

Electronic Voting Using Blockchain Technology

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Abstract: Democratic voting is a crucial and serious event in any country, the current voting scheme in any country is through ballot paper or by use of EVM. These processes have many drawbacks such as transparency, low voter turn-out, tampering of votes, distrust in the election body, forging of unique Id (voter id card), delay in giving out results and the most important is security issues. Security of digital voting is always the biggest concern when considering to implement a digital electronic voting system. With such monumental decisions at stake, there can be no doubt about the systems ability to secure data and defend against potential attacks. One way the security issues can be potentially solved is through the use of blockchain technology. Blockchain technology offers infinite number of applications. Blockchain is a distributed ledger technology that allows digital assets to be transacted in a peer-to-peer decentralized network. A distributed ledger technology is an exciting advancement in this regard. Block is a collection of all the transactions. Blockchain possess salient features such as immutability, Decentralization, Security, Transparency and anonymity. Blockchain with smart contracts emerges as a promising candidate for building a safer, secure and transparent E-voting systems. In this paper we have implemented and tested a sample e-voting application as a smart contract for the Ethereum network using the blockchain technology through wallets and the Solidity language. Limited amount of token(gas) is given in the wallet which is exhausted when the user votes thus preventing duplicity of votes. This paper also highlights the pros and cons of using blockchain technology and also demonstrates a practical system by showcasing a web app for voting and its limitations.

Keywords: E-Voting , Smart contracts, Blockchain, Ethereum

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ELECTRONIC HEALTH RECORD MANAGEMENT USING BLOCKCHAIN APPROACH

1. INTRODUCTION

Elections play a crucial role in any country and they have a great importance in determining who will rule a nation or an organization. The current voting in any country is through ballot paper or by the use of EVM (electronic voting machine). These processes have many drawbacks such as vote rigging, hacking of EVM, election manipulation, polling booth capturing and security is also a major issue. It can be solved through the use of blockchain technology.

Blockchain is said to be emerging decentralized and distributed ledger which keeps track of all records. It is highly secured and the data that is stored once cannot be modified or altered. We are going to create a web application in which the voter can access the voting system through the electronic devices that is connected to the internet. Later the voter goes through the identity verification process that is instructed by the system. The voter determines the vote through the UI. As we are using blockchain technology it provides some functionalities like verifiability, immutability, auditability, transparency and consistency. So finally by using this we can get rid of flawed electronic voting system.

Our main motivation in this project is to provide a secure voting environment and show that a reliable e-voting scheme is possible using blockchain. Because, when electronic voting is available for everyone who has a computer, or a mobile phone, every single administrative decision can be made by people and members; or at least people's opinion will be more public and more accessible by politicians and managers. This will eventually lead humanity to the true direct democracy. It is important for us since elections can easily be corrupted or manipulated especially in small towns, and even in bigger cities located in corrupt countries. Plus, large-scale traditional elections are very expensive in the long term, especially if there are hundreds of geographically distributed vote centers and millions of voters. Also, the voter turn-out at the voting centers is relatively low as the person might not be staying at the address his name is enrolled in the list, or he might be out for vacation or any other work. E-voting will be able to solve these problems, if implemented carefully. The concept of e-voting is significantly older than blockchain. So that, all known examples so far used means of centralized computation and storage models.

2. DESIGN

The proposed framework consists of voters, registration page and login page.

- 1) **USER LAYER** the person who is eligible for voting need to register in our application by providing some details like aadhar number, name, password, phone number and so on. As aadhar number is unique for everyone we have used aadhar number and password while logging. This can happen only after successful registration. Once the user logged in it will ask for face recognition process and we need to take a snap. Later it will match our current snap with the previous one. If it is a 80% match it allows us for voting otherwise it sends a message that "you are not eligible for voting".

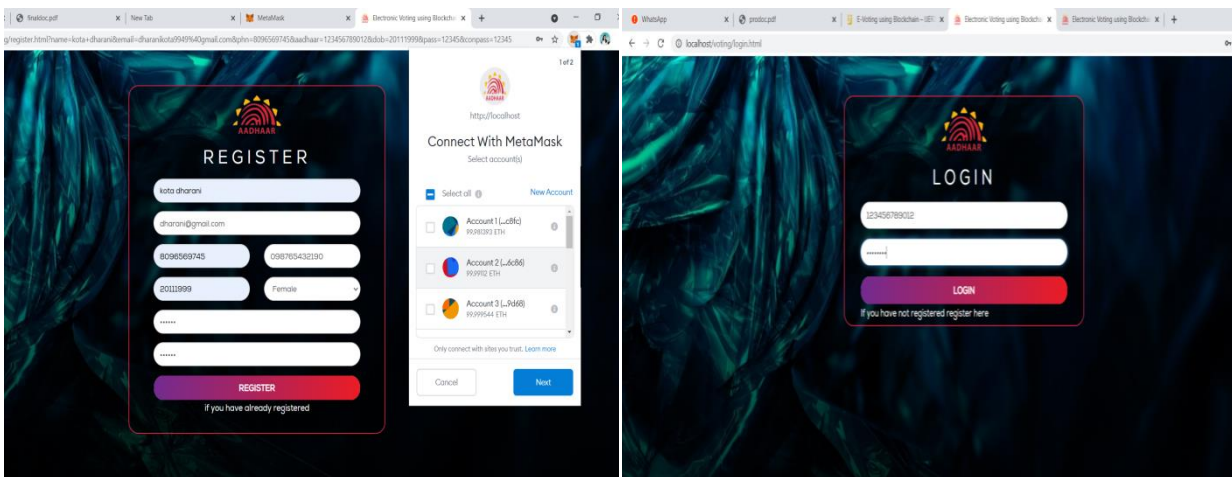
After successful face recognition it allows us for voting and there we will have a list of nominees and we can vote for the nominee we need and later it will send us a message that "your vote is casted". Once the person voted cannot be allowed for voting again. He can also check whether his/her vote is counted or not. We can know whether the person is voted or not and there voting choice remains anonymous.

- 2) **BLOCKCHAIN LAYER** the data here is stored in the form of blocks. Each block will contain unique addresses and private key. For default each block will have 100ETH. After the vote is casted some ethers will be reduced. The information about this voting process is stored in the form of events whether the vote is casted or not.

We will connect truffle with local blockchain sever and later we can compile and deploy smart contracts. Smart contracts are self-executing, business automation applications that run on a decentralized network (p2p network) of a blockchain. It gives efficiency safety and trust. In blockchain sever we will have “log” that stores all the details like user connectivity, gas charge default balance ETH.

- 3) **SYSTEM IMPLEMENTATION** As already explained in the previous sections, the system was implemented by using on Apache, Perl, MySQL database, and PHP through the system of the host itself. Apache is an HTTP a cross-platform web server. It is used worldwide the Ethereum and its dependencies. Later we need to start XAMPP and run apache. XAMPP helps a local host or server to test its website and clients via computers and laptops before releasing it to the main server. It is a platform that furnishes a suitable environment to test and verify the working of projects based for delivering web content.
- 4) After compiling and deploying of smart contracts we have to paste those files in XAMPP server. Once the contracts are deployed no need to deploy them again. After doing all this process we can run our application in any browser by using local host server.

Figure



3. ANALYSIS

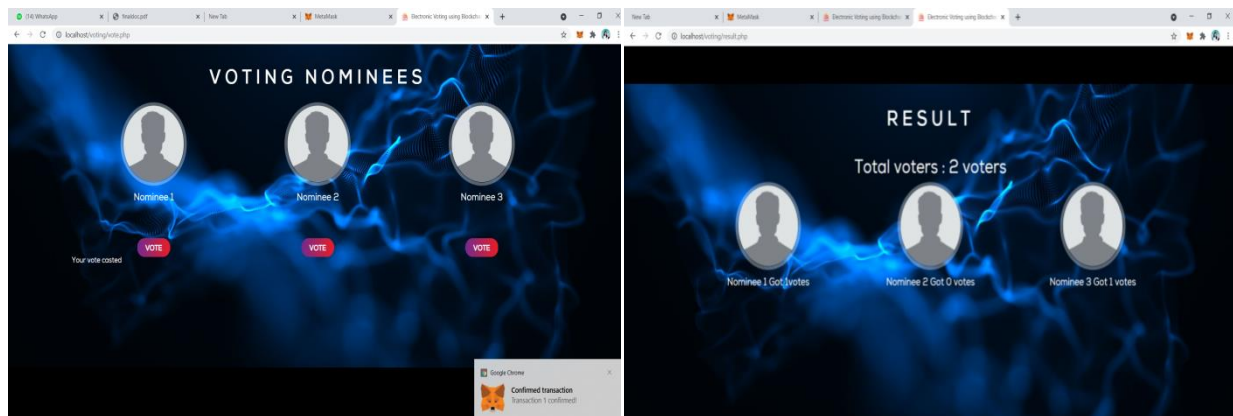
While we logging to our application it will ask us for face recognition process. We have done this face recognition process by using the services provided by AWS(Amazon Web Service account). The service we used here is IAM(Identity and Access Management) and in that Amazon Recognition Full Access.

4. RESULTS

In our application one of the interesting fact is to know the results immediately. we can know how many voters have casted their vote and also know the number of votes casted for each nominee. We can test this results at any time. while voting it is connected to blockchain server and so it is highly secured and we can get rid of this flawable electronic voting system.

ELECTRONIC HEALTH RECORD MANAGEMENT USING BLOCKCHAIN APPROACH

Figure



5.CONCLUSION

In this paper, we introduced a unique, blockchain based electronic voting system that utilizes smart contracts to enable secure and cost-efficient election while guaranteeing voters privacy. By comparison to previous work, we have shown that the blockchain technology offers a new possibility for democratic countries to advance from the pen and paper election scheme, to a more cost- and time- efficient election scheme, while increasing the security measures of the today's scheme and offer new possibilities of transparency.

E-voting is still a controversial topic within both political and scientific circles. Despite the existence of a few very good examples, most of which are still in use; many more attempts were either failed to provide the security and privacy features of a traditional election or have serious usability and scalability issues. On the contrary, blockchain-based e-voting solutions, including the one we have implemented using the smart contracts and the Ethereum network, address (or may address with relevant modifications) almost all of the security concerns, like privacy of voters, integrity, verification and non-repudiation of votes, and transparency of counting. Yet, there are also some properties that cannot be addressed solely using the blockchain, for example authentication of voters (on the personal level, not on the account level) requires additional mechanisms to be integrated, such as use of biometric factors.

Blockchain technology has lot of promise, but in its current state it requires lot more research and currently might not reach till its full potential. There needs a concerted effort in the core blockchain technology to improve its support for more complex applications.

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