

# VISVESVARAYA TECHNOLOGICAL UNIVERSITY

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### Project Synopsis on **BLOCKCHAIN-BASED VOTING SYSTEM**

Submitted in partial fulfilment of the requirement for the award of Bachelor Degree  
In

**Computer Science and Engineering**  
Submitted By

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# 01. Introduction

A **blockchain-based voting system** is a digital platform that uses blockchain technology to ensure **secure**, **transparent**, and **tamper-proof** elections. It enables **immutable vote recording**, **real-time verification**, and **decentralized consensus** using **cryptographic encryption** and **smart contracts**, reducing fraud and eliminating the need for a central authority. Ideal for **government**, **corporate**, and **online voting**, it ensures trust and fairness.





# 02.

# Problem Statement

Traditional voting systems face issues like **vote tampering**, **lack of transparency**, **security risks**, and **accessibility challenges**. EVMs and online systems are vulnerable to **hacking** and **centralized control**, leading to **mistrust** and **disputes**. Manual vote counting is **slow** and **error-prone**. There's a need for a **secure**, **decentralized**, and **verifiable** system to ensure **fair** and **trustworthy elections**.



# 03. Aim

To build a **secure**, **transparent**, and **tamper-proof** digital voting system using **blockchain**, ensuring **voter anonymity**, **real-time verification**, and **immutable records**. The goal is to eliminate **fraud**, **hacking**, and **inefficiencies**, while enabling **remote voting**, **faster counting**, and enhancing **trust** in election outcomes.



# 04. Scope



- **Security & Integrity:** Encrypted, tamper-proof voting records
- **Transparency & Trust:** Verifiable and auditable process
- **Decentralization:** No central point of control or failure
- **Anonymity & Privacy:** Confidential yet traceable votes
- **Remote Access:** Global participation, higher turnout
- **Efficiency:** Faster results, lower costs, fewer errors
- **Smart Contracts:** Automated validation and tallying
- **Scalability:** Adaptable for government, corporate, and online voting



# 05. Objectives



- **Secure Voting:** Ensure tamper-proof vote recording
- **Voter Authentication:** Enable safe and simple registration
- **Decentralized Platform:** Eliminate central control, build trust
- **Privacy & Anonymity:** Protect voter identity and choices
- **Real-Time Results:** Live vote tracking with full transparency
- **User-Friendly UI:** Design an accessible and intuitive interface

# 06. Requirement Specifications

## Hardware:

- Intel i3 / Ryzen 3 or higher
- 4GB RAM (8GB recommended)
- 128GB SSD or more

## Software (Tools & Technologies Frontend):

- **Blockchain:** Ethereum
- **Frontend:** HTML, CSS, React.js
- **JavaScript Backend:** Solidity (Smart Contracts),node.js
- **Web3.js Testing:** Ganache
- **Truffle Wallet:** MetaMask



# 07. Methodology



- **Vote Casting:** Voter submits vote after authentication
- **Validation & Encryption:** Invalid votes rejected; valid ones encrypted
- **Blockchain Storage:** Encrypted votes added immutably to the blockchain
- **Smart Contract Tallying:** Automated, unbiased vote counting
- **Result Evaluation:** Declare winner or trigger runoff if needed
- **Runoff Voting:** Repeat until a clear winner is found



# 08. Flowchart

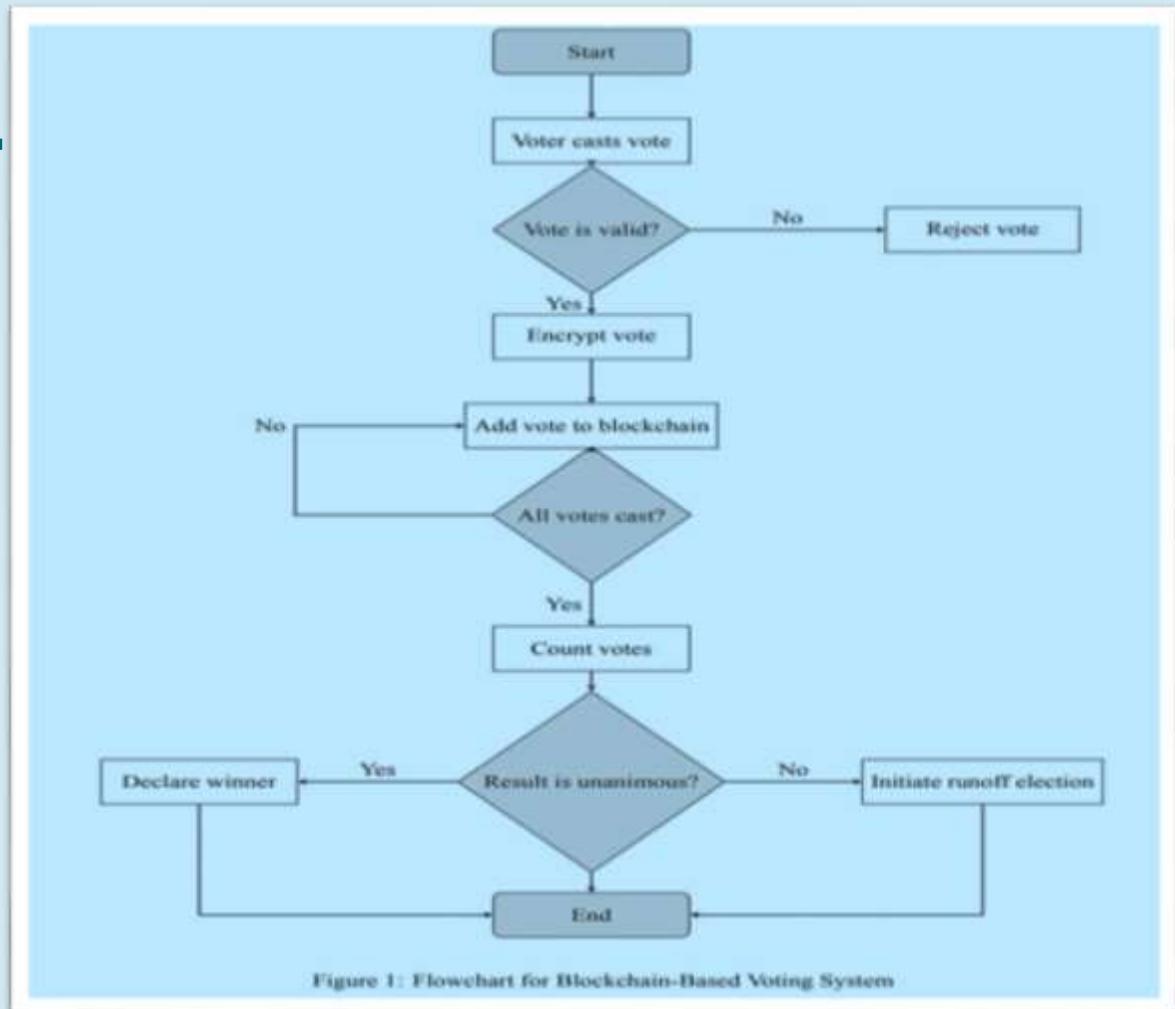


Figure 1: Flowchart for Blockchain-Based Voting System

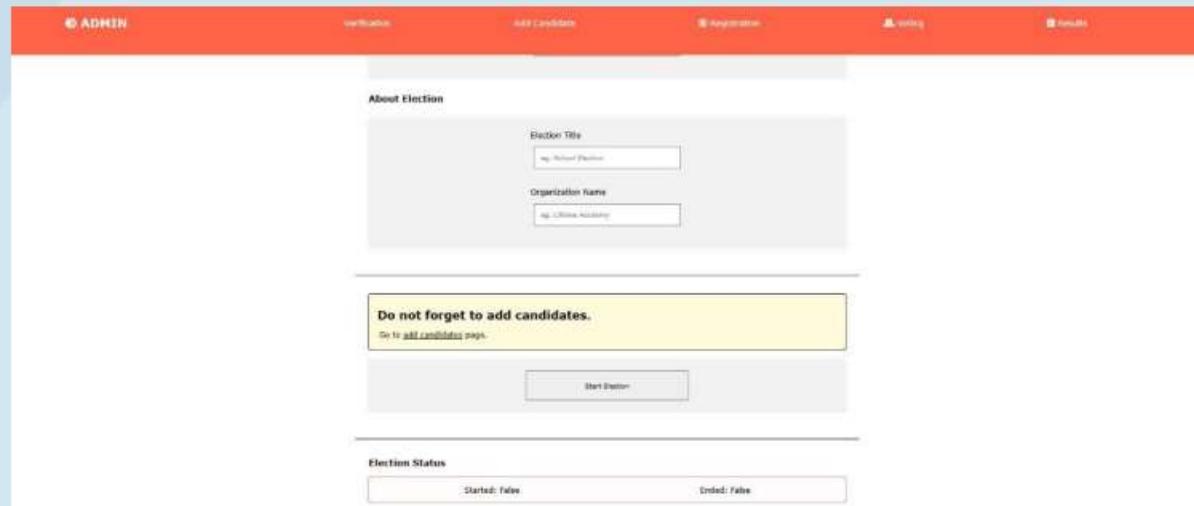
# 09. Application

Blockchain-based voting can be used in **government elections, corporate decision-making, university elections, online polls, community voting, and political party primaries** to ensure secure, transparent, and tamper-proof results.



# 10. Implementation

Figure 6.1: About Admin



**"About Admin"** section displays the administrator's account address and provides fields to enter their full name and email. It also shows a notification indicating that the election has not yet been initialized, prompting the admin to set it up.

## Figure 6.2: User Registration

The screenshot shows a web application interface for user registration. At the top, there is a navigation bar with tabs: 'ADMIN' (highlighted in orange), 'Verification', 'Add Candidate', 'Registration' (highlighted in blue), 'Voting', and 'Results'. Below the navigation bar, a message box displays 'Total registered voters: 1'. The main content area is titled 'Registration' and contains the sub-instruction 'Register to vote.' Below this, there are three input fields: 'Account Address' (containing the value '0xD75cd2d86B5cBAA5700DCdcFfCa7BBEfD05a5759'), 'Name' (containing 'eg. Ava'), and 'Phone number \*' (containing 'eg. 9841234567'). A note below the fields states: 'Note: Make sure your account address and Phone number are correct. Admin might not approve your account if the provided Phone number hub does not matches the account address registered in admins catalogue.' To the right of the note is a vertical scroll bar. At the bottom right of the registration form is a button labeled 'Update'.

User register with account addresss,name,Phone number

### Figure 6.3: Home Page

The screenshot displays a web-based election application interface. At the top, there is a navigation bar with links for "ADMIN", "Verification", "Add Candidate", and "Registration". Below this, the title "SCHOOL ELECTION" is centered. On the left side, there is a sidebar with the text "Gecm" and contact information: "Admin Adithya K P (Hr)" and "Contact adithyakp@gmail.com". A horizontal line separates this from the main content area. The main content area contains a message "The election started." above a button labeled "End". Another horizontal line separates this from the bottom section. The bottom section is titled "Election Status". A modal window titled "Transaction request" is overlaid on the page. It contains the following details:

- Request from: ▲ HTTP localhost:3000
- Interacting with: 0x5FF23...674d1
- Network fee: 0.02 ETH

At the bottom right of the modal are two buttons: "Cancel" and "Confirm".

It represents Home page

## Figure 6.4: Election End



The "**Election End**" section allows the admin to officially end the election process. Upon clicking the "End" button, a blockchain transaction is initiated, requiring confirmation along with a network fee to finalize and record the election's conclusion.

# 11.Results

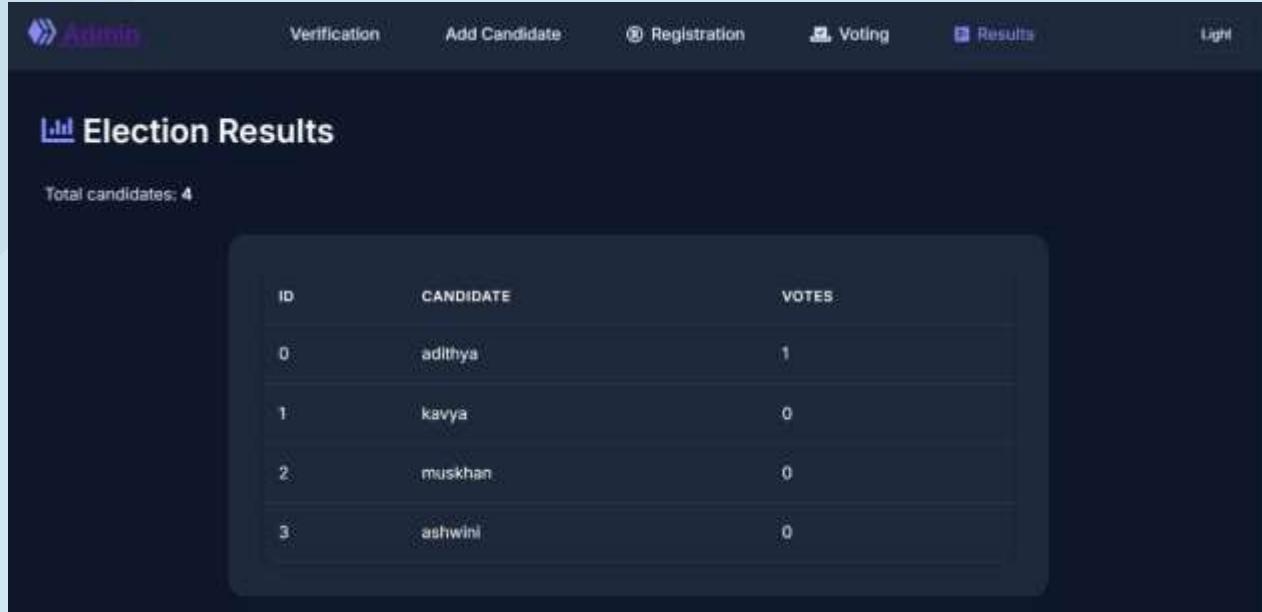
Figure: Election Rules & Guidelines

The screenshot shows a dark-themed web interface for an election system. At the top, there is a navigation bar with tabs: 'Admin' (highlighted in blue), 'Verification', 'Add Candidate', 'Registration', 'Voting', 'Results', and 'Light'. Below the navigation bar, the main content area has a blue header titled 'Election Rules & Guidelines'. The page is divided into four sections: 'Voter Registration', 'Voting Process', 'Security & Transparency', and 'Election Timeline'. Each section contains a bulleted list of rules or guidelines.

- Voter Registration**
  - Each voter must register with valid name and phone number
  - Only one registration per blockchain address
  - Admin must verify each registration before voting
  - Registration is required before the election starts
- Voting Process**
  - One vote per verified voter
  - Votes are recorded on the blockchain
  - Voting is anonymous and secure
  - Cannot change vote once submitted
- Security & Transparency**
  - All transactions are recorded on blockchain
  - Results are tamper-proof and verifiable
  - Admin cannot manipulate votes
  - Full transparency in the voting process
- Election Timeline**
  - Registration period: Before election starts
  - Voting period: After admin starts election
  - Results: Available after election ends
  - No voting after election is closed

**"Election Rules & Guidelines"** This page explains the rules of voter registration, secure voting process, and blockchain-based transparency. It highlights one-vote-per-user policy, tamper-proof results, and clear election timelines to ensure fair and trustworthy elections."

## Figure : “Election Results”

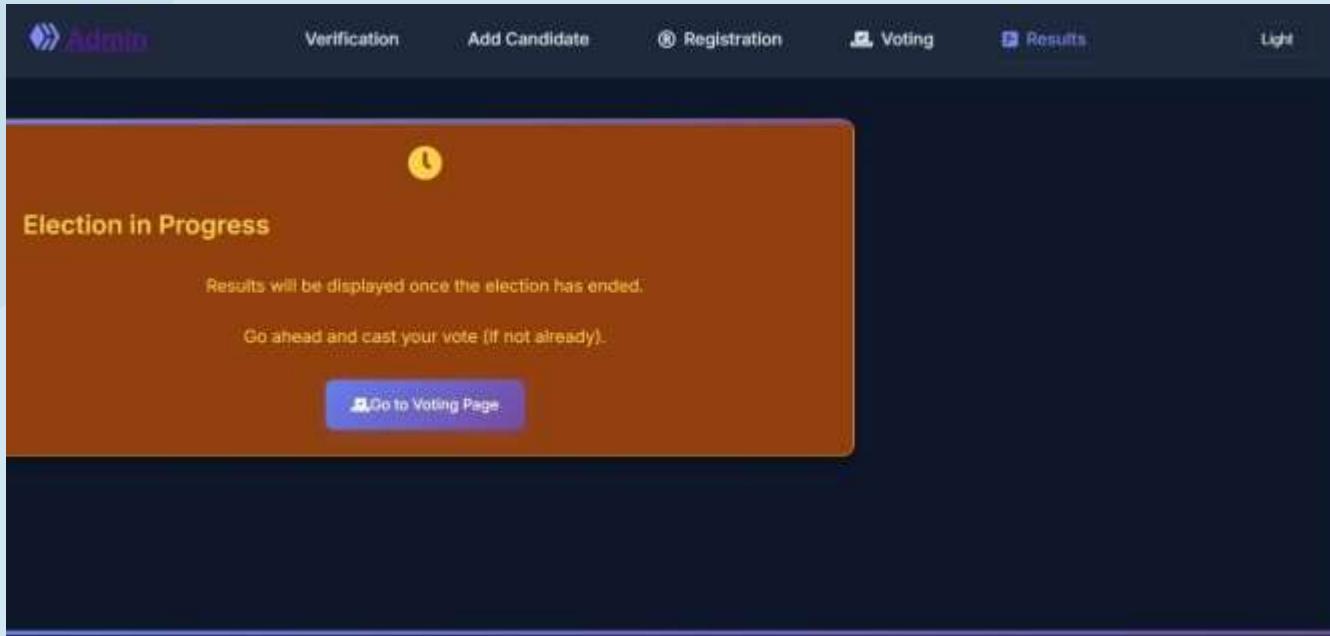


The screenshot shows the 'Election Results' page of the Aion app. At the top, there is a navigation bar with icons for Verification, Add Candidate, Registration, Voting, Results, and Light. Below the navigation bar, the title 'Election Results' is displayed with a chart icon. A message 'Total candidates: 4' is shown above a table. The table has columns for ID, CANDIDATE, and VOTES. The data is as follows:

| ID | CANDIDATE | VOTES |
|----|-----------|-------|
| 0  | adithya   | 1     |
| 1  | kavya     | 0     |
| 2  | muskhan   | 0     |
| 3  | ashwini   | 0     |

**“Election Results”** This page displays the final vote count for each candidate in a transparent manner. Results are recorded on the blockchain, ensuring accuracy, security, and tamper-proof verification.

## Figure : “Election in Progress”



**“Election in Progress”** This page indicates that the election is currently active and results will only be visible after completion. It allows verified voters to cast their votes during the voting period.”

## Figure : Voter Verification

The screenshot shows a web application interface titled "Admin". The top navigation bar includes links for "Verification", "Add Candidate", "Registration", "Voting", "Results", and "Light". A blue header bar displays the text "List of registered voters". Below this, a table lists voter information:

|                 |  |
|-----------------|--|
| ACCOUNT ADDRESS | 0x8d53EfAa4F0a98c8f7Ebb64fb77390aFe10d4c46 |
| NAME            | adithya p                                  |
| PHONE           | 6565656565                                 |
| VOTED           | False                                      |
| VERIFIED        | False                                      |
| REGISTERED      | True                                       |

A white button at the bottom of the table area contains the text "Approve".

**“Voter Verification”** This page allows the admin to verify registered voters before participation. It displays voter details like account address, name, phone, and status, ensuring only verified users can cast their votes.”

# 12. Work Done So Far:

- Add candidate functionality (managed by Admin)
- Implement voter registration (by Admin)
- Enable voter verification process
- Develop voting interface for users
- Create result interface for displaying outcomes
- Improve overall UI/UX design for better user experience

# 13. Work to be done

- ◆ Voter Registration Fault Correction
- ◆ UI & UX Enhancements
- ◆ Validation in Every Registration Page

# 13. Conclusion

A **Blockchain-Based Voting System** offers a **secure**, **transparent**, and **tamper-proof** solution to modern electoral challenges. By leveraging **decentralization**, **encryption**, and **smart contracts**, it ensures **voter privacy**, **real-time verification**, and **trustworthy results**. This technology has the potential to **revolutionize democratic processes**, making elections more **efficient**, **inclusive**, and **credible** worldwide.





# 14. References

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- Ethereum Foundation - [ethereum.org](https://ethereum.org)
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- Swan, M. - *Blockchain: Blueprint for a New Economy*
- IBM Blockchain - [ibm.com/blockchain](https://ibm.com/blockchain)
- IEEE & Springer articles on blockchain voting



# Thanks!

