BLOCKCHAIN BASED E-VOTING SYSTEM

**ABSTRACT:**

The online voting system project comprises three modules: Voter, Candidate, and Admin, designed for seamless and secure electoral processes. In the Voter module, users register with a unique Aadhar card number, ensuring no duplicate registrations. Upon successful registration, voters log in using their Aadhar number and password to access the voter homepage, where they can view their details and participate in the voting process. Each voter can cast a single vote, which cannot be altered once submitted. The module also features a results page displaying live election outcomes. The Candidate module includes similar registration and login processes, allowing candidates to create profiles with their name, image, and emblem. Candidates can also view live election results. The Admin module provides administrative access to voter and candidate details, and live results, and ensures vote security through blockchain integration. This system utilizes advanced technologies such as Blockchain for secure voting, React JS for a dynamic frontend, Spring Boot for the backend, and MySQL for database management, ensuring a robust and reliable online voting platform.

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**LIST OF SYSMBOLS**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.NO** | **name** | **NOTATION** | **DESCRIPTION** |
| 1. | Class | *Class Name*  *-attribute*  *-attribute*  *+operation*  *+operation*  *+operation*  *+ public*  *-private*  *# protected* | Represents a collection of similar entities grouped together. |
| 2. | Association | Class A  Class B | Associations represents static relationships between classes. Roles represents the way the two classes see each other. |
| 3. | Actor | Class B    Class A  Class B  Class A | It aggregates several classes into a single classes. |

|  |  |  |  |
| --- | --- | --- | --- |
| 4. | Relation  (uses) | uses | Used for additional process communication. |
| 5. | Relation  (extends) | extends | Extends relationship is used when one use case is similar to another use case but does a bit more. |
| 6. | Communication |  | Communication between various use cases. |
| 7. | State |  | State of the processs. |
| 8. | Initial State |  | Initial state of the object |
| 9. | Final state | State | F inal state of the object |
| 10. | Control flow |  | Represents various control flow between the states. |
| 11. | Decision box |  | Represents decision making process from a constraint |
| 12. | Use case |  | Interact ion between the system and external environment. |

|  |  |  |  |
| --- | --- | --- | --- |
| 13. | Component |  | Represents physical modules which is a collection of components. |
| 14. | Node |  | Represents physical modules which are a collection of components. |
| 15. | Data Process/State |  | A circle in DFD represents a state or process which has been triggered due to some event or acion. |
| 16. | External entity |  | Represents external entities such as keyboard, sensors etc. |
| 17. | Transition |  | Represents communication that occurs between processes. |
| 18. | Object Lifeline |  | Represents the vertical dimensions that the object communications. |
| 19. | Message | Message | Represents the message exchanged. |

# INTRODUCTION

The emergence of digital technologies has catalyzed significant advancements across various sectors, and the electoral process is no exception. Traditional voting systems, often fraught with logistical challenges and security vulnerabilities, are increasingly being replaced by more efficient and secure online voting solutions. This project introduces an innovative online voting system that harnesses blockchain technology, React JS, Spring Boot, and MySQL to revolutionize the electoral landscape. These technologies collectively aim to enhance accessibility, transparency, and security for voters, candidates, and administrators alike.

In the modern era of technological innovation, the electoral process is undergoing a paradigm shift towards digitalization. Conventional voting methods, characterized by paper ballots and manual counting, are giving way to online voting systems that promise greater efficiency and reliability. This project presents an advanced online voting platform designed to leverage blockchain technology alongside robust frameworks like React JS and Spring Boot, integrated with a MySQL database. By embracing these technologies, the system aims to streamline voting procedures, ensure the integrity of electoral outcomes, and provide a user-friendly experience for all stakeholders involved in the democratic process.

# CHAPTER 1

# BLOCKCHAIN

# GENERAL

Blockchain technology has emerged as a transformative force across industries, revolutionizing how data is stored, managed, and exchanged. At its core, blockchain is a decentralized digital ledger that records transactions in a secure and transparent manner. Unlike traditional centralized databases, where data is stored and managed by a single authority, blockchain operates on a distributed network of computers (nodes), each maintaining a copy of the entire ledger. This decentralized architecture ensures that no single entity has control over the data, enhancing security and reducing the risk of fraud or manipulation.

One of the key features of blockchain is its immutability. Once a transaction is recorded and validated on the blockchain, it becomes part of a continuous chain of blocks (hence the name), linked together in a chronological order. Each block contains a cryptographic hash of the previous block, creating a tamper-resistant chain where altering any past transaction would require the consensus of the majority of the network's nodes. This property makes blockchain ideal for applications where data integrity and transparency are paramount, such as financial transactions, supply chain management, and, notably, electoral processes.

Security in blockchain is bolstered by consensus algorithms, which determine how transactions are validated and added to the ledger. Popular consensus mechanisms include Proof of Work (PoW), used by Bitcoin, where miners compete to solve complex mathematical puzzles to validate transactions; and Proof of Stake (PoS), which relies on participants (stakers) holding a certain amount of cryptocurrency to validate transactions based on their stake in the network. These mechanisms ensure that malicious actors cannot alter the blockchain's history without substantial computational power or stake, thereby safeguarding the integrity of the data stored within.

Beyond security, blockchain technology offers unprecedented transparency. The distributed nature of blockchain means that every participant in the network can view the entire transaction history, promoting accountability and trust. This transparency is particularly beneficial in industries where auditability and traceability are critical, such as healthcare, where blockchain can securely store patient records, ensuring privacy and accessibility to authorized parties while preventing unauthorized alterations.

# OBJECTIVE:

The objective of this project is to develop and implement an online voting system that leverages blockchain technology to enhance the security, transparency, and efficiency of the electoral process. By integrating blockchain, React JS, Spring Boot, and MySQL, the system aims to provide a robust platform that ensures the integrity of votes cast while offering a seamless user experience for voters, candidates, and administrators. Specifically, the project aims to address common challenges associated with traditional voting methods, such as voter fraud, logistical complexities, and delayed results.

Through the use of blockchain technology, the system will establish a decentralized ledger where each vote is securely recorded and immutable, thereby preventing tampering or unauthorized access. This ensures that election results are transparent and verifiable, instilling confidence in the integrity of the electoral process. Furthermore, by implementing a user-friendly interface with React JS and a reliable backend with Spring Boot, the system aims to facilitate easy registration, voting, and result viewing for voters and candidates, while administrators can efficiently manage and oversee the entire electoral cycle. The ultimate goal is to create a scalable and adaptable online voting solution that sets a new standard for democratic elections in the digital age.

**1.3 EXISTING SYSTEM:**

The existing electoral system traditionally relies on paper-based ballots and manual counting processes, which are susceptible to various challenges. These include logistical complexities in distributing and collecting ballots, potential errors in counting and recording votes, and vulnerabilities to fraud or tampering. Moreover, the reliance on physical infrastructure limits accessibility for voters who may face barriers such as distance or mobility issues. Administratively, the process often entails significant resource allocation for organizing and overseeing elections, with delays in result announcements not uncommon. These factors collectively underscore the need for modernizing the electoral system through the adoption of secure and efficient online voting solutions.

**DISADVANTAGES OF EXISTING SYSTEM:**

**1. Security Concerns:** Online voting systems are vulnerable to cyberattacks, hacking, and manipulation. Ensuring the security of votes and preventing unauthorized access or tampering with the electoral process remains a significant challenge. Blockchain integration helps mitigate some of these risks but introduces complexities in implementation and requires robust cybersecurity measures.

**2. Digital Divide:** Not all voters may have access to the internet or be comfortable with digital technologies, potentially disenfranchising certain demographics such as older adults or those in rural areas with limited connectivity. Bridging this digital divide is crucial to ensure equitable access to voting opportunities for all eligible citizens.

**3. Privacy Risks:** While online voting systems aim to protect voter anonymity, ensuring the confidentiality of votes cast online can be challenging. Issues such as data breaches or inadequate encryption methods could compromise voter privacy, undermining trust in the electoral process.

**4. System Complexity and Reliability:** The complexity of implementing and maintaining secure online voting systems requires significant technical expertise and resources. Ensuring the reliability of the system to handle high volumes of traffic during elections without downtime or glitches is critical but poses operational challenges.

**1.3.1 PROPOSED SYSTEM**

The proposed online voting system aims to overcome the limitations of traditional methods by integrating advanced technologies such as blockchain, React JS, Spring Boot, and MySQL. This system will offer a secure and transparent platform where voters can register securely using unique identifiers, cast their votes online via a user-friendly interface, and view real-time election results. Blockchain technology will ensure the immutability and integrity of votes, preventing tampering and enhancing trust in the electoral process. The system will also include modules for candidates to create profiles, administrators to manage elections, and robust security measures to protect voter privacy and prevent cyber threats. By leveraging these technologies, the proposed system seeks to provide a more efficient, accessible, and reliable voting experience that meets modern electoral demands.

**ADVANTAGES OF PROPOSED SYSTEM**

**1. Accessibility and Convenience:** Voters can participate from anywhere with internet access, reducing barriers such as geographical constraints or mobility issues. This enhances voter turnout and engagement by making the voting process more convenient and accessible.

**2. Enhanced Security:** Integrating blockchain technology ensures a decentralized and tamper-proof ledger, safeguarding the integrity of votes. Each vote is securely recorded and verifiable, minimizing the risks of fraud or manipulation compared to paper-based systems.

**3. Real-Time Results:** The system provides instant tallying and display of election results, offering transparency and reducing the time delays associated with manual counting. Voters, candidates, and administrators can access real-time updates on voting outcomes.

**4. Cost and Efficiency:** Online voting reduces administrative costs associated with printing, distributing, and counting paper ballots. It streamlines the election process, allowing for faster tabulation of results and efficient management of voter registration and candidate profiles.

**FEASIBILITY STUDY**

The feasibility study for the proposed online voting system assesses various aspects to determine its viability and potential success. It evaluates technical feasibility, ensuring that integrating blockchain, React JS, Spring Boot, and MySQL is achievable within project timelines and budget constraints. Economic feasibility examines cost-effectiveness, comparing savings from reduced administrative expenses against initial development and maintenance costs. Operational feasibility assesses the system's usability and scalability, considering factors like user training, system performance under load, and adaptability to changing electoral requirements. Legal and regulatory feasibility examines compliance with electoral laws and data protection regulations, ensuring voter privacy and security are upheld. The study concludes with a risk assessment to identify potential challenges and mitigation strategies, ensuring the project's overall feasibility and success in modernizing the electoral process.

**TECHNICAL FEASIBILITY**

Technical feasibility for the proposed online voting system involves evaluating the capability and compatibility of integrating blockchain technology, React JS, Spring Boot, and MySQL. This assessment ensures that the selected technologies can effectively support the system's functionalities, including voter registration, secure voting processes, real-time result tabulation, and administrative management. Key considerations include the availability of skilled developers proficient in these technologies, the scalability of the system to handle peak voting periods without performance degradation, and the feasibility of implementing robust cybersecurity measures to protect voter data and prevent unauthorized access. Additionally, technical feasibility encompasses the ability to integrate with existing electoral infrastructures and ensure seamless interoperability across different devices and platforms, providing a user-friendly experience for all stakeholders involved in the electoral process.

**ECONOMICAL FEASIBILITY**

Economic feasibility for the proposed online voting system examines the financial aspects involved in its development, implementation, and maintenance compared to the potential benefits and savings. It involves assessing the initial investment required for technology integration, software development, and infrastructure setup against the long-term cost savings from reduced administrative expenses associated with traditional paper-based voting methods. Factors such as hardware and software costs, personnel training, maintenance, and ongoing support are considered to determine the total cost of ownership over the system's lifecycle. Cost-benefit analysis evaluates whether the projected benefits, such as increased voter turnout, streamlined election processes, and enhanced transparency, justify the initial investment. Furthermore, economic feasibility examines potential revenue streams, funding sources, and return on investment (ROI) considerations to ensure the sustainability and financial viability of the online voting system.

**OPERATIONAL FEASIBILITY**

Operational feasibility for the proposed online voting system assesses its practicality and usability within the context of electoral operations. This includes evaluating how well the system aligns with current election procedures, the readiness of stakeholders to adopt and utilize the technology, and the system's ability to meet functional requirements effectively. Key aspects examined include user acceptance and training needs for voters, candidates, and administrators to ensure they can navigate and utilize the system efficiently. Scalability is also considered to accommodate varying voter turnout and administrative workload during elections without compromising performance or security. Additionally, operational feasibility evaluates the system's reliability, uptime, and ability to handle peak loads during voting periods to ensure uninterrupted service. By addressing these factors, the study determines whether the online voting system can feasibly integrate into existing electoral processes while improving efficiency, transparency, and accessibility for all stakeholders involved.

**1.3.2 LITERATURE SURVEY:**

# TITLE: E-Voting System Based on Blockchain Technology: A Survey

**YEAR:** 2021

**AUTHOR:** [Sarah Al-Maaitah](https://ieeexplore.ieee.org/author/37088920289), [Mohammad Qatawneh](https://ieeexplore.ieee.org/author/37086837963), [Abdullah Quzmar](https://ieeexplore.ieee.org/author/37088921153)

**DESCRIPTION:**

Democracy in any country must have a transparent voting system that meets the people's needs to give the power to the right person. Furthermore, the existing traditional voting systems suffer from major drawbacks and missing the lack of security and transparency. This survey paper discusses the possible opportunity for applying BC technology in e-voting systems to improve the process of voting by tackling the issues of trustless, privacy, and security. This paper aims to evaluate different applications of blockchain as a service to implement distributed electronic voting systems. Some of them have been only a draft paper; others are implemented in the real world. A blockchain-based e-voting application improves security, privacy, and decreases the cost, even more, which can be achieved.

# TITLE: E-Matdaan: A Blockchain based Decentralized E-Voting System

**YEAR:** 2022

**AUTHOR:** [Shreyas Tandon](https://ieeexplore.ieee.org/author/37089535637), [Niharika Singh](https://ieeexplore.ieee.org/author/37089538826), [Shivani Porwal](https://ieeexplore.ieee.org/author/37089539480), [Satiram](https://ieeexplore.ieee.org/author/37089537145), [Ashish Kumar Maurya](https://ieeexplore.ieee.org/author/37089613852)

**DESCRIPTION:**

In current times, electronic voting systems are used for conducting elections but E-voting system has many problems like transparency, credibility, security functionality and reliability and also the complete process is quite slow. Most of these drawbacks can be removed by using Blockchain based E-voting system. Blockchain is a shared, immutable record that allows for the recording of transactions and the tracking of benefits in a network. Blockchain is an immutable and shared record that provides the method of recording transactions and tracking benefits in a network. In this paper, we propose and implement a blockchain based E-voting system using proof of work as the consensus algorithm. We feel this field has a lot of potential and scope of improvement in near future.

# TITLE: Blockchain Based E-Voting System: Open Issues and Challenges

**YEAR:** 2021

**AUTHOR:** [Zarif Khudoykulov](https://ieeexplore.ieee.org/author/37089243189), [Umida Tojiakbarova](https://ieeexplore.ieee.org/author/37089245247), [Suhrob Bozorov](https://ieeexplore.ieee.org/author/37089243226), [Dilshoda Ourbonalieva](https://ieeexplore.ieee.org/author/37089244074)

**DESCRIPTION:**

Blockchain technology has become very trendy and penetrated different domains, mostly due to the popularity of cryptocurrencies. Blockchain technology offers decentralized nodes for e-voting and is used to create e-voting systems, mainly because of their end-to-end verification benefits. This technology is an excellent replacement for traditional e-voting solutions with distributed performance, reliability and security. The following article provides an overview of e-voting systems based on blockchain technology. The main purpose of this analysis was to examine the current state of blockchain-based voting systems, as well as any associated difficulties in predicting future events.

# TITLE: Decentralized E-voting system based on Smart Contract by using Blockchain Technology

**YEAR:** 2020

**AUTHOR:** [Ali Mansour Al-madani](https://ieeexplore.ieee.org/author/37088418588), [Ashok T. Gaikwad](https://ieeexplore.ieee.org/author/37542548200), [Vivek Mahale](https://ieeexplore.ieee.org/author/37085870197), [Zeyad A.T. Ahmed](https://ieeexplore.ieee.org/author/37088751661)

**DESCRIPTION:**

Nowadays the use of the Internet is growing; E-voting system has been used by different countries because it reduces the cost and the time which used to consumed by using traditional voting. When the voter wants to access the E-voting system through the web application, there are requirements such as a web browser and a server. The voter uses the web browser to reach to a centralized database. The use of a centralized database for the voting system has some security issues such as Data modification through the third party in the network due to the use of the central database system as well as the result of the voting is not shown in real-time. However, this paper aims to provide an E-voting system with high security by using blockchain. Blockchain provides a decentralized model that makes the network Reliable, safe, flexible, and able to support real-time services.

# TITLE: HAC-Bchain: A Secure and Scalable Blockchain-Shard Based E-Voting System

**YEAR:** 2023

**AUTHOR:** [Sohel Ahmed Joni](https://ieeexplore.ieee.org/author/757100615200036), [Rabiul Rahat](https://ieeexplore.ieee.org/author/629082178222788), [Nishat Tasnin](https://ieeexplore.ieee.org/author/635463769774985), [Partho Ghose](https://ieeexplore.ieee.org/author/37086534637), [Loveleen Gaur](https://ieeexplore.ieee.org/author/37085872619)

**DESCRIPTION:**

Voting is a fundamental right of citizens in a democratic country and crucial for any thriving democracy. Reliable voting systems are essential for free and fair elections in the modern era. Biometric Electronic Voting Machines (EVMs) address many issues with paper-ballot systems, but their closed-source nature undermines voter trust. Traditional election systems are also vulnerable to cyberattacks. In this paper, we propose a hybrid blockchain-based electronic voting system (HAC-Bchain) to address the limitations of conventional e-voting systems and ensure a secure, auditable, tamper-proof, transparent, and privacy-preserving voting process. A scripting system for our blockchain facilitates a limited set of predefined operations for each layer, which helps authoritative figures to manage the election securely. We also combine a category-based sharding mechanism with the HAC-Bchain hybrid approach to create more data-concentrated shards, which improves scalability, performance, and data availability. Furthermore, we compare and discuss the performance and efficiency of different sharding configurations. Our experiments shed new light on the overall security, performance, and scalability of blockchain-based evoting systems.

# TITLE: Blockchain-Based E-Voting System

**YEAR:** 2018

**AUTHOR:** [Friðrik Þ. Hjálmarsson](https://ieeexplore.ieee.org/author/37087897677), [Gunnlaugur K. Hreiðarsson](https://ieeexplore.ieee.org/author/37087897695), [Mohammad Hamdaqa](https://ieeexplore.ieee.org/author/37313876800), [Gísli Hjálmtýsson](https://ieeexplore.ieee.org/author/37443819400)

**DESCRIPTION:**

Building a secure electronic voting system that offers the fairness and privacy of current voting schemes, while providing the transparency and flexibility offered by electronic systems has been a challenge for a long time. In this work-in-progress paper, we evaluate an application of blockchain as a service to implement distributed electronic voting systems. The paper proposes a novel electronic voting system based on blockchain that addresses some of the limitations in existing systems and evaluates some of the popular blockchain frameworks for the purpose of constructing a blockchain-based e-voting system. In particular, we evaluate the potential of distributed ledger technologies through the description of a case study; namely, the process of an election, and the implementation of a blockchain-based application, which improves the security and decreases the cost of hosting a nationwide election.

# TITLE: A Novel Approach for e-Voting System Using Blockchain

**YEAR:** 2022

**AUTHOR:** [Abhijeet Banawane](https://ieeexplore.ieee.org/author/37089483286), [Yash Bhansali](https://ieeexplore.ieee.org/author/37086823357), [Manthan Dabadgaonkar](https://ieeexplore.ieee.org/author/37089489368), [Om Javalekar](https://ieeexplore.ieee.org/author/37089489372), [Gaurav Patil](https://ieeexplore.ieee.org/author/37089487499), [Mrs. Kavita Kumavat](https://ieeexplore.ieee.org/author/37089488936)

**DESCRIPTION:**

With the inventions of new systems such as blockchain, the technological world gets new opportunities to develop new projects. The topic is relatively new hence the issues such as legal issues are hindering the growth of these technologies. In this paper, we are going to implement a thought experiment on Blockchain technology which is widely regarded as open-source to conduct a trial and error process for adopting a new voting system that could be used in elections and will have a blockchain base. The advantages of a Blockchain-based system are that it will provide security, reliability, and anonymity of a voter which are core fundamentals of hosting a free and fair election while and it can assist the government to widespread their narrative as there is no chance of cracking the hash stored. We have seen election commissions fail at various levels of security and privacy so having an alternative method will help in designing the blueprint of elections in many unreliable areas. This paper will first analyze and showcase the newly proposed method that is blockchain-based voting.

# TITLE: Utilization of Blockchain in E-Voting System

**YEAR:** 2022

**AUTHOR:** [G. Pranitha](https://ieeexplore.ieee.org/author/37089490160), [T. Rukmini](https://ieeexplore.ieee.org/author/37089491787), [T. N. Shankar](https://ieeexplore.ieee.org/author/37860995400), [Basant Sah](https://ieeexplore.ieee.org/author/37089490079), [Naween Kumar](https://ieeexplore.ieee.org/author/37089610287), [Sasmita Padhy](https://ieeexplore.ieee.org/author/37089302786)

**DESCRIPTION:**

This paper is based on a voting system that's widely used in elections known as electronic voting machines and has the potential to conduct the process securely by blockchain technology. The prime aim of this system for ensuring security, integrity as well as transparency. Voter privacy is one of the prime factors in the electronic voting portal that presents a blockchain-based voting system to overcome several drawbacks of current voting methods by proposing a simple, reliable, fast and inexpensive e-voting system. The election data can be arranged in a chain with several blocks with the best security level for this process that employs for any election to ensure flawless counting.

# TITLE: Study on E-Voting Systems: A Blockchain Based Approach

**YEAR:** 2021

**AUTHOR:** [Kamran](https://ieeexplore.ieee.org/author/37089192133), [Muhammad Hammad Nasir](https://ieeexplore.ieee.org/author/37085480917), [Muhammad Imran](https://ieeexplore.ieee.org/author/37088440173), [Joon-Sung Yang](https://ieeexplore.ieee.org/author/37292636200)

**DESCRIPTION:**

The traditional voting system has many flaws such as election manipulation, security breaches, transparency and privacy issues. These issues occur as the votes can be changed by a central authority in favor of one party when they are being counted manually or there can be human error while counting votes. This system puts a lot of trust in the central authority. Also, there is an economical issue due to the cost of security, human and ballot resources. Many of these issues are solved using the E-Voting system which has been successful in countries like Estonia that have implemented this system of voting. There is still an issue of universal verifiability of votes even in the Estonian E-Voting system. This paper conducts a study of various e-voting systems. From among the various existing methods, an effective blockchain based solution to solve the existing issues of E-voting has been explained. The blockchain is a database, distributed among all users on the network which will help in the verification of all votes cast without the need to put complete trust on a third-party system.

**CHAPTER 2 :PROJECT DESCRIPTION**

**2.1 METHODOLOGIES**

The methodology section of a research project outlines the systematic approach employed to ensure the accuracy, reliability, and validity of the findings. Quantitative methodology focuses on the collection and analysis of numerical data to identify patterns and relationships. Techniques such as surveys, experiments, and statistical analysis are used to gather measurable and generalizable results. This approach is particularly effective for large-scale studies where precision and objectivity are crucial. Quantitative research is often employed in fields such as economics, health sciences, and engineering, where structured data collection tools like questionnaires and data modeling software are utilized to quantify variables and test hypotheses.

On the other hand, qualitative methodology seeks to explore phenomena through detailed, contextual, and subjective analysis. This approach employs methods such as interviews, focus groups, and participant observations to gain in-depth insights into human behavior, experiences, and social processes. Qualitative research is invaluable for understanding complex issues that quantitative data may not fully capture. By analyzing non-numerical data such as texts, audio, and video recordings, researchers can uncover underlying meanings, motivations, and patterns. Fields such as sociology, anthropology, and education often rely on qualitative methods to achieve a richer understanding of cultural and social dynamics. In some cases, a mixed-methods approach, combining both quantitative and qualitative techniques, is used to leverage the strengths of both methodologies, providing a comprehensive perspective on the research questions.

**AGILE METHODOLOGY**

Agile methodology is a flexible and iterative approach to project management and software development that emphasizes continuous improvement, collaboration, and responsiveness to change. Originating from the Agile Manifesto, which values individuals and interactions over processes and tools, Agile prioritizes working software over comprehensive documentation, customer collaboration over contract negotiation, and responding to change over following a fixed plan. In Agile, projects are divided into small, manageable units called iterations or sprints, typically lasting two to four weeks. Each sprint results in a potentially shippable product increment, allowing teams to regularly reassess and adapt their strategies based on stakeholder feedback and changing requirements.



One of the core principles of Agile is the active involvement of all stakeholders, including developers, testers, and customers, throughout the development process. This collaboration ensures that the final product aligns closely with user needs and expectations. Daily stand-up meetings, or scrums, keep the team aligned and informed, fostering transparency and accountability. Agile methodologies, such as Scrum, Kanban, and Extreme Programming (XP), provide frameworks for implementing Agile principles in practice. These methodologies encourage practices like continuous integration, test-driven development, and regular retrospectives, which help teams to identify areas for improvement and optimize their workflows.

**2.2 MODULES**

The online voting system project is structured into three main modules: Voter, Candidate, and Admin. Each module is designed to fulfill specific functions to ensure a seamless and secure voting experience.

**Voter Module**

1. Registration:

* Voters can register using their unique Aadhar card number.
* This process ensures no duplicate registrations.

2. Login:

* Registered voters log in using their Aadhar number and password.

3. Voting:

* Once logged in, voters access the voter homepage where they can view their details.
* Voters can cast their vote, which is securely recorded and cannot be altered once submitted.

4. Live Results:

* Voters can view real-time election outcomes on a dedicated results page.

**Candidate Module**

1. Registration:

* Candidates register using a similar process to voters, ensuring their profiles are unique.

2. Login:

* Candidates log in using their registered credentials.

3. Profile Creation:

* Candidates can create and update their profiles, including their name, image, and emblem.

4. Live Results:

* Candidates can view live election results to monitor their progress.

**Admin Module**

1. Voter and Candidate Management:

* Admins have administrative access to view and manage voter and candidate details.

2. Election Management:

* Admins oversee the entire electoral process, ensuring all operations run smoothly.

3. Live Results:

* Admins can view live election results and ensure their accuracy.

4. Blockchain Security:

* When the vote button is clicked, the admin can view the secure recording of votes via blockchain, ensuring the integrity and immutability of each vote.

**CHAPTER 3**

**REQUIREMENTS ENGINEERING**

**3.1 GENERAL**

These are the requirements for doing the project. Without using these tools and software’s we can’t do the project. So we have two requirements to do the project. They are

1. Hardware Requirements.

2. Software Requirements.

**SYSTEM REQUIREMENTS**

**HARDWARE REQUIREMENTS**

The hardware requirements may serve as the basis for a contract for the implementation of the system and should therefore be a complete and consistent specification of the whole system. They are used by software engineers as the starting point for the system design. It shows what the system does and not how it should be implemented.

PROCESSOR : DUAL CORE 2 DUOS

RAM : 4GB RAM

MONITOR : 15” COLOR

HARD DISK : 250 GB

**SOFTWARE REQUIREMENTS**

The software requirements document is the specification of the system. It should include both a definition and a specification of requirements. It is a set of what the system should do rather than how it should do it. The software requirements provide a basis for creating the software requirements specification. It is useful in estimating cost, planning team activities, performing tasks and tracking the team’s and tracking the team’s progress throughout the development activity.

FRONT END : HTML, CSS, REACT JS

BACK END : SPRINGBOOT

DATABASE : MY SQL

IDE : VISUAL STUDIO

**CHAPTER 4**

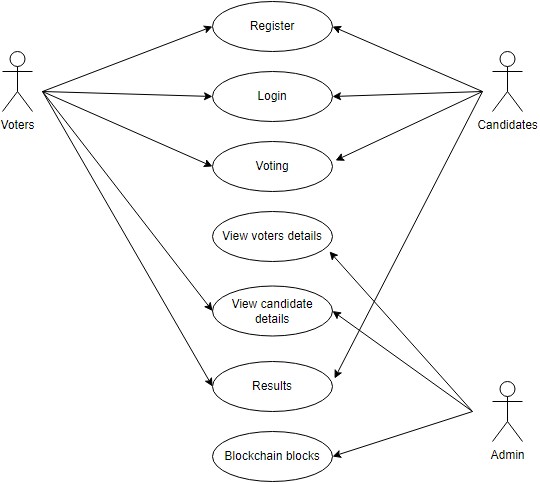
**DESIGN ENGINEERING**

**4.1 GENERAL**

Design Engineering deals with the various UML [Unified Modeling language] diagrams for the implementation of project. Design is a meaningful engineering representation of a thing that is to be built. Software design is a process through which the requirements are translated into representation of the software. Design is the place where quality is rendered in software engineering. Design is the means to accurately translate customer requirements into finished product.

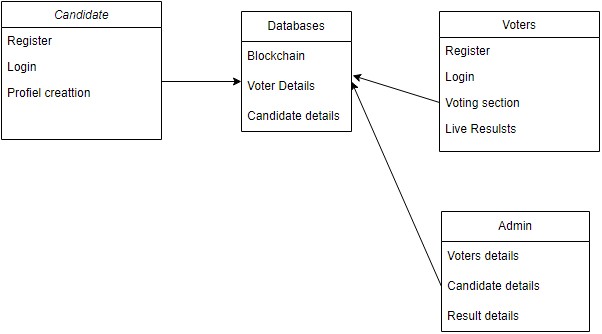
**USECASE DIAGRAM:**

Use case diagrams are a way to capture the system's functionality and requirements in UML diagrams. It captures the dynamic behavior of a live system. A use case diagram consists of a use case and an actor.  Here, data owner and user having separate registration and login then data owners will uploading the text document using the symmetric key for encrypting the cloud data.



**CLASS DIAGRAM:**

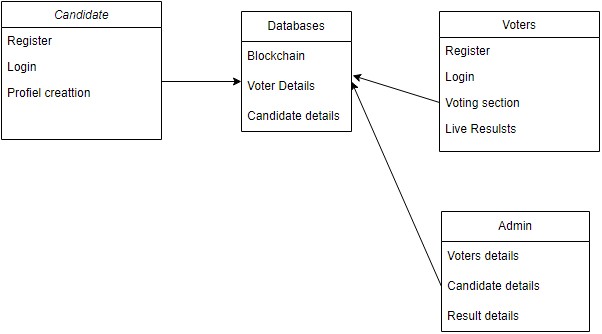
Class diagrams are the main building block in object-oriented modeling. They are used to show the different objects in a system, their attributes, their operations and the relationships among them. The different object's are Data owner, Cloud user, Cloud admin these are the objects in this uml relationships and their properties are uploading the documents, generating key for securing the data, maintaining the cloud data s then downloading using the key and accessing the cloud data.



**OBJECT DIAGRAM:**

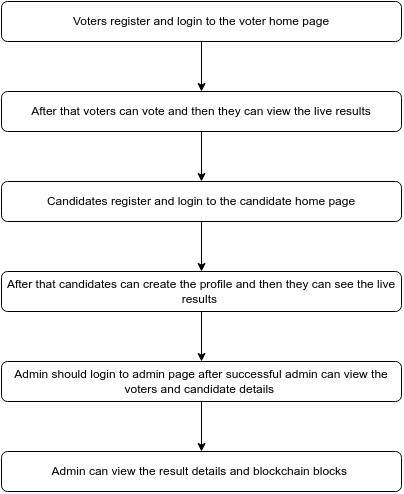
An object diagram shows this relation between the instantiated classes and the defined class, and the relation between these objects in the system. They are be useful to explain smaller portions of your system, when your system class diagram is very complex, and also sometimes modeling recursive relationship in diagram.

The best way to illustrate what an object diagram look like is to show the object diagram derived from the corresponding class diagram.



**STATE DIAGRAM:**

A state diagram, also known as a state machine diagram or state chart diagram, is an illustration of the states an object can attain as well as the transitions between those states in the Unified Modeling Language. Then, all of the possible existing states are placed in relation to the beginning and the end.



**ACTIVITY DIAGRAM:**

Activity Diagrams describe how activities are coordinated to provide a service which can be at different levels of abstraction. Typically, an event needs to be achieved by some operations, particularly where the operation is intended to achieve a number of different things that require coordination**.**