Decentralized Voting System Using Blockchain

A SYNOPSIS

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Title:
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Problem Definition:
In a democratic country like India (which is the largest democracy in the world), Voting plays a major role in the selection of government officials as well as showing our opinion how the governing body to be formed. Time to time, researches are conducted in order to tackle the difficulties in the centralized voting system to make it more anonymous, reliable and secure while preventing any kind of frauding. Even though the use of e-voting through the electronic medium, we have to face well-known problems of maintenance and fraud. Currently, various researches are conducting in-order to make secure and reliable voting system while tackling issues of anonymity and security. Through Decentralized System, focus is drifting towards making Voting Process simple, secure and anonymity in the hand of the public. This paper presents a literature review on the papers and the techniques used to tackle voting challenges.

Objectives:

A project objective describes the desired results of a project, which includes electronic voting, e-voting, blockchain, e-government, verifiable voting.

Scope:

The scope of the final project is to research the possibility to design a decentralized e-voting system and implement a prototype as a proof of concept that assures transparency, privacy, correctness, and integrity.

Literature Review:
In this section, we introduce study done by few researchers. This article gives an overall view of Blockchain technology and its potential to contribute to the development of the future by proposing several directions for further research. This paper proposed the effects of industrial revolution 4.0 to the society were robots will replace humans completely in the work force. This paper explains the basic operation of blockchain technology that is peer-to-peer decentralized ledger which provides a method to record and distribute information publicly on peer-t-peer systems of computers through crypto protocol. This paper also describes the advantages of blockchain such as it is arranged rationally that allows user to execute quick insurance requests that can be valuate immediately using AI and Blockchain decentralization helps it become less likely to be attacked. It gives role of blockchain in technological revolution 4.0 and also within the society. Blockchain can help in faster insurance and payments, it can make travelling easier by helping the travel insurance agencies to automate payment which saves a great amount of time, helps in protecting corporate identities, in banking sectors, internet

security, supply chain management, helps government to alleviate bureaucracy, increase safety and transparency in government activities and many more. This paper investigates bitcoin cryptocurrency application and blockchain technology that enables existence of digital currency. This paper also highlights requirements and benefits related to security, database and network. This paper gives the understanding of Bitcoin as it is a peer-to-peer electronic cash system. The word bitcoin denotes three different objects:

blockchain platform, digital currency and protocol that runs over this platform to define how transactions are moved. This paper describes the characteristics of blockchain where the distributed ledger is structured into two main network types: permission less network such as bitcoin where anyone can join the network without previous permission.

Proposed Methodology/ Planning of work

Using blockchain, voting process can be made more secure, transparent, immutable, and reliable. How? Let's take an example.

Suppose you are an eligible voter who goes to polling booth and cast vote using EVM (Electronic Voting Machine). But since it's a circuitry after all and if someone tampers with microchip, you may never know that did your vote reach to person for whom you voted or was diverted into another candidate's account?

Since there's no tracing back of your vote. But , if you use blockchain- it stores everything as a transaction that will be explained soon below; and hence gives you a receipt of your vote (in a form of a transaction ID) and you can use it to ensure that your vote has been counted securely.

Now suppose a digital voting system (website/app) has been launched to digitize process and all confidential data is stored on a single admin server/machine, if someone tries to hack it or snoop over it, he/she can change candidate's vote count- from 2 to 22! You may never know that hacker installs malware or performs clickjacking attacks to steal or negate your vote or simply attacks central server.

To avoid this, if system is integrated with blockchain- a special property called immutability protects system. Consider SQL, PHP, or any other traditional database systems. You can insert, update, or delete votes. But in a blockchain you can just insert data but cannot update or delete. Hence when you insert something, it stays there forever and no one can manipulate it- Thus name immutable ledger.

But Building a blockchain system is not enough. It should be decentralized i.e if one server goes down or something happens on a particular node, other nodes can function normally and do not have to wait for victim node's recovery.

So a gist of advantages are listed below:

You can vote anytime/anywhere (During Pandemics like COVID-19 where it's impossible to hold elections physically

Secure

Immutable

Faster

Transparent

Expected Outcomes / Findings :

The goal of this research is to analyze and evaluate current research on blockchain-based electronic voting systems. This discusses recent electronic voting research using blockchain technology. The blockchain concept and its uses are presented first, followed by existing electronic voting systems. Then, a set of deficiencies in existing electronic voting systems are identified and addressed. The blockchain's potential is fundamental to enhance electronic voting, current solutions for blockchain-based electronic voting, and possible research paths on blockchain-based electronic voting systems. Numerous experts believe that blockchain may be a good fit for a decentralized electronic voting system.

Furthermore, all voters and impartial observers may see the voting records kept in these suggested systems. On the other hand, researchers discovered that most publications on blockchain-based electronic voting identified and addressed similar issues. There have been many study gaps in electronic voting that need to be addressed in future studies. Scalability attacks, lack of transparency, reliance on untrustworthy systems, and resistance to compulsion are all potential drawbacks that must be addressed. As further research is required, we are not entirely aware of all the risks connected with the security and scalability of blockchain-based electronic voting systems. Adopting blockchain voting methods may expose users to unforeseen security risks and flaws. Blockchain technologies require a more sophisticated software architecture as well as managerial expertise. The above-mentioned crucial concerns should be addressed in more depth during actual voting procedures, based on experience. As a result, electronic voting systems should initially be implemented in limited pilot areas before being expanded. Many security flaws still exist in the internet and polling machines. Electronic voting over a secure and dependable internet will need substantial security improvements. Despite its appearance as an ideal solution, the blockchain system could not wholly address the voting system's issues due to these flaws. This research revealed that blockchain systems raised difficulties that needed to be addressed and that there are still many technical challenges. That is why it is crucial to understand that blockchain-based technology is still in its infancy as an electronic voting option.

Facilities required for proposed work:

Universities computer labs are provided for the Final Project work. Various educational reference books.

Timeline: 6 months

Team:
Role of Members in the team.

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