

**METHODIST UNIVERSITY GHANA**

Computer Seminar

Faculty of Science | IT Level 300-Class

**FINGERPRINT BASED VOTING SYSTEM.**

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1. **INTRODUCTION**

Organizing fair and transparent elections is a challenging task in many countries. Issues like corruption and bribery often result in election outcomes that do not reflect the true will of the people. This has led to social unrest and post-electoral conflicts in numerous African nations, causing significant consequences. To address these issues, the introduction of a fingerprint voting system could play a crucial role in ensuring transparent and fair elections. This system aims to guarantee that voting rights are accessed only by legitimate users, ensuring that each person can cast only one vote. Given that fingerprint patterns are unique to each individual, this technology can authenticate voters accurately. By using fingerprints for voter identification, the system provides a secure and reliable method for conducting elections.

1. **OBJECTIVES**

Main Objective: Enhance the existing voting system to achieve greater accuracy, transparency, and speed, while reducing various forms of electoral fraud, such as voter impersonation and multiple voting.

Specific Objectives:

* Ensure that only eligible users have access to the voting system.
* Guarantee that each voter can cast only a single vote.
* Implement real-time balloting to facilitate immediate and accurate vote recording.

1. **HOW IT WORKS**

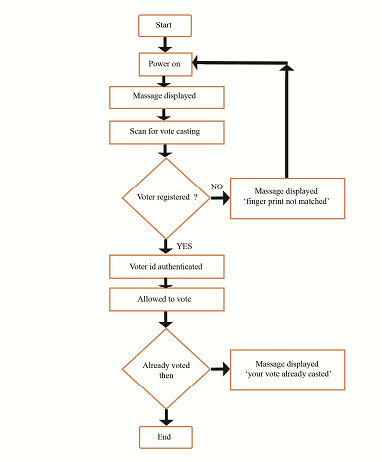


Fig. 1 Fingerprint voting machine system flow chart

1. **Biometric voter registration**

A pre-poll procedure is conducted to register and capture voter’s data to establish a database of eligible voters.

1. **Biometric voter authentication**

During elections, using Electronic Voting Machine (EVM), the thumb impression of a voter is entered as input to the system. This is then compared with the available records in the database. If the particular pattern matches with anyone in the available record, access to cast a vote is granted. But in case the pattern doesn’t match with the records of the database or in case of repetition, access to cast a vote is denied or the vote gets rejected.

1. **Vote counting and result**

The result is instantaneous and counting is done in real time.

1. **FEATURES**
2. **Biometric Enrollment and Verification**

* **Fingerprint Enrollment:** Voters register their fingerprints in a secure database before the election.
* **Verification:** During voting, the system verifies the voter’s identity by comparing their fingerprint with the stored data.

1. **User-Friendly Interface**

* **Touchscreen Voting Booths:** Intuitive interfaces to guide voters through the process.
* **Multilingual Support:** Interface available in multiple languages to accommodate diverse populations.

1. **Security and Privacy**

* **Data Encryption:** All biometric data and votes are encrypted to prevent unauthorized access.
* **Tamper-Detection:** Systems detect and report any unauthorized access attempts.
* **Privacy Protection:** Ensuring that individual votes cannot be traced back to specific voters.

1. **Integration with Voter Databases**

* **Voter Authentication:** Integration with national or local voter databases to authenticate voter eligibility in real-time.
* **Real-Time Updates:** Update voter statuses immediately after they cast their votes to prevent multiple voting attempts.

1. **Accurate and Reliable Voting Process**

* **Error Detection:** Mechanisms to detect and prevent duplicate or fraudulent votes.
* **Audit Trails:** Maintaining an audit trail for each vote to ensure transparency and accountability.
* **Backup Systems:** Redundant systems to ensure data integrity in case of hardware failures.

1. **Efficient Vote Counting and Reporting**

* **Automated Tallying:** Immediate and accurate counting of votes.
* **Real-Time Results:** Providing real-time updates and results as votes are counted.
* **Data Analytics:** Tools for analyzing voting patterns and turnout.

1. **Scalability and Flexibility**

* **Scalable Architecture:** Capable of handling large numbers of voters and votes without performance degradation.
* **Configurable Settings:** Customizable settings to accommodate different types of elections and voting rules.

1. **BENEFITS**

* **Enhanced security:** Reduces the risk of voter fraud and ensures only eligible voters can cast votes.
* **Improved accuracy:** Minimizes errors in voter identification and vote counting.
* **Increased efficiency:** Streamlines the voting process, reducing wait times and improving voter experience by creating a real time experience.
* **Transparency:** Provides a clear and auditable trail for verifying election results.

1. **CHALLENGES**

* **Technical issues:** Potential for technical malfunctions or failures.
* **Privacy concerns:** Ensuring voter data is securely protected.
* **Cost:** High initial setup costs for biometric equipment and software.
* **Resistance to change:** Overcoming skepticism and resistance from voters and officials accustomed to traditional voting methods.

1. **CONCLUSION**

Adopting a fingerprint voting system represents a significant advancement in enhancing election integrity. By leveraging biometric technology, this system can address issues like voter impersonation and multiple voting, ensuring greater accuracy, transparency, and speed. It secures voting rights by restricting access to eligible users and guarantees that each person can vote only once, with real-time balloting facilitating immediate and precise vote recording.

While biometrics can address some voter registration problems and improve voting experience, it is important to recognize that technology alone cannot completely prevent manipulation and malpractice. Effective human oversight and robust legal frameworks are essential to complement technological solutions.

Implementing this system will foster public confidence in the electoral process, reduce the likelihood post-electoral conflicts, and contribute to more democratic societies. Therefore, investing in a fingerprint voting system is a crucial step towards achieving fair and transparent elections, but must be part of a broader strategy that includes vigilant oversight and strong legal safeguards.

**REFERENCES**

[1] Peter Wolf, “Introducing Biometric Technology in Elections”, International Institute for Democracy and Electoral Assistance, pp. 10–16, (2017).

[2] Nahida Nigar, Mohan Lal Nath, MD. Toufiqul Islam, “A Proposed Framework for Fingerprint-based Voting System in Bangladesh”, International Journal on Informatics Visualization, vol. 4, no. 1, (2020).

[3] Mr.Sharathchandra N R, Dr. Jose Alex Mathew, Dr. B C Prem Kumar, “IOT Based Fingerprint Voting System”, International Journal of Creative Research Thoughts, vol. 10, (2022).

[4] Rudrappa B. Gujanatti, Shivaram N. Tolanur, Murughendra S. Nemagoud, Shanta S. Reddy, Sangameshwar Neelagund, “A Finger Print based Voting System”, International Journal of Engineering Research & Technology, vol. 4, no. 5, (2015).

[5] Haydar Imad Mohammed, “FingerPrint Base Electronic Voting System”, Asia Pacific University of Technology & Innovation, Faculty of Computing, Engineering & Technology School of Engineering, (2013).

[6] CH Srilatha, Dwaraka Chand Venigalla, Sai Kaushik Tuttagunta, Nallagatla Akshay, Myasar Mundher adnan, B Rajalakshmi, H Pal Thethi and Ashwani Kumar, “Fingerprint-Based Biometric Smart Electronic Voting Machine Using IOT And Advanced Interdisciplinary Approaches”, E3S Web of Conferences 507, 01037 (2024).

[7] Debojyoti Ghosh, Anushka Banerjee, Pratik Ranjan Roy Chowdhuri, Ankur Sen Gupta, Barnasha Pal, Sahana Khatun, “Fingerprint Based Electronic Voting Machine: A Review”, International Journal of Novel Research and development, vol. 3, (2018).

[8] Dibya Dahal, “Electronic Fingerprint Voting System”, Helsinki Metropolia University of Applied Sciences, Bachelor’s Degree Electronics Engineering, Bachelor’s Thesis, (2019).

[9] Eduardo Ibañez, Nicolás Galdámez, Cesar Estrebou, Ariel Pasini, Franco, Chichizola, Ismael Rodríguez, Patricia Pesado, “Biometric Identification in Electronic Voting Systems”, Institute of Research in Computer Science III-LIDI – School of Computer Science.

[10] Nishanthi R,Preethi L, Anitha lakshmi V, “Online Voting System Using Fingerprint Sensor”, International Journal of Advanced Networking & Applications.