International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 11 | November - 2023 SJIF Rating: 8.176 ISSN: 2582-3930

Digital Voting Application using Blockchain Technology

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Abstract - Building a secure electronic voting system that offers the fairness and privacy of current voting schemes, while providing the transparency and flexibility offered by electronic systems has been a challenge for a long time. The development of a robust and secure e-voting system is crucial to ensure the integrity and authenticity of electoral processes. In this context, the integration of blockchain technology with face detection and Aadhar card verification presents an innovative solution. This system combines the power of blockchain's immutability and transparency with biometric authentication through face recognition and Aadhar card validation. By leveraging blockchain, the system can maintain a tamper-proof ledger of votes, ensuring their verifiability and integrity. The incorporation of face detection and Aadhar card verification enhances security by ensuring that only eligible voters can participate, thereby reducing the risk of fraudulent voting. This abstract introduces a novel e-voting system that promises to enhance the trust and reliability of the electoral process through blockchain technology, face detection, and Aadhar card authentication.

Key Words*: *Blockchain, Electronic Voting System and Evoting, face recognisition.

1.INTRODUCTION

The use of technology has become important at this point in helping to meet human needs. Due to the increasing use of technology, new challenges are brought in the process of democracy as most people today don't trust their governments, making elections is very important in modern democracy. Elections have a great importance in determining who will rule a nation or an organization or it can be said as it is an event that decides the fate of any nation. In modern democracy, elections are very important but large sections of society around the world do not trust their election system which is a major concern for democracy. Even the world's largest democracies like India, United States, still suffer from a flawed electoral system. Vote rigging, hacking of EVM (Electronic voting machine), election manipulation, and polling booth capturing are the major issues in the current voting system.

The blockchain is said as emerging, decentralized, and distributed technology that promises to enhance different aspects of many industries. Expanding e-voting into blockchain technology could be the solution to eliminate the present concerns in e-voting system. There is no doubt that the ever-changing concept of the blockchain, which is the backbone of the famous cryptocurrency Bitcoin has triggered the start of a new era in the Internet and the online services. While most people focus only on bitcoin and other cryptocurrencies; there are in fact, many operations, both administrative and fintech that can only be done online/offline can now safely be moved to the Internet as online services because of immutability of blockchain. What makes blockchain a powerful tool is its smarts contracts and many features which overcomes traditional systems.

The advent of the digital age has opened up new possibilities for transforming traditional voting systems into more secure, efficient, and accessible processes. One promising innovation in this domain is the integration of blockchain technology with face detection and Aadhar card verification to create an advanced e-voting system. This system aims to address the longstanding challenges associated with electoral fraud, voter impersonation, and the need for secure online voting platforms. By utilizing blockchain's inherent security features, including immutability and transparency, it offers a robust framework for recording and storing votes securely. Moreover, the incorporation of face detection and Aadhar card verification enhances the system's trustworthiness by ensuring that only eligible voters can cast their ballots, reducing the risk of unauthorized or fraudulent voting. This introduction sets the stage for a comprehensive exploration of a cutting-edge e-voting solution that harnesses the potential of blockchain technology while bolstering security through biometric verification methods.

2. PURPOSE

Elections are fundamental pillar of a democratic system enabling the general public to express their views in the form of a vote. Due to their significance to our society, the election process should be transparent and reliable so as to ensure participants of its credibility. Within this context, the approach to voting has been an ever-evolving domain. Blockchain is one of the emerging technologies with strong cryptographic foundations

enabling applications to leverage these abilities to achieve resilient security solutions.

3. EXISTING SYSTEM

- Electronic voting has been an area of research focus for many years by using computing machines and equipment for casting votes and producing high quality and precise results in accordance with the sentiments of the participating voters.
- Initially computer counting system allowed the voter to cast vote on papers.
- If the voting system is well understood by the voters, the system's usability can be increased remarkably.

4. OBJECTIVE OF SYSTEM

1. To make such a system which will be easy to use and more user friendly for our customer.
2. Centralized management system.
3. To build an online system this would enable voters to cast their votes on chosen candidates.
4. Study and implement a security method to be used to ensure that votes being cast in the system will not be compromised and any outside attack.
5. The main objective of this review is to design a E-voting mechanism based on blockchain, to avoid fraudulence and Malpractice by the voters who have registered as a voter and to improve the security performance by making facial authentication, it helps in providing easy access to cast the vote.
6. The blockchain based voting system is a versatile solution for mal practices within the loose and honest electoral process.

5. LITERATURE SURVEY

"A Visionary Approach to Smart Voting System" a paper of Rohit Sroa. A paper state that with the emergence of COVID-19 as a global pandemic, the need for an online voting system is becoming appallingly evident in India. Unfortunately, India still suffers from a flawed electoral system in today's scenario. Ballot rigging, hacking of the EVM (Electronic voting machine), election manipulation, and polling booth capturing are the significant issues in this voting system. To avert such a costly predicament in the future, many countries are currently experimenting with blockchain-based voting systems. However, there are also significant drawbacks to this method. Consequently, our paper proposes a novel online voting system based on hash graph technology. The hash graph encryption method is a superior version of blockchain encryption and eradicates a few drawbacks of blockchain. This system preserves participant's anonymity while still being open to public inspection. Voters are authenticated using their Voter Id, Aadhaar Card Number, and face recognition. Furthermore, JWT Authentication is implemented to enhance the security of the login portal. Additionally, the voters can also assure their cast vote using the highly encrypted unique ID generated by our system. Besides that, the voter data is stored in a highly secured database. Furthermore, homomorphic encryption is used to store the votes and assist in counting the vote securely. Finally, it is also equipped with a chatbot that works as a support to the voters. In conclusion, this paper presents an in-depth evaluation of the scheme that successfully demonstrates its effectiveness in achieving an end-to-end verifiable online voting system. [1]

"Aadhar Card based smart e-voting system", Author K. Lakshmi. This paper presents, the paper proposes the need of a protected voting system to avoid the unlawful voting The authentication of an individual are made using biometric and capability of the voter is affirmed using the Aadhar. In this system the data stored in the Aadhar card act main criteria for authentication and conformation. The security is provided through biometrics such as fingerprint. The fingerprint information stored in the Aadhar is taken as the reference and used for authentication at the time of voting. The proposed system prevents the bogus voting (i.e.) the voting of an illegal citizens. [2]

"RFID Based Smart Voting System" B. Surendra Rao. This paper describes the design, operation of smart EVM using microcontroller, RFID, GSM technology to improve the election process by avoiding the electoral fraud and to ensure safety, security, reliability, guarantee and transparency and smooth conduct of elections in the country as the voting is of crucial importance in the society where people determine its government. This paper talks about an innovative approach for voting process where the device communicates with the RFID tag which is embed in the voter ID card [3]

"Advanced voting machine using face recognition", is paper of A Samundeeswari. This paper state that, project is advance voting machine using face recognition will provide better safe and secure voting system. During the voting session, the person and his database image matching is verified. Based on the image recognition results, the person is allowed or prohibited from voting. With this systematic verification, fake voters could be prevented. In case of fake attempts, the original voter will also be alerted via GSM message.[4]

"Arduino Based Authenticated Voting Machine (AVM) using RFID and Fingerprint for the Student Elections", is paper of Vinayachandra. This paper state that design of an advanced voting system is a difficult task as many main requirements have to be met. The secrecy of a poll should be maintained. No proof of which candidate gets particular voting shall be provided by the voting system. The authors implemented the Authenticated Voting Machine in the College elections in this paper to ease the process and improve transparency. The concept is still in its infancy and requires more research to keep it stable and theoretically strong. To ensure protection, the model uses radiofrequency and fingerprint recognition.[5]

6. SYSTEM ARCHITECTURE

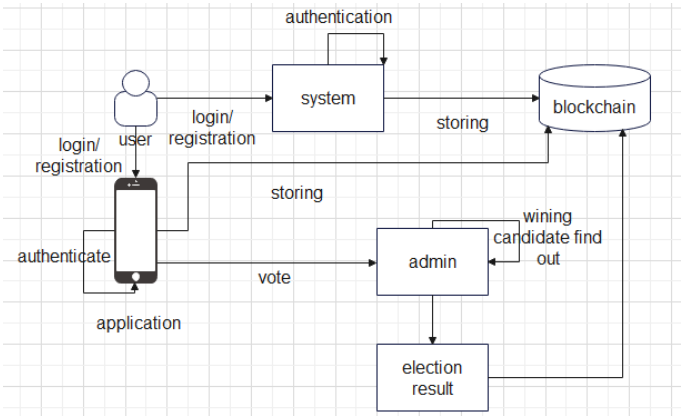

Fig -1: System Architecture Diagram

7. IMPLEMENTATION DETAILS

The implementation of a face detection and Aadhar card-based e-voting system using blockchain technology involves a multi-faceted approach to ensure its effectiveness and security. To begin with, voter registration would require individuals to authenticate their identity using Aadhar cards, which are unique and government-issued identity documents in India. During this process, a voter's biometric information, such as fingerprints and facial features, would be captured for subsequent verification.

Once a voter is registered, the blockchain would serve as the underlying ledger for recording and storing votes securely. Each vote would be encrypted and timestamped, ensuring the anonymity of the voter while providing an immutable and transparent record of the ballot. This blockchain network would be decentralized, preventing any single point of failure and enhancing resilience against cyberattacks.

The face detection component of the system would play a critical role in ensuring that the individual casting the vote matches the biometric data captured during registration. This biometric verification would add an additional layer of security to prevent unauthorized voting and voter impersonation.

To further enhance security, smart contracts within the blockchain could automate the verification and tallying process, ensuring that only valid votes are counted, and the results are calculated accurately. Additionally, the system can provide real-time monitoring and auditing of the election process to detect any irregularities.

8. MATHEMATICAL MODEL

System Description:

S = (I, O, F)

Where,

S: System.

I = {UI, AD, FR} are set of Inputs

Where,

UI: User Id Login

AD: Aadhar Data

FS: Face recognition

F = {A, P} are set of Function

Where,

A: Authentication

P: processing

O = {N, U} are set of Output

Where,

N: Notification

V: Vote

Success Conditions:

Proper database, Scanning

Failure Conditions:

No database, internet connection

9. APPLICATION

To develop a secured electronic voting system using face recognition and Aadhar verification techniques that would tackle all the drawbacks presented in this project and satisfy e-voting functional and security requirements towards achieving credible elections at all levels.

REFERENCES

1. Blockchain Based E-Voting System, May 2021International Journal of Scientific Research in Science and Technology, Prof. Mrunal Pathak, Amol Suradkar, Ajinkya Kadam, Akansha Ghodeswar
2. E-voting systems: A tool for e-democracy, January 2010Knowledge Management Research Practice 2(3):264-274, Emad Abu-Shanab, Michael B. Knight
3. Science and Information Conference 2015 July 28-30, 2015 — London, UK 1365 — P a g e www.conference.thesai.org, A Secure e-Government's e-Voting System, Mohammad Hosam Sedky, Essam M. Ramzy Hamed
4. E-Voting System Based on Blockchain Technology: A Survey, Sarah Al-Maaitah; Mohammad Qatawneh; Abdullah Quzmar, 2021 International Conference on Information Technology (ICIT)IEEE 2021
5. International Journal of Trend in Research and Development, Volume 2(5), ISSN 2394-9333 www.ijtrd.com IJTRD — Sep - Oct 2015 Available Online@www.ijtrd.com 438, Student Online Voting System, Raja Lakshmi, Meenakshi Nivya and K S Selvanayaki.
6. 'RFID Based Smart Electronic Voting System For Reducing Electoral Frauds Using Arduino', Ms.A.Achamma, Ms.P.SelvaSundari, Ms.A.Jaya, Ms.P.Umamaheshwari, Mr.K.Karthik, SSRG International Journal of Electronics and Communication Engineering , January 2021.
7. 'Arduino Based Authenticated Voting Machine (AVM) using RFID and Fingerprint for the Student Elections', Vinayachandra, K Geetha Poornima, M Rajeshwari and K Krishna Prasad, Journal of Physics: Conference Series, 2020.
8. 'Iot Based Voting Machine With Fingerprint Verification', Shilpa C Venugopal, Resmi K. Rajan, International Journal of Applied Engineering Research ISSN 0973-4562 Volume 15, June 2020.
9. 'Advanced Voting Machine Using Face Recognition', A Samundeeswari , P Parthasarathy, K Ragul, K Raguram , International Journal of Creative Research Thoughts (IJCRT) www.ijcrt.org, 2020.
10. Election Commission of India, 2018, Status Paper on Electronic Voting Machine(Ed-3). Retrieved from https://eci.gov.in/files/file/8756-status-paper-on-evm-edition-3/
11. M, D. K., A, S., N S, A., & D, P. K, 2016, Embedded System Based Voting Machine System using Wireless Technology. International Journal of innovative research in electrical, electronics, instrumentation and control engineering, February 2016, 4(2), 127–130.
12. Hasan, S. M., Rashid, M. T., Chowdhury, M. S. S., & Rhaman, M. K, 2016, Development of a credible and integrated electronic voting machine based on contactless IC cards, biometrie fingerprint credentials and POS printer. Canadian Conference on Electrical and Computer Engineering (CCECE), Vancouver, BC, 2016, 1-5