

Finger-Print Voting System

Ankit Vijayvargiya¹, Bhawana², Gurudutt Solanki³, Harshit Soni⁴, Harshad Hada⁵, Ayan Yogi⁶

^{1, 2, 3, 4, 5, 6} Department of Electrical Engineering

^{1, 2, 3, 4, 5, 6} Swami Keshvanand Institute of Technology Management & Gramothan, Jaipur

Abstract- *Electronic Voting Machine (EVM) has all the properties of voting by ballot papers, while making polling a bit more expedient being fast and reliable. The EVM saves time, money and manpower. In this paper we will introduce two units with two micro-controllers having internal storage and a finger-print module, first unit will be in control of voting officer and the second unit will be Voter Unit.*

When a person wants to cast vote then the voting officer will check his/her individuality or identity by matching his/her finger-prints from pre-scanned fingerprints and if matched then permit to cast vote else not. After it, when the voter will press any button on the voter unit then his vote will be entered in the officer's unit and now if he try to press more button to enter more vote then machine will not accept his voting. In this manner a voter can only cast once. At the end of voting process the officer will press an end button which will terminate the voting process and after pressing the terminate button, no more vote can be cast at any cost. Now when counting of vote will start after pressing a button in the machine and after this, result will be on the LCD.

Keywords- Fingerprint Module, Micro-controller, Liquid Crystal Display (LCD), Power Supply

I. INTRODUCTION

Biometrics is the technology of measuring and analyzing data. In information technologies that measures and analyze characteristics of human body, such as DNA, fingerprints, eye retinas, voice patterns, facial patterns and hand measurements.

The aim of the project is to requests the voter to give his/her fingerprint as a personality proof. This fingerprint voting system will fetch the fingerprint's data and compares it with the previously stored data. If the data meets with the previously stored data, the voting system will allow the voter to cast the vote. If the data of the finger didn't meet with the stored fingerprint, then the system will instantly trigger the display by showing that finger doesn't found or matched.

Once the user complete the identification process, he will be allowed to cast his vote easily and if it is not like that then we can take any action against that person. The counting of the votes will be immediately and that makes the voting

process efficient, fast, and secure. This offers the security by using fingerprints which are already been stored in the database. The fingerprint voting system is cost effective for the whole election process.

II. ISSUES OF EXISTING ELECTRONIC VOTING SYSTEM

Elections are a defining feature of democratic government, but all too frequently, we take the actual process of the election for granted. We speak at such issues as who is allowed to vote, how conduction of campaigns takes place, and how they are financed, but no one gives priority to the understanding of the actual voting process. Electronic Voting Machines (EVMs) were designed by Election Commission of India in collaboration with Bharat Electronics Limited (BEL), Bangalore and Electronics Corporation of India Limited (ECIL), Hyderabad. The EVMs are manufactured by these two undertakings. An EVM consists of two units, i) Control Unit, ii) Balloting Unit, these two units are connected by a five-meter cable. The Control Unit is under Polling Officer and the Balloting Unit is inside the voting compartment[1].

There are two problems with EVM which is currently in use :

1. **Security Problem** - The program installed in the EVM can be changed by anyone and tamper the results after the polling. These instructions can be sent wirelessly from a mobile phone.
2. **Illegal Voting (Rigging)** – It is a very common problem. One candidate, casts the votes of any member in the electoral list illegally. This results in the loss of votes for the opposition candidate participating and results in increasing the number of votes to the candidate who performs this action.

III. BIOMETRIC SYSTEM (FINGERPRINT RECOGNITION)

A biometric system basically is a pattern recognition system that operates by extracting biometric data, extracting a feature set from the data, and comparing this feature set against the stored database set.

A biometric system is designed using the following main modules :

- 1) Sensor module, to capture the biometric data of an individual.
- 2) Feature extraction module, in which the received biometric data is processed to excerpt a set of salient or prejudiced features.
- 3) To generate matching scores, Matcher module is used, in which the features excerpted during recognition are compared with the stored database.
- 4) System database module, used to store the biometric templates of the enrolled users[1].

IV. ARCHITECTURE OF THE SYSTEM

The main components of the voting system are :

1. Microcontroller (8052)
2. Fingerprint Identification Module
3. LCD
4. Power Supply

1. Microcontroller – It is a small computer on a single integrated chip(I.C.) containing a processor core, memory and programmable I/O peripheral. The AT89S52 is a low-power, high performance 8-bit microcontroller with in-system programmable Flash memory of 8K bytes. The AT89S52 provides 8K bytes Flash, 256 bytes RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer, a six-vector interrupt architecture, a serial port, on-chip oscillator, and clock circuit. The Idle Mode stops the CPU and allow the RAM, counters, serial port, and interrupt system to continue operation. The Power-down mode saves the RAM contents, disabling all other functions until the next interrupt reset[2].

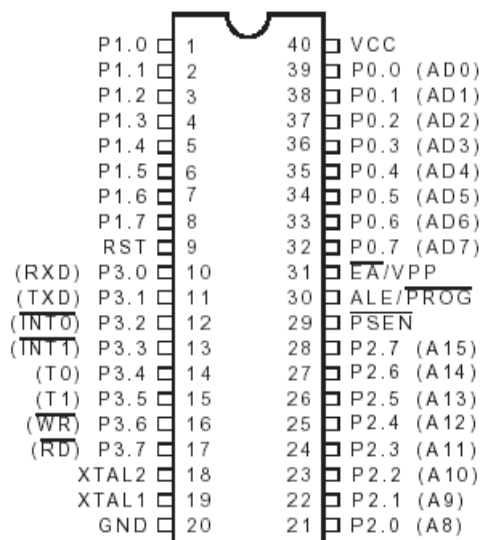


Fig 1 : Pin Diagram of 8052 Microcontroller

1. Finger-Print Module - A fingerprint sensor is an electronic device which is used to capture a image of the fingerprint pattern. The captured image is known as a live scan. This live scan is digitally processed to create a biometric template which is stored and used for matching.

Features-

- 1) Integrated image collecting and algorithm chip altogether.
- 2) Fingerprint reader can be embedded into a variety of end products.
- 3) Low power consumption, low cost, small size, excellent performance.
- 4) Professional optical technology, precise module manufacturing techniques.
- 5) Good image processing capabilities, can capture image up to resolution 500 dpi.

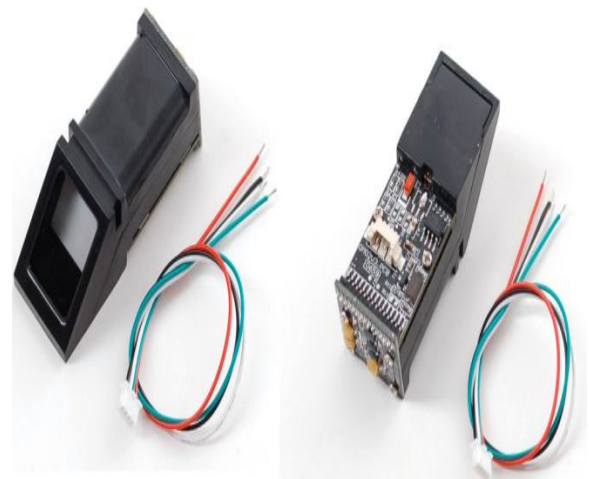


Fig 2 : Fingerprint Module (R 305)

This is a fingerprint module with TTL UART interface for direct connection to UART or to PC through USB-Serial adapter. The user can store the data i.e. fingerprint in the module and can configure it in 1:1 or 1: N mode for identifying the person. The fingerprint module can directly interface with 3V or 5V Microcontroller[3].

Liquid Crystal Display - A liquid crystal display (LCD) is a flat panel electronic display that uses the properties of liquid crystals (LCs).

Its low power consumption enables it to be used in electronic equipment with batteries. It is made up of any number of segments filled with liquid crystals and assembled in front of a light source to produce images in color or monochrome.

LCDs available in two models: Character LCD and Graphics LCD. The character LCD displays ASCII values and graphics LCD displays graphic characters. LCDs are available in various kinds of models[4].

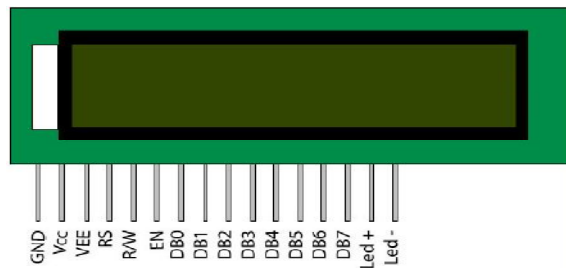


Fig 3 : Liquid Crystal Display

Table 1 : Specifications of LCD

| MECHANICAL DATA | | |
|------------------|----------------|------|
| ITEM | STANDARD VALUE | UNIT |
| Module Dimension | 80.0 * 36.0 | mm |
| Viewing Area | 66.0 * 16.0 | mm |
| Dot Size | 0.56 * 0.66 | mm |
| Character Size | 2.96 * 5.56 | mm |

4. Power Supply - Power supply unit consists of the following:

- Step down transformer
- Rectifier unit
- Input filter
- Regulator unit
- Output filter

STEP DOWN TRANSFORMER: It is used to step down (or to reduce) the main supply voltage. It consists of primary and secondary windings. The output from the secondary coil is AC wave. And we have to convert the AC wave form into DC voltage by using rectifier.

RECTIFIER UNIT: Bridge rectifier is used to convert AC voltage to DC. This output voltage often rectified is in rippled form, so to remove ripples from DC voltage, filters are used.

INPUT FILTER: Capacitor acts as filter. The capacitor either charges or discharges. Capacitor charges in the positive half cycle of the AC and discharge in the negative half cycle. So it allows only AC voltage and blocks the DC voltage. This filter is used before the regulator.

REGULATOR UNIT: Regulator regulates the o/p voltage constant depends upon the regulator. It stabilize the DC voltages used by the processor and other elements.

OUTPUT FILTER: This filter is fixed after the regulator. Capacitor acts as filter. So it allow only allows AC voltage and blocks the DC voltage.

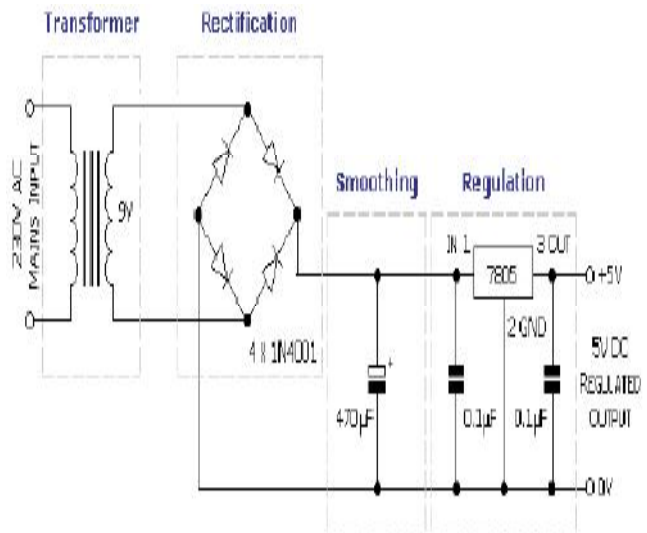


Fig 4 : Power Supply Circuit

Supply Section of this circuit consists of an IC 7805 IC. The output of the regulator (IC 7805) is +5 volts, which is used for all other digital applications.

The display section uses the open drain configuration port 1 of microcontroller and as a result, pull up resistors should be provided for its operation. The contrast of this LCD display is adjusted by using a variable resistor which is grounded at the other end.

Crystal oscillator uses the mechanical resonance of a vibrating piezoelectric material crystal to create an electrical signal with a precise frequency. For each instruction fetching, decoding, executing, and storing, processor require clock pulse.

R305 has 4 pins Vcc, gnd, Tx and Rx. The Rx of R305 is connected to serial receive input of microcontroller which is P3.0 pin. Similarly Tx of R305 finger-print module is connected to serial transmit pin of microcontroller P3.1[3].

CIRCUIT DIAGRAM OF FINGER-PRINT VOTING SYSTEM

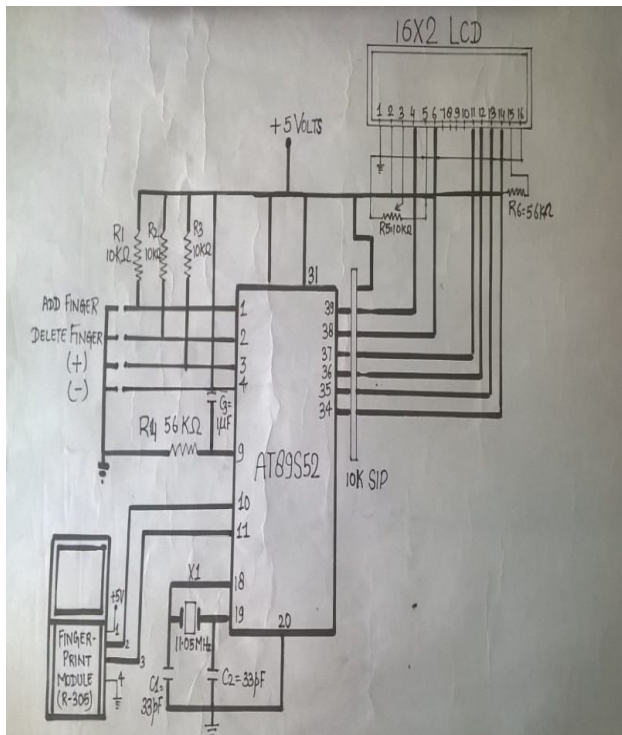


Fig 5 : Circuit diagram

V. ADVANTAGES

1. The system is highly reliable, tamper-proof and secure.
2. It is a very fast and user friendly system.
3. The maintenance cost is very less when compared to the present systems.
4. Problems like Illegal practices (rigging) in elections can be solved.
5. It is possible to get instantaneous results and with high accuracy.
6. This unique fingerprint voter ID card can be used for identification purpose in Govt./Semi-Govt. bodies. E.g.: Passport, Driving license, etc.

VI. CONCLUSION

Fingerprint is considered as the most popular biometric method used for human recognition. Every person in the world has unique fingerprint even twins born with totally different fingerprints. For that reason fingerprint voting system has been introduced and now the person ID will be replaced with his/her fingerprint.

This biometric system is implemented and evaluated successfully. While observing well developed voting transparency, at the voter as well as the system, the proposed system is capable of rejecting access to any illegal voter/s, preventing multiple votes by the same voter, that would adversely affect the voting process altogether.

Simulation results of the system, while running a live database server, reveal a number of important factors that should be analyzed carefully by the party adopting a system[5].

VII. FUTURE SCOPE

1. In a few years, this system can be implemented with recent development in technology, a fingerprint scanner is inexpensive and not so complicated.
2. In order to avoid the congestion at the voting area, there is need to provide personal computers, these PC's will be connected to the main server in order to allow many people to cast vote at the same time.
3. It is easy to create and maintain such an interface since internet connectivity has changed drastically .
4. 1mb flash memory can be used in finger print module to increase the capacity or to expand the memory.

Soon every Indian citizen can have a similar identity as Unique Identification Numbers (aadhar cards) have already been introduced in India, it contains an individual's fingerprints and iris scan. [5].

REFERENCES

- [1] Finger Print Recognition Based Electronic Voting Machine, International Journal of Engineering and Technical Research ISSN: 2321-0869, 2014
- [2] Muhammad Ali Mazidi - "The 8052 Microcontroller And Embedded Systems", Pearson Education
- [3] Electronic Voting System Using Fingerprint Scanning Technical Article, "E-Voting System ", Wikipedia, the free encyclopedia (Available Online)
- [4] https://en.wikipedia.org/wiki/Electronic_Voting_System
- [5] The Carter Center – Developing A Methodology For Electronic Voting, 2007
- [6] Tadayoshi Kohno_ Adam Stubblefield Avield Rubidans Wallach —Analysis of an Electronic Voting system, IEEE symposium on Security and Privacy 2004.