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A Reliable E-Voting System Using Blockchain

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Abstract: ***We place a great deal of importance on our electoral system as a society. As a result of the election system, we developed the future of our nation and country. Technological advancements and inventions are very easy to come by in the modern world. Nowadays, everyone wants a sophisticated lifestyle and rapid speed. In this technology when the development of the nation is mandatory then trusted technology is also mandatory. Blockchain technology is secure and end-to-end encrypted. When the technology meets the human correct needs then technology correct use is invoked. We are using blockchain technology to create a secure voting system that eliminates concurrence. Blockchain technology is a decentralized, disruptive, encrypted voting system that is necessary for the current era. E-voting systems designed for end-to-end encryption, security, portability, user-friendliness, and preference are described in this paper.***
Keywords: Blockchain, smart contract, HTML, CSS, React-js, web3.

I. INTRODUCTION

In our e-voting system we define selection is a smart contract between voter and oursystem. Each node is connected to another node in between the voting system. We developed a web where blockchain technology is used for validation, verification, authenticity, and accuracy. Based on the blockchain system, we build a secure model beyond the trust boundaries. Blockchain enables for decentralization, without intermediaries. The blockchain need is Voting system shouldn't be traceable. Voters are sure of where their votes are counted. In the voting system eligibility also verify. The election system is cost-efficient. Blockchain is a tamperproof and non-alterable system. Html, CSS, and JScript are the web building languages used for the system.

We define selection in our e-voting system as a smart contract between the vote and our system. In thevoting system, each node is connected to another node. With the help of blockchain technology, we developed a web that validates, verifies, authenticates, and ensures accuracy. We create a secure modelthat transcends trust boundaries through the blockchain system. Subsidiarity are enabled by blockchain, without the need for intermediaries. The blockchain need is Voting system shouldn't be traceable. Voters are sure of where their votes are counted. In the voting system eligibility also verify. The election system is cost-efficient. Blockchain is a tamperproof and non-alterable system. Html, CSS, and JScript are the web building languages used for the system.

II. METHODOLOGY

A. Frontend

Frontend of e-voting system involves several sub modules. The System userwill interact with this module. This frontend module is consisting of various sub-modules,and all these sub-modules will work independently. There are a total of ten sub-modules, they are as follows:

1) *Admin Login Module:* In order to proceed, the Admin Login module is required. This module requires voters to enter their mobile numbers. After entering themobile number, voters must click the login button.
2) *OTP Module:* The next module will be OTP Module where voters have to enter their Aadhaar card number which is linked to their mobile number. After resolvingthe captcha, you can move on to the next module successfully.
3) *Verifying OTP:* After entering the Aadhar number, the voter gets OTP on their mobile. The voter has to write this OTP and click on verify OTP.
4) *Voting Module:* After verifying OTP, candidates' symbols and names will appear. Voters can vote according to their choice.

B . Backend

In the backend, Ethereum is used to store data. In this system, there is nointeraction between the votes cast by voters and their identities. A casting vote is permanently recorded and cannot be modified or altered at any circumstances. In order toensure the number of votes is accounted for, the system will be verifiable. Voting will berestricted to registered voters.

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Summary of Papers:

1) "Friðrik Þ. Hjálmarson and Gunnlaugur K. Hreiðarsson"[2020] "Blockchain based E-voting System" ,Technique and methods used: Smart contract, Multi-Authority Election Schemes a Secure and Efficient Method, presented a method of the election with a secret ballot that would guarantee privacy, robustness, and universal verifiability, where voters would contribute using a PC, where the main concern is the effort required of voter limitations: Users may vote if they have a balance in a compliant token.
2) "Haibo Yi"[2019] "Safe Digital Voting System based on Blockchain technology" Technique and methods used: P2P network, The author wishes to extend his most sincere thanks to the section editor and reviewers for their time, a thorough review of our manuscript, and valuable insights on this paper. Limitations are; The current study did not generate or analyse datasets there for not eligible for data sharing.
3) "Prof. Anita A. Lahane1, Junaid Patel1, Calif Pathan1, and Prathmesh Potdar"[2020], "Blockchain technology- based on the e-voting system" ,Technique and methods are used: Hashing algorithm, Convenient to use the business Intelligence(BI) Tools Limitation are; Anonymous vote forming and the Personalized ballot processes are included.
4) "Adarsh.G.Vernekar1, MaheshPhutane2, RohitGodase3, VinayakWaghmode4, Mr.S.M.Shinde"[2020] ,"Blockchain-based E-Voting System" ,Method used; Smart contract, This E-Voting system is economical than the traditional electoral system to use. Extreme security is delivered by the network to all/any of the contributors within the election. Limitation; The DoS attacks aren't feasible as we use the "Proof of Authority consensus algorithm" in our case
5) "Ms.Satoshi Nakamoto"[2020], "Bitcoin: A Peer-to-Peer Electronic Cash System", Techniques are used: Peer-to-peer network, Even though digital signatures offered a part of the solution. They lose their main advantages if a third party must still involved in stopping double-spending. As part of the traditional banking model, all parties involved and trusted third parties have access to information.
6) "Prof. Pallavi Shejwal1, Aditya Gaikwad2, Mayur Jadhav3, Nikhil Nanaware4, Noor Mohan med Shikalgar"[2019], "E-voting using blockchain Technology", Method used; cryptography, With fewer votes, a nation will be unable to develop, since choosing a good leader is essential. The system we propose is designed to provide a safe and worthy database and reliable E-voting among all the people., Limitations are; In the submitted block id node, the following id node such that it becomes the following; token the timestamp voting outcome hash from the earlier node, and the digital signature of the node are all included.
7) "Naina Nage Sh Dhepe, Dr. Pathan Mohd Shafi"[2021], "A Review on Smart-Electronic Voting System Using Block- Chain Technology" ,Methods used: Blockchain, networking .This voting system is designed for sizing small to medium-sized Internet-based public opinion systems that provide privacy of votes, authentication of voters, audit ability, security and protection from double voting. As soon as a voter casts a ballot with the NCVVS system, they will receive an email confirmation containing the ballot fingerprint (and the election fingerprint) calculated with the SHA algorithm (256).
8) "Uzma Jafar and Mohd Juziddin Ab Aziz and the Zarina Shukur" [2021], "Blockchain for Electronic Voting System", a method used; Blockchain system, Privacy: The choices of the voter cannot be accessed by anyone except the voter There should be no errors in the counting of valid ballots.
9) "Snehal Kadam Khushbu Chavan , Ishita Kulkarni , Prof. Amrut Patil"[2019], "Review on Modern E-Voting System by using Blockchain Technology: Block chain system, voting system , A vote is assigned to you after your details have been verified. There is still a need for external trust anchors despite block chain.
10) "Pavel Tarasov, Hitesh Tewar" [2018],"The upcoming of E-voting ",Blockchain system Currently, there is no blockchain protocol that offers anonymity of transactions, a characteristic not found in voting technology. Security protocol verification is inadequate.
11) "vo Kubjas" [2017] ,Paper Name: "Using blockchain for enabling internet voting", Blockchain system Using Block chain technology to secure and reliably conduct internet voting. Coercion resistance allows for re-voting.
12) "Yash Dalvi, Shivam Jaiswal, and Pawan Sharma" [2021] Paper Name:"E-Voting using Block-chain" ,Blockchain, cryptography, security, level, Advantage We suggest implementing a transaction panel in the application where the user can verify, based on their identity, whether the vote was accurately cast for the right candidate in order to maintain transparency of the voting process.

    In order to keep the nation from being tripped up by premature results, the pollpanel must not be activated before the end of the event.
13) "J. P. Gibson, R. Kri0069mmer, and V. Teague, and J. Pomares"[2015], Paper Name: "A review of: E-voting, the past, present; and future", Block chain system Advantage They take a different view of electronic voting. The review focuses on past and current e-voting systems.

14) "Rachid Anane, and Richard Freeland and Georgios Theodor Poulos" [2014], Paper Name: "E- voting requirements & implementation Blockchain system, networking, cryptography advantage A prototype e-voting system is designed and implemented, and a context is providedfor selection and deployment of appropriate mechanisms. By securing worthiness, and preventing bribery; and coercion, they could not maintain not maintain the integrity of the democratic process

III. PROPOSED SYSTEM

From above listed papers we have observed that many of papers used peer to peer network technology, cryptography, etc. technologies. We have observed some limitations, to overcome this limitation we have adda new idea in our system. In earlier system authentication is done by authenticating voter id number. In our system authentication is done by authenticating Aadhar number by sending OTP to the voter's mobile number linked with Aadhar number, before authentication voter has to solve auto-generated captcha. If the voter hasvalid age, then voter can move further for next window. After that voter can cast vote for desired candidate.

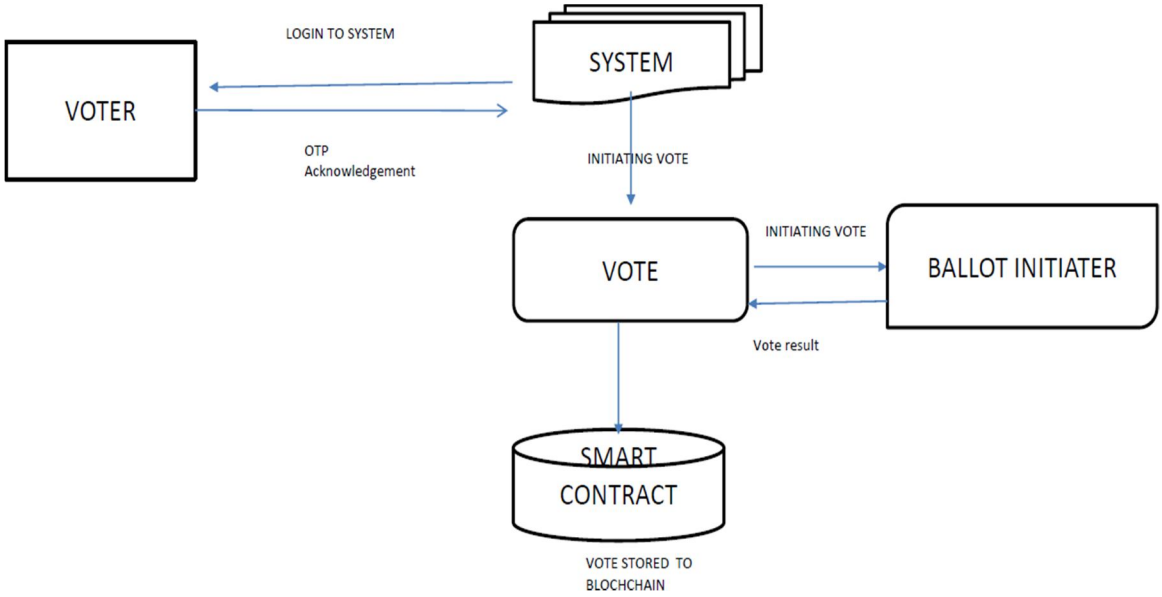


Fig.1. E-voting Proposed System

IV. SHA 256 ALGORITHM

SHA-256 is a variant of SHA-2 (Secure Hash Algorithm 2), which was invented by the National Certain sensitive information must be protected by the US government using SHA-256Security Agency in 2001. Cryptographic hash function SHA-256 produces a value of 256 bits. Hashing functions like SHA-256 are among the most secure on the market. Certain sensitive information mustbe protected by the US government using SHA-256. Specifics of SHA-256's operation are classified, however, we know that it uses a Merkle-Damaged structure derived from a specialized block cipher'sone-way compression function.

Security is provided by three properties of SHA-256. In the first place, reconstructing the original datafrom a hash value is nearly impossible. To generate the initial data, there would need to be 2256 attempts to perform a brute-force attack. Secondly, it is extremely unlikely that two messages will havethe exact equal hash value (called a collision). Since there are 2256 possible hash values (more than the number of atoms in the known universe), it is highly unlikely that two have the same hash value. Lastly, changing the original data so much changes the hash value so it isn't immediately apparent it comes from the same source; this is known as the avalanche effect.

V. RESEARCH GAP ANALYSIS

By referring to several related works, the following challenges associated with the E-voting system are noticed**:**

1) Users may only vote if they have a balance in a compliant token.
2) Security protocol verification is inadequate.
3) There should be no errors in the counting of valid ballots.
4) There is still a need for external trust anchors despite blockchain

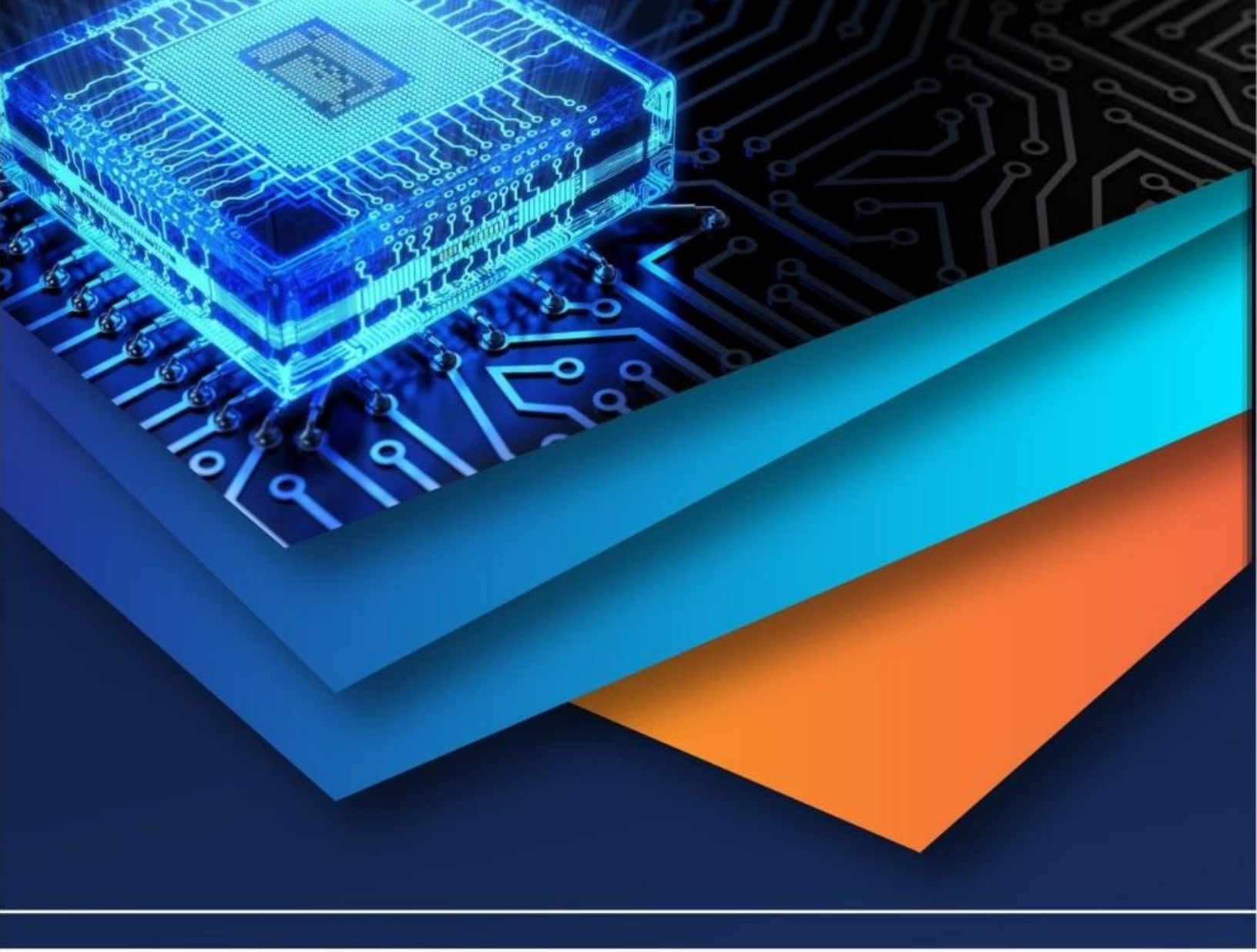
VI. CONCLUSION

The primary initiative is for developed an easier, cheaper, and more secure voting system.We focused on the use of a sensible voting system. We have also focused on security issues in the previous system and tried to overcome them. This voting system is providing transparency between the voter and the election system. Blockchain-based E-Voting system gives surety of authentication tothe voter. We are trying to avoid data loss and interference from the third party.

The system has only one admin and only the admin can change and update the data of the voting system for avoiding mismatch and loss of data. OTP generation is a mandatory part of the system. After OTP generation voter is ensured that he is in the login phase. Authenticity is the main part of our system that it invokesvery well. On the other hand, after getting successfully OTP voters are visible to the next window, where they can see party names and their symbols, candidate names, and the vote option button. Afterone vote initializes the voter vote option gets disabled, that is one voter can give only one vote.

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