BLOCKCHAIN-BASED E-VOTING SYSTEM

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ABSTRACT

Online voting is gaining traction in modern society due to its potential to reduce organizational costs and increase voter turnout. By allowing voters to cast their ballots from any location with an Internet connection, the need for physical ballot papers and polling stations is eliminated. However, concerns about vulnerabilities in online voting systems, which could lead to large-scale manipulations, have tempered enthusiasm. Blockchain technology has emerged as a promising solution to address these concerns by offering decentralized nodes for electronic voting. Blockchain provides end-to-end verification, making electronic voting systems more legitimate, accurate, safe, and convenient. This article provides an overview of blockchain-based electronic voting systems, highlighting their potential to overcome existing challenges in traditional electronic voting solutions. The study emphasizes the need for blockchain systems to address privacy protection and transaction speed issues. While blockchain can mitigate problems in election systems, ensuring the security of remote participation and addressing transaction speed for scalability remain crucial. The conclusion suggests that existing frameworks must be enhanced to make them more suitable for use in voting systems, emphasizing the importance of ongoing improvements to achieve a sustainable blockchain-based electronic voting system.

Keyword: - *Voting, E-voting, Blockchain, and Security*

1. Introduction

1. In recognition of the fundamental importance of secure, transparent, and inclusive democratic processes in modern society, we, the undersigned, advocate for the implementation of a blockchain-based voting system. Understanding the critical need for a reliable, tamper-resistant, and verifiable method of recording and tallying votes, we propose the integration of blockchain technology into the electoral framework.

2. This innovative system harnesses the decentralized and immutable nature of blockchain to ensure the integrity and trustworthiness of the voting process. By leveraging cryptographic principles and distributed consensus mechanisms, it offers a solution to address longstanding challenges in traditional voting systems, including concerns about security, transparency, and accessibility. The implementation of a blockchain-based voting system aims to foster greater trust among citizens by providing a transparent and auditable ledger of votes.
3. Each vote, cryptographically secured and time-stamped, becomes an immutable record stored across a network of nodes, thereby mitigating the risks associated with centralized points of failure or manipulation. Moreover, this system facilitates universal access to voting, potentially overcoming geographical barriers and enabling broader participation in the democratic process.

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Fig -1: E voting Sample

2. LITERATURE SURVEY

2.1. IEEE Paper Title: E-Voting System Based on Blockchain Technology

Authors: Sarah Al-Maaitah, Mohammad Qatawneh, Abdullah Quzmar
Year: 2021

Description: This paper intends to assess various uses of blockchain as a help to carry out circulated electronic democratic frameworks. A blockchain-based e-casting ballot application further develops security, and protection, and diminishes the expense, much more, which can be accomplished.

Disadvantages
1. The scale of the implementation is applied on a small scale.
2. They need to improve synchronization, latency, and performance
3. Need to improve of cryptographic method

2.2 IEEE Paper Title: Towards A Privacy-Preserving Voting System Through Blockchain Technologies

Authors: Rabeya Bosri, Abdur Razzak Uzzal, Abdullah Al Omar, and ASMT ouhidul Hasan.
Year: 2019

Description: The democratic framework is the interaction to take the assessment of individuals to appropriately run the constitution. Decency, freedom, and an unbiased attitude ought to be available in the democratic framework. Consequently, it should be a straightforward and gotten process so everyone can offer their own viewpoint uninhibitedly. Overall vote control is a fascinating issue in existing democratic frameworks. Individuals in various nations involve advanced innovation in the democratic cycle (e.g., Optical Output Casting a ballot framework, Web Casting a ballot framework, Electronic Democratic framework) rather than in a conventional way (e.g., Voting booth). No one but digitization couldn't tackle the issues totally. Since still there are various ways of controlling or altering advanced innovation and hampering the democratic cycle. To fabricate a protected electronic democratic climate, we present the use of blockchain innovation as a help for the disseminated electronic democratic framework. With the utilization of blockchain, we accomplish information uprightness which is an essential trait of a democratic climate. The obscurity of the citizens, and the protection, and security of the democratic climate are the principal objective of this work. Through the plan of our framework and with the assistance of blockchain we have addressed all the security issues in the democratic climate.

Disadvantages
1. Privacy challenges in balancing transparency and voter secrecy.
2. Scalability issues affecting transaction processing speed and resource demands.

2.3 IEEE Paper Title: Blockchain Technology Using e-voting system

Author: Prof.Anita A, Lahane, JunaidPatel , Talif Pathan, and Prathmesh Potdar
Year: 2020

Description: This document discusses using blockchain technology to build an electronic voting system to help address issues with current electoral systems like voter fraud, hacking of electronic voting machines, election manipulation, and booth capturing. It reviews existing e-voting systems and outlines objectives for a blockchain-based system like ensuring only eligible voters can vote, the system is tamper-proof, and no organization can manipulate the election process. The proposed system would use blockchain principles of authentication, anonymity, accuracy, and verifiability.

Disadvantages
1. High beginning arrangement costs, especially for organizations.
2. Absence of straightforwardness and confidence in web-based casting a ballot, prompting perceptual issues

2.3 IEEE Paper Title: E-Voting System using Biometrics

Author : CH. Sri Rekha , K.V. Renuka, G. Rama Lakshmi
Year: 2020

Description: The context discusses an e-voting system using biometrics like fingerprints for casting votes in elections. It describes how fingerprints of registered voters are stored in a database. During voting, the system uses a fingerprint scanner interfaced with a Raspberry Pi to match the voter's fingerprint with the database. If matched, the voter can cast their vote through a keypad connected to the system. The votes are stored and counted on the Raspberry Pi. After voting ends, the system can display the total votes cast and the winner.

Disadvantages
1. Fingerprint recognition's unreliability for unclear fingerprints could exclude eligible voters.
2. Large-scale implementation in India faces technical challenges and resource demands.
3. Strong security measures are crucial to protect voter privacy and the integrity of the database.

3. PROPOSED WORK

1. In this system, we have proposed an application where Voters can go to any booth to cast a vote or log in to a web application and cast a vote through online mode.
2. The voters can cast their vote from any location where they are present.
3. The constituency election officer registers voters with AadharNo base. The voter details, election schedule, political party, constituency, election candidates, etc.
4. These are managed by the election officer & election staff of the respective constituency.
5. Based on the constituency of the voter the candidate list will be fetched from the database and displayed to the voter. The voter casts a vote & details are hashed and stored in blockchain in AWS S3.
6. Then the results can be accessed on result announcement day by an authorized entity

4. METHODOLOGY

Project Arranging and Necessities Social occasion:
Characterize the extent of the venture and accumulate itemized necessities for every client job (Political decision Official, Aadhar Staff, Political race Staff, Citizen).

Configuration Stage:
Plan the framework engineering, data set construction, and UIs. Guarantee that the plan consolidates safety efforts to safeguard delicate information and forestall unapproved access.
Characterize the work process for every client's job and how they collaborate with the framework.

Implementation:
Foster the framework iteratively, beginning with center elements and slowly adding greater usefulness. Carry out client verification and approval components to control admittance to various pieces of the framework. Coordinate blockchain innovation for secure and sealed casting ballot records. Use AWS S3 for putting away XML documents safely.

Testing:
Lead careful testing to recognize and fix bugs, guaranteeing the framework's capabilities as planned. Perform unit tests, mix tests, and client acknowledgment tests to approve the framework's dependability, security, and convenience. Consider carrying out mechanized testing cycles to smooth out the testing stage.

Deployment:
Convey the framework to an organizing climate for definite testing and approval. Once approved, convey the framework to creation servers, guaranteeing versatility and dependability. Screen system execution and address any issues that arise during the association.

Preparing and Documentation:
Give instructional courses to framework clients (Political race Officials, Aadhar Staff, Political decision Staff, Citizens) to acclimate them to the framework's elements and functionalities. Make thorough documentation, including client manuals and investigating guides, to help clients in utilizing the framework.

Upkeep and Backing:
Lay out processes for continuous upkeep, including programming refreshes, bug fixes, and security patches. Offer consistent help to address client requests, resolve issues, and execute highlight upgrades on a case-by-case basis.

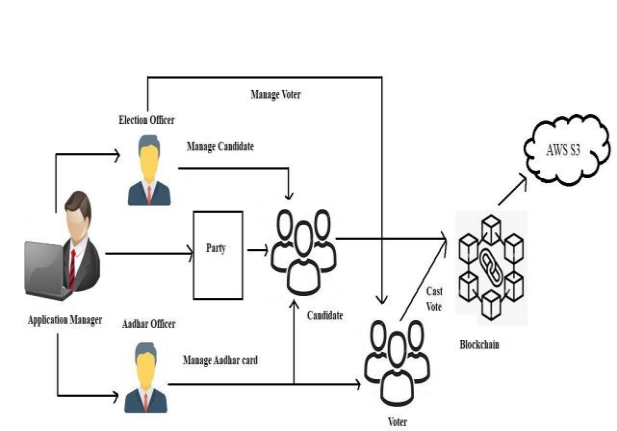

Fig -2: System Architecture

5. RESULTS

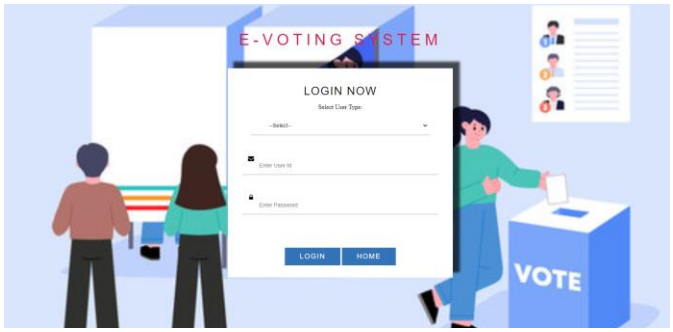

Fig -3: Home Login

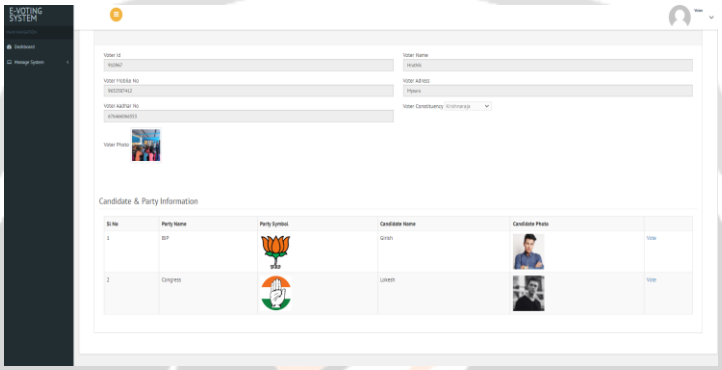

Fig -3: Voter Main Page

6. CONCLUSION

In conclusion, the outlined election management system encompasses essential functionalities catering to various stakeholders involved in the electoral process, including Election Officers, Aadhar Staff, Election Staff, and Voters. For Election Officers, the system provides capabilities such as managing cities, constituencies, parties, election and staff details, as well as recording and disseminating election results. Aadhar Staff can log in to the system to add Aadhar cardholders, facilitating the verification process during voting.

Election Staff members are empowered to register voters within their assigned constituencies and add candidates associated with specific constituencies and political parties. Meanwhile, Voters can securely log in to view their constituency's candidate list, cast their votes using blockchain technology, and view election results post-election.
This comprehensive system ensures transparency, efficiency, and security throughout the electoral process, from voter registration to result declaration. By implementing blockchain technology for vote casting and AWS S3 for secure data storage, the system enhances trust and integrity while safeguarding against fraud or manipulation.

6. FEATURE ENHANCEMENT

Manage Staff based on Voting Booths:
Develop functionality to assign election staff members to specific voting booths within each constituency.
Allow Election Officers to manage and allocate staff resources efficiently based on the workload and requirements of each voting booth.
Implement features for staff scheduling, task assignment, and communication to ensure smooth operations during elections.
Allocate Voting Booths for Voters:
Create a module to allocate voting booths for voters based on their registered constituency.

Enable voters to view their assigned voting booth location and details through the voter application.
Implement algorithms to optimize booth allocation, considering factors such as voter density, accessibility, and logistical constraints.

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