A Report on

Fingerprint-based Voting Machine

For

Mini Project 1-a (REV- 2019 'C' Scheme) of Second Year, (SE Sem-III)

In

Electronics & Computer Science Engineering

By

Gopinath Adidravad – 121A7002

Akanksha Dodamani – 121A7016

Vivek Rasal – 121A7040

Kunal Zemse – 121A7060

Supervisor

Prof. Dr. Deepti Reddy

Department of Electronics and Computer Science

**SIES Graduate School of Technology Nerul, Navi Mumbai -
400 706**

University of Mumbai

(AY 2022-23)

CERTIFICATE

This is to certify that Mini project entitled **Fingerprint Voting system** is a Bonafide work of

1. Gopinath Adidravad 121A7002
2. Akanksha Dodamani 121A7016
3. Vivek Rasal   121A7040
4. Kunal Zemse   121A7060

submitted to the University of Mumbai in partial fulfillment of the requirement for the award of **Mini Project 1-a (REV- 2019 'C' Scheme) of Second Year, (SE Sem-III)** in **Electronics and Computer Science Engineering** as laid down by **University of Mumbai** during academic year **2022-23**

Pranavi Nikam   Dr. Deepti Reddy   Dr. Atul Kemkar

Guide   **Head of Department**   **Principal**

Department of Electronics and Computer science

Mini Project Approval

This Mini Project entitled "Fingerprint Based Voting System" by

1. Gopinath Adidravad (121A7002)
2. Akanksha Dodamani (121A7016)
3. Vivek Rasal (121A7040)
4. Kunal Zemse (121A7060)

is approved for **Mini Project 1-a (REV- 2019 'C' Scheme) of Second Year, (SE Sem-III)**
in **Electronics and Computer Science Engineering**

Examiners

1...
(Internal Examiner Name &Sign)

2...
(External Examiner name &Sign)

Date:

Place:

Department of Electronics and Computer science

DECLARATION

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Gopinath Adidravad 121A7002

Akanksha Dodamani 121A7016

Vivek Rasal   121A7040

Kunal Zemse   121A7060

Date:

Department of Electronics and Computer science

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Project team
Gopinath Adidravad
Akanksha Dodamani
Vivek Rasal
Kunal Zemse

Department of Electronics and Computer science

ABSTRACT

Biometric sensors analyze biological data. Biometric Fingerprint devices are used in the Electronic Voting machine for voter verification. We have designed a fingerprint-based voting machine where there is no need for the user to carry his ID which contains his required details. The person at the polling booth needs only to place his Finger on the device, thus allowing the acquisition of an on-spot fingerprint from the voter which serves as an identification. This data is passed onto the controlling unit for the verification. If the data matches with the pre-stored database of the registered fingerprint, the person is allowed to cast his vote. If not, a warning message is displayed on LCD and the person is barred from polling his vote.

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Chapter 1

INTRODUCTION

1.1 INTRODUCTION

The Fingerprint Based Voting System is one of the voting techniques in which people can cast their votes to their candidates. These days voting machine has become effective toll compared with traditional way of voting using paper. Thus, we decided to design the machine to overcome the already existing voting technique. The main objective of this is to give security to the valuable votes of the voters and make voting process easy as much as possible.

In this, Arduino is the main part and other devices are connected to it. The fingerprint module is connected to Arduino which stores the data for voters for verification. LCD is used to display the status of the voters. Firstly, the voter must give thumb impression on the module to start the process of voting. The Arduino will check the data and LCD will display the output. Fingerprint module plays an important role in this system as it secures voter's data.

1.2 PROBLEM STATEMENT AND OBJECTIVES:

PROBLEM STATEMENT:

The Problem Statements of this project which we are trying to are as follows:

1. To stop the fake voting.
2. To make system more efficient and more reliable.
3. Reduce human interaction to make system perfect and accurate.

OBJECTIVES:

The core objective of this project is to design fingerprint-based voting system which will solve the problem such as problems faced by the people in voting manually, to stop the fake voting and reduces the time for ballot counting and many others.

1.3 Organization of the Report:

Introduction, Principal and Objective are covered in Chapter 1. Literature Survey is covered in chapter 2. Chapter 3 covers information about Mini project such as Working

of Mini project, block diagram, components used and their Quantity and Circuit diagram. Troubleshooting of Mini Project is covered in Chapter 4. Chapter 5 consists of Result of project. Conclusion, Advantage, disadvantage, and Future Scope of project is covered in chapter 6 and last but not the least Chapter 7 consists of appendix means cost analysis of project.

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Chapter 2.

LITERATURE SURVEY

In [1] a secure online voting system by utilizing the concept of biometric and steganographic authentication is proposed. Homomorphic technique encrypts the casted vote stored and decrypt s it during the results. It is a fingerprint-based application, and it generates list of all people who are above 18 years from Aadhar card database. By using Aadhar number he/she can cast his/her vote. This system has high level security. If he/she tries for the second time he/she will not be able to vote since tracking feature is included in this system. When each voter is casting his/her vote the count will be updated at the same time in the admin database through the server.

In [2] Md. Mahboob Karim, Nabila Shahnaz Khan In this paper, they have focused on designing a biometric electronic voting machine (BEVM) along with fingerprint authentication and centralized database. Based on total number of voters, several BEVM will be installed in each polling station for different elections in Bangladesh which will help to deploy the fingerprint matching task accurately within less time. The proposed system is a biometric e-voting system which has two main sections- 1) voter registration & 2) voting control and result calculation. Each user needs to register first as a voter through the system with biometric (fingerprint) verification. The information of the voter will be saved in a central database

In [3] Arduino based Smart Electronic Voting Machine" V. Kiruthika Priya, V. Vimaladevi Proposes a system with the addition of biometric fingerprint sensor, each voter is entered into the system only after being recognized and checked with the given database of enlisted voters. Once the corresponding fingerprint is matched with the information provided, the voter will be allowed to proceed for choosing their preferred candidate from the panel of buttons. The final vote is then

displayed onto a LCD for the satisfaction of voters. The proposed project displays transparentness and carries the feature of being autonomous during the course of operation. They propose an idea to avoid fraudulence in mechanism to make e-voting in India a reality. It improves the security performance and avoid fake vote because naturally one human fingerprint is different from another human.

Chapter 3

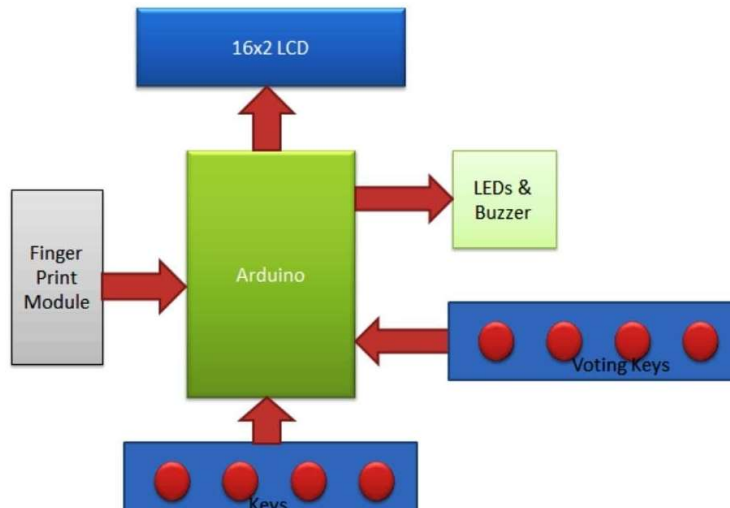# Mini Project Working

3.1 BLOCK DIAGRAM

Fig 3.1 Block Diagram

In this circuit we used Arduino UNO, fingerprint module, LCD (I2C), push buttons, breadboard. Arduino is the main component and supplies input and output to other components. Fingerprint module is connected to RX & TX pin of the Arduino and LCD is connected to A4 and A5 pin of Arduino. The push buttons are arranged as per the requirement.

Initially all the enters of the voters will be inserted in the database of fingerprint module. Voters can select their candidates and can vote them using push buttons. So, when a voter verifies their fingerprint, on fingerprint module if they are registered in module's database, the LCD will print as 'Authorized Voter' else if not registered in module, LCD will show 'Finger Not Found'.

Once the verification of voter is completed, they can vote their candidate using push buttons and that count will be increased of the candidates as they will be getting votes. The total count of the votes will be showed to the authorized Admin.

3.2 COMPONENTS USED IN PROJECT

ITEM	QUANTITY
Arduino Uno	1
Fingerprint Sensor Module	1
Push Buttons	9
I2C Module	1
Connecting wires	25
16x2 LCD	1
Bread Board	1

Table 3.1
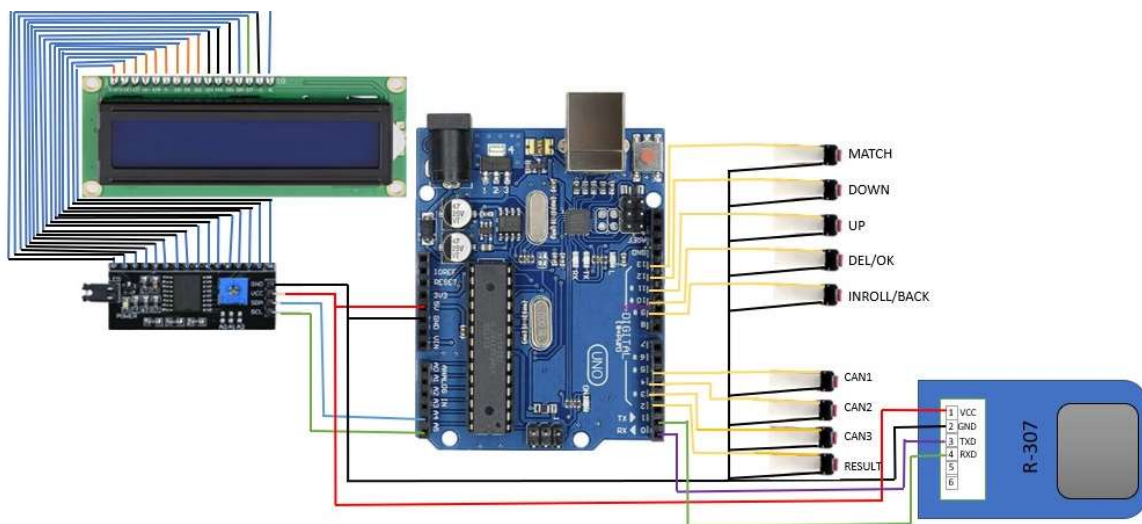
3.3 CIRCUIT DIAGRAM

Fig 3.2 Circuit diagram

DESCRIPTION OF COMPONENTS:

1. **Arduino Uno:** Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards can read inputs – light on a sensor, a finger on a button, or a Twitter message – and turn it into an output – activating a motor, turning on an LED, publishing something online. To instruct the Arduino you use the Arduino programming language (based on Wiring), and

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the Arduino Software (IDE), based on Processing. Arduino was born at the Ivrea Interaction Design Institute as an easy tool for fast prototyping, aimed at students without a background in electronics and programming. As soon as it reached a wider community, the Arduino board started changing to adapt to new needs and challenges, differentiating its offer from simple 8-bit boards products for IoT applications, wearable, 3D printing, and embedded environments. All Arduino boards are completely open-source, empowering users to build them independently and eventually adapt them to their needs.

Fig 3.3 Arduino Uno

2.   LCD Display I2C Module:

The I2C 16×2 Arduino LCD Screen is using an I2C communication interface. The I2C is a type of serial bus developed by Philips, which uses two bidirectional lines, called SDA (Serial Data Line) and SCL (Serial Clock Line). Both must be connected via pulled-up resistors. The usage voltages are standard as 5V and 3.3V. Usually, Arduino LCD display projects will run out of pin resources easily, especially with Arduino Uno.
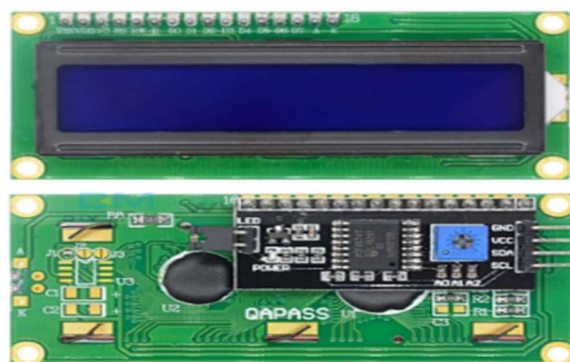

Fig 3.4 LCD Display I2C Module

3. Fingerprint sensor

It is a fingerprint sensor module with TTL UART interface. The user can store the fingerprint data 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 3v3 or 5v Microcontroller. A level converter (like MAX232) is required for interfacing with PC. Fingerprint Scanning technology is one of the most popular biometric modalities to verify the identity of individuals. The fingerprint matching compares the unique features such as the characteristics of ridges or minutia patterns that are found within the print pattern. This is an optical biometric fingerprint reader/sensor with an R305 module and TTL UART interface for direct connections to a UART microcontroller. The user can store the fingerprint data in the module and can configure it in 1:1 or 1: N mode for identifying the person. This module can directly interface with any 3.3V or 5V microcontrollers, but a suitable level converter/serial adapter is required for interfacing with the serial port of a PC.

Fig 3.5 Fingerprint sensor

Chapter 4

TROUBLESHOOTING

4.1 Problems/test cases run on to validate the project:

Case 1: <u>Enrolment</u> In this, the voters initially insert their finger impression using fingerprint module if it matches with database of module the further process starts and enrollment process ends. If the voter's details is not stored in module's database the voter cannot cast their vote.

Fig 4.1.1 Case 1

Case 2: <u>Authorization</u>: In this, the voters finger impression we place on fingerprint module and matches with the enrolled fingerprint database it displays the "Authorized Voter", if the Fingerprint not found in the database it displays the "Finger Not Found" . If the voted Finger try to vote again it displays the "Already Voted".

Fig 4.1.2 Case 2

4.2 Steps to solve problems/faults in project: As such no faults in project. Working Properly.

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Chapter 5

Results

To verify the Result, we enroll the three fingerprints in the system. Then we one by one we have verified the finger According to the above test cases we have mention 4.1. We got the same result.

Enrollment:

Fig 5.1 Enrolment

Verification:

Fig 5.2 Verification

Advantages

• Cost effective

 • This system allows only authenticated voting than the existing equipment as the person isidentified based on his Fingerprint which is unique to everyone.

• Low power consumption

• It is economical

• Less manpower required

 • Time conscious, less time required for voting & counting

• Avoids invalid voting as it prevents unregistered voters from voting.

• Ease of transportation due to its compact size. • Convenient on the part of voter.

Disadvantages

• Before voting the user has to enroll first.

• Sensitivity of fingerprint module causes sometimes Combine character error

Chapter 6

CONCLUSION

The project "Fingerprint Based Voting Machine" was mainly intended to develop a fingerprint based advanced Electronic Voting Machine (EVM) which helps in free and fair way of conducting elections which are basis fordemocratic country like India. For this a prototype device was made namely Arduino Uno based fingerprint voting system using R307 fingerprint module and LCD (16×2) The final system is the result of various successful hardware and software integration. The process includes review and analysis, designing the system and algorithm, hardwiring, hardware, and software integration, test and troubleshooting and result analysis. To summarize, the prototype device was successfully able to enrol the fingerprint of the voters in R307 fingerprint module, verify the status of voters (registration and multiple voting), matching the new fingerprint input with saved fingerprint template, authorize the voter to cast the vote and was able to generate result. To conclude, the device is great alternative to other lengthy election processes especially ballot paper voting system. Further improvement of the prototype device could be done at the later development stage. For instance, an addition of WIFI module could help send result wirelessly to host computer and adding external memory space could help store any amount of fingerprint data.

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[2] Karim, Md Mahboob, et al. "A proposed framework for biometric electronic voting system." *2017 IEEE International Conference on Telecommunications and Photonics (ICTP)*. IEEE, 2017.

[3] Priya, V. Kiruthika, et al. "Arduino based smart electronic voting machine." *2017 International Conference on Trends in Electronics and Informatics (ICEI)*. IEEE, 2017.

[4] **https://circuitdigest.com/microcontroller-projects/fingerprint-based-biometric-voting-machine-arduino**

APPENDIX

Cost analysis of the project:

ITEMS	QUANTITY	PRICE in Rs
Arduino uno	1	800
Fingerprint Sensor	1	1600
LCD Display	1	250
I2C Module	1	100
Push Buttons	9	100
TOTAL	-----------------	2850/-