

# Biometric Based Electronic Voting Machine

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**Abstract-** *The main goal of this project is to develop an electronic voting machine with biometric authentication that will aid in the elimination of fraud in manual voting systems and previous electronic voting versions. The thesis investigates and proposes a system with many levels of verifications to verify the device's dependability. With the use of a biometric fingerprint sensor, each voter is only registered into the system after being identified and cross-checked against the voter database. The voter will be able to choose their favorite candidate from a panel of buttons after the appropriate fingerprint is matched with the information given. The final vote is then presented on an LCD for voters' enjoyment. The proposed project displays transparency and also carries the feature of being autonomous during the course of operation.*

**Indexed Terms-** *Arduino, Biometric, Electronic voting machine, LCD.*

## I. INTRODUCTION

Election is the act of a political party casting ballots to elect a candidate for a certain office. Depending on the post, an election may entail a public or private vote. Elections are held for almost every job in the municipal, state, and federal governments. In a paper-based election, voters cast their ballots by placing them in sealed boxes located throughout the electoral circuits of a certain country. When the voting time is over, all of these boxes are opened and the votes are physically tallied in the presence of certified authorities.

There may be errors in counting of ballots, or voters may find ways to vote more than once throughout this procedure. Votes are sometimes manipulated in order to skew election outcomes in favor of specific

candidates. To address these flaws, the Indian government devised a direct- recording electronic (DRE) voting method, which is similar to an electronic voting machine (EVM). The simplicity of the design, ease of use, and dependability of these gadgets have all been appreciated. However, it has been discovered that EVMs are vulnerable to tampering and may be readily hacked. Furthermore, many assaults, both hardware and software, are undetectable but very easy to carry out. As a result, we developed a system that is safe, transparent, trustworthy, and simple to use for citizens. Biometric e- voting systems are no longer a novelty; they are now widely utilized in Ghana and Ireland, and are expanding to other developing countries. In this project, we suggest a concept for preventing fraud in the system used to make biometric authentication voting a reality in India. It enhances security. Biometric electronic voting systems are no longer a novelty; they are already widely used in Ghana and Ireland, and their use is spreading to other developing nations. We propose a solution for preventing fraud in the system that would make biometric identification voting a reality in India in this project. It improves safety.

## II. HARDWARE REQUIREMENTS

### A. Arduino UNO:

Arduino is an open-source prototype platform based on an easy-to-use hardware and software. Arduino Uno is a microcontroller board based on the ATmega328.



FIG.1 ARDUINO BOARD

It has 14 digital input/output pins [12] (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. Microcontroller: ATmega328, Operating Voltage: 5V, Input Voltage (recommended): 7-12V, Input Voltage (limits): 6-20V, Digital I/O Pins: 14 (of which 6 provide PWM output), Analog Input Pins: 6, SRAM: 2 KB (ATmega328), DC Current per I/O Pin: 40 mA, DC Current for 3.3V Pin: 50 mA, Flash Memory: 32 KB of which 0.5 KB used by boot loader, EEPROM: 1 KB (ATmega328), Clock Speed: 16 MHz

**B. Fingerprint Sensor Module:**

The R305 is one kind of fingerprint sensor module used in biometrics for security in fingerprint detection as well as verification. These devices are mainly used in safes where there is a high-powered DSP chip used in the rendering of image, feature-finding, searching and calculation by connecting it to any microcontroller with the help of TTL serial, & send data packets to get photos, notice prints, search and hash.



FIG.2 FINGERPRINT MODULE

- The fingerprint sensor is an optical type
- The interface is USB1.1/ TTL logical level(UART)
- The speed of scanning is 0.5 sec
- The speed of verification is 0.3 sec
- The capacity storage is 1000
- The security level is 5
- The baud rate of RS232 is 4800BPS ~115200BPS variable
- Current is typical 50 mA, and peak 80mA
- The corresponding technique is 1: N
- Fixed indicators-15KV bright green backlight
- The life of the sensor is 100 million times
- The dimension is 44.1 X 20 X 23.5mm

- The size of the character file is 256 bytes
- The template size is 512 bytes
- The FRR (False Rejection Rate) is <1.0%
- The FAR (False Acceptance Rate) is 0.001%
- Voltage is 4.2 to 6.0 VDC

III. DESIGN AND IMPLEMENTATION

A. VOTING MACHINE:



FIG.3 BLOCK DIAGRAM

Voting machine consist of Arduino Uno, Fingerprint sensor LCD display, SFG Demo V2 Software, switches. Arduino UNO act as the controller unit. In order to unlock the device and as security a Fingerprint sensor has been attached to the machine. LCD and switches are also used.

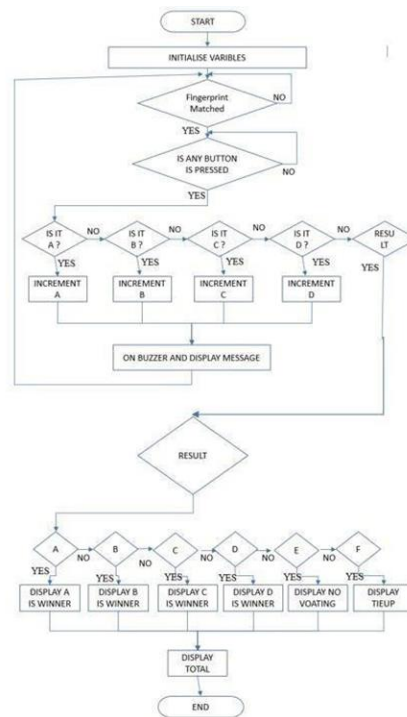


FIG.4 FLOW CHART

In this project we have used Fingerprint Sensor Module with four push buttons for four different candidates. We can increase the number of candidate but for better understanding we have limited it to four. When any voter press any of four buttons then respecting voting value will increment by one each time. After whole voting we will press result button to see the results. As the "result" button is pressed, Arduino calculates the total votes of each candidate and show it on LCD display. Circuit of this project is quite easy which contains Arduino, push buttons and LCD

Arduino controls the complete processes like reading button, incrementing vote value, generating result and sending vote and result to LCD. Here we have added five buttons in which first button is for BJP, second for CONG, ETC.

Now when user wants to vote then he/she needs to press match key and then buzzer will beep and LED will also glow and LCD will ask for place finger over fingerprint module. Now Arduino will give you three attempts to put your finger. After placing a finger over fingerprint module fingerprint module captures finger image find its IDs is present in the system. If finger ID detected then LCD will show authorized Voter. It means the user is authorized to vote. And then the system moves to next stage for voting. Now Green LED will glow it means now voter can vote for their candidates by pressing a reflected key (from RED bread board in this demonstration). Now if the same voter wants to vote again then the system will show it 'Already Voted'. Means same voter can't vote again and buzzer will beep for 5 seconds. If any Non-registered user wants to vote then finger print module will not detect its ID into the system and LCD will show 'No Fingerprint Found'.

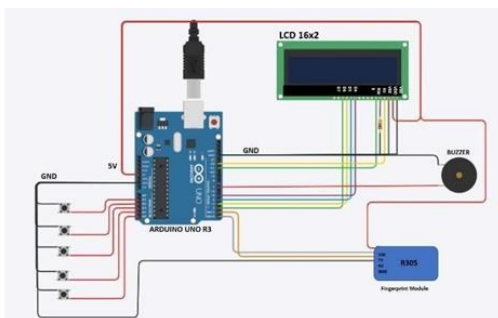


FIG.5 CIRCUIT DIAGRAM

This Fingerprint Based Voting Machine Project's circuit is very simple, consisting of an Arduino for controlling the entire project's process, a push button for enrolling, deleting, selecting IDs, and voting purposes, a buzzer for alert, LEDs for indication, and a 16X2 LCD for instructing the voter and also showing the result. The fingerprint module is ready to take an image of the finger with a yellow LED, and the system is ready to vote or display the results with a green LED.

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#### IV. ADVANTAGES AND DISADVANTAGES

##### A. The Benefits

- Because the person is identified based on his fingerprint, which is unique to each person, this method permits only authenticated voting, as opposed to the present equipment.
- Low usage of electricity
- It is cost-effective.
- Voting takes less time if you're short on time.
- counting It stops unregistered voters from voting, resulting in invalid voting.
- Because of its small size, it is easy to move.
- On the part of the voter, it is convenient.

##### B. Negative aspects

- Before voting, the user must first register.
- When the finger print module's sensitivity is too high, it can cause problems.
- Character erroneous combination

##### C. Applications

- This device can be used as a voting machine in polling booths to avoid rigging during elections. Fast-track voting, which might be utilized in small-scale elections such as those held by resident

welfare associations.

- Elections at the "panchayat" level and at other levels of society
- Instantaneous results are possible in elections.
- It might also be used to poll shareholders during the annual meeting.
- It might also be utilized to hold small-scale general assembly elections where the number of candidates is fewer than or equal to eight, as is the case now basis.

### CONCLUSION

The concept of electronic voting systems is not a new one. However, for its use to widely spread it is important to aim for a system that properly is able to fulfil all the requirements expected as well as the standards achievable by the use of technology. The system provided by this paper goes the lengths to cover the necessities that met the requirement for a fair, transparent and reliable election tool. This project assures that, if this system is brought into practice, it will reduce the rate of Corruption in an honest and sincere way. This system is a small contribution for a fair election. But corruption in voting system cannot be erased through this system if there is no sincerity.

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