iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 13 **Issue:** V **Month of publication:** May 2025

DOI: https://doi.org/10.22214/ijraset.2025.71342

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 13 Issue V May 2025- Available at www.ijraset.com

Advanced E-Voting System

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Abstract: ***This advanced electoral system aims to revolutionize voting by ensuring a secure, efficient, and user-friendly process. The core feature is its biometric fingerprint authentication, which guarantees that only eligible voters participate, reducing the risk of fraud. By integrating a voter list database, voters can easily identify themselves using their fingerprints, minimizing wait times and confusion at polling stations. The system also enhances voter convenience by allowing them to select their preferred polling station after identity confirmation. Once at the station, voters can cast their votes electronically, streamlining the process and ensuring accuracy. Election authorities benefit from real-time data management, providing them with up-to-the-minute insights into the voting process, enabling better oversight and transparency. Overall, this system addresses critical issues in traditional voting, offering a secure and efficient solution for modern elections.***

Keywords: Fingerprint, E-voting System, Android Application, graphical user interface, Authentication, Algorithm, Verification, Database

I. INTRODUCTION

This project introduces an advanced electronic voting system designed to improve the Security, efficiency, and transparency of elections. Traditional voting systems often face issues like voter fraud and inefficient identification processes, which compromise fairness. To combat these challenges, the system uses biometric fingerprint authentication, ensuring that only registered voters can cast ballots and virtually eliminating fraudulent voting. While e-voting has been implemented invarious elections as a supplement or alternative to in-personvoting, concerns over its legitimacy and authenticity remaina hindrance to its wider adoption[1].E-Voting or electronic voting is a modern alternative for the traditional voting system involving paper ballots. For the large-scale implementation of electronic voting, the design of the proposed system has to support reliability as well as security.[6]

With a simple, intuitive interface, even those with limited technological experience can easily cast their votes by electronically selecting their candidates. Blockchain is a new technology with strong implications for the future of how we exchange information and currency as a globally networked society. It is so new that there is relatively little academic work done on it, but this is changing quickly. While blockchain is not well understood, it is growing rapidly as a medium, and it is a really hot topic in current media[2].

Many attempts have been made by several people in the academic field to develop systems which promote secure means of voting. Using fingerprint for authenticated entry to enter the voting procedure has been proposed in several articles. RFID tags have also been used as a valid id to conduct secure voting through the electric voting machines or implemented as a prototype of Aadhar id along with other security measures like finger vein sensing and using alcohol sensors to provide peaceful environment in polling booths[9].

II. LITERATURE SURVEY

1) *MARIA-VICTORIA VLADUCU, " E-Voting Meets Blockchain: A Survey", IEEE, VOLUME 11, 2023*

This study reviews global implementations of blockchain-based electronic voting systems, highlighting their benefits, such as enhanced privacy and tamper resistance. It analyzes current systems in countries like Germany and Estonia, examines challenges faced, and identifies areas for future research to improve the security and trustworthiness of e-voting systems

2) *Vatsa Joshi, "Blockchain Technology", ResearchGate, March 2024*

This paper analyzes blockchain technology's core concepts, including its decentralized architecture, cryptographic security, and consensus protocols. It examines development methodologies, evaluates existing implementations, and discusses future applications in various sectors. The research addresses challenges and implications of adoption, emphasizing the need for scalability solutions and regulatory frameworks for responsible growth.

3) *Ms. Kavya Ramesh Naidu, Mr. Ankush Dinesh Ingale, Ms. Pratiksha Sukhadeo Gaikwad, Mr. Hitesh Rajendra Thakare, Mr. Sujal Sunil Chavan, Prof. Yogeshk Sharma; "ONLINE VOTING SYSTEM ", IRJETS(Volume:05/Issue:05/May-2023)*

The growth of technology enables a shift from traditional to online voting methods, providing a modern, secure solution for elections. Online voting software allows individuals to vote remotely, increasing accessibility and conserving resources.

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This software enhances accuracy, transparency, and democratic participation. While some countries have adopted it, universal adoption faces challenges such as eligibility verification and ensuring accurate voter information. This study examines various e-voting methods, successful global implementations, and trends in online voting, comparing online and traditional voting approaches.

4) *N. Sreenivasa , Gopal Agarwal , Rishab Jain; "Online Voting System by Using Three Step Verification"; ICAECT 2023*

India's offline voting system is labor-intensive and slow, prompting a shift to online voting to improve efficiency and voter participation. This proposed system uses three levels of authentication—face, Aadhar, and voter card verification—to ensure security and authenticity. Although online voting simplifies the process, it also presents challenges in maintaining security and trustworthiness..

5) *Fahad Riaza* , Saad Zafarb; "Circuit Design of Four Persons Voting Machine ", International Journal of Research Publication and Reviews, Vol 3, no 12, pp 459-465, December 2022*

This project presents an Electronic Voting Machine (EVM) that operates transparently within a digital framework, counting votes through a pulse flow from switches activated by voters. The system restricts each voter to a single vote per candidate, displaying vote totals for individual nominees. Designed to deepen understanding of digital electronics, the four-person EVM uses Multisim software and integrates circuits with LED displays to indicate votes. The system uses 74LS183 and 74LS48 chips for display functions, while logic gates manage voting limits, ensuring functionality through successful simulation.

6) *Vivek S K, Yashank R S, Yashas Prashanth, Yashas N;"E-Voting System using Hyperledger Sawtooth", IEEE, 10 Nov 2020*

E-voting offers a digital alternative to paper-based voting, aimed at improving reliability and security. This research proposes a secure and decentralized e-voting system using Hyperledger Sawtooth, a blockchain framework that ensures transparency and integrity. By restricting access to registered polling stations, voters can cast ballots that are securely recorded on an immutable blockchain ledger, effectively eliminating vote manipulation. This approach enhances trust in the election process and demonstrates the feasibility of a secure, blockchain-based voting system

III. SYSTEM ARCHITECTURE

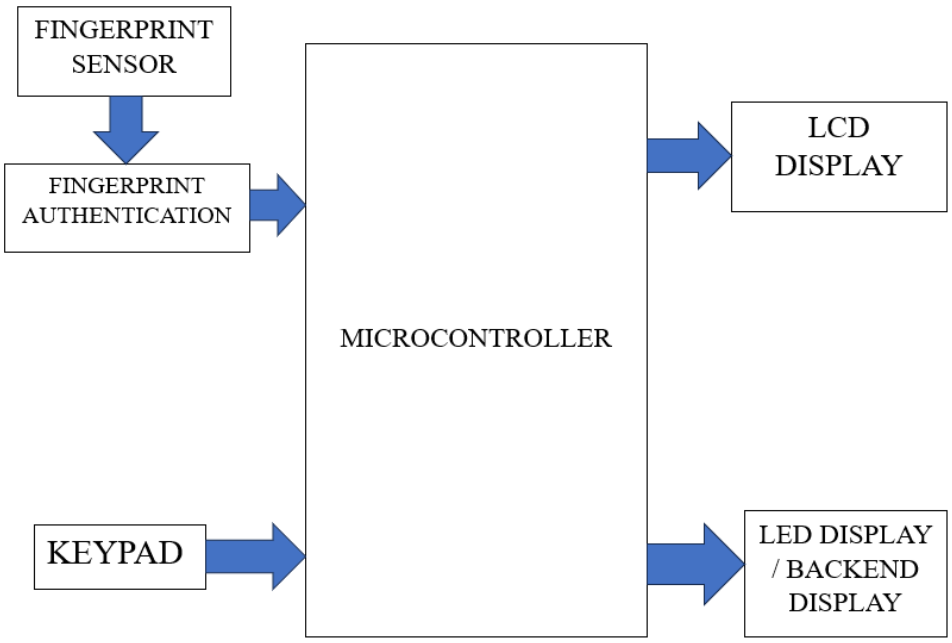


Fig1. Block Diagram of Advanced E-Voting System

IV. CONCLUSION

In correlation to the research all of the objectives and goals of the voting areas has been achieved positively. On the research of various voting systems, we analyzed the security risk that could harm the integrity and confidentiality of the voting process.

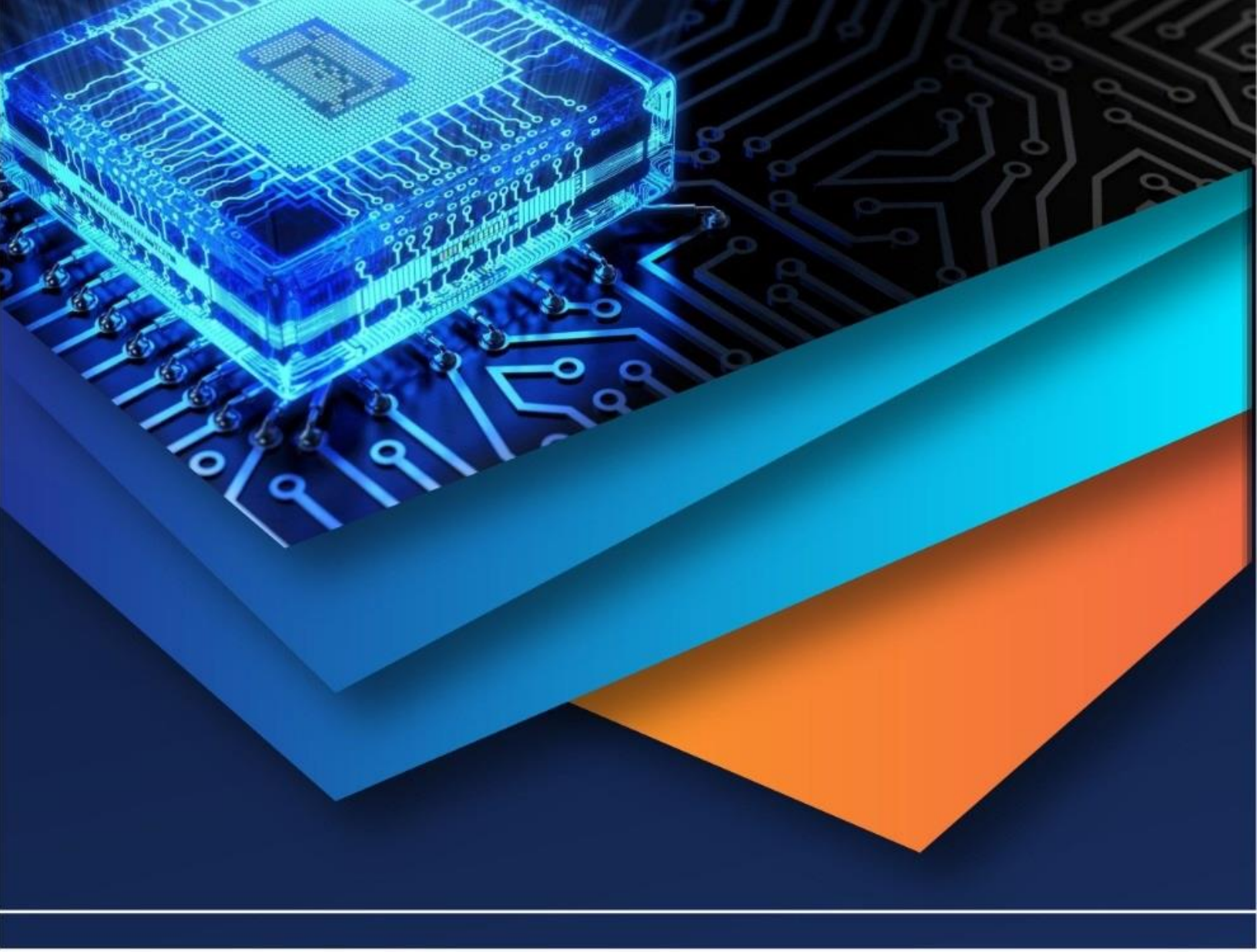
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The result of our study proposed that the fingerprint is recognized as the popular biometric methods, for that intention the main motive of this research is to developing a secure and efficient fingerprint Evoting system based on android application that contains GUI designed. In these research exercises, we conceive a testing methodology, improved new tools for the security analysis and suggest a new idea of the voting system. This E-voting system has the ability to reduce fraud attempts and eliminate errors in votes counting. In addition to its scalability this system can handle various techniques and provide enhanced efficiency and reliability for the elections. This fingerprint E-voting system which is based on android application is evaluated and implemented successfully. The final result of the voting system was amazingly computable and significant with other voting system.

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