ONLINE E-VOTING SYSTEM USING BLOCKCHAIN

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Abstract: The increasing digitization of societal processes has paved the way for the exploration of innovative technologies to enhance the integrity and security of critical systems, particularly in the realm of electoral processes. This paper introduces an Online E-Voting System utilizing Blockchain technology, aiming to address the challenges associated with traditional voting systems such as fraud, tampering, and lack of transparency. The proposed system leverages the decentralized and immutable nature of blockchain to establish a secure, transparent, and auditable platform for conducting electronic voting.

Index Terms – Blockchain, consensus, e-voting, government, industry, security, transparency.

I. INTRODUCTION

India is a democratic country and has a democratic country. As now all Indian citizen become a part of the growing digital India with a digital ID that is Aadhaar card. Voting schemes have evolved from counting hands in early days to systems that include paper, punch card and electronic voting machine.

Traditional voting systems have grappled with issues ranging from tampering of votes to concerns about the integrity of the overall electoral process. As societies increasingly rely on digital solutions, there is a pressing need to adapt and innovate electoral practices to ensure they remain robust, reliable, and resilient against emerging threats. The utilization of blockchain technology presents a compelling opportunity to instill trust in online voting systems by leveraging its decentralized and tamper-resistant characteristics.

The decentralization of blockchain technology, characterized by a distributed ledger that records transactions across a network of nodes, offers a novel approach to address vulnerabilities present in centralized voting systems. By employing cryptographic principles and consensus mechanisms, blockchain not only safeguards the integrity of individual votes but also ensures the transparency of the entire electoral process. This transparency is crucial for instilling confidence among voters, election authorities, and stakeholders in the democratic process.

In the following sections, this paper will delve into the intricacies of designing and implementing an Online E-Voting System using blockchain technology. Through a comprehensive examination of the system's architecture, security features, and potential benefits, we aim to demonstrate how blockchain can serve as a robust foundation for the evolution of secure and transparent online voting systems, thereby bolstering the fundamental pillars of democratic governance in the digital era.

II. METHODOLOGY

EXISTING SYSTEM

The Existing System of Election is running manually. The Voter has to Visit to Booths to Vote a Candidate so there is wastage of Time. Due to this many people don't go out to cast their vote which is one of the most important and Worrying factor. In democracy Each and every vote is important. This Traditional system can be replaced by a new online system which will limit the voting frauds and make the voting as well as counting more efficient and transparent.

PROPOSED SYSTEM

The current voting system requires some improvement in it because of the issues mentioned above. This can be achieved by replacing the existing system by the new system which will limit the voting frauds and make the voting as well as counting more efficient

Blockchain can help to implement a system that is immutable, transparent, and efficient and cannot be hacked into. The inability to change or delete information from blocks makes the blockchain the most effective technology for voting systems. Blockchain technology is supported by a distributed network consisting of variety of interconnected nodes. Each of these nodes have their own copy of the distributed ledger (information) that contains the total history of all transactions the network has processed. There is no centralized system that controls the network. If the majority of the nodes agree, then they accept a transaction. This network permits users to stay anonymous. A basic analysis of the blockchain technology (including sensible contracts) suggests that it is an appropriate basis for e-voting and furthermore, it might have the potential to form e-voting a lot of acceptable and reliable.
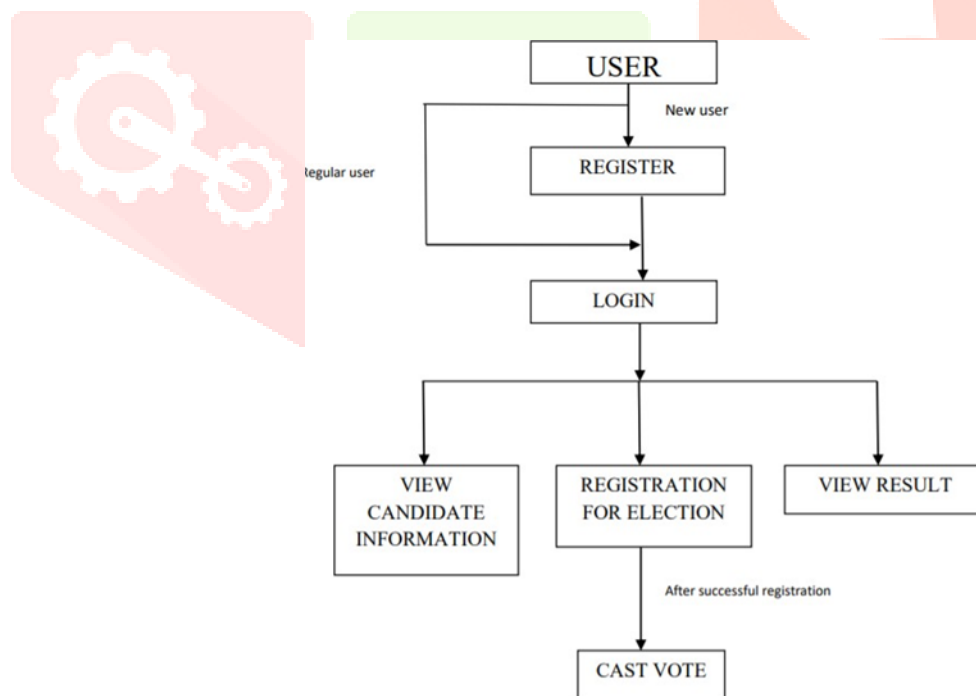

Fig. data flow diagram

III. SYSTEM ARCHITECTURE

The architecture of the proposed Online E-Voting System leveraging blockchain technology is designed to ensure a secure, transparent, and tamper-resistant electoral process. The system employs a decentralized approach, utilizing blockchain's inherent features to address the vulnerabilities associated with traditional voting systems.

1. USER INTERFACE

Provides a user-friendly platform for voters to cast their votes securely. It includes options for voter authentication, candidate selection, and submission of votes.

2. USER AUTHENTICATION

Voters are authenticated through secure login credentials, ensuring that only eligible individuals can participate in the voting process. This layer acts as a gateway to the voting interface
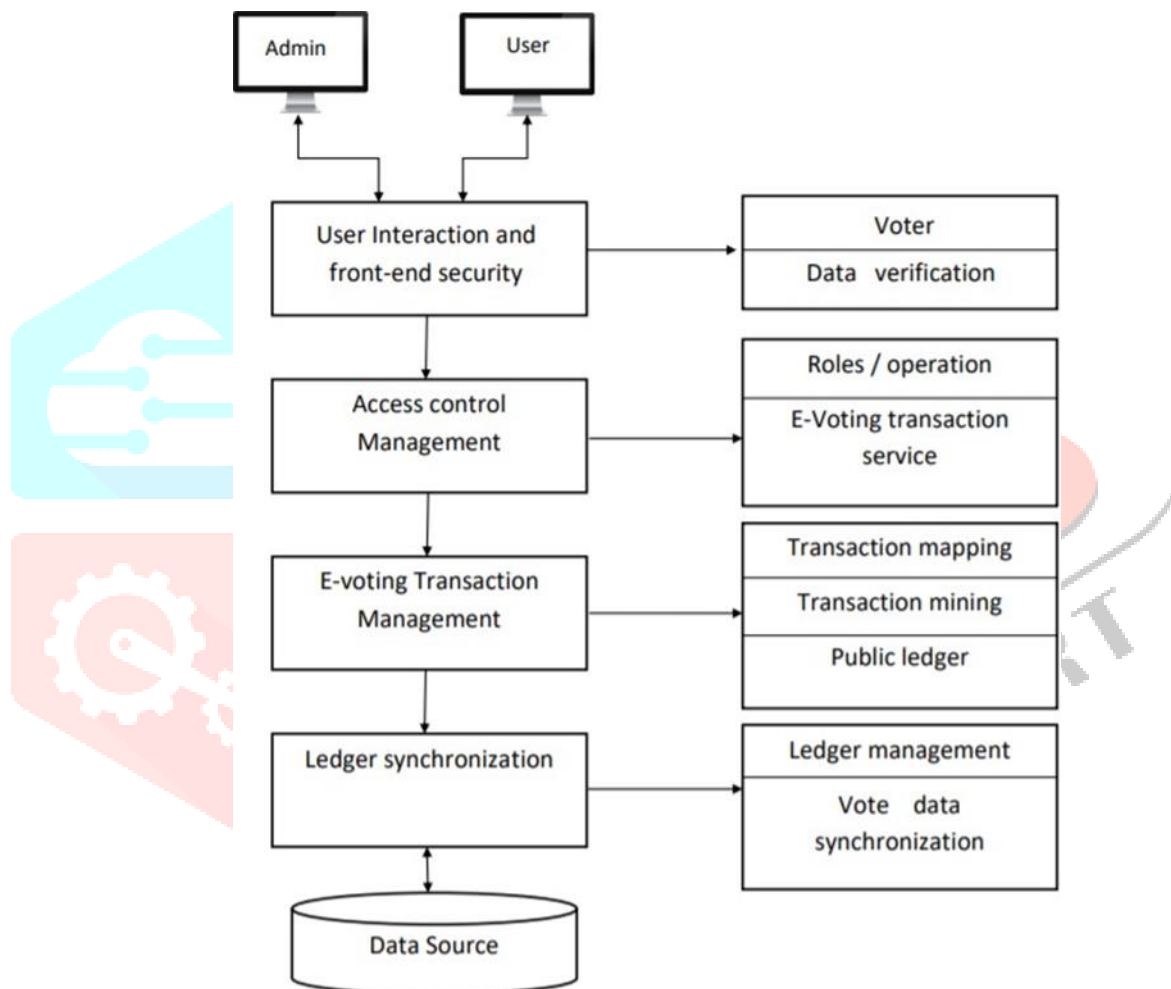

Fig. System Architecture

3. BLOCKCHAIN NETWORK

A decentralized network of nodes forms the backbone of the system, utilizing blockchain technology. This network is responsible for reaching consensus on the validity of transactions and maintaining a distributed ledger of votes.

4. VOTER IDENTITY AND KEY MANAGEMENT

Each voter is assigned a unique cryptographic identity, and a secure key management system is implemented to ensure the confidentiality and integrity of voter information. Public and private key pairs are generated for secure authentication and transaction signing.

5.DECENTRALIZED STORAGE

All voting transactions and relevant information are stored in a decentralized manner across nodes in the blockchain network. This ensures that there is no single point of failure or vulnerability in the storage of critical election data

6.RESULT VERIFICATION INTERFACE

A transparent results verification interface allows voters, election authorities, and other stakeholders to independently verify the recorded votes and the overall outcome of the election.

IV. LITERATURE SURVEY

I. Blockchain-Based Online Voting System: A comprehensive Review:

This literature survey provides an in-depth analysis of existing research on online voting systems leveraging blockchain technology. It explores various blockchain architectures, consensus mechanisms, and security features implemented in different proposals, offering a comprehensive understanding of the evolving landscape.

II. Security challenges and solutions in blockchain-enabled e-voting systems

This literature survey provides an in-depth analysis of existing research on online voting systems leveraging blockchain technology. It explores various blockchain architectures, consensus mechanisms, and security features implemented in different proposals, offering a comprehensive understanding of the evolving landscape.

III. Decentralized and transparency: examining blockchain's impact on electoral processes

This literature survey provides an in-depth analysis of existing research on online voting systems leveraging blockchain technology. It explores various blockchain architectures, consensus mechanisms, and security features implemented in different proposals, offering a comprehensive understanding of the evolving landscape.

IV. User experience and adoption of blockchain -based e-voting system

This literature survey provides an in-depth analysis of existing research on online voting systems leveraging blockchain technology. It explores various blockchain architectures, consensus mechanisms, and security features implemented in different proposals, offering a comprehensive understanding of the evolving landscape.

V. Legal and regulatory consideration in blockchain-enabled e-voting

This literature survey provides an in-depth analysis of existing research on online voting systems leveraging blockchain technology. It explores various blockchain architectures, consensus mechanisms, and security features implemented in different proposals, offering a comprehensive understanding of the evolving landscape.

VI. Comparative analysis of blockchain consensus mechanism for e-voting system

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V. CONCLUSION

In this project, we introduced a blockchain-based electronic voting system that utilizes smart contracts to enable secure and cost-efficient election while guaranteeing voters privacy. Blockchain technology offers a new possibility to overcome the limitations and adoption barriers of electronic voting systems which ensures the election security and integrity and lays the ground for transparency. Using an Ethereum private blockchain, it is possible to send hundreds of transactions per second onto the blockchain, utilizing every aspect of the smart contract to ease the load on the blockchain.

VI. ACKNOWLEDGEMENT

REFERENCES

[1]. Dongliang Xu, Wei Shi, Wensheng Zhai and Zhihong Tian, "Multi-Candidate Voting Model Based on Blockchain", IEEE/CAA Journal of AutomaticaSinica, vol. 8, no. 12, December 2021.

[2]. Himanshu Agarwal and GN Pandey, "Online voting system for india based on aadhaar id", 2013 Eleventh International Conference on ICT and Knowledge Engineering, pp. 1-4, 2013.

[3]. Soumyajit Chakraborty, Siddhartha Mukherjee, Bhaswati Sadhukhan and Kazi Tanvi Yasmin, "Biometric voting system using aadhar card in India", International journal of Innovative research in Computer and Communication Engineering, vol. 4, no. 4, 2016.

[4]. P. Tarasov and H. Tewari, "The future of E-voting", IADIS Int. J. Computer. Sci. Inf. Syst., vol. 12, no. 2, pp. 1-19, 2017.

[5]. N. Kshetri and J. Voas, "Blockchain-enabled Evoting", IEEE Software., vol. 35, no. 4, pp. 95-99, Jul. 2018.

[6]. J. Xie, H. Tang, T. Huang, F. R. Yu, R. Xie, J. Liu, et al., "A survey of blockchain technology applied to smart cities: Research issues and challenges", IEEE Commun. Surveys Tuts., vol. 21, no. 3, pp. 2794-2830, 3rd Quart. 2019.

[7]. What is blockchain, [online] Available: https://www.investopedia.com/terms/b/blockchain.asp.

[8]. Basit Shahzad and Jon Crowcroft, "Trustworthy electronic voting using adjusted blockchain technology", IEEE Access, vol. 7, pp. 24477-24488, 2019.

[9]. S. Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System.

[10]. P. N. Gour, S. Narumanchi, S. Saurav and S. Singh, "Hardware accelerator for real- time image resizing", Proceedings of the 18th IEEE International Symposium on VLSI Design and Test, pp. 1-6, 2014.

[11]. A Amer and H El-gendy, "Towards a Fraud prevention e-voting system", International Journal of Advanced Computer Science and Applications, vol. 4, no. 4, pp. 147-149, 2013.

[12]. V. Lakshmi Narayana, "Secured data transmission with integrated fault reduction scheduling in cloud computing", Ingenierie des systems d'Information 2021, vol. 26, no. 2, 2021.

[13]. V. Lakshmi Narayana, "Secured resource allocation for authorized users using time specific blockchain methodology", International Journal of Safety and Security Engineering, vol. 11, no. 2, pp. 201-205, 2021.

[14]. V. Lakshmi Narayana, "Computational Intelligence Approach for Prediction of COVID-19 using Particle Swarm Optimization", Studies in Computational Intelligence, vol. 923, pp. 175-189, 2021.

[15]. V. Lakshmi Narayana, "A Trust Based Efficient Blockchain Linked Routing Mrthod for Improving Security in Mobile Ad hoc Network", International Journal of Safety And Security Engineering, vol. 10, no. 4, pp. 509-516, 2020.

[16]. V. Lakshmi Narayana, "Secure data uploading and accessing sensitive data using time level locked encryption to provide an efficient cloud framework", Ingenierie des Systems d'Information, vol. 25, no. 4, pp. 515-519, 2020.