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IJIEMR Transactions, online available on 31st Mar 2023. Link

[:http://www.ijiemr.org/downloads.php?vol=Volume-12&issue=Issue 03](http://www.ijiemr.org/downloads.php?vol=Volume-12&issue=Issue 03)

10.48047/IJIEMR/V12/ISSUE 03/69

Title **BLOCKCHAIN BASED E-VOTING**

Volume 12, ISSUE 03, Pages: 498-502

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Blockchain Based E-Voting

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Abstract

Voting is a significant right of every individual over 18 years old. In our country, India, it makes a huge difference in deciding the country's future. There are two types of voting systems that India has seen: the traditional voting system, which includes ballot papers, the physical presence of the voters, and infrastructure arrangements that would result in large investments. The other process is the EVM, known as electronic voting machines, which also need the physical presence of the voter. These machines are to be designed and used specifically for elections. Both processes are tricky at times since there is a scope for the duplication of votes and vote tampering in the EVM. This web application has face recognition for the authentication of voters. Once the voter is authenticated, they proceed to cast their votes, which get saved permanently in the blockchain database. With the help of smart contracts, the votes that are cast once become immutable, so that duplication of votes and one person casting multiple votes would be easily avoided.

Keywords: *Blockchain, Face Recognition, Web application.*

I. INTRODUCTION

Voting plays a key role in deciding the growth of the country. In this paper, we propose a web application that validates the voter with the help of face recognition, which is one of the strongest authentication features among the other features.

Though there are multiple web applications that were developed using other technologies, they end up getting hacked. This is when, blockchain technology enters the picture to protect the voter's data and prevent the system from hacking and vote tampering, which seems quite impossible.

Smart contracts are written in such a manner that they are executed after the voter has cast their vote, and they won't give the same person a second chance to vote again or manipulate their vote. Consider that 100% of voting is done, and there is only one chance to manipulate the votes, which is to change 51% of votes, which is nearly impossible and a hectic task for the hacker as well. There are two types of voting systems, which

are common in many countries in common. They are traditional election process, which demands the physical presence of the voter irrespective of their capabilities when it comes to physically disabled people, and if situations like COVID-19 arise, it is not feasible to conduct the elections through this process. In traditional elections, it is very clear that people tend to fail at maintaining social distance. In the case of EVM elections, tampering with votes is something that needs to be taken seriously.

II. LITERATURE SURVEY

1. An electronic voting system using Blockchain, and fingerprint authentication were proposed by Brahim, M., Ravindran, K., Lee, H., Farooqui, O., and Mahmoud, Q.H. in 2021. In this proposed system, a fingerprint is used for authenticating the voter. And blockchain technology plays a key role in securing the data. This system is being used by only a few countries in the world.

2. Electronic voting based on the virtual ID of Aadhar using blockchain technology was proposed by Roopak, T.M., and Sumathi, R., in 2020. This application deals with collecting every voter's data, like their Aadhar card number, and using it as a virtual ID to authenticate the voter.

3. Secure authentication for online voting systems was proposed by Khairnar, S.B., Naidu, P.S., and Kharat, R. in 2016. According to this paper, the application used strong authentication features, which could be one of the existing modules like OTP, Aadhar ID.

4. A decentralized voting platform based on the Ethereum blockchain was proposed in 2021 by Puneet, Aman Chaudary, Nitin Chauhan, and Abhishek Kumar. As per this paper, the security of votes and the voter's data is high since the base is blockchain technology. It removes the barrier between voting security and convenience.

III. EXISTING SYSTEM

There are many systems developed that support online voting, but they failed in different areas like authentication and providing security to the voter's data and their votes. Admin, who is a central authority in those applications, holds all the power and control over the voter data and might act dishonestly to show favor for the candidate he wants to win so that he could benefit from it.

Another important aspect is that if we follow the traditional election process, voters have to stand in the queue for long hours, and the government has to invest a huge amount of money to make proper arrangements for the people coming to cast their vote, along with some common necessities like public water, places for parking vehicles, and a police force to maintain the people and solve the issues between the people.

Physically challenged people might find it hard to attend elections if they have no helper, and if something like COVID-19 arrives, this traditional election process fails at implementation and spreads the virus among people so easily, which

results in a rapid rise in COVID cases.

Now, considering the second-most-used election process, that is, the EVM (electronic voting machine), where the people vote through a machine specifically designed for the electorate with candidate party symbols, though they reduce the risk of the traditional election process and cover the disadvantages it has, EVMs are hackable at times.

That is why the concept of online voting systems was introduced to avoid the risks of both above election procedures.

There are online voting applications that are feasible, safe, and support remote voting through the voter's device, like smart phones or desktops.

These applications are better to some extent, but just like the ideas that promote security, on the other side, there are new technologies and hacks being developed to collapse these applications and steal or manipulate the data.

This is when blockchain enters the picture, which is decentralized and immutable. Here voters have control over their data and once the voter casts the vote the votes get saved permanently in form of blocks associated with the next blocks so that the manipulation of votes is nearly impossible.

IV. PROPOSED SYSTEM

Our proposed system is to create a web application. Which involves the voter and admin portals. But here, admin is not the central authority for the application. As the blockchain is familiarly known as decentralized technology it allows the voters to have control over their data. If any voter is new to the application, they have to register themselves with the necessary details, which are saved in the database. A login ID and password are provided to the voter, through which they are allowed to login into the application. Once the voter logs in successfully, they'll authenticate themselves using the camera on their devices.

If the voter's data matches the data in the database, then they can view the candidates who are participating in the election, select one of them according to their choice, and cast their vote. Through this application, voters do not need to travel to a particular place to cast their votes. If there is a stable internet connection and uninterrupted power supply, they can finish their voting at their residences. We can achieve privacy through this application, as block chain technology acts as a synonym for security, making it impossible to trace voter data.

Eligibility is another feature that is used to verify whether the voter is fit to participate in voting as per his age and other details, and this application has an authentication feature called "face recognition," which scans the voter's face to ensure that there is no dishonesty in this process.

It is quite common that a few individuals or groups of people are targeted and forced by higher authorities who seek favor from the voters using their power and popularity. Also, after voting, if they came to know to which party the vote had been cast by a particular voter, they were stressed by people from the political side in an illegal manner. However, using this technology, it is impossible to determine which party everyone voted for.

1. Registration

If the voter is new to, they must register themselves by providing the necessary details. After which login credentials are provided to them.

2. Login

Using the given credentials voter has to login into the application. If their input matches with the login details which are saved in the database, then it routes the voter to authentication phase.

3. Authentication of voter

In this application face recognition is used which is secure among other existing

features. Through the camera voter's face is scanned and if the voters are eligible as per the data in the database they can view the candidate list and decide their vote.

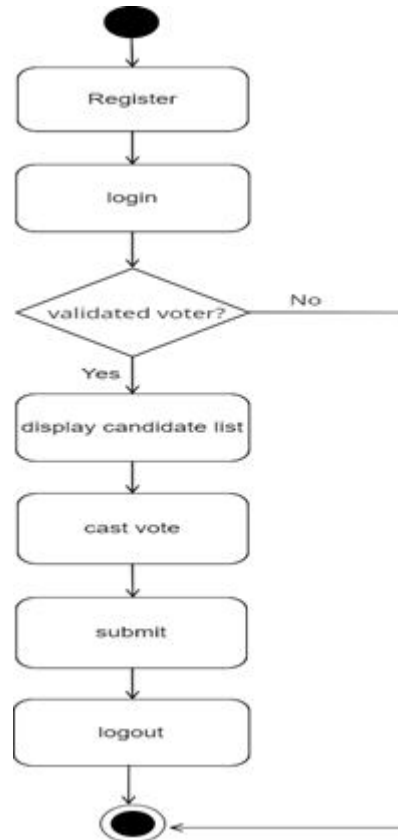


FIG 1: Process Flow Diagram

Here admin is not responsible to authenticate or control the voter's data. Admin can be given access to add party details, update candidate details and view votes count. Admin also logs into the system with his login credentials. At times Admin

MERITS:

1. Transparency of votes
2. Avoids vote tampering.
3. Security to Voter's data and votes
4. Unbackable application

DEMERITS:

1. Uninterruptable power supply is needed.
2. Stable internet connection

3. Proper awareness is to be given to the uneducated Voters.

Execution of Smart Contracts:

Smart contracts are like programmers stored inside the blockchain, which are used to run when the specified conditions are met. These contracts establish transparency and trust in the voting process.

Here in this application, the use of smart contracts is to save the vote permanently once the voter submits it so that duplication of votes or allowing one voter to cast a vote multiple times is impossible. As soon as the voter submits the vote, the conditions written inside the smart contracts are executed immediately. In simple terms, smart contracts ensure that voters cast their votes only once.

Smart contracts were introduced around 1994, when Nick Szabo developed self-executing digital codes. These contracts act as digital ones, which are stored inside the blockchain. Implementation of smart contracts is to avoid dependency on a third person or entity like an admin in terms of this application, where he is supposed to manage the voter's data and maintain transparency in the process. It is not possible to depend on the third person all the time and give control over the data entirely.

V.METHODOLOGY

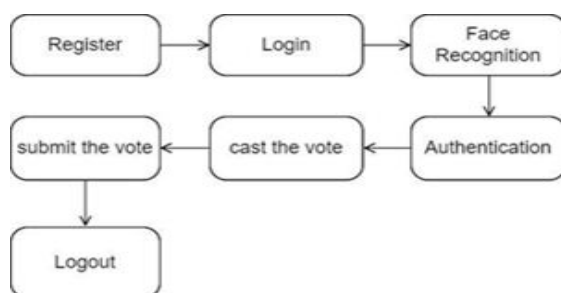


FIG 2: Working of the application.

VI.RESULTS AND DISCUSSION

The results of this research indicate that the blockchain, which is a decentralized technology, can be involved in developing

applications that deal with crucial events like elections since they decide the future of every individual in the country.

Though the votes are being cast honestly, it is the middlemen or central entities that decide to mislead the result or manipulate it to get their benefits. So, if technology like blockchain is used, it is not at all easy to gain power over the data. As proposed in this paper, this application can be developed in a way that makes remote voting possible. blockchain technology helps in maintaining the transparency, accuracy, verifiability, ease, security, of the system.

VII. CONCLUSION

Our paper suggests a decentralized voting application using blockchain and a face recognition feature to authenticate the voter's identity so that no dishonesty takes place in elections.

The only disadvantage of this approach is that one must get a proper understanding of the workings of this application and blockchain technology, and if this is to be implemented to a larger extent, then the government must pay for the gas to use the blockchain.

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