D-Smart voting System using Blockchain

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Abstract: At this stage, technology play a significant role in meeting human requirements. The democratic process is facing new challenges as a result of the growing use of technology. Since the majority of people do not trust their leaders, elections are crucial. in a contemporary democracy. Elections are crucial in deciding who will lead a country or organization, or one could argue that they are a momentous occasion that determines the destiny of any given nation.The widespread mistrust that a sizable section of the populace has for modern democracies' electoral processes is one of their greatest obstacles. There are still problems with elections in well-known democracies like India and the United States.

Since the 1970s, electronic voting, often known as e-voting, has been used in a number of arrangements. In comparison to paper-based systems, it offers a number of benefits, such as increased efficiency and reduced mistake rates.But there are still challenges standing in the way of these systems being widely adopted, especially when it comes to boosting their resilience to such errors. Blockchain is a cutting-edge technology that promises to improve electronic voting systems' overall resilience.

Voting, particularly in an election, is a formal admission of a person's or group's viewpoint or choice. Early voting methods included counting hands; today, voting techniques include paper, punch cards, and digitized voting machines.[6] The aim of this project is to develop a decentralized electronic voting system with blockchain technology that guarantees voter identity protection, privacy during data transfers, and verifiability through an accessible and transparent voting procedure.[4]

Keywords: Blockchain, Ethereum, Decentralized, Digitization, Metamask.

I. INTRODUCTION

Electronic voting systems that enable voters to use a computer, smartphone, or other electronic device to cast their ballots whenever they wish has been the subject of significant studies. However, because of the inherent dangers and Despite potential concerns about the voting process's legitimacy, none of these technologies have been used more extensively. This article describes a blockchain-based voting system that ensures voter privacy, openness, and consistency.

The system is trustworthy and safe. At every stage of the blockchain update, smart contracts are significant bits of code that are included into the network and carried out according to plan. Another trend that is important to internet services is e-voting.

Blockchain technology that supports smart contracts is demonstrating potential as a tool for developing more user-friendly, transparent, economical, safe, and secure electronic voting systems. When it comes to contract logic, Ethereum and its network rank among the finest. In order to avoid repeated votes and ensure complete transparency while protecting participant privacy, the electronic voting system must be safe. Using Solidity and the Ethereum programming language, we created and evaluated an electronic voting application for the Ethereum network.

II. LITERATURE SURVEY

A. Blockchain technology enables an online voting method for Akhil Shah and Nishita Sodhia in 2020.
The proposed voting process takes advantage of a more dependable, reasonably priced, and unalterable blockchain that is not impacted by modifications made to votes by voters or any other outside entity. We would also broaden the constraints on the engineering, design, and use of the voting process in our community.[1]

B. In 2013, India's online voting system for Himanshu Agarwal was based on G. N. Pandey's AADHAR ID.

Before voting is permitted, a high security password is verified in the main database. If the vote is moved to the right candidate or party, the voter will be able to verify. The voter's specified constituency serves as an additional source of votes. Voting by hand ensures data preservation.[2]

B. A Blockchain-based Secure Digital Voting System - Junaid Arshad and Kashif Mehboob Khan enhancing blockchain's ability to withstand the "double spending" issue, which translates to "double voting" in electronic voting systems. Even though blockchain technology is incredibly effective at detecting changeable changes in transactions, successful demonstrations of these events have been made, which encourages us to look into it more.[3]

C. Decentralized Blockchain E-voting will be implemented by Saad Moin Khan and Aansa Arshad in 2020.

This project's main objective is to develop an electronic voting system based on blockchain technology that resolves the legislation's long-standing problem. This methodology can be applied at many levels, such as national voting as well as at offices, colleges, and schools. Because fraudulent activities such as voting machine hacking, vote tampering, organizing information campaigns, and more consistently pose a threat to elections. Our model will handle each of these issues.

III. PROPOSED SYSTEM

By utilizing blockchain technology, the D-Smart Voting System aims to transform conventional voting techniques by offering a safe and decentralized platform for election procedures. To enable a smooth and transparent voting process, our novel method incorporates essential components such contract numbers, the Metamask account, Solidity programming, and the Ethereum blockchain.

We provide a solution that prioritizes security with strong authentication, authorization, and verification processes, while providing improved accessibility as an application. The user starts by filling out a registration form inside the application. The registration entry is recorded by the system in a centralized database upon form submission. After that, users can use the program to take part in the survey.

After Users have to go through a limited-time one-time password verification process after successfully signing in with correct credentials. After successfully authenticating, the user is granted access to a dashboard that displays data gathered from the central database.

To ensure user identity, fingerprint authentication adds an additional layer of security. Voting is done with tokens, which are unique to user accounts. Voting is done by moving the token from the user's wallet to the candidate's wallet.

An associated web application is being created to track voting statistics, such as the total number of voters, the percentage of votes cast, and the overall number of votes cast. To ensure the integrity of the system, each account can only cast a single vote.

The associated account is prevented from taking part in the current voting process after a vote is made. This method offers a user-friendly interface for a wide variety of voters while guaranteeing a safe and transparent voting process.[1]
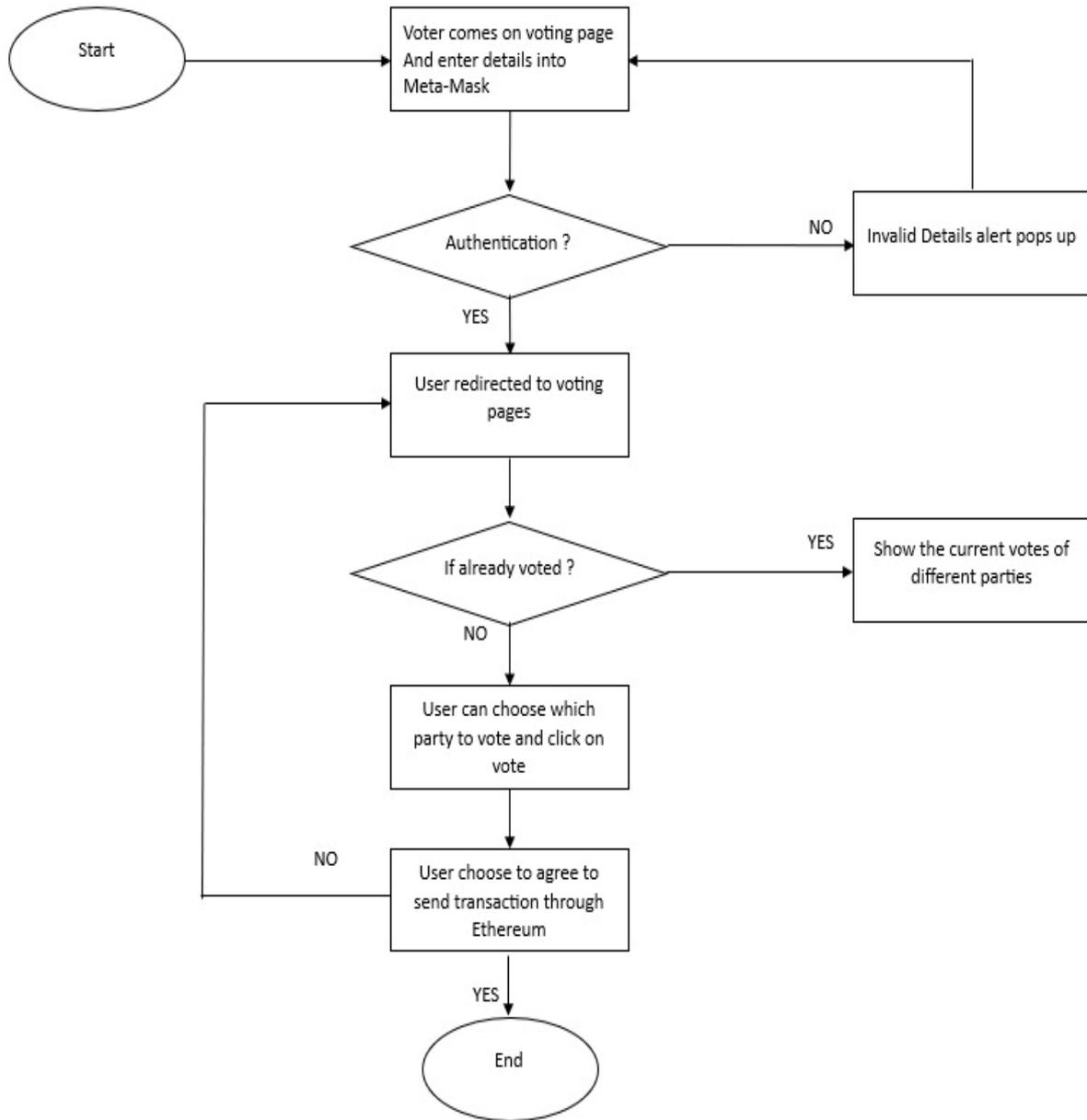
IV.   FLOW DIAGRAM

Fig. FLOWCHART

V.   PROPOSED METHODOLOGY

A. Registration Module

The customer or individual will be able to cast their vote for the preferred candidate
and have their entry placed into the database following the completion of the process' registration module's registration form. If the voter's registration form is incomplete, they will not be permitted to vote or be able to vote. On the voter registration form, in addition to the voter's data, certain papers must be uploaded. The database entry is updated after the form is completed and submitted. The registration procedure is complete once the user's phone number and email address have been verified and the registration form has been submitted.
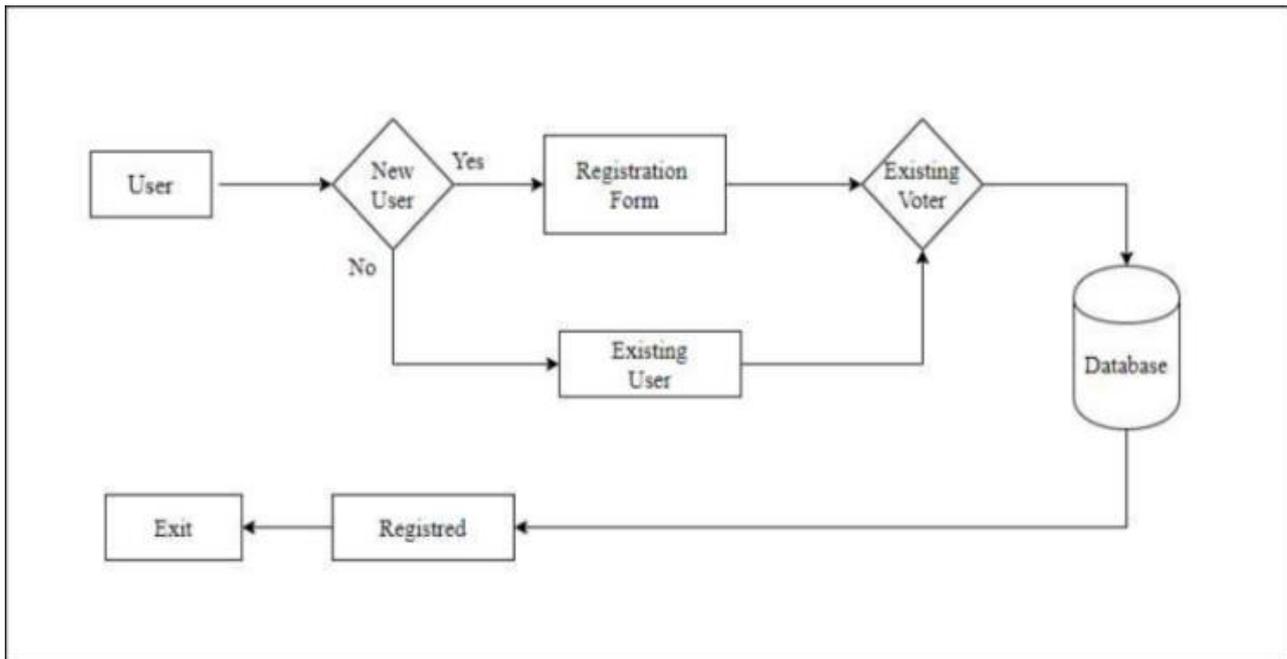[1]

Figure. 4. Registration Module [1]

B. Voting System

One could think of the voting procedure as the EVM's substitute. It is a decentralized application with a Blockchain at theback end with an HTML or Bootstrap front end. The smart contract has been written in Solidity. The candidate's name and symbol are mentioned in the smart contract.

The real logic underlying the entire voting system is stored in a smart contract. Any alteration made to a blockchain is called a transaction. A transaction is the way that the outside world interacts with the Ethereum network. Transactions are used when we wish to update or modify the state that is stored on file within the Ethereum network. Every transaction requires the payment of a transaction fee or service charge. An Ethereum network has its own native money in circulation.

C. Authentication and Login Module

Upon successful submission of the registration form, the individual becomes eligible to participate in the voting process. The user proceeds to log in by entering their credentials in the authentication module, where the system verifies the provided information. Access to the dashboard is granted only after the verification process is successfully completed.

The initial step within the dashboard involves OTP verification. Following successful verification, the user undergoes fingerprint authentication. Once authenticated, the system generates a voter wallet for the user and assigns a unique token. This token serves as the means by which the user can cast their vote.

D. Metamask and verification module

Once we enter the details in authentication module the system will direct to the metamask private key to validate the vote . if the private key matched with the users original private key then the user will be able to cast the vote for the candidates.With the help of the cryptocurrency wallet MetaMask, users may keep Ether and other ERC-20 tokens. Additionally, the wallet can be used to communicate with decentralized programs, or dapps.

VI. RESULT

While current users can log in with a working user ID and password, new users can register within the app. Only when the credentials have been successfully authenticated does the authentication module restrict access to the dashboard. OTP verification is the first step on the dashboard. The user is granted access through fingerprint authentication following a successful verification. The voter wallet is created by the system after authentication, giving the user a special token to cast their vote. The token is moved from the voter's wallet to the wallet of the chosen candidate throughout the voting process.

Figure 5 shows the registration module. In order to guarantee a fair and impartial vote, new users can register for the voting process. Every user are allowed to register only once and cannot re-register thus avoiding repetitions.
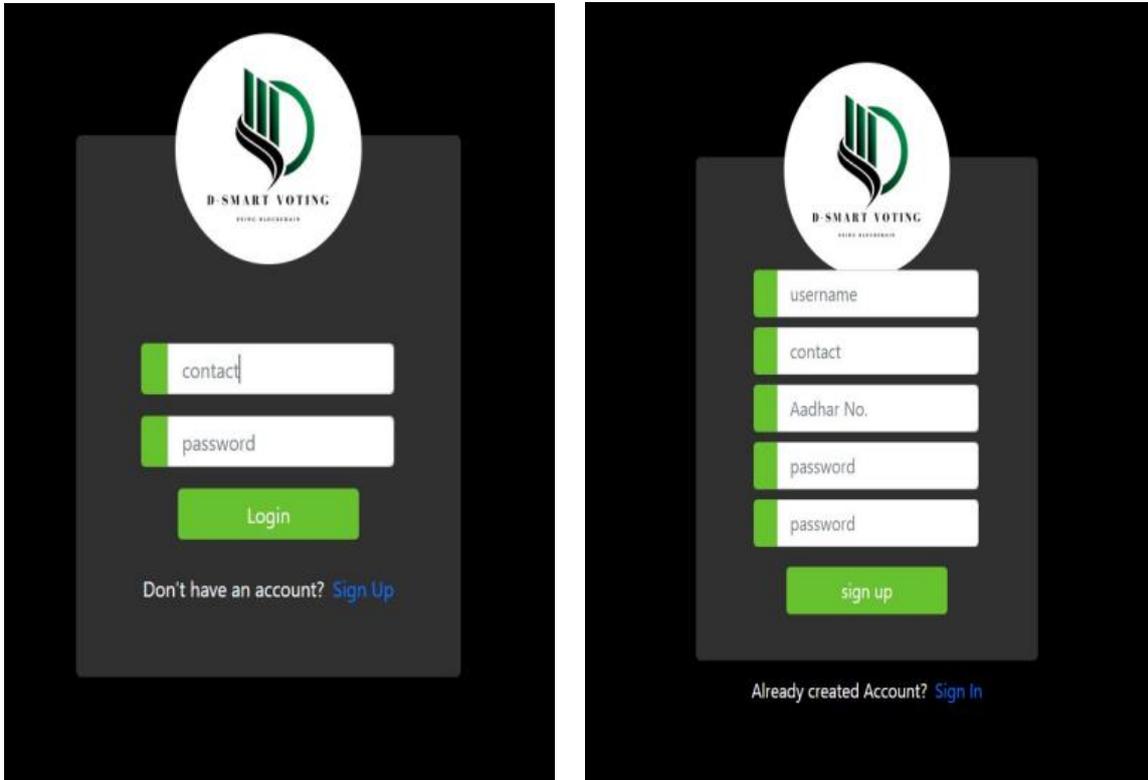

Figure. 5. Login Module

Figure 6 illustrates the verification module. Upon logging in, individuals receive a one-time password on their registered phone number. The user is logged into the relevant dashboard as soon as the OTP is validated.
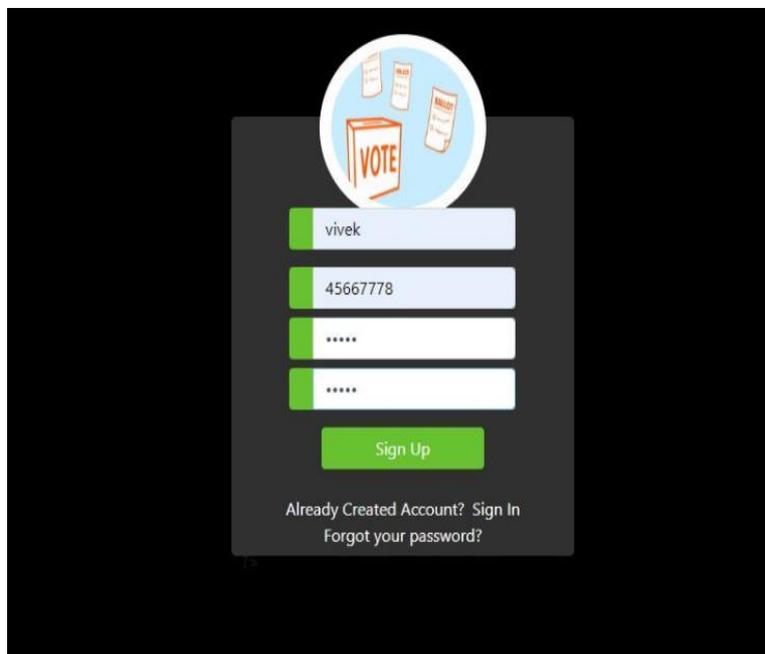

Figure. 6 .Registration Module

The above figure 6 displays the authorisation module which enables only authorised users to login and be a part of the voting process.

The below fig.7(a)(b)(c)(d) shows the vote casting process here we use blockchain metamask private key to cast the votes.
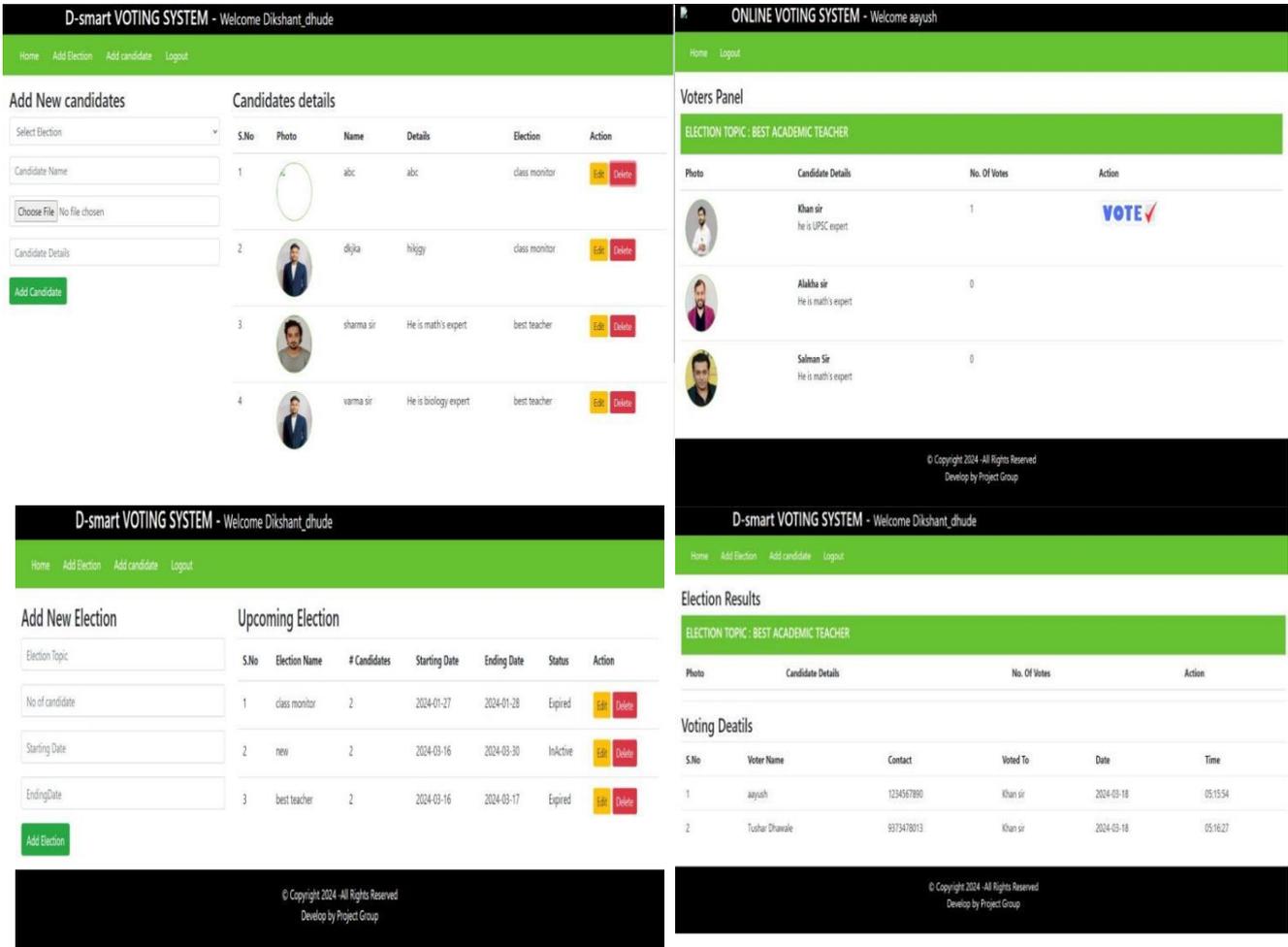

Fig. 7 (a)(b)(c)(d) . voting module

VII. CONCLUSION

The idea of streamlining, speeding up, and reducing the cost of public election procedures through the use of online voting technologies is enticing in today's environment. ensuring that The public views elections as quick and affordable, which lowers the barrier of control between the public This places some pressure on elected officials.

Additionally, it creates the possibility of a more open democracy in which citizens are asked to comment on proposed laws and policies. For this project, we have developed an online blockchain voting system that preserves voter anonymity and facilitates safe, affordable elections using smart contracts. Our findings indicate that blockchain technology offers a fresh prospect for democracy when compared to earlier studies.

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