IJFANS INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES
ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 10, Iss 11, 2021

Online voting system using Blockchain

M.Chenna Keshava, Assistant Porofessor, CSE Department, JNTUACE, Pulivendula
keshava1047@gmail.com
V.Kavitha, Assistant Porofessor, CSE Department, JNTUACE, Pulivendula
kavithareddy.velagalapalli@gmail.com
L.Bhavya, Assistant Porofessor, CSE Department, JNTUACE, Pulivendula
bhavyalevadala@gmail.com
CH. Srilakshmi Prasanna, Assistant Porofessor, CSE Department, KVSRIT, Kurnool
srilakshmi1023@gmail.com
M.Pujitha, Assistant Professor, CSE Department, ECE&T, Hyderabad
mpujitha46@gmail.com

Abstract— **Every individual in a democracy has the legal right to vote. Every person should have an equal opportunity to vote. EVMs and ballot papers are used to vote nowadays. The current voting method, on the other hand, has several severe flaws. We're working on an internet voting system that doesn't rely on electronic voting machines or ballot papers. Voting may be done quickly and easily online from any location. Blockchain is a cutting-edge technology that promises to improve electronic voting methods in general. In order to establish a feasible e-voting scheme, this initiative aims to showcase the most crucial elements of blockchain, such as cryptographic underpinnings and transparency. The proposed approach meets the basic requirements for systems of electronic voting while also providing end-to-end verifiability. The project shows how the multichain platform will be used to accomplish the anticipated e-voting system. It makes use of blockchain technology, which treats each vote as an irreversible transaction. Because the transactions are immutable, malicious attackers cannot alter them. This conclusion implies that this project has the potential to make voting more simple, fair, and accessible, and that it could be used as a future voting prototype.**

Keywords **— Blockchain, cryptography, e-voting, voting, EVM, immutable.**

1. INTRODUCTION

Election security is the major concern of every democratic nation because fair election mechanism leads to the fair voting process. From the past decade, the computer professionals are trying to enhance the security of the election system with the goal of reducing the cost for the election process. Since the beginning voting procedure has been based on the papers. As the technology is blasting day by day, it is the time to complement the old procedures with the developing technologies because these technologies have the potential to add more advantages to the existing procedures. The election system also needs to be improved with the technology.

E-Voting is a system of voting which is done through the electronic devices from the remote locations.

Electronic voting technologies include punched cards, optical scan voting systems, and customized voting kiosks. These technologies also involve computer-assisted transmission of ballots and votes through a network of systems.

There are two types of electronic voting in general:

• E-voting that is physically controlled by government or independent electoral officials (e.g., electronic voting machines at polling stations)

• Remote e-voting is a sort of electronic voting that allows voters to cast ballots from anywhere.

2. LITERATURE SURVEY

In [1], Blockchain is a distributed ledger technology that may be used to process digital assets in a distributed peer-to-peer network, according to [1. In this aspect, distributed ledger technology is a game-changer. The term "block" refers to a grouping of transactions. Immutability, decentralization, security, transparency, and anonymity are just a few of the benefits of blockchain technology. The use of smart contracts on the blockchain has proven to be a good candidate for developing a safe, secure, and transparent electronic voting system. A finite quantity of tokens (gas) will be stored in the wallet, and when the user votes, the tokens will be depleted, preventing double voting. This paper discusses the advantages

and disadvantages of blockchain technology, as well as a realistic mechanism for voting online apps and their limitations.

In [2], the authors presented a novel voting mechanism that makes use of the blockchain as a transparent voting box. This protocol is meant to allow voters to amend or update their votes while respecting core voting features and providing some degree of decentralization (within the permitted voting period). This white paper examines the advantages and disadvantages of using blockchain for such projects from a practical standpoint, including development, deployment, and usage scenarios. This white paper finishes with a possible blockchain roadmap for supporting complicated applications.

In [3], The author reviews several of the prominent blockchain frameworks for the aim of constructing blockchain-based voting systems, a new blockchain-based electronic voting system, and tackles some of the drawbacks of existing systems. The writers, in particular, explain case examples to assess the possibilities of distributed ledger technology. That is, the process of putting in place a blockchain-based application for conducting elections, increasing security, and lowering the cost of hosting national elections.

In [4], One of the causes of database operation fraud, according to the author, is blockchain to database distribution in electronic voting systems. This survey explains how to record voting results from each voting location using the blockchain technology. This paper presented a mechanism based on a given power-on of the system of each node in the created blockchain, as opposed to Bitcoin's Proof of Work.

In [5], Security and integrity, as well as voting transparency and voter privacy, are all requirements for electronic voting platforms. The author suggests a blockchain-based voting system that addresses some of the issues with current voting methods. They also demonstrated numerous cutting-edge blockchain frameworks for electronic voting. The proposed implementation is appropriate for small elections, such as those held in company housing and conference rooms. Ethereum smart contracts are used in the implementation. The Truffle framework is used to create, test, and deploy smart contracts in this article. For testing purposes, Ganache is utilized as an Ethereum client. Meta Mask is used as the browser wallet in this case.

3. PROBLEM STATEMENT

The main intention of this project was to combine the secure blockchain technology and the voting system to address the current flaws and to anticipate future advances. In this contemporary world, as the technology is advancing with maximum phase, online voting is becoming more popular. It has the potential to eliminate many flaws of the existing voting system. These features include reducing administrative expenses and increasing the voting percentage. It also reduces the risk of travelling for voters because they can vote from anywhere with the internet connection. Apart from these advantages, online voting methods can also pose additional risks. A single mistake in the system can lead to a major damage.

To solve these concerns, blockchain technology was developed, which allows for electronic voting via decentralized nodes. Because of its end-to-end verification capabilities, it's utilized to create electronic voting systems. Because of its capabilities, this technology is a fantastic alternative to standard electronic voting systems.

3.1 Objectives of the Project

To accomplish this project, we would perform

1. To implement the voting system in the backend using solidity programming.

2. To deploy the smart contract on to the block chain network.

3. To perform voting demo and display the results.

4. SYSTEM ANALYSIS

4.1 The Existing System

Electronic voting is a technology that allows voters to safely and secretly record the votes of a particular candidate. The voting system is a fully integrated system that uses a microcontroller to produce results in response to public opinion.
The electronic voting system simplifies the voting

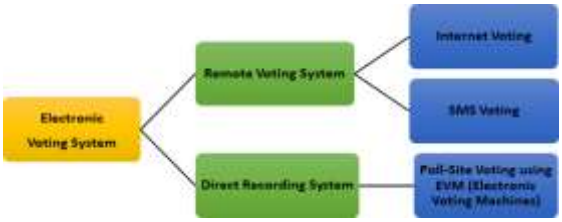
process. The first step is to log in to the site using your voter registration information. The user or voter then selects candidates based on personal preferences. This is called digital voting. The system tracks the information and stores it in the database, and the computer assists in counting.

4.2 Types of Electronic Voting

The most common method of electronic voting is electronic voting (EVM) and voice recording over the Internet (I-Voting) using a telephone, private computer network, or smartphone.

There are various types of electronic voting systems that display election results**.**

- Remote Voting System
- Direct Recording System



4.2.1 Remote Voting System

A remote voting system might be of two types. There are two of them:

• Internet voting and

• SMS voting.

4.2.4 Direct Recording System

A common example of a direct recording system is in-person voting with an electronic voting machine (EVM). EVM federal elections are held in the United Kingdom (UK), Australia, France, Germany, Canada, India, Italy, Belgium, Brazil, Estonia, Namibia, the Netherlands, Norway, Peru, Romania, Switzerland, Venezuela, and the Philippines.

5. PROJECT DESIGN

5.1 Blockchain-Based Voting

There are voting centres in their designated location that use the same blockchain. Also, voting centres can be regarded of as a collection of voting machines, however they are referred to as voting centres for the sake of simplicity.

In blockchains, vote centres are referred to as nodes. Each node (voting centre) will contain a file that keeps track of the number of votes accepted from the upper level during the last synchronisation phase. At certain periods, voting will be halted for a limited period in order to synchronise blockchain data between levels.

5.2 Feasibility and development requirement

This project will look into existing electronic voting systems, both blockchain-based and non-blockchain-based, to see if they are viable for establishing a national voting system. We developed a blockchain-based electronic voting system that is optimised for standards and concerns based on this. The features and components for building electronic voting smart contracts are identified in the next section, which is followed by different blockchain frameworks that can be utilised to incorporate and deploy election smart contracts.

5.3 Evaluating Blockchain as a Service for E-Voting

The three are Exonum, Quorum, and Geth Private Network.

Ethereum-based smart contracts have been discussed for a variety of reasons. According to academics, smart contracts can be employed in e-voting, and this project does so. Smart Contracts reduce transaction costs by obviating the requirement for a third party.

Turing-completeness is a characteristic of Ethereum that allows for the implementation of more personalized and powerful contracts. Ethereum's Delegated Proof of Stake assures data consistency when a new block is attempted to be added to the chain. It takes a long time to add a block to the chain. As a result, different trials and studies on this operation have been conducted.

1. Exonum: The Exonum blockchain is secure from start to finish since it is built entirely in the Rust programming language. Exonum is a blockchain platform that is only accessible to members of the Exonum community. To obtain network consensus, Byzantine methods are used. This consensus

algorithm allows Exonum to process up to 5000 transactions per second**.**

2. Quorum: An Ethereum-based distributed ledger solution that protects transaction or contract data while also utilizing cutting-edge consensus technology. This is a guestbook that has been updated with the most recent version of the guestbook. Quorum has worked on consortium chain-based consensus algorithms in order to optimize the consensus process. Tens to hundreds of transactions per second can be accommodated by this consensus.

3. Geth, also known as Guess, is one of three early Ethereum implementations that allows smart contract applications to execute as intended without the risk of downtime, censorship, fraud, or third-party interference. This framework is the most developer-friendly of the ones we looked at because it allows for development outside of the Geth protocol. Whether the blockchain is used as a public or private network determines the number of transactions per second (transaction rate).

5.4 Security analysis

1.DDoS: An attacker would have to make every boot node in the private network a DDoS vulnerability in order to make a distributed system like the one we're showing a DDoS vulnerability. In this situation, the individual or organization can be immediately located.

2. Vulnerability in authentication: At the voting booth, each voter is identified and authenticated by the system by presenting the 6-digit PIN associated with their electronic ID from Akeni. If an individual knows the PIN of each associated electronic ID that he or she has, he or she can vote for numerous without supervision.

3. Sybil: Sybil attacks on centralised systems are when humans create a large number of nodes to disrupt network operations by hijacking and destroying communications. No one has the ability to build our notion because it runs on a private network.

5.5 Legal issues

1. Remote voting: Faraway elections are not resistant to coercion since they are not supervised. As a result, distant elections can't provide the same level of privacy that people have while voting at a polling booth. A boo coercer can look over your shoulder while you vote, perhaps skewing the results.

2. Transparency: In today's election procedure, no manner of transparency can be provided to election members. There is no guarantee that a voter's vote will be counted and counted efficiently under the proposal if he or she votes inside the field at his or her polling district. Any character vote could be misplaced, counted incorrectly owing to human error, or counted incorrectly because the person counting the votes opposes the event that the voter supported.

3. Voter privacy: Any pen and paper voting system must protect the privacy of voters. Individuals or institutions are not allowed to choose who will vote based on a single vote, according to the legislation. Once such information is accessible for each vote, it can be made public in order to compile a list of everyone who has voted for a specific party or candidate. You must not go back one vote to a voter to safeguard your privacy.

5.6 System Architectures:

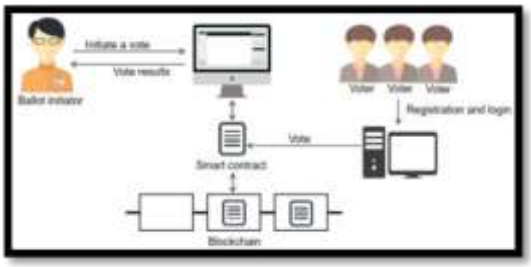


Fig-1: System Architecture

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 10, Iss 11, 2021

6. RESULT ANALYSIS

6.1 Remix IDE Results

Fig - 2: Voting area

The above figure shows the following fields:

A. Representate: We can update the information about the candidates who are running in the election here.

B. Vote: We can vote for a candidate by typing his or her name into this box.

C. GetCandidates: We can acquire information on the candidates running in the election here.

D. GetCandidateVotes: We can see the total number of votes cast for each candidate here.

E. GetVoteResult: This method displays the voting results.

F. Owner: The address of the voter's block can be found here.

Fig-3: Candidate Details

The fields required to update the candidate's information in order to participate in the elections are shown in the diagram above. It is divided into the following sections:

1._candidateName: This field accepts the candidate's name in string format.

2._age: This field accepts the candidate's name in unsigned integer format.

3._candidateId: This field accepts the unique id of the candidate in string format.

7. CONCLUSION

We created a one-of-a-kind system of voting based on blockchain that meets all of the standards for a fair voting system. The following are crucial requirements:

1. Availability
2. Security
3. Flexibility
4. Cost efficiency

Limitations of our project:

1. Our project is built on the Ganache framework, which only allows for voting from ten addresses, i.e. only ten people can vote. It should be developed on a huge scale to meet the needs of the country.
2. Ethereum mining is included in this system. Ethereum mining necessitates a significant amount of computing power and energy. It cannot be applied in countries that are experiencing an energy crisis.

REFERENCES

1.Abhishek Subhash Yadav, Yash Vandesh Urade, Ashish Uttamrao Thombare, Abhijeet Anil Patil, "E-Voting using Blockchain Technology", International Journal of Engineering Research & Technology (IJERT), ISSN: 2278-0181, Vol. 9 Issue 07, July-2020

2.FreyaSheer Hardwick, Raja Naeem Akram, Konstantinos Markantonakis, "E-Voting With Blockchain: An E-Voting Protocol with Decentralisation and Voter Privacy",2018 IEEE International Conference on Internet of Things (iThings) and IEEE Green Computing and Communications (GreenCom) and IEEE Cyber, Physical and Social Computing (CPSCom) and IEEE Smart Data (SmartData), doi: 10.1109/Cybermatics_2018.2018.00262

3.Friðrik Þ. Hjálmarsson, Gunnlaugur K. Hreiðarsson, Mohammad Hamdaqa, Gísli Hjálmtýsson, "Blockchain-Based E-Voting System", 2018 IEEE 11th International Conference on Cloud Computing (CLOUD), DOI: 10.1109/CLOUD.2018.00151

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 10, Iss 11, 2021

4.Rifa Hanifatunnisa, Budi Rahardjo,"Blockchain based e-voting recording system design", 2017 11th International Conference on Telecommunication Systems Services and Applications (TSSA),Date of Conference: 26-27 October 2017,Date Added to IEEE Xplore: 01 February 2018,ISBNInformation:INSPEC, Accession Number: 17543252,DOI:10.1109/TSSA.2017.8272896,Publisher: IEEE

5. Kriti Patidar, Swapnil Jain, "Decentralized E-Voting Portal Using Blockchain", 2019 10th International Conference on Computing, Communication and Networking Technologies (ICCCNT), ISBN Information: INSPEC Accession Number: 19277744, DOI: 10.1109/ICCCNT45670.2019.8944820, Publisher: IEEE