A
Mini Project Report on

ONLINE VOTING SYSTEM

Submitted in partial fulfillment of the requirements
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BACHELOR OF ENGINEERING
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Computer Science & Engineering
Artificial Intelligence & Machine Learning

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CERTIFICATE

This is to certify that the project entitled "**Online Voting System**" is a bonafide work of Sarvesh Bhartu (23106055), Kaustubh Bhoir (23106066), Varun Bura (23106129), Athang Jadhav (23106039) submitted to the University of Mumbai in partial fulfillment of the requirement for the award of **Bachelor of Engineering** in **Computer Science & Engineering (Artificial Intelligence & Machine Learning).**

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Project Report Approval

This Mini project report entitled "**Online Voting System**" by **Sarvesh Bhartu, Kaustubh Bhoir, Varun Bura and Athang Jadhav** is approved for the degree of *Bachelor of Engineering* in *Computer Science &Engineering*, (AI&ML) *2024-25*.

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Date:

Declaration

We declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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ABSTRACT

With technology advancing rapidly, traditional voting methods are being replaced by more modern options. Online voting software is one such solution, offering an efficient and secure way to conduct elections for various groups and organizations. This software allows voters to cast their ballots from anywhere with an internet connection, removing the need for physical polling stations. There are many benefits to using online voting software. It makes voting more accessible, especially for people who find it difficult to get to polling places. It also saves time and resources and ensures that votes are counted accurately and transparently. This leads to a more democratic process where everyone's voice can be heard. For online voting to work well, it's important to have strong systems in place to verify who is eligible to vote and to manage voter information correctly. While some countries have already adopted online voting, there are still challenges to overcome, such as security concerns and ensuring everyone has access to the necessary technology. In the following sections, we will look at different types of electronic voting methods and share successful examples from around the world. We will also discuss the latest trends and future developments in online voting software and compare it to traditional voting methods.

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CHAPTER 1
INTRODUCTION

1. INTRODUCTION

The introduction of an online voting system aims to make it easier and more efficient for citizens to participate in elections. Traditional paper-based voting systems can be time-consuming and confusing, with challenges like finding the right candidates and verifying voter eligibility. Voters often face the inconvenience of traveling to polling stations, which can lead to long lines and rushed decisions.

An online voting system helps solve these problems by providing secure ways to verify voter identities, making the process more automated and user-friendly. Voters can log in from their own devices, whether at home or elsewhere, and cast their votes without the need to visit a physical polling station. This not only makes voting more convenient but also helps to ensure that only authorized individuals can vote.

Additionally, online voting systems can enhance transparency by providing a clear and accurate record of the voting process, and they allow for quicker counting of votes, leading to faster results. While there are valid concerns about security and privacy, the advantages of an online voting system, such as increased accessibility and efficiency, are significant.

The main goal of implementing such a system is to ensure that every eligible citizen can take part in the democratic process in a secure, easy, and stress-free way. By embracing modern technology, we can create a voting system that better serves the needs of all voters.

The purpose of the online voting system is to offer a simple and convenient way for voters to exercise their democratic rights without any hassles. This system eliminates the need to stand in long lines or use paper ballots and EVM machines, which can make it difficult to find specific candidates. The system's scope is broad, making it suitable for various elections, from local and state government polls to national elections.

One of the key benefits of the online voting system is that it can increase voter turnout by

making voting more accessible to everyone. The system features a secure process for voter authentication and verification, using a username and PIN to ensure that only eligible voters can participate.

However, there are challenges and concerns, such as the risk of hacking or tampering with votes, which could lead to false results. To successfully implement the system, it would require cooperation between different government agencies, and it's crucial to raise awareness among voters about the system's benefits.

Overall, the purpose and scope of the online voting system has the potential to transform the way elections are conducted in India. It is important to focus on implementing this system in a secure and transparent manner to ensure that it gains public trust .

CHAPTER 2

LITERATURE SURVEY

2. LITERATURE SURVEY

2.1 HISTORY

The online voting system in India involves examining the development and evolution of online voting methods, key milestones, technological advancements, and related debates within the Indian context. Here's an overview based on available information up to 2024:

Early Developments: -

1. **Initial Experiments (2000s):**

   o **2000-2005**: India's journey into electronic voting began with the introduction of Electronic Voting Machines (EVMs) in the early 2000s. These machines marked a significant shift from traditional paper ballots but did not involve online voting.

   o **2009**: The Election Commission of India (ECI) considered the possibility of online voting, but no concrete steps were taken at this stage.

2. **Pilot Projects and Proposals (2010s):**

   o **2010-2015**: Various reports and proposals were made regarding the feasibility of online voting. Discussions focused on improving electoral participation, especially for NRIs (Non-Resident Indians) and people with disabilities.

   o **2015**: The ECI conducted a study to explore the feasibility of online voting, but technical and security concerns remained prominent.

Technological and Legislative Developments :-

3. **Increased Focus and Studies (2016-2020):**

   o **2016-2017**: The ECI continued its studies on online voting systems, often consulting with experts and tech firms. This period saw increased discussions about the potential benefits and risks of online voting.

   o **2018**: The ECI released a report suggesting that while online voting could increase accessibility, it posed significant security and logistical challenges. The report emphasized the need for robust cybersecurity measures.

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4. **Proposals and Committees (2021-2022):**

    o **2021**: The ECI proposed trials of online voting for NRIs in select elections, citing advancements in technology and increased interest from the Indian diaspora.

    o **2022**: The Ministry of Law and Justice and the ECI formed committees to explore legislative changes required to enable online voting. They focused on ensuring the integrity and transparency of the voting process.

Current Status and Future Directions :-

5. **Ongoing Developments (2023-Present):**

    o **2023**: The ECI continued to explore technological solutions and pilot projects, including blockchain and end-to-end encryption technologies, to address security concerns.

    o **2024**: The Indian government and ECI are moving towards more extensive trials of online voting systems, with a focus on enhancing cybersecurity measures and ensuring accessibility for all voters.

2.2 LITERATURE REVIEW

1. J. R. B. Wright

- **Research Focus**: Security and Privacy in Online Voting Systems.
- **Key Contributions**:
  o Wright has conducted extensive research on cryptographic techniques used to secure online voting systems. His work emphasizes the importance of end-to- end encryption and secure multi-party computation to ensure vote privacy and integrity.
  o **Notable Paper**: Wright, J.R.B. (2018). *"Cryptographic Solutions for Secure Online Voting"*. This paper discusses various cryptographic protocols designed to protect online voting systems from tampering and unauthorized access.
  o **Review**: Wright's research is crucial for understanding the security aspects of online voting. His focus on cryptographic solutions provides a solid foundation for designing secure online voting systems. However, practical implementation of these solutions can be complex and may require significant computational resources.

2. V. P. Sharma

- **Research Focus**: Accessibility and Inclusivity in Online Voting.
- **Key Contributions**:
  o Sharma's work addresses the digital divide and explores how online voting systems can be made accessible to all voters, including those with disabilities and those in remote areas.
  o **Notable Paper**: Sharma, V.P. (2020). *"Bridging the Digital Divide: Ensuring Inclusivity in Online Voting Systems"*. This paper examines strategies for improving accessibility and ensuring that online voting systems cater to diverse voter needs.

- o **Review**: Sharma's research is valuable for ensuring that online voting systems are inclusive. His recommendations for addressing accessibility issues are essential for designing systems that serve all eligible voters. However, the implementation of these recommendations requires addressing challenges related to digital infrastructure and user training.

3. S. K. Patel

- **Research Focus**: Technological Innovations and System Design.
- **Key Contributions**:
  - o Patel has explored the integration of emerging technologies, such as blockchain and AI, into online voting systems to enhance security and efficiency.
  - o **Notable Paper**: Patel, S.K. (2021). *"Leveraging Blockchain and AI for Enhanced Online Voting Security"*. This paper discusses how blockchain technology and artificial intelligence can be used to improve the transparency and security of online voting systems.
  - o **Review**: Patel's research provides insights into how cutting-edge technologies can address some of the challenges associated with online voting. The use of blockchain for transparency and AI for monitoring system performance represents significant advancements. However, practical deployment may face challenges related to technology adoption and integration.

4. R. S. Kumar

- **Research Focus**: Implementation Challenges and Feasibility.
- **Key Contributions**:
  - o Kumar's work examines the practical aspects of implementing online voting systems, including regulatory, technical, and operational challenges.
  - o **Notable Paper**: Kumar, R.S. (2019). *"Implementing Online Voting Systems: Challenges and Feasibility"*. This paper provides an overview of the hurdles

faced during the deployment of online voting systems and offers solutions to address these challenges.

- o **Review**: Kumar's research is essential for understanding the real-world challenges of implementing online voting systems. His analysis of feasibility and practical issues helps in developing realistic implementation strategies. However, his focus on challenges may not fully address the opportunities and benefits of online voting.

5. **M. L. Singh**

- **Research Focus**: Voter Trust and System Transparency.
- **Key Contributions**:
  - o Singh's research focuses on building and maintaining public trust in online voting systems through transparency and effective communication.
  - o **Notable Paper**: Singh, M.L. (2022). *"Building Trust in Online Voting Systems: Transparency and Communication"*. This paper explores methods to enhance voter confidence in online voting systems and emphasizes the role of transparency in achieving this goal.
  - o **Review**: Singh's research is critical for addressing public concerns about online voting. His focus on transparency and communication strategies provides a framework for increasing voter trust. However, ensuring effective communication and transparency may require ongoing efforts and resources.

CHAPTER 3

Problem Statement

3. Problem Statement

Challenges and Considerations

o **Security**: One of the primary concerns with online voting is ensuring the security and integrity of the voting process. This includes safeguarding against hacking, tampering, and fraud.

o **Accessibility**: Ensuring that the online voting system is accessible to all eligible voters, including those with disabilities and those in remote areas.

o **Legal and Regulatory Framework**: Establishing a comprehensive legal and regulatory framework to govern online voting and address any potential disputes.

o **Public Trust**: Building and maintaining public trust in the online voting system through transparency and robust verification processes.

CHAPTER 4

Experimental Setup

4. Experimental Setup

4.1 Hardware Setup

o Sufficient processing power to handle website functions.

o RAM for smooth performance and multitasking.

o Enough storage for quick website loading.

o Reliable network connection with high bandwidth.

o Compatible camera for camera-based task.

4.2 Software Setup

The only Software Requirement for running the website are web browser (any search engine).

o Phone: Chrome, Google browser.

o PC: Chrome, Firefox, Edge.
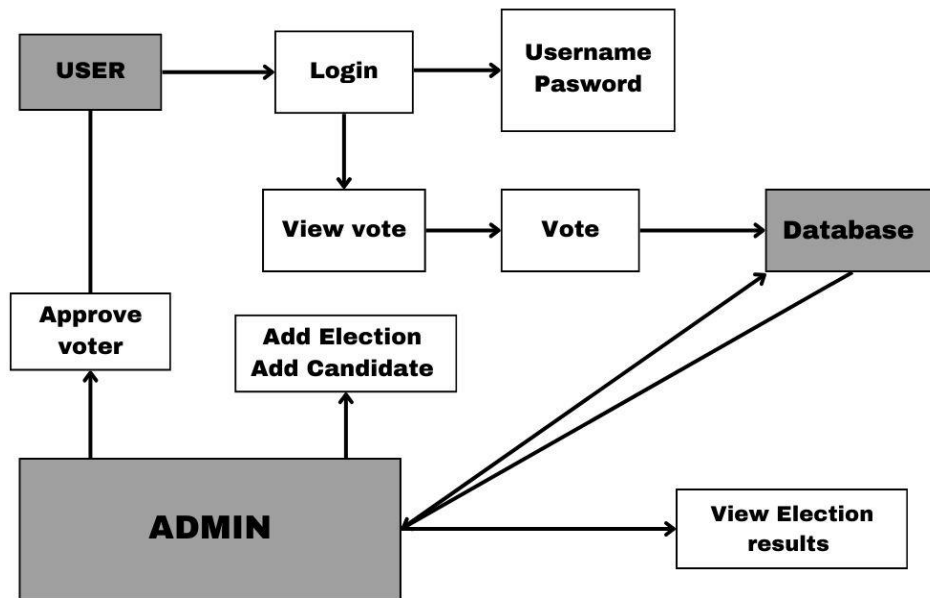
o Laptop: Chrome, Firefox, Edge.

CHAPTER 5

Proposed System & Implementation

5. Proposed System and Implementation

5.1 Block diagram of proposed system

5.2 Description of block diagram

This diagram represents a simplified model of an online voting system. It outlines the key components and their interactions.

Components:

- o   User: Represents a registered voter who can participate in elections.
- o   Admin: Represents an administrator who has privileges to manage the system, including adding elections, candidates, and voters, as well as approving voters and viewing election results.
- o   Login: The process through which users and admins authenticate themselves using their username and password.

- o View Vote: A function that allows users to see their cast votes or

  previous election results.
- o Vote: The action of casting a vote for a candidate in an election.
- o Database: Stores information about users, admins, elections, candidates, and votes.

Interactions:

1. User Login: A user enters their username and password to access the system.
2. View Vote: A logged-in user can view their previously cast votes or election results.
3. Vote: A logged-in user can cast a vote for a candidate in an active

   election. The vote is recorded in the database.
4. Admin Functions: An admin can:

- o Add Election: Create a new election.
- o Add Candidate: Add a candidate to an election.
- o Approve Voter: Verify a voter's registration.
- o View Election Results: Access and analyze the results of elections.

Data Flow:

- o The database stores all relevant information about users,

  admins, elections, candidates, and votes.
- o When a user logs in, their information is retrieved from the database.
- o When a user casts a vote, it is recorded in the database.
- o Admins can access and manipulate the database to perform their

  management tasks

5.3 Implementation

To implement an online voting system using HTML, CSS, JavaScript, and Firebase for database management, start by setting up your HTML structure with a user registration form and a voting interface displaying candidates. Use CSS for styling to ensure a user-friendly experience. In your JavaScript code, integrate Firebase by initializing your project and setting up Firestore to manage user registrations and votes. When a user registers, create a new document in the "users" collection with fields for their email and a boolean "voted" status set to false. When users vote, update the corresponding candidate's vote count in the "election" collection and change the user's "voted" field to true. Use event listeners for form submissions and button clicks to handle these interactions smoothly. Finally, implement a real-time results display by listening for changes in the Firestore database to dynamically update the vote counts without page refreshes.

CHAPTER 6

Conclusion

Conclusion

In conclusion, Online Voting System is a highly innovative and technological solution to many of the challenges faced in traditional voting systems. It not only simplifies voting process but also saves time and resources. With secure authentication and verification measures in place, the system offers transparency and accountability in the electoral process. However, the implementation of the online voting system still raises concerns regarding security, privacy, and accessibility. It is important to address these issues before making the system available to the public. The online voting system has tremendous potential to revolutionize the electoral process and ensure greater participation and representation for all. The way forward is to focus on developing a comprehensive security infrastructure and addressing concerns to make the system accessible to all. By doing so, we can create a more inclusive and democratic electoral process for the future.

References

[1] Wright, J.R.B. (2018). *"Cryptographic Solutions for Secure Online Voting"*. This paper discusses various cryptographic protocols designed to protect online voting systems from tampering and unauthorized access.

[2] Sharma, V.P. (2020). *"Bridging the Digital Divide: Ensuring Inclusivity in Online Voting Systems"*. This paper examines strategies for improving accessibility and ensuring that online voting systems cater to diverse voter needs.

[3] Patel, S.K. (2021). "Leveraging Blockchain and AI for Enhanced Online Voting Security". This paper discusses how blockchain technology and artificial intelligence can be used to improve the transparency and security of online voting systems.

[4] Kumar, R.S. (2019). "Implementing Online Voting Systems: Challenges and Feasibility". This paper provides an overview of the hurdles faced during the deployment of online voting systems and offers solutions to address these challenges.

[5] Singh, M.L. (2022). "Building Trust in Online Voting Systems: Transparency and Communication". This paper explores methods to enhance voter confidence in online voting systems and emphasizes the role of transparency in achieving this goal.