

Review: Biometric Based Electronic Voting Machine (EVM)

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Abstract— Organizing free and fair elections in the country has become quite difficult for the government these days .A large amount of money has been spent on this to ensure that there are no riots during the elections .But nowadays, certain forces have become accustomed to rigging elections, leading to a contrary verdict to what the people intended. The purpose of this paper is to present a new voting scheme that uses biometrics to improve accuracy and speed while avoiding rigging. Due to the fact that each human has a different fingerprint, we can easily identify the personal details by using fingerprint sensors in our system. Therefore, this system is better than the current voting system. Voters' fingerprints will be entered into the system as input during the elections. Then this input fingerprint will be compared to the database. If the user's data is available in our database, then we will grant them voting access. However, if the record does not match our database, then we will reject this vote. The same applies to repeat users. By reducing costs, the system's maintenance costs and overall costs for conducting elections also decrease.

Keywords: Arduino UNO, Biometric sensors, LCD, etc.

I. INTRODUCTION

A voting process is an important part of democracy, which allows people to express their opinions by selecting their candidates. Elections are currently conducted in India using Electronic Voting Machines (EVM) , which are prone to fraud and are time-consuming to use. In India Electronic Voting Machines do not have a mechanism for confirming the voter's identity before casting their ballot. Manufacturing of an EVMS can be tampered with, and in such instances, the actual voting can be manipulated. Governments have to maintain records after elections, which is another time-consuming task.

As a means to overcome these disadvantages of EVMs, our project emphasizes biometric verification and digital maintenance. In order to provide personal identification solutions, biometrics is becoming increasingly important. Identifiers based on biometrics cannot be shared or lost, so they represent the identity of an individual. Due to the fact that every individual's thumb impression is different, it helps minimize the possibility of errors. In accordance with the

requirements, a database with fingerprint images of all voters is created. With accurate coding, this system detects illegal votes and repeated votes. Consequently, implementing this fingerprint-based electoral voting system, elections can be made fair and free of rigging.

II. LITERATURE REVIEW

It has been a tradition in India to conduct elections every five years since 1948. An appropriate candidate is elected using the following methods:

- A. Paper Ballot System
- B. Electronic Voting Machine (EVM)

A. Paper Ballot System

In India, public elections were conducted using paper ballots before 1997. As ink used for voting may stain over time, ballots can only store votes for a very short time. Ballot papers must be properly maintained to prevent them from being affected by humidity, sunlight, and other factors.

The original data from a ballot cannot be recovered once it has been corrupted. When the election process is complete, each ballot paper must be checked manually to count the votes. This takes time and effort. The inflammability of paper may cause it to catch fire accidentally in the unlikely event that all the records are burned and lost which cannot be recovered. Thus, re-elections require additional expenditures on the part of the government. False ballots can be made and untold numbers of fake votes can be cast. Voting was difficult for physically disabled individuals, in those cases they were helped by others and hence privacy was violated.

B. Electronic Voting Machine (EVM)

In 1977, the Chief Election Commissioner proposed Electronic Voting Machines ("EVMs") for voting purpose. The EVMs were designed and developed by the Election Commission of India in collaboration with Bangalore's Bharat Electronics Limited (BEL) and Hyderabad's Electronics Corporation of India Limited (ECIL). In the present day, the above two undertakings manufacture EVMs.

III. PROPOSED SYSTEM

A polling officer or the presiding officer has responsibility for the Control Unit. The Balloting Unit is located inside the voting compartment, where voters cast their ballots. The two units are joined by a five-meter cable. The Control Unit is with the Presiding Officer or a Polling Officer and the Balloting Unit is placed inside the voting compartment.



Fig.1

Presently, EVMs which are in use faces different problems. They are mentioned below:

- 1) *Accuracy*: Invalid votes should not be counted in the final tally. It is not possible to alter a vote to eliminate them.
- 2) *Democracy*: Voting is only permitted to eligible voters, and only one vote is permitted per eligible voter.
- 3) *Security Problems*: After the polling, one can manipulate the results by changing the software installed on the EVM.
- 4) *Illegal Voting (Rigging)*: Rigging is a very commonly known problem that occurs during every electoral process. The procedure can be carried out externally during the voting process.
- 5) *Privacy*: There is no way to link a ballot with a voter, neither by authorities nor anyone else.
- 6) *Verifiability*: The proposed method of independently verifying all votes and tallying them correctly must be independently verified.
- 7) *Resume Ability*: The system allows users to interrupt the voting process and resume or restart it at any time during the polling period. It is, however, impossible to make an accurate election with the proposed system.

We have proposed a new system to reduce manual work and overcome drawbacks, which relies on biometric verification of voters.

As a means to overcome these disadvantages of EVMs, we have designed RFID based Electronic voting machine. This system is based on biometrics and provide the accurate results. For identification, voters thumb impressions are used. Voters keep their thumbs on the scanner during voting, and the system matches those thumb impressions with those already stored in the database. The person is allowed to poll his vote if the data matches the stored information. Upon failing to do so, a message is displayed on LCD, and the person is not allowed to vote.

The proposed project focuses on two aspects that are Highly important for any Voting Machine:

- a) Security
- b) Low production and maintenance cost

A. Security

A key goal of electronic voting is to ensure the accuracy and reliability of the votes cast by electors so as to make the voting process fair and transparent.

According to Neumann (1993), electronic voting systems must follow some vital standards in order to maintain the integrity of the election process.

- An elector should only vote once per election as the first standard.
- The second requirement is that electronic voting systems should support an audit log that contains voting results. This is done to detect errors and modifications.
- Thirdly, voters' preferences must be taken into account and should be confidential. It is also important that the voting system is able to handle a wide range of tasks at the same time throughout the election process.
- Fourth, voting systems should be protected from fraud and exchange.
- The final criterion is that the vote results should be accurately recorded and displayed.

B. Low Production and Maintenance Cost

The proposed project uses less number of parts that reduces the cost of production to a significant level. Less number of parts also helps in reducing the maintenance cost which eventually will lead to cost saving.

These features make the proposed project a very useful device when it comes to Replacement of the present day Electronic Voting Machine.

IV. BLOCK DIAGRAM

The proposed project works in a very simple and easy way. The following Block Diagram shows how the system actually works. This is indicated below in Fig. 2.

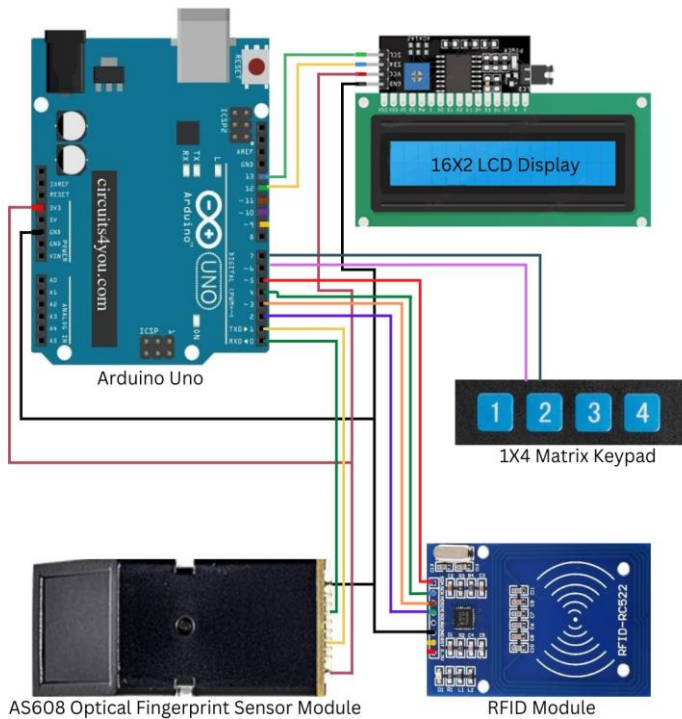


Fig. 2

A. Arduino Uno

- ATmega328p microcontrollers are used in Arduino Uno, a microcontroller board manufactured by ATMEL.
- Monitoring of the alcohol sensor and metal detector is done by this central unit. It is used for controlling purposes.

B. LCD Display

- A 16x2 LCD display can display 16 characters per line and there are two such lines on the screen.
- When the voter places the RFID tag near the RFID reader, the voter's details will appear on the LCD screen.

C. RFID Module

- This RFID reader module communicates with RFID tags by creating an electromagnetic field at 13.56MHz.
- RFID tags contain information about individual voters in this project such as Name of the voter, voter ID, etc.

D. Matrix Keypad

- A 1X4 Matrix Keypad is used and has 4 buttons arranged in a 1x4 pattern.
- Each keypad is used to cast vote by the voter of his choice.

E. Fingerprint module

- An optical fingerprint sensor takes a snapshot of a fingerprint's tip and creates arrays of identifiers that are used to identify a fingerprint uniquely.
- It is used to verify the authenticity of the voter's finger print.

V. WORKING

The flow chart of the given proposed system is given below Fig. 3. The step by step working of the system is shown as:

- 1) The project starts with a welcome message "Scan your RFID".
- 2) If the RFID is found in the database of the system then it displays the message "Scan your Finger" and enables the AS608 Optical Fingerprint Sensor Module.
- 3) As soon as the user's finger is scanned, it starts to process the received information. The RFID and Fingerprint are scanned and the system checks if both of them belongs to same person or not.
- 4) After this the display shows "Please Vote" and the user has to choose from 4 inputs.
- 5) The inputs are stored in the database for further calculation.

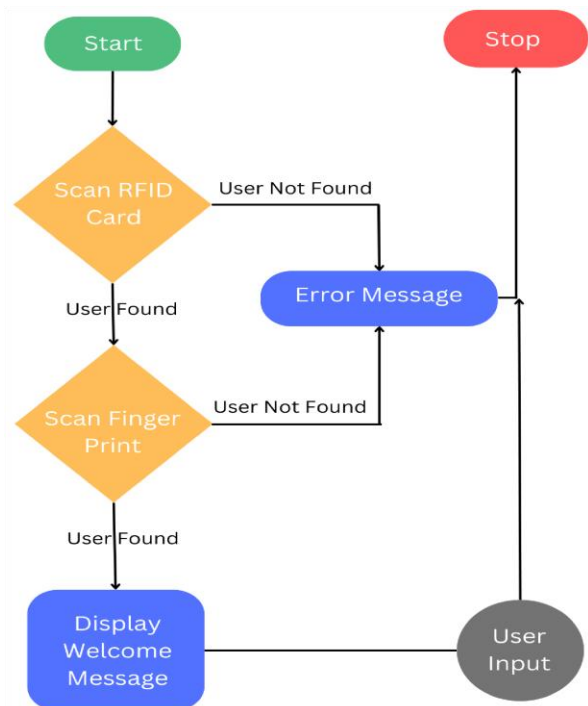


Fig. 3

CONCLUSION

The proposed system “Biometric based Electronic Voting Machine” mainly rely on fingerprint matching as an authentication criteria for securing the polling process and preventing election corruption.

ACKNOWLEDGMENT

We as authors would like to give special thanks to Ms. Shilpa Srivastava, Assistant Professor , Electronics and Communication Engineering department for her excellent guidance and support to work on this project. This paper is supported by ABES Engineering College, Ghaziabad.

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2022	integrity etc. block size adjustment procedure are application specific and require adjustment. Blockchain scalability is of significant concern		
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