome
- **DECENTRALISED:** Blockchain technology is a decentralized system, which means that there is no central authority controlling the network. Instead, the network is made up of a large number of nodes that work together to verify and validate transactions. Each and every node in the blockchain network will have the same copy of the ledger.
- **ENHANCED SECURITY:** All the records in the blockchain are individually encrypted. Using encryption adds another layer of security to the entire process on the blockchain network. Since there is no central authority, it does not mean that one can simply add, update or delete data on the network.
- Every information on the blockchain is hashed cryptographically which means that every piece of data has a unique identity on the network. All the blocks contain a unique hash of their own and the hash of the previous block. Due to this property, the blocks are cryptographically linked with each other. Any attempt to modify the data means to change all the hash IDs which is quite impossible.

EXISTING SYSTEM

The existing voting systems are ballot box voting or electronic voting where people have physically present themselves at the voting centers with an ID proof. But these systems suffer from various security threats such as DDos attacks ,polling booth capturing Vote alteration and also require huge amount of paper work ,human resources, and time. This creates a sense of distrust among existing systems. Some of the disadvantages are long queues during elections, security Breaches like data leaks, vote tampering, lot of paperwork . As Traditional voting systems like ballot paper voting and EVM voting failed to provide the required security, Anonymity and Integrity to the voters vote, due to this e-voting system became prominent and effective.

Many people have worked on different ways to promote voting on internet platform, for easier and secure voting system. Out of those a journal paper [1] related to "Electronic voting system using an enterprise blockchain" explained in detail how the block-chain hyper ledger fabrics would dwell into e-voting system. This paper explains clearly, how blockchain is implemented in e-voting system using Suffrage Net Networks and DAPP, where SUFFRAGE MINTER and SUFFRAGE.VOTER acts as a one main authorization to manage and issue voter transactions, while Validator is the one which validates the entire electoral process; using these networks block-chain is implemented and with the hyper-ledger the whole voting process is validated and kept secure.

PROPOSED SYSTEM

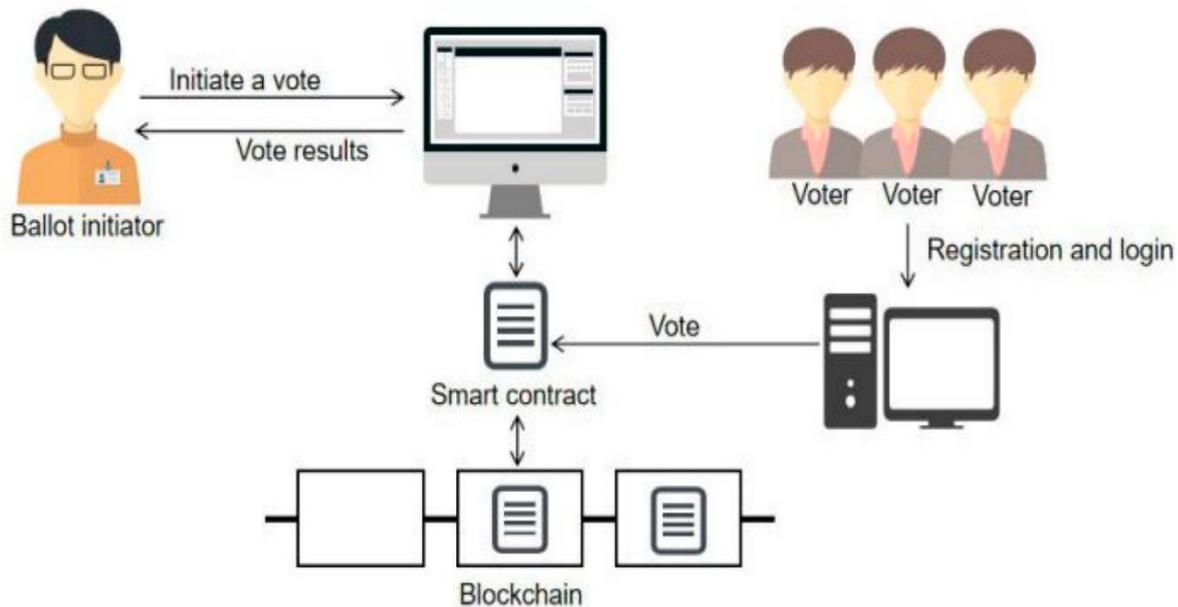
The proposed system utilizes several tools namely ganache, truffle framework, npm and metamask. Truffle imports the smart contracts on the blockchain while as ganache operates the internal blockchain and it will be accessed by using metamask. With some Ether i.e. Ethereum's cryptocurrency is required by a user for an account with wallet address. To write the transaction to blockchain, user needs to pay. The block-chain with the smart contracts, emerges as a good candidate to use in developments of safer, cheaper, more secure, more transparent, and easier-to-use e-voting systems. In the proposed system we solve existing following problems solve. We need transparency, authentication and provability in the voting platform. We need to assure that the people who attend the elections are real people and use correct credentials that we know in electronic environments, and we should be able to prove that any time, also we need

our elections are 100% transparent as desired. So, we need to gather and check signed and time stamped data of the elections. Because, nobody should be able to change the votes after they are casted. Also, we need individuality in elections, so that nobody can vote for someone else.

SYSTEM FEATURES:

- User can access the decentralized e-voting portal to vote.
- There is no need of ballot box or booths to cast votes.
- The data cannot be manipulated once the transaction happens on a blockchain network.

SOFTWARE DESIGN



The voter can log on to the voting website, then he has to log in with the Chrome Extension of Metamask to connect with the local blockchain. Once the user is connected, the page is refreshed and the user can see the candidates and the current votes. Below that is the option to select the candidate to vote, the voter selects the candidate and click on vote, a metamask pop-up comes up which tells the Ethereum transaction that has to be made, once the user clicks.

CONCLUSION & REFERENCES

In this project, To Overcome all the Shortcomings in the Present Voting System, we came up with the Modern Technology of Blockchain i.e. E-Voting System using Blockchain. By using this modern technology, following things can be Achieved:- Cheap Voting System, Accurate Voting System, Fast Voting System. Every Citizen desires to have a Transparent and Direct Form of Democracy which is clear cut obtained from this E- Voting System using Blockchain.

Faith of People on the Voting System is Increased therefore, many People Come Forward for Voting, thereby Increasing the Percentage of the People Voted. The Pen and the Paper Election is Eradicated thereby creating Accuracy in the Voting System. Everybody Prefers Time ,and Cost Efficient Systems so this E-Voting System using Blockchain is apt for Transparent Democracy. Ethereum Private Blockchain allows hundreds and hundreds of Transactions in a Second. Utilisation of the Smart Contracts lower the Load on the Blockchain. For Countries with Greater Population, some additional Technology should be added in this E-Voting System using Blockchain to avoid Errors. The main reason behind this system is to present an idea of implementation of blockchain in the voting system.

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