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Blockchain-Driven Digital Electoral System for India

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ABSTRACT: As a democratic country, India enables inhabitants above the age of eighteen to cast ballots to select the applicant they think would advance the nation's interests. Another essential citizen right is the aptness to vote. The method utilized to hold elections and cast ballots safely is called digital voting. Voters no longer need to physically congregate and can cast their ballots electronically instead of on paper thanks to digitization. In an election, they are limited to casting one ballot. The utility using blockchain technology in digital Voting procedures are being investigated through a survey. A promising solution that facilitates seamless transactions using distributed and decentralized technology is the blockchain. As stated by the literature, these systems use face authentication, fingerprint authentication, and other biometric authentication. Moreover, there are other blockchain-based frameworks for online voting. Hundreds of transactions can be processed at once by Ethereum, which is proven to be the greatest blockchain framework. This research presents a method for creating our nation's voting procedure that makes use of the Ethereum foundation, a retina scanner, and OTP for authentication while taking the aforementioned context into account. Blockchain technology enhances digital voting to improve security and address issues with the current voting methodology. The proposed system has the propemsity to manage fraud and conduct the electoral process remotely.

I. INTRODUCTION

As of now, all citizens of India are eligible for voting by using an Aadhar card which Is a part of growing digital India with a digital Id but their name should be enrolled in the list. Present voting scheme punch, paper and electronic voting machine which has begun its era from counting from hands.

The present system of election takes place manually. In this system, the user has to go to respective booths and perform voting. this will be a waste of time and some of them just ignore the things. This system is challenging for residents who are residing far away from booths. As India is a democratic country, each and every vote is important and to avoid these problems, The present system is interchangeable with a new digital voting system which provides more security, less fraud, and makes voting counting more efficient.

Concerning the problems with the current electoral system, The system may be swapped out for a new, higher-security system, less fraud, and makes voting counting more efficient. The online election system consists of two primary parts. such as an admin and a Voter. The system facilitates voting amenities available to users who linked Aadhar with voter id and admin login. The users need to enter OTP upon successful validation of Aadhar and voter id link. After that, it will be redirected to the candidate's details page where the candidates of the constituency are displayed. In this place, the User needs to give permission to the camera and microphone. Using the retina scanner which had been stored while applying Aadhar, the person is authenticated and it will be continued until the vote has been successfully cast. The admin login is done through face detection, user id, and password. The admin has access to create an election, view an election, add candidates, view candidates, and view results. The Voter is capable of voting in any geographical area with security provided by blockchain.

II. LITERATURE REVIEW

The initial stage of digital voting was proposed by David Chaum, who proposed system with a public key cryptography. This system keeps the voters anonymous, with the use of a blind theorem [1]. after that many scholars proposed different types of works for digital voting [2-3]. Votereum, a decentralized e-voting system built upon the

Ethereum network, has been suggested by four Vietnamese individuals, namely Nguyen Ngoc Hoong Vo-Vo-Thuy, Nguyen Ngoc Hoi Minh, Nguyen Chien Hoi Hung, and Nguyen Xuan A., and has been approved by the Ethereum platform. The system is hosted on a single server, which is accountable for administering the whole system and responding to all requests in connection with the blockchain.[4]. Cryptographic Verification and Homomorphic Encryption Techniques were proposed by Vaibhav Anasune, Pradeep Choudhary, Madhura Kelapure Pranali Shirke, and Prasad Halgaonkar. In this system, Operations in mathematics are performed on a cipher text which hides the original data passed. Friðrik p. Hjálmarson et al. proposed a system and a paper regarding the potential of distributed ledger technologies such as blockchain and the description of a case study has been evaluated. The agenda is to host elections through the use of digital voting machines basis of blockchain technology [5]. Blockchain-Based E Voting Recording System Design was proposed by Rifa Hanifatunnisa and Budi Rahardjo in 2017. The voting system shall begin to record when the voter has casts his vote. The system is safer with the use of hash values to record vote results from all polling station in a group and by using digital signatures its more secure. The utilize of the arrangement proposed within the blockchain creation handle in this framework considers that in an discretionary framework not required for mining as within the Bitcoin framework since the voter information and numbers are clear and are not permitted to choose more than once, the proposed guarantees that all hubs which are lawfully associated and can maintain a strategic distance from collision in transportation [6]. Tyagi A. K., Fernandez, T. F., and Aswathy S. U proposed a system as a means to implement paperless and tamper less elections in India. their system uses the generalization of Aadhar and blockchain for deploying paperless elections [7]. Seva- Secure and Efficient voting application proposed by Varma. The system mainly focuses on the security of a current voting system by implementing the same using the Ethereum's Blockchain Technology framework [8]. Anjan, S., & Sequeira, J. P have proposed a Blockchain-Based E-Voting System in India Using the Aadhaar of UIDAI. The system facilitates security to avoid fake ID's which are implemented through the use of Blockchain [9].

III. DATA AND METHODOLOGY

System Architecture:

The Ethereum framework process follows certain stages. In the beginning, the user has to connect to the Ethereum network. while connecting it initializes smart contract. Browser User Interface provides a user interface where the activities can be performed. Ganache and Metamask are integrated for transactions. These transactions are stored in Blocks. Truffle is a testing framework that acts as an Asset pipeline for blockchain. With respect to the proposed work, the voter is authenticated using OTP which is sent to Aadhar enrolled contact number. later the retina will be scanned until the vote is cast. The way in which safeguarding the casted vote, Unique hash addresses are used. The hash address is associated with this system to ensure that the voter can vote only once. The working of the Ethereum framework of blockchain is illustrated in Figure 1.
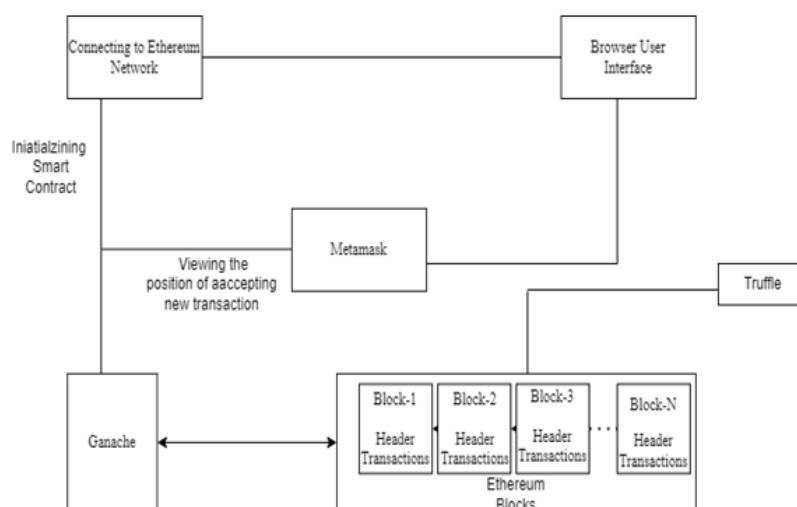

Figure 1: System Architecture [10]

Proposed Work:

For the proposed work, Modules need to be categorized as Front end for the application and back end for implementing blockchain technology which uses solidity to frame rules to be followed. In three stages the proposed work can be achieved. The first two are based on the above-mentioned module, and the last one is used to merge the two modules. The Backend needs to be implemented through the Ethereum framework to convert the system into a decentralized one. In the first stage, there will be two main sections:

The admin section comprises seven parts, which are Dashboard, Party Details, Create Election, View Election, Add Candidates, View Candidates, and View Result. Dashboard Displays the menus for various operations of admin such as Party Details creating and viewing elections, adding and viewing candidates, and viewing results. Party Details displays details of all the parties. In Creating an election, The type of election needs to be specified, and the list of constituencies involved in the election. So that the Voters of the specified constituency are able to vote. View election Displays the complete details of elections. Add candidates involves the basic details of candidates along with the party. View Candidates Displays the candidate's detail. View Result is used to fetch results After the election process. The Results can be viewed, and they are not modifiable. The flow diagram of the admin module where the components are located, is shown in figure 2
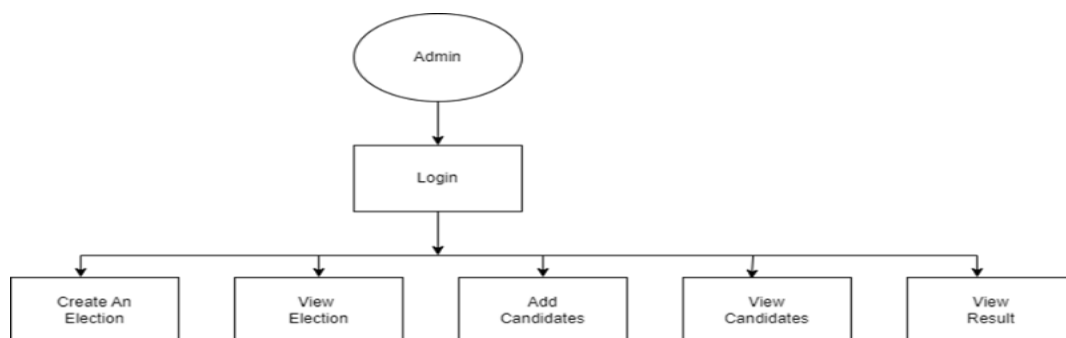

Figure 2: Flow Diagram of Admin Module

The Voter section includes two parts, which are Voter Authentication and Voter Panel In Voter Authentication, the link of Aadhar and voter id is validated and OTP will be Received on successful validation of the link of Aadhar and voter id. Later retina scanner will be started until a vote has been cast. Voting Panel enables Voters can cast a vote for a candidate from the list of candidates who stood for election. Fig. 3 illustrates the flow diagram of the voter module shows its components.
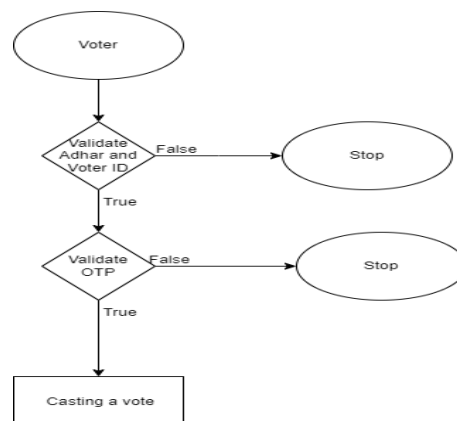

Figure 3: Flow Diagram of User Module

IV. CONCLUSION AND FUTURE WORK

In this proposed system, Blockchain's Ethereum Framework is used for the secure casting of votes and cost-efficient elections which uses smart contracts to define rules. The system Overcomes the demerits of the current voting system. The voting on votes which are capable of performing hundreds of transactions in a second is being carried out by using Ethereum Blockchain, and the rules set up for how to vote based on Smart Contracts shall also be applied.

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