Building Online Voting System Using Blockchain

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Introduction

- E-Madan is Online voting using Ethereum blockchain is a secure, transparent and tamper-proof way of conducting online voting.
- It is a decentralized application built on the Ethereum blockchain network, which allows participants to cast their votes and view the voting results without the need for intermediaries.
- In this system, votes are recorded on the blockchain, making it impossible for anyone to manipulate or alter the results.
- The use of smart contracts ensures that the voting process is automated, transparent, and secure.
- The use of the blockchain technology and the implementation of a decentralized system provide a reliable and cost-effective solution for conducting trustworthy and fair elections

Problem Statement

- The current voting systems suffer from security vulnerabilities, lack of transparency, and trust issues.
- Election fraud, manipulation, and hacking are major concerns under mining the integrity of the democratic process.
- The innovation gap lies in improving the security,transparency, and trustworthiness of voting systems.

Literature Survey

Sr.no.	Paper Title	Authors	Observation	Limitation
1	A Survey of Blockchain Based on E-voting Systems Year:- Dec 2019	Yousif Osman Abuidris, Rajesh kumar and Wang Wenyoug	The paper compares security and privacy requirements of current blockchain-based e-voting systems.	The paper may oversimplify the advantages and challenges of blockchain e-voting, overlooking specific contexts, and might not account for recent developments, potentially lacking the latest information.
2	Survey on Voting System Using Blockchain Technology Year:- 04 April 2022	Mayur Shirsath, Mohit Zade, RiteshKumar Talke, Praful Wake and Maya P.Shelke	The project aims for a user-friendly blockchain e-voting system, prioritizing simplicity and accessibility for all users, irrespective of technical expertise.	Blockchain's potential for enhancing electronic voting faces resistance from stakeholders, including government agencies and the public, posing challenges to its widespread adoption.
3	A Survey on Smart Electronic Voting System Using Block-Chain Technology Year:- Jan 2021	Naina Nagesh Dhepe and DR.Pathan Mohd Shafi	The research aims to enhance electoral security by developing a transparent, secure voting machine through blockchain technology.	The paper outlines a system for India's electoral process, cautioning that its applicability may vary across countries due to differing implementation details and considerations in electoral systems.

4	A Systematic Literature Review and Meta-Analysis on Scalable Blockchain-Based Electronic Voting Systems Year:- Oct 2022	Uzma Jafar , Mohd Juzaiddin Ab Aziz, Zarina Shukur and Hafiz Adnan Hussain	The research guides future studies to consider voting needs, merits, and drawbacks, providing scalable voting solutions' guidelines.	Blockchain security, while robust, faces risks from smart contract bugs and network attacks, necessitating stringent measures and audits, offering no absolute protection against malicious actors.
5	Blockchain based E-voting System Year:- 2022	Albin Benny, Aparna Ashok Kumar, Abdul Basit, Betina Cherian and Amol Kharat	The paper explores a transparent, secure e -voting system with cost-efficiency, employing blockchain and smart contracts via Ethereum's private blockchain.	Blockchain voting's implementation may face accessibility hurdles for specific demographics, and scalability issues, despite solutions like sharding, may affect efficiency in the electoral process.

Existing System

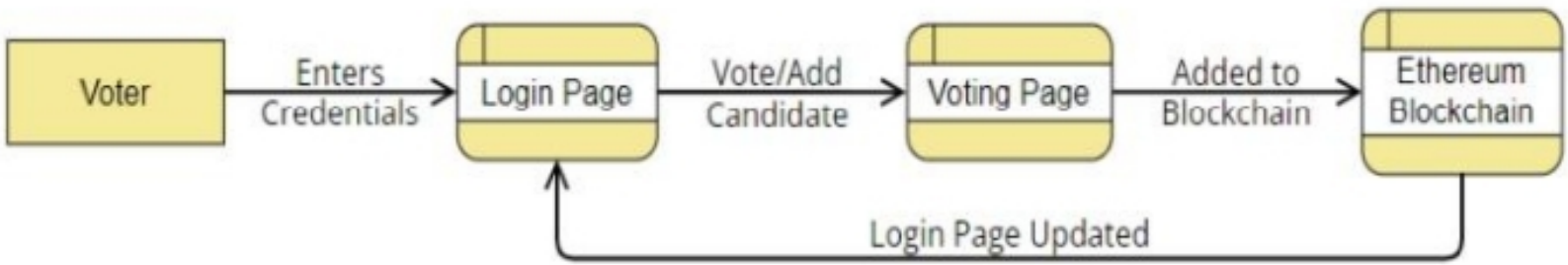
- Ballot System [old traditional system]

- Electronic Voting System

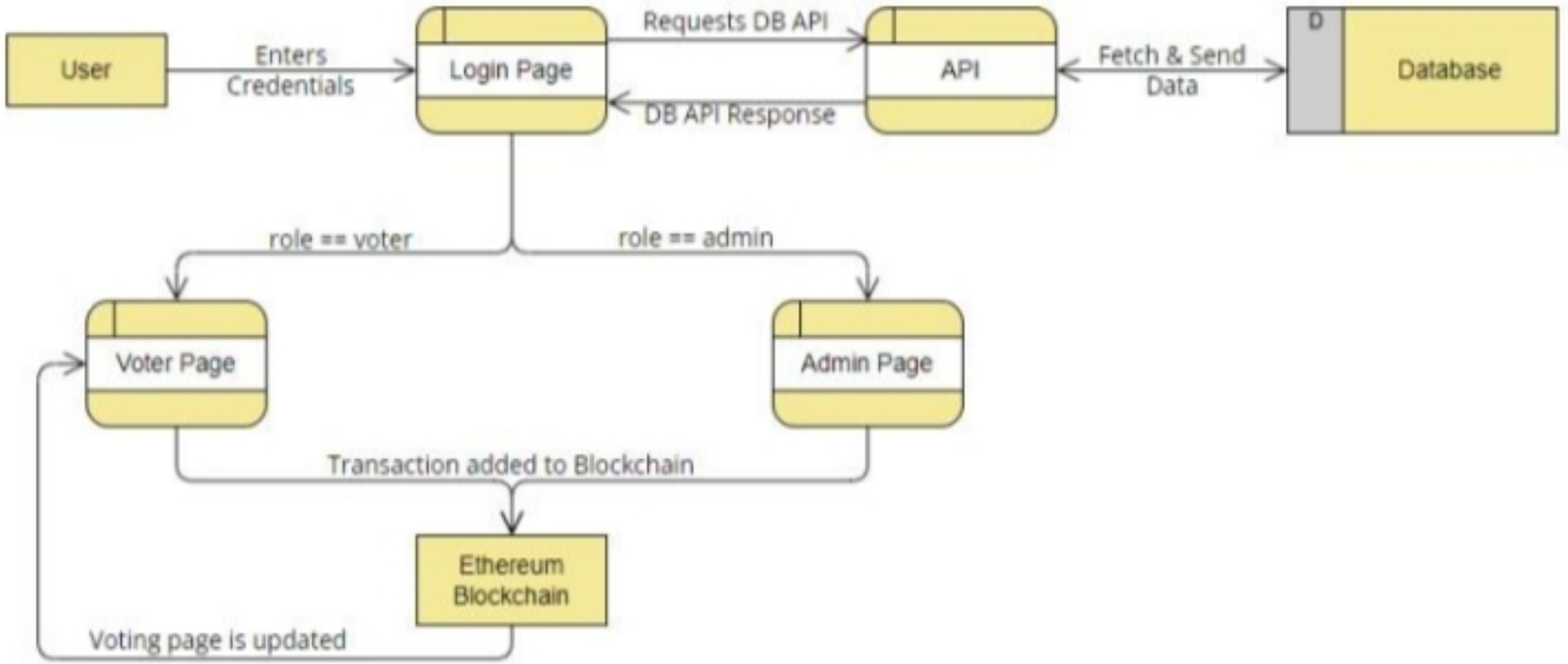
Proposed System

- The proposed voting system using Ethereum blockchain aims to provide a transparent and tamper-proof solution for conducting elections
- By leveraging smart contracts on the Ethereum network, the system enables secure and anonymous voting, while ensuring the integrity and immutability of the voting data.
- This would increase voter trust in the election process and reduce the risk of fraud or manipulation.

- Level 1 data flow diagram



- Level 2 data flow diagram



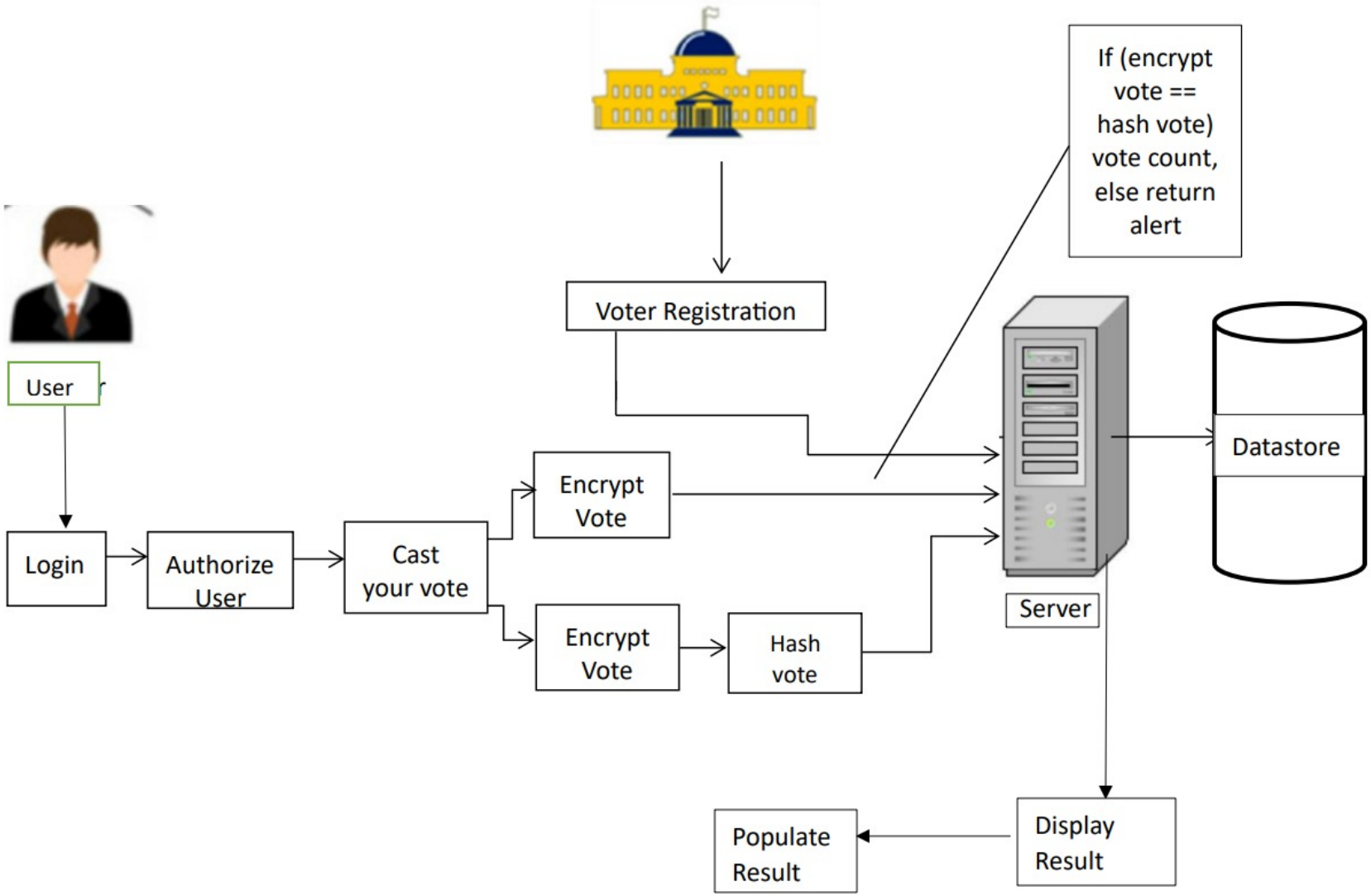


Figure: System Architecture of Voting System

Requirements

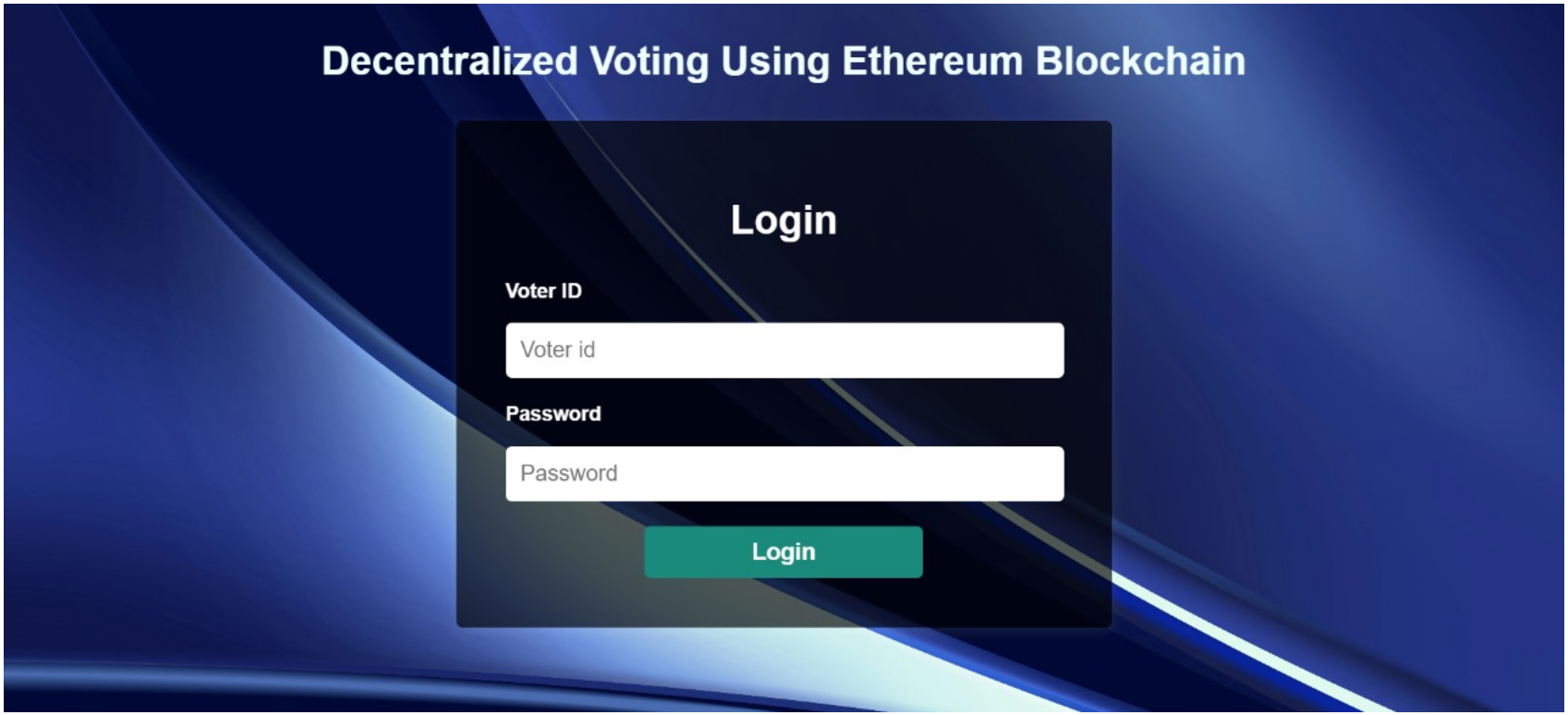
Software Requirements

1. Node.js (version – 18.14.0)
2. Web3.js (version – 1.8.2)
3. Truffle (version – 5.7.6)
4. Solidity (version – 0.5.16)
5. Ganache (version – 7.7.3)
6. Metamask
7. Python (version – 3.9)
8. FastAPI
9. MySQL Database (port – 3306)
10. OS-Windows 10 and above
11. HTML, CSS ,JAVASCRIPT

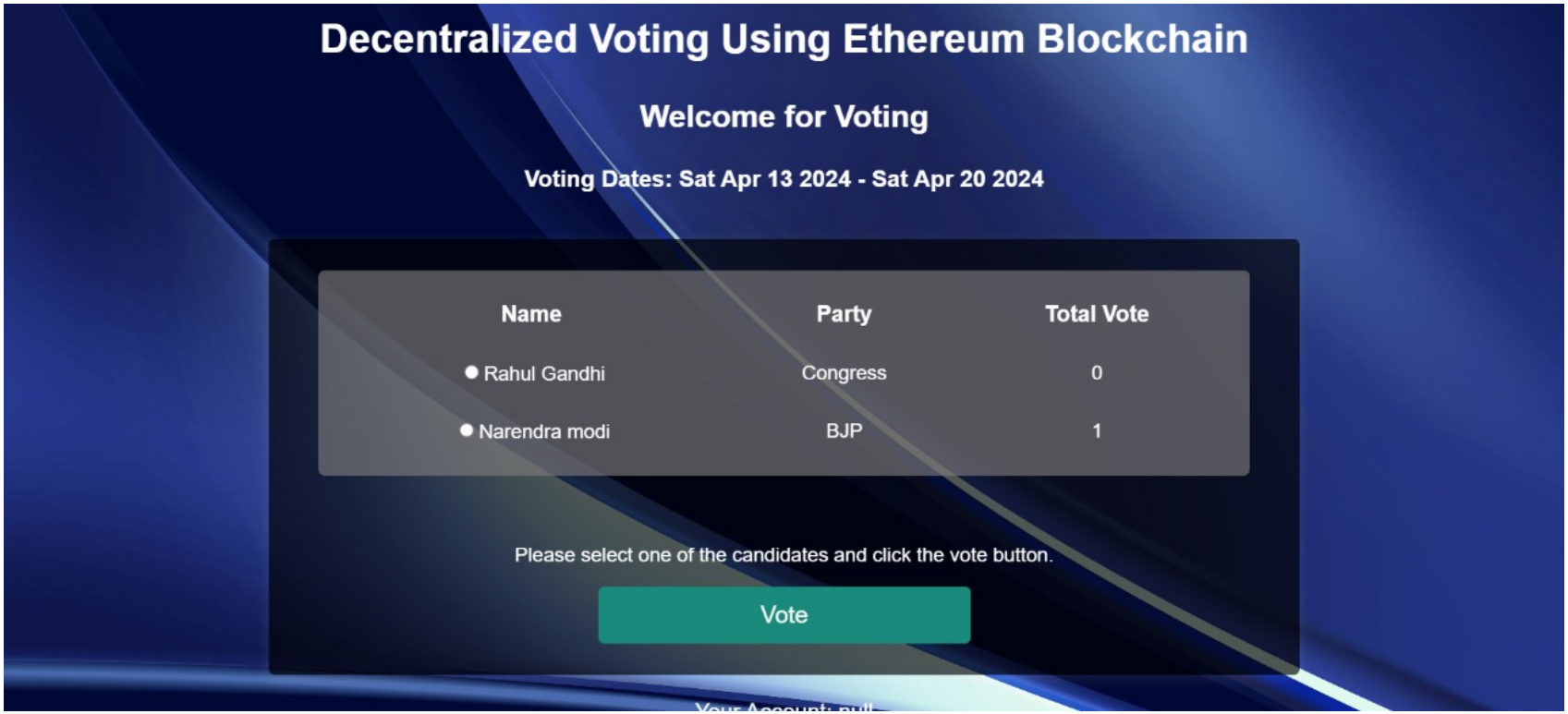
Hardware Requirements

1. Processor – 2 GHz or more
2. RAM – 4 GB or more
3. Disk Space – 100 GB or more

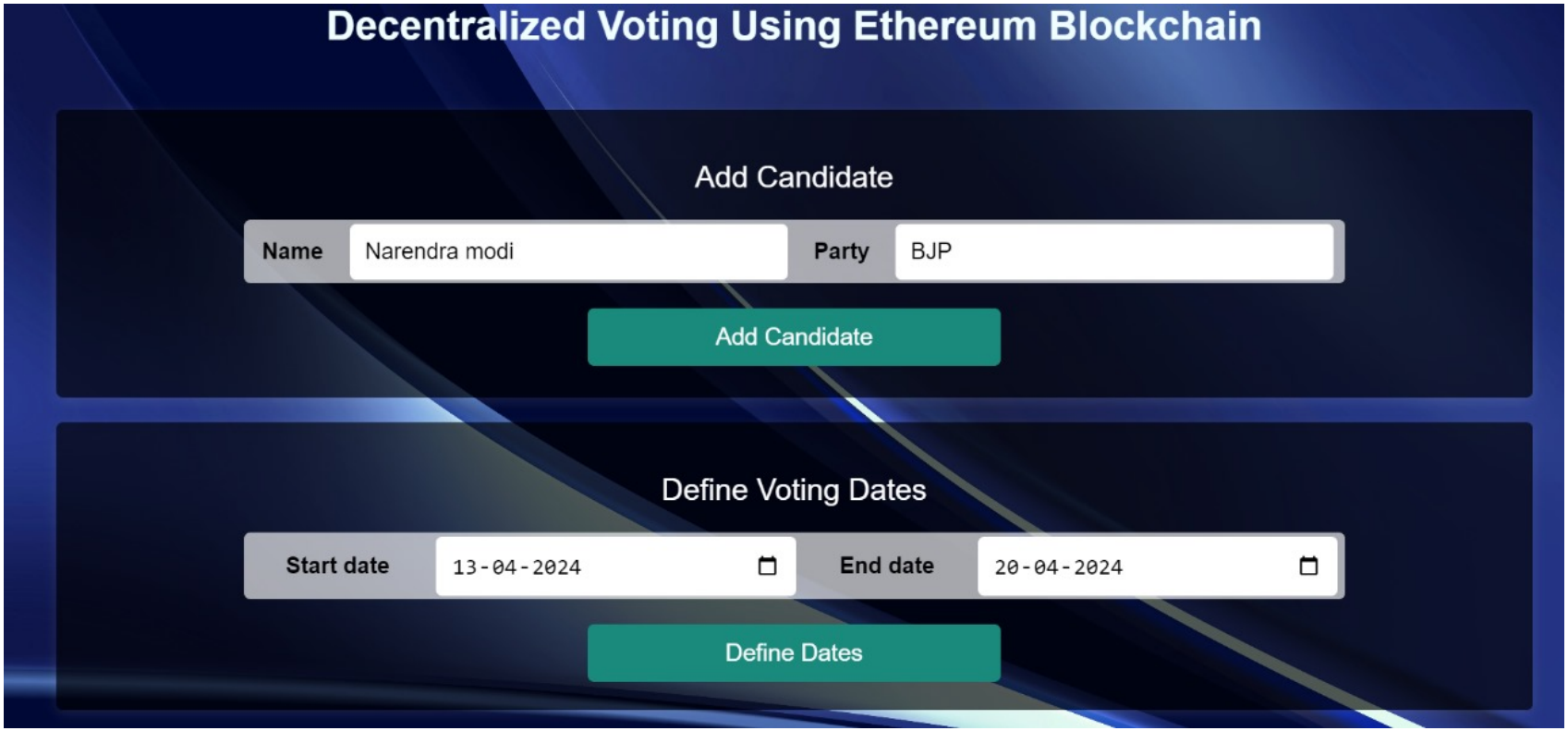
Implementation



Implementation



Implementation



Application

- Political Elections: Implementing a blockchain-based voting system for political elections can increase transparency, reduce fraud, and improve the integrity of the electoral process. It can provide voters with a verifiable record of their votes and ensure that votes are accurately counted.
- Corporate Governance: Companies can use blockchain-based voting systems for shareholder meetings and corporate governance processes. Shareholders can cast votes on important issues such as board elections, executive compensation, and corporate policies securely and transparently.
- Nonprofit Organizations: Nonprofit organizations can use blockchain-based voting systems for decision-making processes such as board elections, project funding proposals, and policy decisions. This can increase participation among members and donors and improve the accountability of organizational leadership.

Conclusion

- Voting with Ethereum Blockchain offers a robust and transparent solution for secure elections. By leveraging blockchain technology, it ensures the integrity of votes and provides a tamper-proof platform.
- With continued enhancements, including improved user experience, scalability, and integration with other cutting-edge technologies, it has the potential to revolutionize the democratic process and empower citizens to participate in a trusted and efficient voting system. It represents a significant step towards building a more democratic and accountable society.

Future Scope

- In future,the Voting system can be enhanced by implementing additional features such as real-time vote counting, secure voter identification mechanisms, advanced data analytics for voter insights, and integration with emerging technologies like artificial intelligence and biometrics.
- These enhancements will further enhance the efficiency, security, and accessibility of the voting process, making it more inclusive and trustworthy.

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