Software Requirements Specification

DECENTRALIZED VOTING SYSTEM

Group 3:
Ann Tressa Paul(14)
Krishna K S(38)
Lubaib P Rehman(40)
Neerja Binu Vimalan(53)

Contents

Problem Statement

The current voting system is vulnerable to various types of errors, fraud, and inefficiencies which include:

- Voter fraud
- Tampering of voting records
- Lack of transparency
- Inefficiency

This can affect the accuracy and integrity of the election results.

Decentralised Voting System

- Provide a secure, transparent, and immutable platform for conducting elections.
- Prevent any unauthorized changes or manipulations to the voting records.
- Provide a reliable voting process, accessible to all eligible voters, while ensuring the integrity and confidentiality of the voting records.

Scope

- Can be used by all eligible voters and also the election officials.
- Can be accessed from anywhere, as long as users have an internet connection.
- Can be used to make a wide range of decisions, from electing public officials to voting on proposals or policies
- Offers greater transparency, security, and accessibility than traditional centralized voting systems.

Stakeholder Identification

1. **Primary Stakeholders:**
- Voters
- Candidates/Political parties
- Election Officials

2. **Secondary Stakeholders:**
- General Public
- Civil society organizations
- Media

Requirements Gathering

- **Researched on existing system**

  Analysed existing voting systems and their drawbacks.
- **Expert consultation**

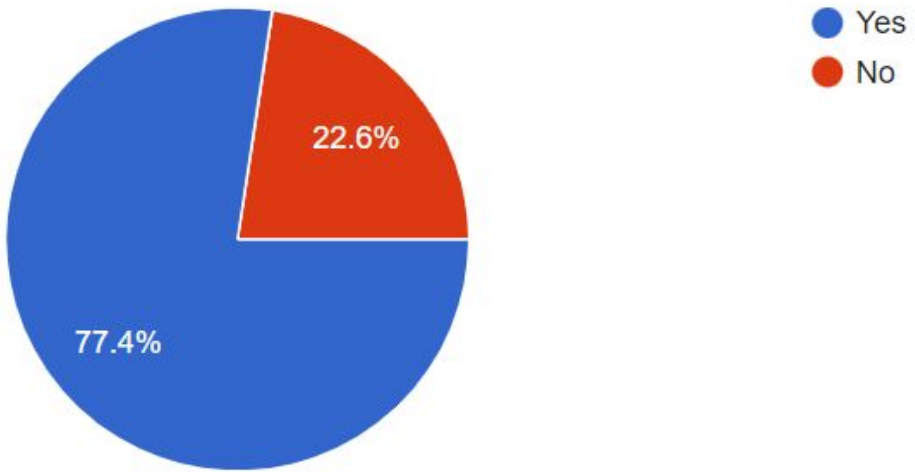
  Contacted professionals in the field of blockchain to identify potential risks and requirements.
- **Google form survey**

  Conducted a survey using google form to gather public opinion.

Let’s have a survey

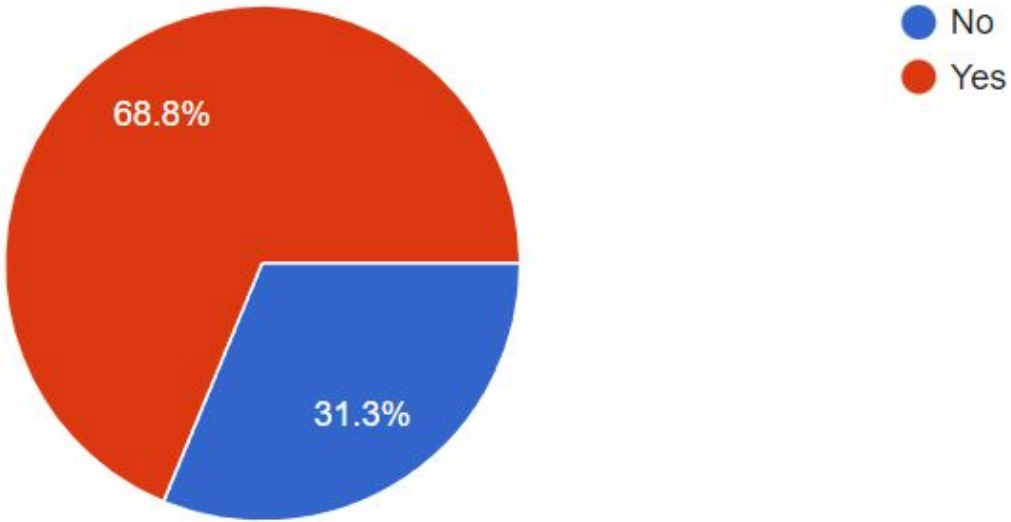
Have your ever cast a vote?

31 responses



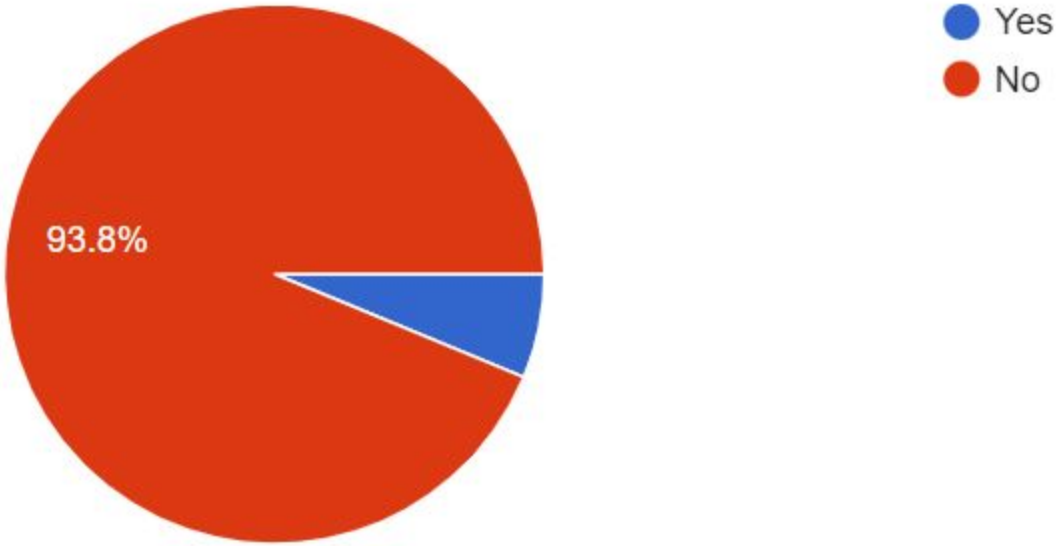
Do you have any knowledge about fraudulent voting?

32 responses



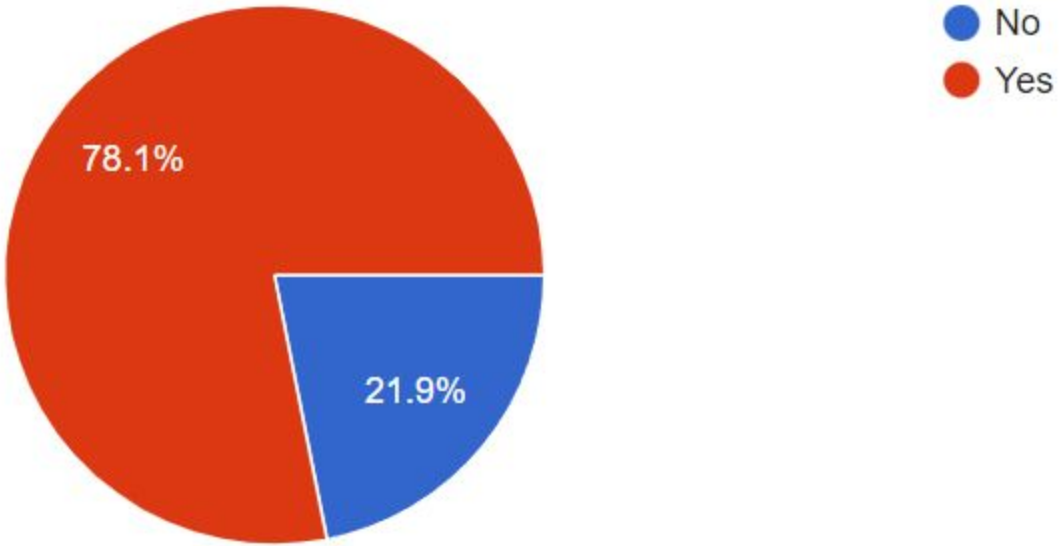
Have you ever faced an electoral fraud?

32 responses



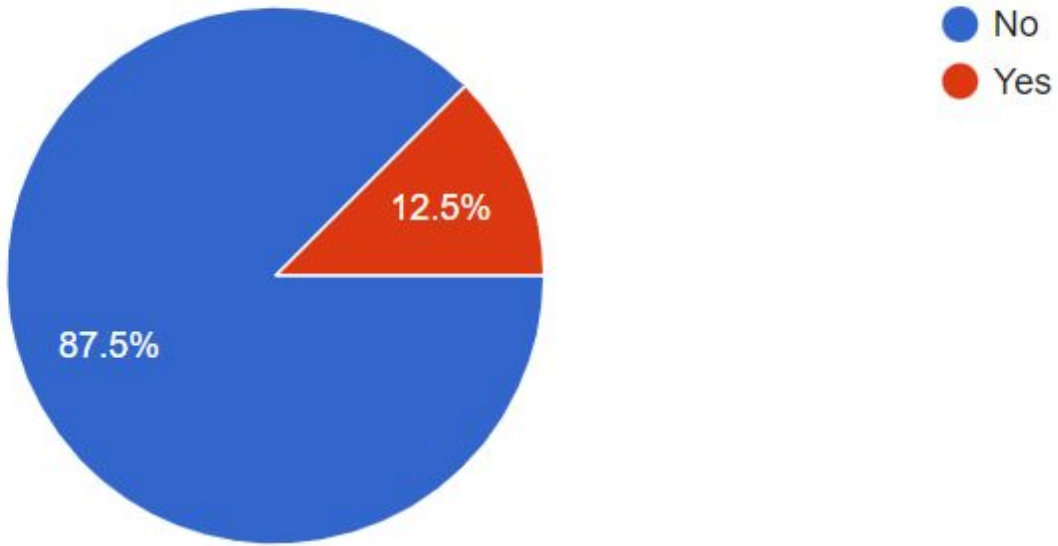
Have you ever heard of fraudulent voting in your community, nation, or state?

32 responses



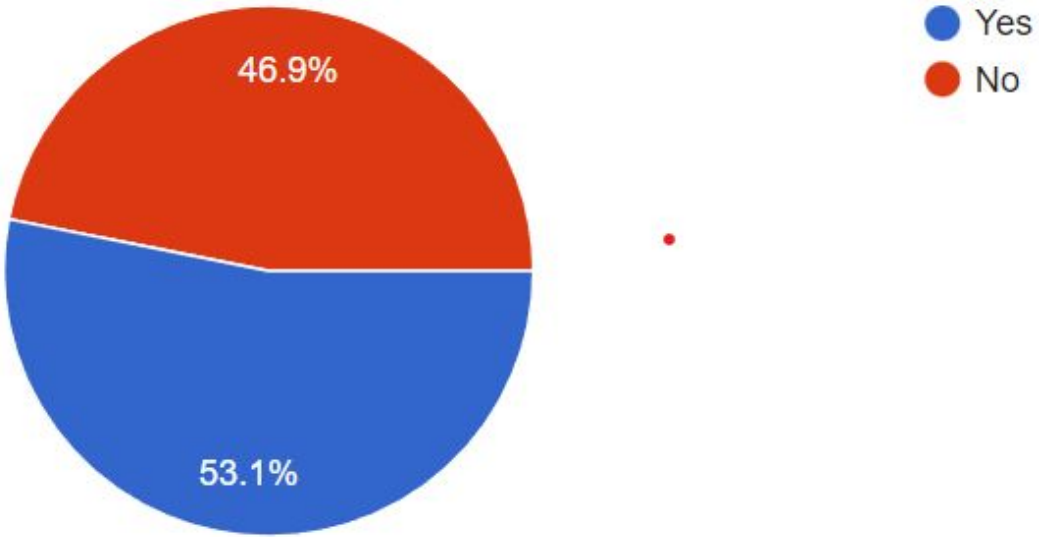
Do you know about 49P (a law outlined in the Indian Election Commission Act)?

32 responses



Are you sure that the vote you cast is recorded correctly?

32 responses



Please leave a comment below if you have any technical suggestions for avoiding the problems listed.

4 responses

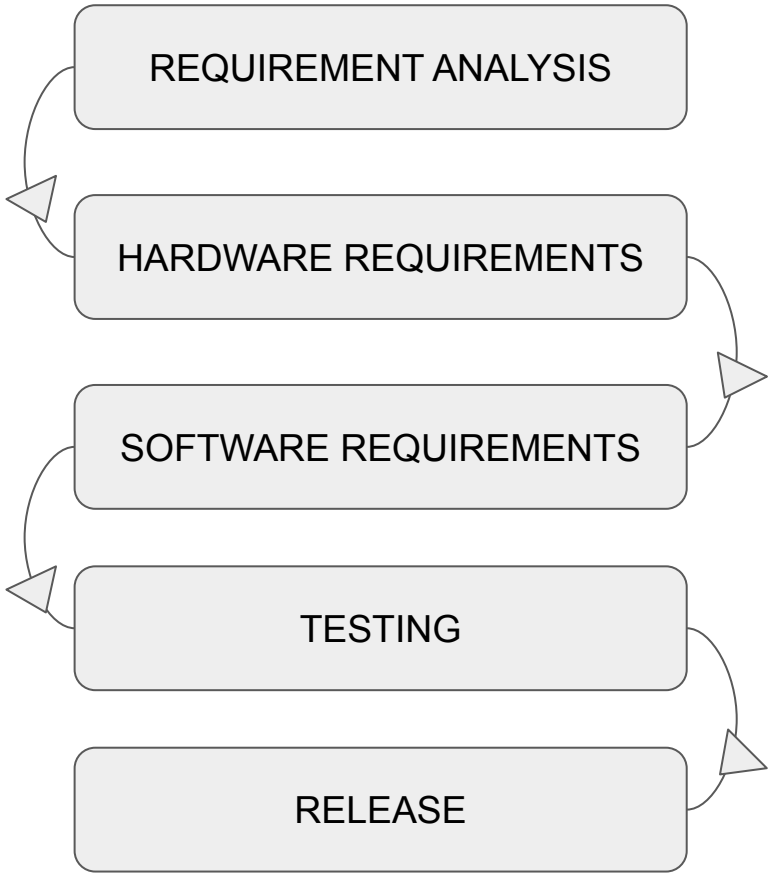
Biometric voting system

Voting system on thump impression retina detection etc

Using Finger print technology in voting machines.

Awareness

Project Plan



Literature Review

- https://www.sciencedirect.com/science/article/pii/S1319157822002221

This paper throws light over the idea of using smart contracts so the involvement of the third part is less. The casted votes are kept encrypted.Here the voter's information is stored as a hash so that no one can identify the voter in the network. Here, the data is preserved as a hash instead of full information, so cost is also reduced.It also discusses how it facilitates voters to vote for their candidate via smart devices from everywhere in the world,thus providing anonymity, security,integrity,etc

- https://ieeexplore.ieee.org/document/9792791

This paper discusses the proposed solution that will solve the above problems. Our proposed solution is to use an Online Voting System using Ethereum Blockchain. This web-based voting system helps the voters to vote from any location. The system validates the voters with the help of their Aadhar cards linked with their voter id. After which the system requires the voters to scan their face and fingerprint which will be verified with the data in the database. Blockchain technology encrypts the vote and thus it prevents every vote from tampering. It makes sure that a voter can vote only once for one candidate. The system fetches the election results quickly and thus reduces the labour cost and counting errors.

- https://www.investopedia.com/news/how-blockchain-technology-can-prevent-voter-fraud/

Speaks about Horizon State, a company that aims at bringing blockchain to the voting populace.Also it talks about the real life implementation of this voting system. One such incident occurred on November 18 in Thailand, where primary elections were conducted using ZCoin. This marked the first large-scale political election carried out using the blockchain technology.

Functional Requirements

⇒**Authentication** : The machine must authenticate each voter’s identity to ensure that only eligible voters are allowed to cast their votes.

⇒**Vote casting** : The machine should allow voters to cast their votes accurately and easily without any confusion or errors.

⇒**Vote counting** : The machine should be capable of counting the votes automatically and providing the final election results quickly.

⇒**Fake vote detection** : The machine should be capable to identify the fake vote and release the fake vote from the counting.

⇒**Voting receipt** : The machine should be capable to print the voted data after he/she voted for conforming vote is correctly casted.

Non Functional Requirements

⇒**Reliability**: The machine must be reliable, with minimal downtime and system failures during the election process.

⇒**Performance**: The machine should perform well under high volumes of usage and processing data quickly to ensure that the election results are available promptly.

⇒**Scalability**: The machine should be designed to scale up or down as per the requirements of different types of elections, from small local elections to large national ones.

⇒**Maintainability**: The machine must be easily maintainable, with minimal downtime for repairs or upgrades.

⇒**Interoperability**: The machine should be compatible with other election-related systems such as voter registration databases, election management systems, and result transmission systems.

App Interface - Functionalities

- Home page
- Candidate registration and authentication
- Voter registration and authentication
- Voters list

Home page

- The home page consists of label indicating the number of candidate and voters in the system
- It also contains a label which is used to display the current date and time
- There also exists a drop-down menu with the following features :
    1. Candidate registration
    2. Voter registration
    3. Voter list

Candidate registration and authentication

- A candidate can register in the voting system by filling the details and uploading his/her image
- The registration process will only be completed if the organiser confirms their authenticity
- Also while registering the candidate, details such as age are checked upon based on the system of the election

Voter registration and authentication

- Similar to the candidate registration process, the voter is authorized only after the confirmation of organizer
- Once successfully registered, the voter can see the list of candidates and register a vote for a candidate of their choice.
- After registering a vote , the “Already voted” message is displayed on the home page and vote cannot be changed or new vote cannot be registered

Voters list

- Shows the list of the voters registered in the voting system.

Tools Used

- **Solidity** is used to write smart contracts on the Ethereum blockchain.
- **React** is used for building user interfaces.
- **Node.js** allows to run JavaScript code outside of a web browser.
- **CSS** is used to style web pages.
- **Metamask** allows users to interact with Ethereum blockchain applications directly from their web browser.
- **Web3** allows developers to interact with the Ethereum blockchain.
- **Hardhat** is for building and testing Ethereum applications.

Conclusion

- Decentralized voting machines offer secure, transparent, and tamper-proof elections.
- Blockchain technology can reduce election fraud and manipulation.
- Decentralized voting requires careful consideration of technical, legal, and social factors.
- Protect user privacy, maintain integrity, and provide a user-friendly interface.

References

1. Link for SRS document:

   bit.ly/SRS_DVM

2. Review paper 1:

   https://www.sciencedirect.com/science/article/pii/S131915782200221

3. Review paper 2:

   https://ieeexplore.ieee.org/document/9792791

4. Review paper 3:

   https://www.investopedia.com/news/how-blockchain-technology-can-prevent-voter-fraud/

Individual Contributions

Ann Treesa Paul - UI using CSS, Developing smart contracts for Ethereum using Solidity.

Krishna K S - Backend using MetaMask and Node.js for scalability.

Lubaib P Rehman - Database creation and management as well as deployment of web3.

Neerja Binu Vimalan - Page - Page functionality implementations using Hardhat.

THANK YOU!