

BIOMETRIC VOTING SYSTEM

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Abstract

Elections are the cornerstone of democracy, and the integrity of the voting process is crucial to ensuring fair and transparent elections. The traditional voting system, however, has several inherent flaws that compromise the integrity of the process, including vote rigging, ballot stuffing, and impersonation. Biometric authentication is a promising solution to these issues, as it can provide secure and reliable identification of voters, prevent duplicate voting, and eliminate the need for physical ballots. This paper proposes a biometric voting system that utilizes fingerprint recognition technology to authenticate voters. The proposed system is designed to be secure, user-friendly, and accessible to all voters. The system consists of a database of biometric information for all registered voters, a biometric scanner at each polling station, and a central server that validates voter identity and ensures the integrity of the voting process. To ensure the security and integrity of the voting process, the proposed system employs advanced encryption techniques to protect voter information and prevent hacking or tampering. The system also includes measures to protect voter privacy, such as anonymizing biometric data and ensuring that individual voting records cannot be traced back to specific voters.

Keywords: Elections, biometric authentication, voter, fingerprint, security, identity

1. INTRODUCTION

One of the most crucial tasks that an election management body (EMB) must complete is voter registration, but it is also one of the most time- and money-consuming. An accurate voter list gives the electoral process legitimacy, aids in preventing electoral fraud, and guarantees that every eligible voter can vote in an election and that they can only do so once. An inaccurate voter list can disrupt the electoral process by casting doubt on the fairness and

outcome of the election and by providing opportunities for fraud and manipulation. Many nations that struggle to compile an accurate voter list are thinking about changing their voter registration procedures by implementing biometric technologies.

By allowing all eligible citizens to vote and at the same time reducing various types of electoral fraud, such as voter impersonation and multiple voting, these reforms seek to increase public confidence in the electoral process. For all parties involved in discussions about the use of biometrics in elections, both for voter registration prior to an election and for voter verification at polling places on election day, this guide provides an overview of key concepts and considerations.

2. LITERATURE REVIEW

"Biometric Voting System: A Survey" by Vigneshwaran R., Sathiya S., and Muthusamy V. - This paper provides a comprehensive overview of biometric voting systems, including their benefits, challenges, and applications. The authors analyze the different types of biometric technologies used in voting systems, and examine their effectiveness in ensuring the accuracy and security of the voting process.

"Design and Development of a Biometric Voting System" by Fadi Aloul, Waleed Al-Salman, and Mohammed Al-Zinati - This paper presents a detailed case study of the design and development of a biometric voting system for use in municipal elections. The authors describe the system architecture, authentication process, and vote recording mechanism, and evaluate the system's performance and security features.

"A Secure and Efficient Biometric Voting System" by S. A. Jadhav and S. K. Nandedkar - This paper proposes a novel biometric voting system that uses a combination of iris recognition and digital signatures to ensure the security and privacy of the voting process. The authors describe the system architecture and evaluate its performance and security features using simulation and experimental results.

"Biometric Authentication for E-Voting Systems: A Comparative Study" by Ahmad Al-Khasawneh, Mohd Al-Khasawneh & Omar Al-Jarrah, compares the effectiveness and usability of different biometric technologies in e-voting systems, including fingerprint, iris, and face recognition. The authors evaluate the performance and security features of each technology and provide recommendations for their implementation in e-voting systems.

"Biometric Authentication in Electronic Voting: A Review of the Literature" by Onur Savas and Arda Yurdakul, summarizes the research on the use of biometric authentication in electronic voting systems. The authors analyze the different types of biometric technologies used in e-voting, and discuss their benefits and challenges in ensuring the accuracy, security, and privacy of the voting process. They also identify areas for future research in the field of biometric authentication for e-voting.

"Biometric Voter Registration in Africa: Benefits and Challenges" by Jørgen Elklit and Daniel H. Niemi, examines the implementation of biometric voter registration in Africa and its impact on the democratic process. The authors discuss the benefits and challenges of using biometric technology in voter registration, including issues of cost, accessibility, and political acceptance, and provide case studies from several African countries.

3. PROBLEM DEFINITION

The need for a reliable and secure method of voter identification and authentication in the election process is the issue that a biometric voting system seeks to address. Voter fraud, voter impersonation, ballot stuffing, and inaccurate vote counting are common problems with traditional voting systems that can compromise election integrity and erode public confidence in the democratic process. A biometric voting system can also help with issues like accessibility for voters with disabilities, lowering election costs, and improving the voting process for both voters and election officials.

4. OBJECTIVE

Improved Security: The most important objective of a biometric voting system is to enhance the security of the electoral process by preventing voter fraud, impersonation, and other forms of electoral malpractice.

Increased Accuracy: The system should aim to improve the accuracy of the electoral process by providing real-time vote counting and reporting, reducing the likelihood of errors, and ensuring a more accurate result.

Accessibility: The system should provide a more accessible voting experience for all voters, including those with disabilities.

Efficiency: The system should aim to provide a more efficient voting experience for both voters and election officials.

Scalability: The system should be designed to accommodate different voting scenarios, including high-volume elections and multiple voting stations.

5. RESEARCH METHODOLOGY

- Voter registration and enrolment is necessary for the biometric voting system, which involves collecting and storing voter biometric information in a secure database.
- Voter authentication and verification: On election day, voters must appear at the polling place and authenticate their identities using biometric information. To confirm a voter's identity and eligibility to vote, the biometric scanner or sensor compares the voter's biometric data with the data stored in the database.

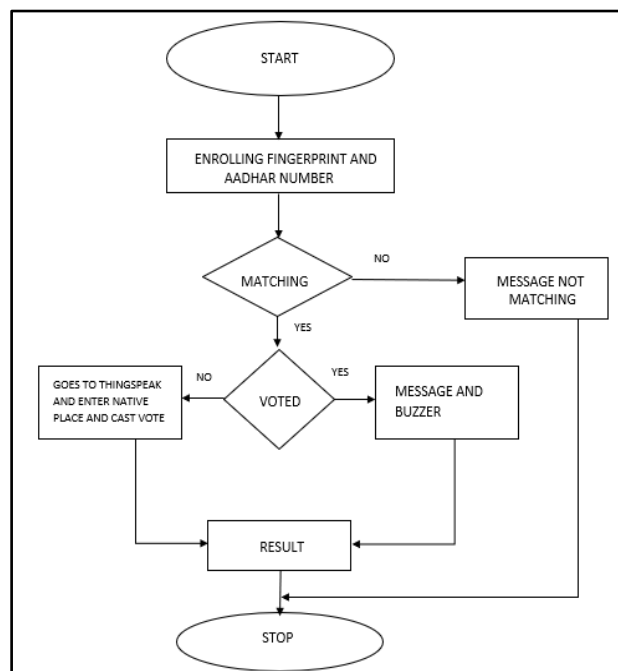


Figure 1: Working System [8]

- Vote casting and recording: After the voter's identity has been confirmed, they are permitted to use an electronic voting machine or device to cast their ballot. The voter's selections are recorded by the voting machine and kept in a safe, encrypted database.
- Vote counting and tabulation: At the end of the election, the votes are counted and tabulated using software programs that use encryption and decryption algorithms and keys to ensure the accuracy and integrity of the results.

6. ANALYSIS AND FINDINGS

- **Greater security:** When compared to conventional voting systems, biometric voting systems offer a higher level of security. Biometric systems ensure that only authorized people are permitted to vote by authenticating a voter's distinct physical and behavioral traits.
- **Decreased voter fraud:** By removing the chance of multiple voting, impersonation, or voting under false identities, biometric systems can reduce voter fraud.
- **Increased accuracy:** When compared to conventional voting systems that rely on manual identification, biometric voting systems are more accurate. Each voter's identity is confirmed using biometric systems to ensure that they are eligible to vote.
- **Greater effectiveness:** When compared to traditional voting methods, biometric voting systems are quicker and more effective. Through the use of biometric technology, manual identification is no longer necessary, saving time and lowering the possibility of mistakes.
- **Economical:** Over time, biometric voting systems are economical. Although implementing biometric technology may cost more up front, the system will ultimately cost less because it eliminates the need for paper ballots, poll workers, and other costs related to conventional voting systems.
- **Privacy concerns:** Since biometric voting systems involve the collection and storage of personal data like fingerprints, iris scans, or facial recognition data, they raise privacy concerns. To avoid misuse and unauthorized access, this information must be kept in a secure location.

7. LIMITATION & FUTURE SCOPE

- Potential technical issues with biometric recognition
- Risk of false positives or false negatives in biometric identification
- Ongoing research and development to improve accuracy, reliability, and security of biometric voting systems
- Greater public education and awareness around biometric voting systems

8. CONCLUSION

One of the most widely used biometric identification techniques for humans is the finger print. Every individual on the planet has a distinct fingerprint, and even identical twins are born with very different prints. These prints are naturally immutable throughout life. Because of this, a voting system using fingerprints has been created, and person identification has been replaced with fingerprints. This finger print voting system has been successfully tested and put into use. Utilizing various PCs with various specifications, the system is assessed in order to determine its strengths and weaknesses. The finger print voting system produces meaningful results that are compatible with other voting systems.

9. REFERENCES

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- [3] "Biometric Voting System: A Solution to Electoral Fraud?" by Victor Johnson and Nathan Pope. This article examines the potential of biometric voting systems to prevent electoral fraud and improve the integrity of elections.
- [4] "Design and Implementation of a Biometric Voting System" by D.K. Ghosh and S. Banerjee. This paper describes the design and implementation of a biometric voting system that uses fingerprint recognition technology to verify the identity of voters.
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