

Decentralised E-Voting System Using Blockchain

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ABSTRACT—Voting is a fundamental right of every citizen in a democracy, allowing them to select the future leaders of their country. Online voting platforms can be used to conduct votes and elections in a secure manner. They do away with the necessity for paper ballots and in-person voting because they are a digital platform. They also prohibit voters from casting multiple ballots, preserving the validity of your vote. Electronic voting, sometimes known as "e-voting," has many advantages over paper-based systems, including greater effectiveness and fewer mistakes. The ability to vote from any location and on any internet-connected device helps the e-voting system maximize user engagement. Blockchain is a newly developed, decentralized, and distributed technology with solid cryptographic underpinnings that has the potential to enhance numerous businesses in various ways. The current issues with electronic voting may be resolved by incorporating blockchain technology. Here, we suggest a blockchain-based voting system that will reduce voting fraud and streamline, secure, and streamline the voting process.

Keywords— Democracy, Voting, Elections, Ballots, Electronic voting, Decentralized, Cryptography, Blockchain.

I. INTRODUCTION

India is a democratic nation. With an aadhaar card, every Indian citizen is now a part of the developing digital India. Voting procedures have changed from early systems that relied solely on human counting to ones that now use paper ballots, punch cards, and electronic voting machines. It provides community members with the opportunity to express their opinions. It aids in their understanding of the value of citizenship. Elections and votes may be conducted securely via

online voting tools. Because they employ a digital platform, they eliminate the need for paper ballots and in-person voting [1]. Additionally, they forbid voters from using more than one ballot, protecting the legitimacy of your choice. Electronic voting, or "e-voting," provides a number of benefits over paper-based systems, including increased efficiency and fewer errors. The e-voting system is able to maximize user involvement since voters may cast their ballots from any place and on any internet-connected device.

1.1 BLOCKCHAIN

A system that is un-hackable, transparent, and efficient can be implemented with the use of blockchain technology. The blockchain is the most advanced mechanism for voting systems since it is impossible to add, delete, or modify information within blocks. A distributed network made up of numerous interconnected nodes serves as the foundation for blockchain technology [2]. The distributed ledger, which stores the whole history of all transactions handled by the network, is duplicated on each of these nodes. The network is not entirely under the control of one system. The transaction is accepted if the majority of nodes agree. Users of this network are able to remain anonymous. Based on a fundamental review of blockchain technology that takes into consideration acceptable contracts, it can be said that it is a solid foundation for electronic voting and even has the potential to make it more legitimate and widely accepted. Implementing electronic voting is now more affordable, simple, and safe thanks to blockchain technology. It is a radically new paradigm that can aid in the creation of decentralized systems that guarantee the accuracy, accessibility, and fault tolerance of the data. The systems are intended to be transformed by this

technology. The decentralized networked computer systems that make up blockchain technologies are used to validate and record pure online transactions [3]. They also make up the blockchain, which are ledgers where electronic information is connected to one another. The data stored on a blockchain is essentially unchangeable. The E-Voting system offers numerous benefits over the current system. Some of the benefits include: increasing the level of participation, security, efficiency, and precision. By enabling users to vote through any location and on any internet-connected device, the online system of voting tends to maximize user involvement. By considering the importance of the e-voting system is implemented using “Blockchain”. When compared to, say, traditional paper voting, and the efficiency of election management is greatly increased by the decrease in organizational and implementation costs. The electronic vote reduces mistakes in the manual count, resulting in accurate and prompt results publication and receipt of votes for each vote cast [4].

II. LITERATURE SURVEY

Many people's lives have improved as a result of the growth of digital technology. Compared to the election system, it utilizes a lot more regular paper during implementation. Elections still regularly use traditional voting procedures, endangering transparency and security. Since it employs a decentralized structure and the complete database is held by many users, block chain technology is one of the answers. Without a doubt, the ground-breaking block chain idea, which is the basis for the well-known cryptocurrency Bit coin and its offspring, is ushering in a new age for the Internet and online companies. In this study, we used Ethereum wallets and the Solidity programming language to create and evaluate an example e-voting application as a smart contract for the Ethereum network [5]. A peer-to-peer payment system that enables cash transactions across the Internet without depending on trust or the necessity for a financial institution was first presented by Satoshi Nakamoto (a pseudonym), who also invented the block chain. Block chain is a system with a high byzantine failure tolerance that is secure by design [6]. The lack of enthusiasm for voting among the young, tech-savvy population may be addressed through e-voting. An option for improving e-openness, voting's transparency, and ability to be independently audited is to base it on block chain technology. Although the future of block chain technology is bright, its existing limitations may prevent it from realizing its full potential [7]. Since the 1970s, many versions of

electronic voting have been utilized, and they have many advantages over paper-based methods, including more efficiency and fewer mistakes [8]. Numerous efforts have been undertaken to investigate whether adopting block chain technology could help with an efficient solution to e-voting, given the remarkable development in the use of these technologies. It described one such initiative that makes use of block chain advantages like transparency and cryptographic underpinnings to achieve an efficient answer to e-voting. The proposed method has been implemented with Multichain, and a thorough analysis of the method shows that it is effective in satisfying the essential conditions for an electronic voting system [9]. Secure digital identity management is one of the most recent and significant technical challenges connected to electronic voting systems, although it is not the only one. Before the elections, every prospective citizen should register with the electoral system. Their information should be very easily processed digitally. Additionally, their identification information must be completely private in any material regarding them. The outdated voting systems pose many problems, some of them being, anonymous voting isn't secure, individualized ballot process, voters have to verify themselves since there is no aadhaar verification, expensive setup costs, security issues, lack of openness and confidence, voting inefficiencies and delays while remote voting, etc. To reduce these risks, the following software approaches should be implemented: preventing the removal of evidence, transparency with privacy. Blockchain fulfills most of the requirements, and ensures the following: voting will only be available to registered voters due to authentication, the system precludes drawing any association between a voter's identity and their ballot, votes are accurately recorded and cannot be changed after they are cast, it will be possible to verify that all votes were cast using the system [10]. Nowadays, several nations have chosen electronic voting methods as a result of technological advancements. Any voting system that aims to be fair must adhere to the principles of objectivity and openness. Additionally, it must be safeguarded from cyberattacks and denial-of-service (DDOS) attacks, which could slow down voting processes and possibly compromise the fairness of the process. This paper creates a network security method for block chain-based voting systems. Any user in the block chain can validate data integrity, which satisfies standards of openness and impartiality in voting systems. Additionally, the block chain method has a distributed architecture that can avoid

system shutdown caused by malicious cyberattacks [11].

III. PROPOSED SYSTEM

For our proposed plan of work we are considering two modules that are to be completed in three phases. The two modules being front-end for the application, and back-end using solidity to implement blockchain. Each of these module will be considered as one phase and the remaining one phase will cover the connection and testing of these modules.

Phase 1: In this phase we will cover the front-end module, in which we will build the interactive user-interface for the admin as well as the user.

In parallel the research work related to the implementation of Block chain in decentralized application will be done. The two main modules are Admin and User. The admin module is divided into 5 components:

- Dashboard: It will have numerous graphs to illustrate data like the number of parties, voters, etc.
- Add Candidate: Admin can add candidates who are running for office using this admin capability. The user side will display the candidate after it has been added.
- Create Election: He will be able to create elections thanks to this admin feature. Only after the election has been created by the admin may a user cast their vote. Between the start date and the end date, users can cast ballots.
- Election Details: In this section admin can update election details such as start date, end date etc.
- Candidate Details: In candidate details all the candidates added by admin will be displayed. Admin can update the candidate details if in case a wrong entry is done.

The user module is divided into 4 components:

- Dashboard: Information about parties and their candidates can be seen on the user dashboard. The user has access to all the candidate's information.
- Voter Register: In this section, users must register themselves first and only then will they be able to vote.
- Voting Area: Only the registered user will be sent to this page to cast his vote after registration.

- Results: In this component the user will be able to see the results of the election.

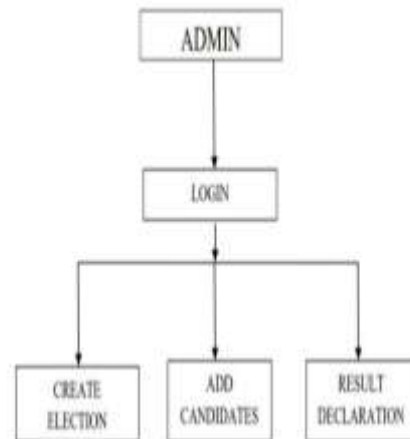


Figure 3.1: Admin flow diagram

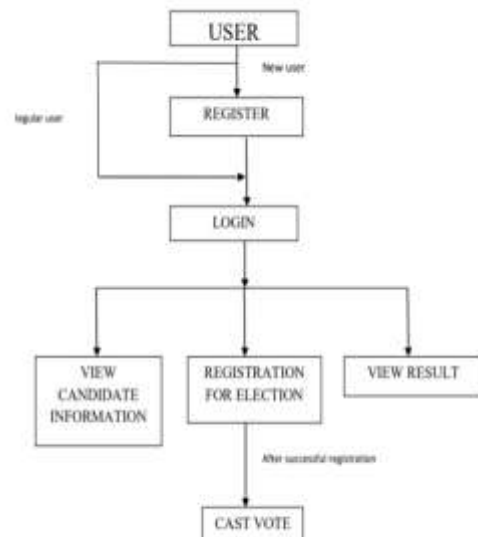


Figure 3.2: User flow diagram

Phase 2: In this phase we will cover the back-end module, we will implement the Blockchain using Ethereum framework and convert the system into a decentralized application.

Figure 3.3: Research Methodology (Phase 2)[12]

Phase 3: The connection of two different module along with the testing of the platform will be completed in this phase.

IV. RESULTS

India now uses an EVM (Electronic Voting Machine) based voting method. Paper ballots and manual tallying were employed in the

past before this technology. Paper ballots were fiercely opposed due to fraudulent voting and booth takeover, in which party members took control of booths and packed them with phony ballots that were previously filled out. The voting process must be traceable and verifiable in order to reduce fraud and make the results more accurate. As we can see, the internet has sparked a revolution in every conceivable field by attempting to move the current system to an online platform to make the processes quick and user-friendly. We are aware of the Reliability of the current system, but that does not exclude us from making improvements to it. Block chain-based online voting systems may be that first step. A distributed, unchangeable, unquestionable public ledger is a block chain. The four key components of this innovative technology are as follows: The distributed ledger has several locations, multiple people have the power to enter new transactions into the ledger, any proposed "new block" to the ledger must make reference to the earlier iteration of the ledger in order to construct the immutable chain that gives the block chain its name. We have made an effort to create a user interface for the decentralized program that will simplify the voting process. 30% of the total work that has to be done can be presumed to be the UI component. The blockchain technology, which will be in charge of

V. CONCLUSION

In this paper, we provide an electronic voting system based on block chain that protects voter privacy while enabling secure and affordable elections. Block chain technology offers a creative way around the restrictions and adoption challenges connected with electronic voting methods, protecting election security and integrity and paving the way for transparency. By making use of all available smart contract features to lighten the load on the network, it is possible to transfer hundreds of transactions per second onto an Ethereum private block chain. To do this, we separated the paper into two parts: the front-end module, and the back-end module. The first module consists of frontend web pages with interactive user interface for both the admin and the user. Additionally, we have conducted some study on the use of blockchain in decentralized applications. In the future, ML and AI principles can be used in the system to increase voting process security and accurately identify the voter. These ideas allow us to confirm that the voter matches the person who registered during the registration procedure. This is a pure prototype model; there are a lot of changes may need to use in mass scale. The paper describes

the whole working of the system and its frontend with the API connection in the second part of it will elaborate the whole working of the block chain in the system how the votes will be created in a box and how one should maintain its privacy.

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