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Smart EVM

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Abstract *– The Smart Electronic Voting Machine (EVM) with Biometric Authentication is an innovative solution designed to enhance the security, transparency, and efficiency of the voting process. Traditional EVMs are prone to issues such as voter impersonation and duplicate voting, which can compromise the integrity of elections. This project addresses these challenges by integrating biometric fingerprint authentication with an electronic voting system*

Keywords- *ultrasonic sensor, arduino uno, battery, buzzer*

INTRODUCTION

India is a Democratic country with a huge population where voting plays an important role. Every citizen has the right to choose their leaders. This is done by using electronic voting machines (EVMs) at polling booths. But even there may be some malfunctions during elections. Under these circumstances holding elections is a complex task for the Election Commission because there is rigging taking place. Electronic voting systems have come into the picture to prevent rigging up to the maximum extent. For this, we are using the R307 Fingerprint Module which scans the fingerprint and gives input to Arduino Uno. Our developed algorithm stores the particular fingerprint in the storage drive and makes sure that the fingerprint is unique from the previously stored data. Thus, when the same person comes to poll his vote during the elections, he needs to give his fingerprint before polling his vote if his fingerprint is already present in stored data. If both the data are matched. The person can be eligible to pole his vote else the buzzer will give us the alert sound. The advanced technology will improve the “Biometric Voting System” through the fingerprint enrolment process making the authentication easy and enhancing security.

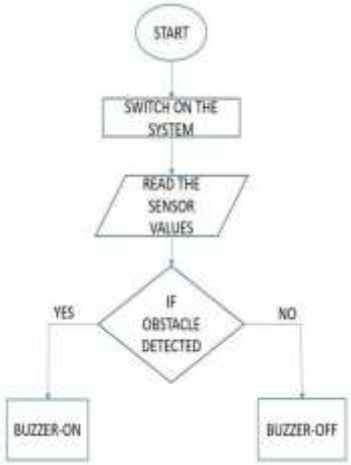
LITERATURE REVIEW

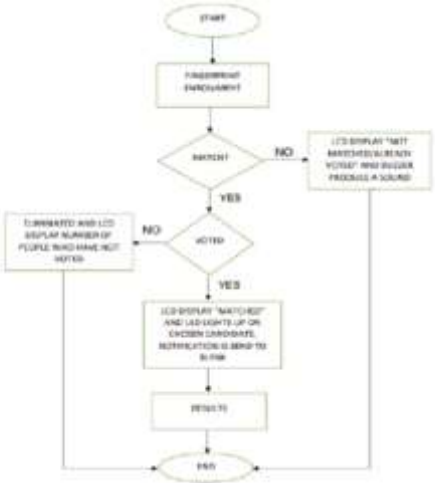
Studies have shown that the design and functionality of Smart EVM Machine play a crucial role in user acceptance. "A Smart Voting System Combining Fingerprint for Enhanced Security" (2024)
Authors: Amitesh Yadu and Dr. Omprakash Chandrakar
Summary: This study presents a smart voting machine that utilizes fingerprint technologies to authenticate voters, aiming to eliminate bogus voting and enhance election security. The system captures real-time biometric data and compares it with pre-registered information to ensure voter authenticity.

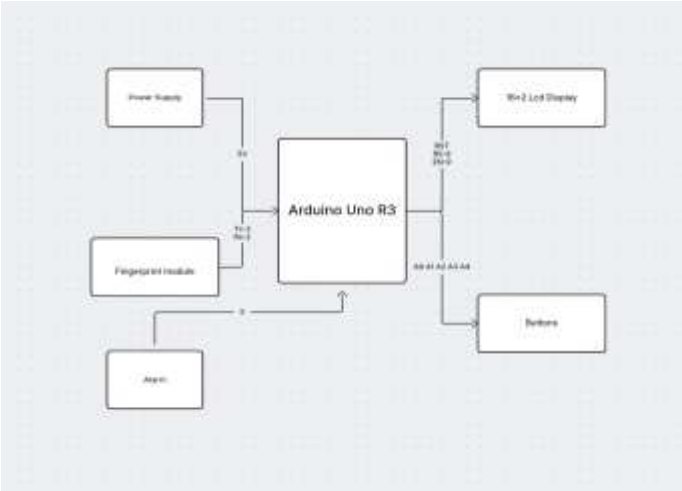
"Fingerprint Biometric Voting Machine Using Internet of Things"(2023)
Authors: Zakiah Mohd Yusoff, Yusradini Yusnoor, Arni Munira Markom, Siti Aminah Nordin, and Nurlaila Ismail
Summary: This paper proposes a voting system that integrates fingerprint biometric authentication with IoT technology. Utilizing the Arduino Uno controller and fingerprint sensors, the system ensures that only registered voters can cast their votes, with results stored securely in the cloud for real-time monitoring and enhanced election integrity

"Fingerprint-Based Biometric Smart Electronic Voting Machine Using Arduino"(2024)
Authors: Authors not specified
Summary: This research introduces an electronic voting machine that employs the R307 fingerprint module interfaced with an Arduino Uno to authenticate voters. The system stores unique fingerprint data to prevent duplicate voting and enhances the security and reliability of the electoral process.

BLOCK DIAGRAM

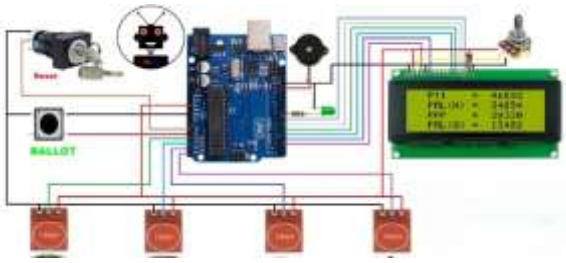






1. Start: The system begins.
2. Fingerprint Enrollment: A user scans their fingerprint for verification.
3. Match Check: If the fingerprint does not match or the person has already voted, an error message is displayed on the LCD, and a buzzer sounds. If the fingerprint matches, the system proceeds.
4. Voting Status Check: If the person has not voted, they proceed to vote. The system tracks the number of people who have yet to vote, If the person has already voted, the system displays "Matched," lights up an LED for the chosen candidate, and sends a notification to Blynk
5. Results Display: The voting results are processed. 6. End: The system concludes the process.

CIRCUIT DIAGRAM



This circuit diagram represents an Arduino-based electronic voting machine (EVM). It includes touch sensors for voting, a ballot button for activation, and a key switch for resetting. An LCD displays real-time vote counts, while a buzzer and LED provide feedback. A rotary potentiometer adjusts the display contrast. The Arduino Uno processes votes and updates the results, making the system efficient for secure and electronic voting.

Power Supply: Provides 5V power to the Arduino. **Fingerprint Module:** Connected to Arduino via Tx (pin 3) and Rx (pin 2) for biometric authentication.
16×2 LCD Display: Connected to Arduino to show system messages.
Buttons: Connected to analog pins (A0–A4) for user interaction.
Alarm: Activated by Arduino if unauthorized access is detected.
ADVANTAGES:

• Voters don't need to carry any ID cards; their fingerprint is enough for identification.
• The system ensures that each person can only vote once, preventing any chance of double voting.
• The voting process is faster compared to traditional methods, making it more convenient for voters
. • Only registered voters can cast their votes because the system verifies each voter using their fingerprint. This helps prevent cheating.

.**DISADVANTAGES**:

• Some people might find it difficult to use if they are not familiar with the technology.
• Technical Issues like Software Glitch.
• Storing fingerprints in a database might raise privacy concerns for some voters.
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CONCLUSION

Our project developed a helpful tool, the Smart EVM (Electronic Voting Machine) using biometric technology represents a significant step forward in ensuring secure, transparent, and efficient elections. By incorporating biometric authentication, the system enhances voter identification, reducing the chances of identity fraud and impersonation. This innovative approach addresses common challenges faced by traditional EVM systems, such as voter authentication errors and manipulation risks. Additionally, the real-time data processing and secure voter registration contribute to building trust among citizens in the electoral process. Overall, the integration of biometric systems into EVMs can play a crucial role in strengthening democracy by ensuring that elections are conducted with integrity and fairness.

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