E-Voting System using Ethereum Network

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Abstract: **An e-voting system using the ethereum network is an electronic voting platform that utilizes blockchain technology to enable secure, transparent, and decentralized voting. Ethereum is a distributed computing platform that allows for the creation of decentralized applications, including e-voting systems. The system operates on a peer-to-peer network, and each vote is recorded on the ethereum blockchain, which is immutable and tamber-proof. The platform ensures that each vote is recorded accurately and can be verified by anyone on the network. Additionally, the use of smart contracts on the ethereum network eliminates the need for intermediaries, such as election officials or third-party auditors, reducing the potential for fraud and corruption. The e-voting system using ethereum also faces challenges, such as technical complexity and scalability limitations. To ensure the system's security and accuracy, rigorous testing and auditing are required, which can be costly and time-consuming. In this paper we store the details of voting in all systems. So that no one can edit the details of voting once entered in system. To ensure the system's security and accuracy, rigorous testing and auditing are required, which can be costly and time-consuming. In this paper we store the details of voting in all systems. So that no one can edit the details of voting once entered in system.**

Keyword: Ethereum blockchain, Smart-contracts, Peer-to-peer network, Decentralized, Tamber-proof.

1. INTRODUCTION:

Electronic voting (E-voting) is a modern approach to voting that utilizes digital technologies to facilitate the electoral process. E-voting has the potential to provide a more secure, transparent, and efficient voting system compared to traditional paper-based systems. One of the most promising technological solutions for e-voting is blockchain technology, which offers decentralization, immutability, and transperancy. Ethereum is a popular blockchain platform that allows the development of decentralized applications (DApps) using smart contracts. Smart contract are self-executing computer programs that can automate the enforcement of rules and regulations. This makes ethereum an ideal platform for developing e-voting systems. Using ethereum, and e- voting system can be developed that allows votes to cast their votes securely and anonymously. The bockchain provides transparency, making it possible to verify the integrity of the voting process. The use of smart contracts ensures that the voting rules are enforced automatically, reducing the need for human intervention. E-voting using the ethereum network has the growing demand for more secure and transparent voting systems, the future of e-voting using ethereum looks promising.

2. SYSTEM ARCHITECTURE:

An e-voting system using the Ethereum network provides a secure and transparent way for voters to cast their votes in an election. The decentralized nature of the Ethereum network ensures that votes are recorded accurately

and transparently, while the smart contract ensures that the rules and regulations governing the e-voting system are followed.

Figure 1.1 System Architecture

3. EXISTING SYSTEM:

A finger sensor system typically consists of several components, including:

- Sensor: A small electronic component that is used to capture an image of the fingerprint. The sensor may use a variety of technologies, such as optical, capacitive, ultrasound.
- Database: A database that is used to store the fingerprints of authorized users. When a fingerprint is scanned, the processor compares it to the finerprint in the database to determine if there is a match.
- User Interface: A user interface that allows users to interact with the system, such as by scanning their fingerprint or entering a password.
- Software: Software that is used to manage the fingerprint sensor system, such as by adding or removing users from the database, configuring system settings, and generating reports.
- Power Supply: A power supply that is used to provide electricity to the fingerprint sensor system. This may be a bettery or a wired power source.

4. PROPOSED SYSTEM:

An e-voting system using the ethereum network is an interesting idea. Here's a high-level overview of how such a system might network:

- User Registration: The first step would be create a system for users to register to vote. This could be done through a web portal that would require users to provide their personal information and proof of identity. Once verified, the user's identity would be added to the ethereum network.
- Smart Contract creation: The next step would be to create a smart contract that would represent the election. The contract would specify the results of the rules of the election, including the eligible voters, the candidates, the voting period, and the criteria for winning.
- Voter Authentication: On election day, voters would log into the system using their unique ethereum identity, which would be authenticated against the list of eligible voters.
- Casting votes: once authenticated, voters would be able to cast their vote by sending a transaction to the smart contract that.
- Vote Tally: At the end of the voting period, the smart contract would automatically tally the votes and declare the winner based on the predefined criteria.
- Result Verification: After the election, anyone could review the result by querying the smart contract and verifying the vote counts. Since the blockchain is immutable, the results would be transparented and tamber-proof.

However, there are still some challenges that would need to be addressed, such as ensuring the privacy of the voters and protecting against attacks on the ethereum network itself.

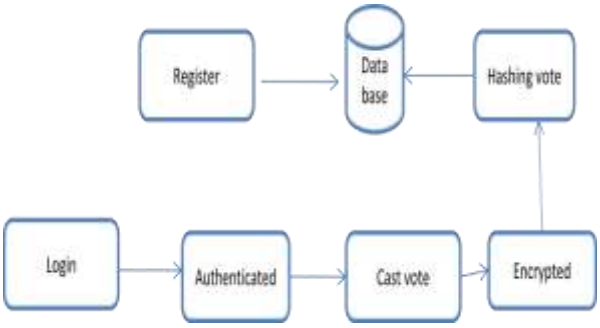
5. ALGORITHM:

A Smart contract should be developed using the solidity programming language on the etereum network. This smart contract will be responsible for managing the voting process, storing the votes, and computing the results.

The smart contract will need to define the rules for the election, including the number of candidates, the number of votes each voter is allowed to cast, and the deadline for voting. Before the election begins, voters will need to register with the e-voting system. The voter's ethereum address will be used to verify their identity, and each voter will only be allowed to register once. Once the voter is registered, they can cast their vote using ethereum wallet. The voter will send a transaction to the smart contract indicating their vote. The smart contract will validate the vote and record it. After the voting deadline has passed, the smart contract will count the votes and determine the winner. The winner will be determined based on the rules defined in the smart contract. Once the winner has been determined, the e-voting will announce the results on the ethereum network.

The result will be publicly visible and verifiable, allowing anyone to confirm the accuracy of the results. To ensure the security of the e- voting system, the smart contract code should be audited by security experts the identity any vulenerabilities. Additionally, access to the e-voting system should be restricted to authorized users to prevent unauthorized access or tampering. Overall, an e-voting system using the ethereum network can provide a secure, and decentralized way to conduct elections.

6. DATA FLOW DIAGRAM:



MODULES:

Registration

Login

Voting

Result

Modules Description

Registration:

Registration module is used for registering the user account into the system used validate details. Enter all the required fields and click register button. Students would register their details to get a separate login so that they can perform their assigned their login.

Login:

A login page is a web page or an entry page to a website that requires user identification and authentication, regularly performed by entering a username and password combination. The student can login their account using their user id and password any number of times for completing all their tasks.

Voting:

A voting module is a software component or application that allows users to cast their votes in an election or poll. The module typically consists of a user interface that allows voters to input their selections, as well as backend logic that tallies the results and ensures that the voting process is fair and secure. The voting module can be designed to handle different types of elections, such as single or multiple-choice elections, or elections with ranked or weighted voting. It can also be integrated with other systems, such as a voter registration system, to ensure that only eligible voters are allowed to participate.

Result:

A voting result module typically displays the results of an election or poll in a clear and concise manner, allowing viewers to easily understand the outcome. The module may include a variety of information, such as:

- Total number of votes cast.
- Number of votes received by each candidate or option.
- Percentage of votes received by each candidate or option.
- Presentation of the vote distribution (e.g., bar graph, pie chart, etc.)
- Any relevant comments or explanations about the voting process or results.

7. CONCLUSION:

In conclusion, an e-voting system based on the ethereum network can offer numerous advantages such as increased security, transparency, decentralization, and accessibility. However, the implementation of such a system may also come with some challenges, including complexity, scalability, and cost issues. To ensure the success of an e-voting system project using the ethereum network, it is crucial to carefully evaluate and address these challenges. This may involve engaging experienced developers with the technical expertise required to develop, deploy, and maintain the system, as well as implementing measures to ensure scalability and manage costs. Overall, an e-voting system based on the ethereum network has the potential to revolutionize the voting process, providing a secure, transparent, and weigh the pros and cons and ensure that the system is designed and implemented in a way that maximizes its benefits while minimizing its potential drawbacks.

8. FUTURE ENHANCEMENT:

E-voting using the ethereum network is a potential future enhancement that could bring greater transparency, security, and accessibility to the voting process. Ethereum is a blockchain-based platform that allows for the development of decentralized application, including smart contract that can automate the execution of agreements and transaction. Firstly, the decentralized nature of the ethereum network means that all transactions are publicly recorded on the blockchain, making the voting process more transparent and auditable.

Secondly, the use of smart contract could help to prevent fraud and tampering by automating the vote counting process and ensuring that each vote is accurately recorded. Thirdly, e-voting on the ethereum network could be accessible to anyone with an internet connection, potentially increasing voter turnout and making the voting process more convenient. Finally, there are also potential challenges and limitation to implementing e-voting on the ethereum network. For example, there are concerns around the security of internet- based voting systems, and ensuring the privacy and anonymity of voters would be critical. Additionally, the ethereum network can be slow and expensive to use, which could make it difficult to scale e-voting to larger population.

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