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E-Voting Using Blockchain

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Abstract - In this paper, we have understood the drawbacks of traditional voting systems, like scams, misuse of voter information, lack of security, changing of votes on the ballot machine, and lack of authenticity of the voter. This paper provides a web-based e-voting system that utilizes blockchain technology and provides a safe, open, and auditable platform for e-voting by utilizing the decentralized and unchangeable features associated with blockchain technology. The e-voting method allows users to vote without having to physically visit the polling booth. .E-voting allows for more convenient ways of capturing and the counting votes in election process.

***Key Words*:** E-Voting system, Meta-mask, Ethereum, Blockchain Technology, Ganache, Smart Contract.

I.INTRODUCTION

E-voting, or electronic voting, is an important turning point in the democratic process, allowing voters to cast ballots online. Compared to conventional pen-and-paper procedures, this digital evolution indicates the next phase of global democracy. Blockchain technology, a distributed and decentralized digital ledger, is concurrently changing the face of safe and transparent transactions across several machines. Smart contract and blockchain integration are showing promise as a solid approach to creating open-source, dependable electronic voting systems. Election integrity is a crucial component of national security in contemporary democracies. Making the switch from traditional techniques is essential to reducing fraud and guaranteeing an open, auditable voting process. Blockchain technology represents an innovative solution because of its distributed, transparent, and immutable nature. This technology provides a unique perspective on dependable and secure electronic voting. We prefer to utilize blockchain as a building block for electronic voting systems to secure voter anonymity while still maintaining the integrity and transparency of the entire election process. This paper evaluates the potential of blockchain-enabled electronic voting systems and how they will impact democracy, national security, and election procedures in the future.

II.LITERATURE SURVEY

Anita A. Lahane and Junaid Patel [1] describe the potential of blockchain technology and its quality within the e-voting theme. The blockchain is going to be publicly verifiable and distributed in such a manner that nobody is going to be able to corrupt it. The idea of adapting digital selection systems to make the general public electoral method cheaper, quicker, and easier could be a compelling one in a trendy society. Creating the electoral method low-cost and fast normalizes it in the eyes of the voters, removes an explicit power barrier between the elector and therefore the functionary, and puts an explicit quantity of pressure on the functionary.

Kashif Mehboob Khan, Junaid Arshad, and Muhammad Mubashir Khan [2] described the fundamental requirements for e-voting schemes and achieved end-to-end verifiability. It is used on a multichain platform.

III. PROBLEM STATEMENT

Design and develop E-voting system using blockchain technology to address college student association election issues. This technology will enable secure, transparent, and safe elections, resulting in increased student involvement and trust. Using blockchain, we can create a decentralized and verifiable voting platform, making the election process more efficient and reliable for all students.

IV. OBJECTIVES

1. To create a user-friendly user interface.
2. To Ensure Secure, Anonymous E-Voting: Develop blockchain e-voting for anonymity and tamper-proofing.
3. To Establish Decentralized Control: Design e-voting to prevent single-entity control.
4. To provide accessible e-voting, create a user-friendly, cost-effective platform.

V. METHODOLOGY

1. EXISTING SYSTEM

The current election system can be controlled manually. Time is wasted because voters require visits to booths in order to cast their ballots for candidates. One of the most crucial and concerning factors is that a large number of people choose not to cast their ballots as a result. In a democracy, every single vote is crucial. A new online system that limits vote fraud and improves the efficiency and transparency of both voting and counting can take the place of this traditional one.

2. PROPOSED SYSTEM

The identified problems with the existing voting mechanism need certain improvements. This can be fulfilled by replacing the current system with a new one that will reduce voting fraud and improve the efficiency of both voting and counting. Blockchain technology is able to help in implementing a system that is unchangeable, transparent, effective, and impenetrable. The blockchain is the best technology for voting systems because it doesn't allow data to be added to or removed from blocks.

Blockchain technology is ensured by a distributed system made up of several linked nodes. The distributed ledger, or information, which comprises the whole history of all the transactions the network has handled, is replicated on each of these nodes. Nodes accept a transaction if the majority of them approve. Users on this network can maintain the confidentiality of their identities. A fundamental analysis of blockchain technology, which includes sensible contracts, indicates that it is a suitable foundation for electronic voting and that it may even create a more reliable and acceptable type of electronic voting.

VI. PROPOSED WORK

1. **Design the system:**
   Define the requirements and functionalities of the e-voting system. Consider factors like user authentication, ballot encryption, and result verification.
2. **Choose the blockchain platform:**
   Select a suitable blockchain platform based on factors like scalability, consensus mechanisms, and smart contract support like Ethereum, Hyperledger
3. **Smart Contract Development:**
   Develop smart contracts to handle the voting process, including ballot creation, voter registration, casting votes, and tallying results. Ensure the smart contracts are secure and auditable.
4. **User Interface Development:**
   Create user-friendly interfaces for voters to register, cast their votes, and verify the authenticity of their votes.
5. **Security Measures:**
   Implement robust security measures to protect against threats such as double voting, tampering, and denial-of-service attacks.

6. **Testing and auditing:**
   Thoroughly test the system to identify and fix any vulnerabilities or bugs. Conduct independent audits to ensure the integrity and fairness of the voting process.
7. **Regulatory Compliance:**
   Ensure compliance with relevant regulations and standards, such as data protection laws and electoral regulations. Collaborate with legal experts to address any legal or regulatory challenges.
8. **Public Awareness and Education:**
   Educate voters and stakeholders about the benefits and mechanics of e-voting using blockchain technology. Address concerns and misconceptions to build trust and confidence in the system.

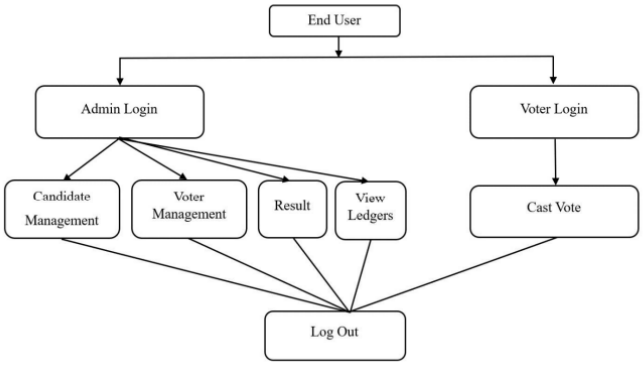
VII. SYSTEM REQUIRMENT

Hardware and software	Specification
Processor	Minimum 64-bit (i3 or above generation)
GPU (Optional)	To speed up Voting System
Technology	Blockchain

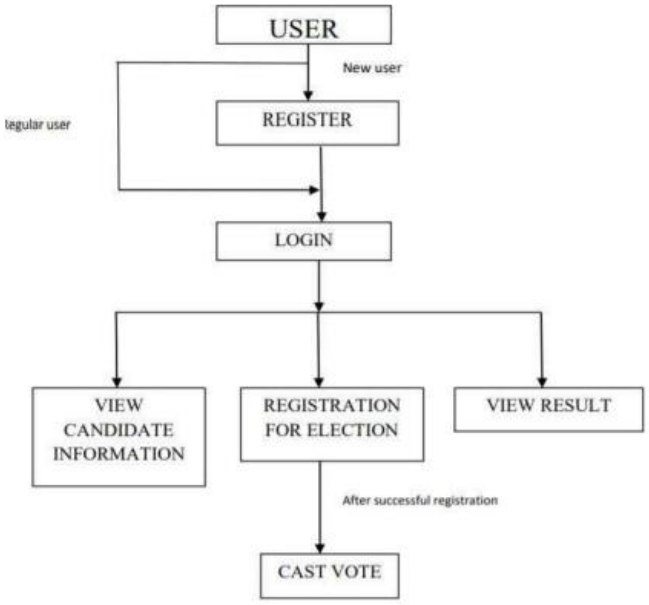
Tools Used :

1. **Ethereum**: It is a decentralized in nature, freely available blockchain which comes with smart contract capabilities.
2. **Metamask Wallet:** A metamask wallet is used for transactions.
3. **Truffle:** Truffle is Ethereum's implementation environment, testing framework, and transaction processing.
4. **Ganache:** Ganache is a personal blockchain for Ethereum development that you can use to deploy contracts, develop applications, and run tests.

VIII. SYSTEM ARCHITECTURE



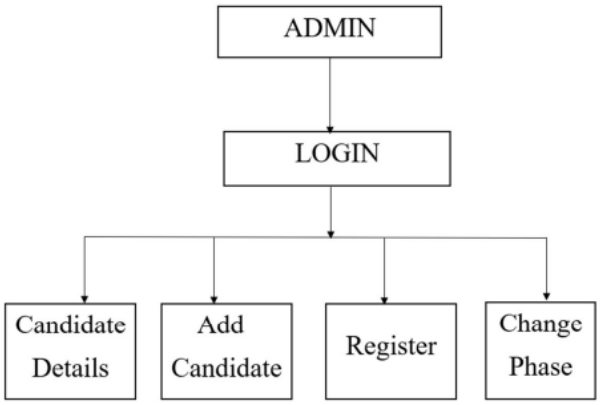
User Flow Diagram :



1. **Dashboard:** Users are presented with a dashboard containing information about political parties and their respective candidates, offering insights into the election landscape.
2. **Voter Registration:** Prior to casting a vote, users must register themselves. This section facilitates the user registration process, ensuring that only registered users can participate in the election.
3. **Voting Area:** Once registered, users are directed to the voting area, where they can cast their votes securely. Access is granted only to registered users during the active election period.

4. **Results:** In this component, users can view real-time election results, providing transparency and keeping the electorate informed about outcomes.

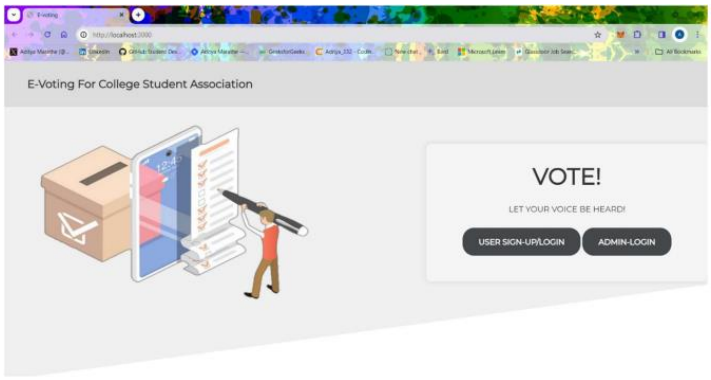
This structured division of the admin and user modules in Phase One ensures a comprehensive approach to building the front-end of the electronic voting system, incorporating essential features for both administrators and users alike.



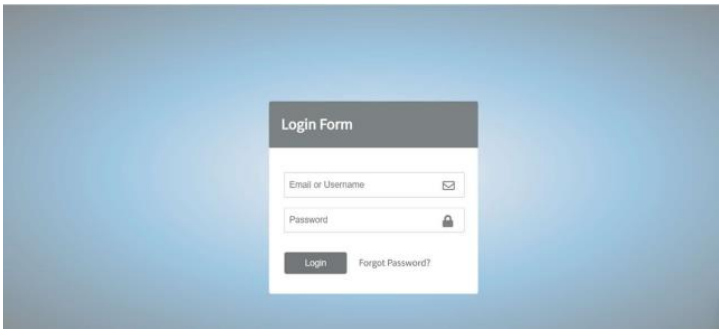
Admin Module:

1. **Candidate Details:** This section contains a list of all candidates added by the admin. The admin has the ability to update candidate details, correcting any inaccuracies in the entries.
2. **Add Candidate:** The admin can use this feature to add candidates who are participating in the election. Once added, candidate details become visible on the user side.
3. **Register Voters:** The admin oversees the voter registration process, ensuring that users register before being eligible to cast their votes.
4. **Change Phase:** This feature allows the admin to transition between different phases of the election process. It includes functionalities like starting or ending the voting phase, ensuring flexibility and adaptability during the election period.

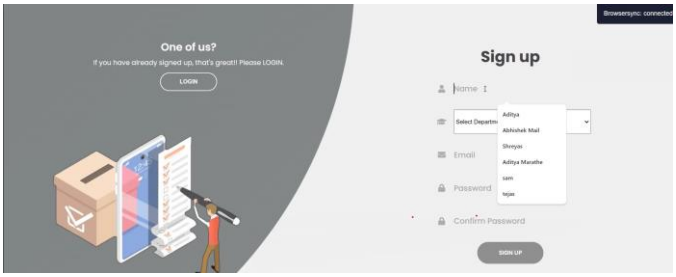
IX. RESULT



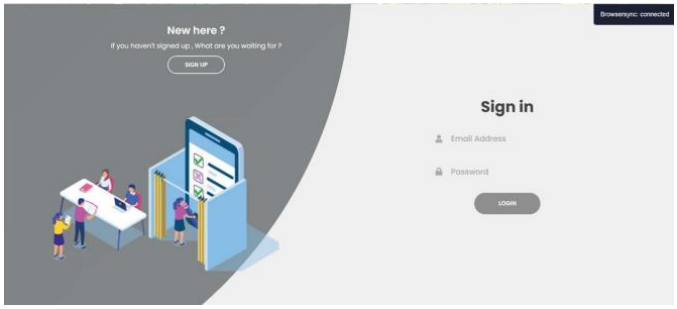
The homepage consists of two options:
The first option is for admin login.
The second option is for user signup or login



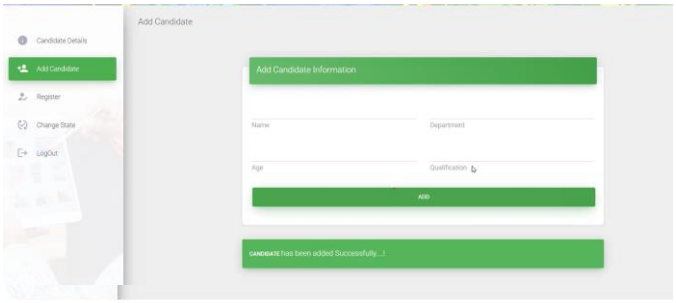
This is the login page for admin.
After admin is logged in, he or she is directed to the dashboard.



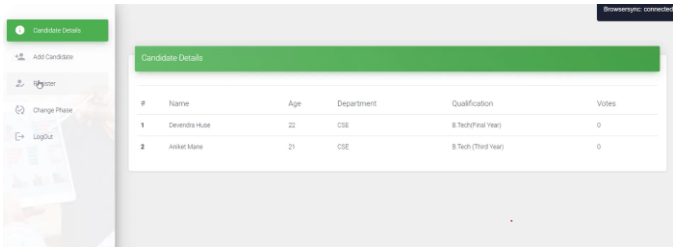
The user will have to sign up before logging in.
This is the sign-up page for the user.



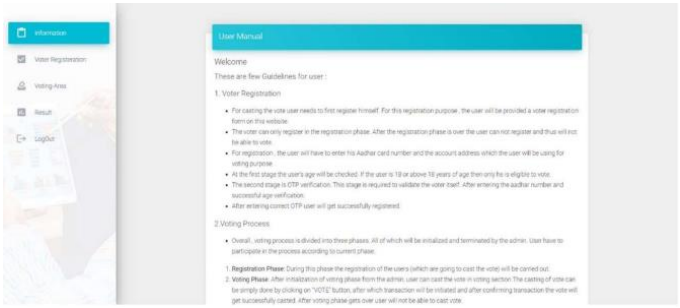
If the user chooses the user sign-in option on the homepage, he will be directed to this page. After logging in, he will be directed to the user dashboard.



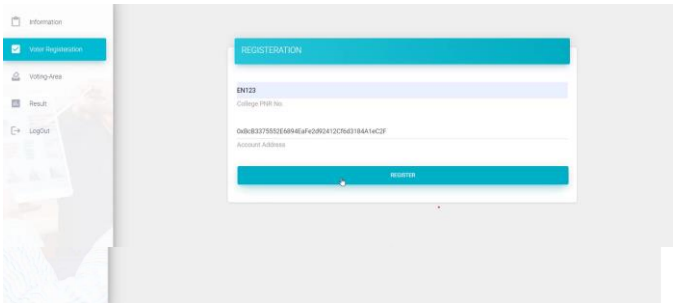
In this module, the administrator can add candidates who are running in the election. After a candidate is added, it will be displayed on the user side.

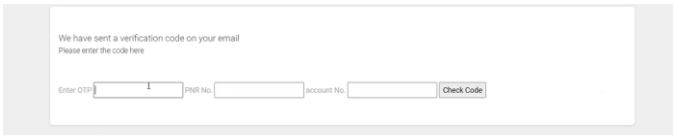


All candidates uploaded by the administrator will be listed on the candidate details page. If a mistake is made, the administrator can update the candidate's information.

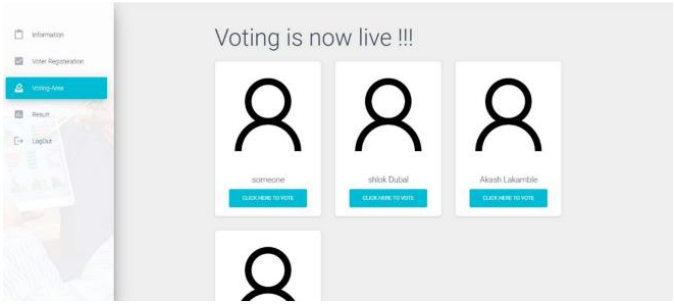


The user dashboard provides information about voter registration. The user can view all of the candidate's details. account verification using email.

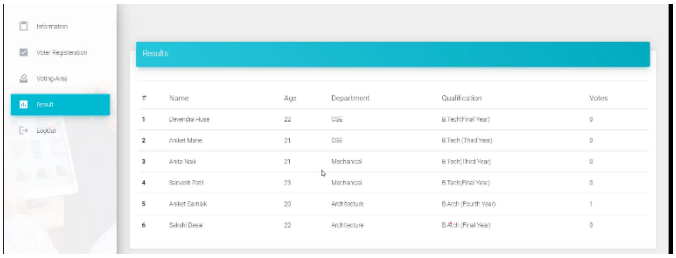




After the user is registered, he will only be directed to this page, where he can cast his vote.



The result page is



X. CONCLUSIONS

In this project, we introduced a blockchain-based electronic voting system that uses smart contracts to provide secure and cost-effective elections while also protecting voters' privacy. Blockchain technology provides a new way to overcome the limits and adoption obstacles of electronic voting systems, ensuring election security and integrity while laying the groundwork for transparency. Making use of an Ethereum private blockchain, it is easy to send multiple transactions per minute onto the blockchain, employing every part of the smart contract to reduce the burden on the blockchain.

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