

# BIOMETRIC VOTING MACHINE USING ZIGBEE

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**Abstract**— The aim of our project is to design a fingerprint based voting machine using ZIGBEE for eliminating the problems that is occurred from the previous electronic voting machine. We are using a ATMEGA 328p microcontroller, LCD (16\*2) to display the steps and instructions of voting system, a finger print scanner to scan the voter's finger print, a security alarm for the alarm of the false voting, ZIGBEE transmitter, ZIGBEE receiver, a RS 232 cable for the interfacing between ZIGBEE and ATMEGA 328p and a computer is used to display the results of the election conducted. Coding and .hex file is generated for ATMEGA 328p using arduino software. Where each voter is allowed to vote once and thus the election being a fair method. There are each fingerprint of voter stored in the database of the microcontroller for the verification during the election process. And thus we can save time and the manpower. Thus this system can be said as a reliable and fast.

**Index Terms**— Finger print scanner, voting, electronic voting machine, ZIGBEE, microcontroller

## 1 INTRODUCTION

In conventional voting system voter caste his vote to their representatives by showing voter id. Voter id card is checking during the polling to conform his authorization and thus it is a time consuming process. In order to overcome this problem a fingerprint based voting machine is introduced where the person no need to carry his id.

The system uses the finger print as the identification method during the election process. In this we are using and storing everyones finger print in the database of the microcontroller ATMEGA328p and the voter, while voting usually compares the voted finger print with the finger print content with the existing database. When the finger is placed on the finger print scanner, the image that is captured is sent and compared with the database stored. The microcontroller allows the voter to vote if the finger print matches with the database stored. If the fingerprint is not matched then the alarm is there to notify the false voting. polling is done with the help of the switches

Now in India we are using electronic voting machine and an voter id card is used for the identification purpose. The defect of this system is its security. Because during this system there is a chance of fake voting.

To overcome the disadvantage of the security in the present voting system this project gives a reliable and security based voting system.

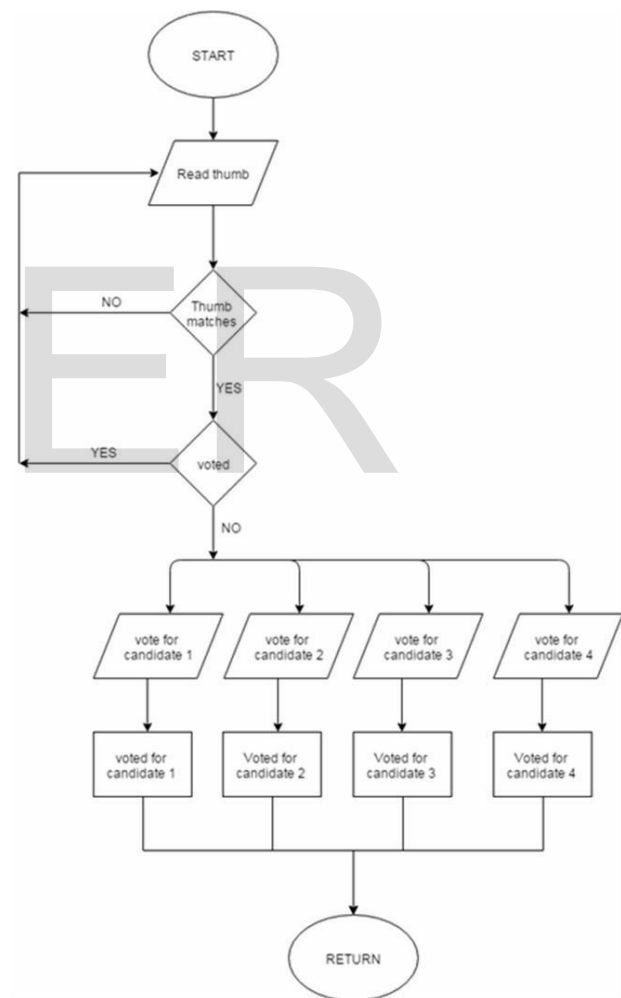


Fig 1. Flow chart

## 2 BLOCK DIAGRAM

### 2.1 Transmitter section

The block diagram of the transmitter section of the proposed system is given

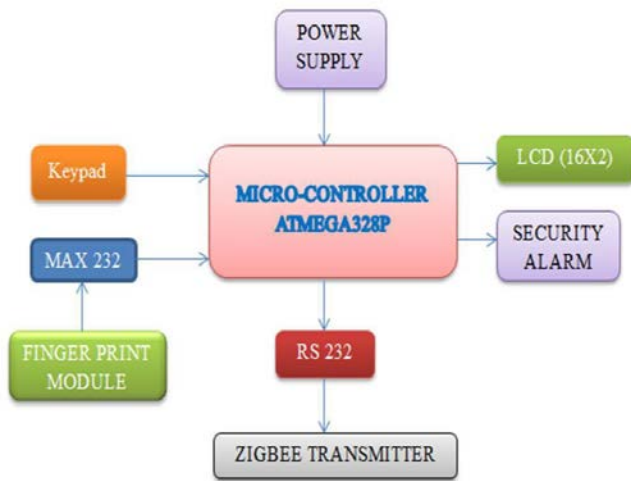


Fig 2. Transmitter section

## 2.2 Receiver section

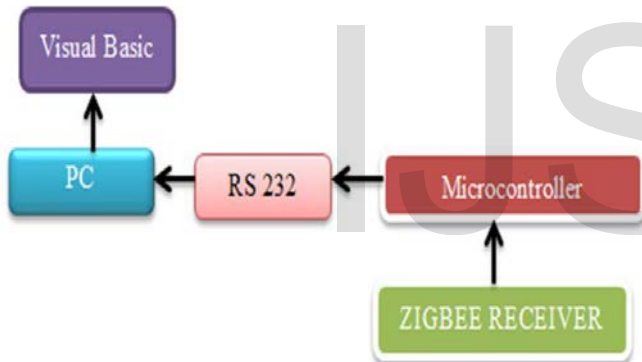


Fig 3. Receiver section

## 3 OVERVIEW OF THE PROJECT

In this proposed system we are having a microcontroller, fingerprint scanner, LCD, ZIGBEE module. The interfacing is done between microcontroller and other components. There are mainly two sections

1. Microcontroller section
2. Polling section

In microcontroller is programmed by using arduino software to interface with the fingerprint module, LCD, and switches.

The fingerprint scanner scans the finger and the finger print that is captured is compared with the database that is stored in the microcontroller and the steps are directed by the programming and displayed in the LCD

Polling section has the switches that is used to caste the vote with the help of the microcontroller. Alarm is used for the alarming purpose when the voting is not valid.

## 4 BLOCK DIAGRAM DESCRIPTIONS

### 4.1 Power supply

The power requirement for the system is in between 5V-12V DC. power supply circuit consist of a 230/12V step down transformer used to step down the supply voltage to 12V. It is followed by a capacitor filter for removing the ripples present in the rectifier output. A smoothing capacitor of 470 $\mu$ F is used in the circuit. The 7805 voltage regulator IC is used to get a constant 5V DC supply which is the required supply voltage for the microcontroller. The 7805 is a linear voltage regulator which requires input and output capacitors located close to the regulator to operate reliably. Here we used 0.1  $\mu$ F capacitors both in input and output side in order to get better results.

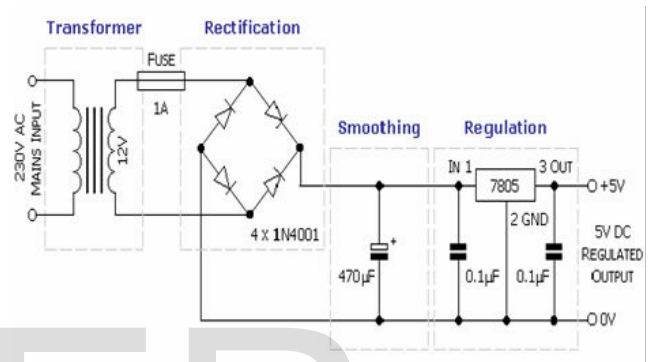


Fig 4 circuit diagram of the power supply

### 4.2 ATMEGA328p

Microcontroller is mainly used for the controlling purpose Special microcontroller features

Special Microcontroller Features:

- Power-on Reset and Programmable Brown-out Detection
- Internal Calibrated Oscillator
- External and Internal Interrupt Sources
- Six Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, Standby, and Extended Standby
- I/O and Packages
- 23 Programmable I/O Lines
- 28-pin PDIP, 32-lead TQFP, 28-pad QFN/MLF and 32-pad QFN/MLF
- Operating Voltage:
- 1.8 - 5.5V for ATmega48PA/88PA/168PA/328



Fig 5 ATMEGA328p

### 4.3 LCD

A liquid-crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed. LCD screen functions as interface between the user and microcontroller. The main function of the LCD is to display by giving the instructions to the voter by each step. If the voter tries to vote twice or his fingerprint does not match with the already stored data then it will ring to inform the higher officers that voter is not valid for voting and for correct person it will show –CASTE YOUR VOTE ||. After completion of correct voting process by the voter it will display –VOTED SUCCESSFULLY ||.



Fig 6 LCD display

### 4.4 FINGER PRINT MODULE

Fingerprint module is used to scan and save the fingerprint in the database of the microcontroller. The features of the fingerprint module is given below

- Integrated image collecting and algorithm chip together, ALL-in-One
- Fingerprint reader can conduct secondary development, can be embedded
- into a variety of end products
- Low power consumption, low cost, small size, excellent performance
- Professional optical technology, precise module manufacturing techniques
- Good image processing capabilities, can successfully capture image up to
- resolution 500 dpi

Specifications

- RS232 communication baud rate:4800BPS~115200BPS changeable
- Dimension: 55\*32\*21.5mm
- Image Capture Surface 15 – 18(mm)
- Verification Speed: 0.3 sec
- Scanning Speed: 0.5 sec
- Character file size: 256 bytes
- Template size: 512 bytes
- Storage capacity: 250
- Resolution 500 DPI



Fig 7 fingerprint scanner module

### 4.5 ZIGBEE MODULE

Characteristics of ZIGBEE

- It is type of technology which requires ultralow power consumption with an excellent battery life. Long battery life of ZIGBEE standard can be achievable by two different methods:

Continuous network connection: these connections are slow but they drain the battery surely.

Intermittent connection: these are slower than the previous one but they can also drain the battery.

- Maximum data rates allowed for different frequency bands but in some cases these band are fixed.
- High throughput and low latency for duty cycle operations that are nearly to 0.1%.
- Uses carrier sense multiple for channel access and also avoids the collision during access.
- Addressing of number of networks with the help of addresses devices up to 64 bit.

## 5 HARDWARE

### 5.1 Transmitter section

Transmitter section consist of fingerprint scanner, LCD, microcontroller,ZIGBEE transmitter and switches. The fingerprint scanner scans and compares the fingerprint that is saved in the database. And when the comparison is matched then only the voter is allowed to caste the vote for the desired candidate

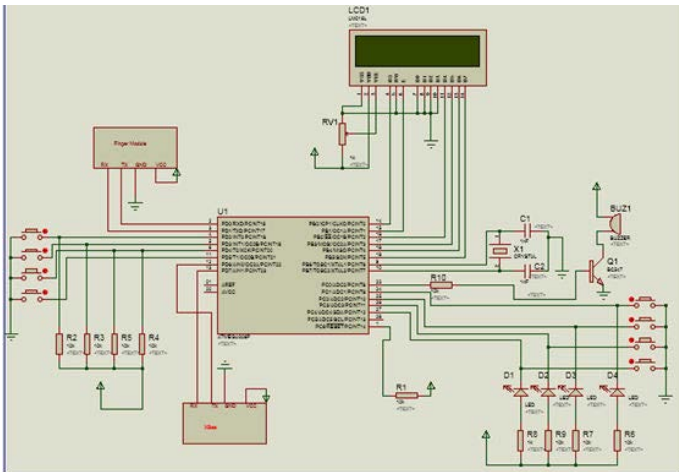


Fig 8 circuit diagram of transmitter section

5.2 Receiver section

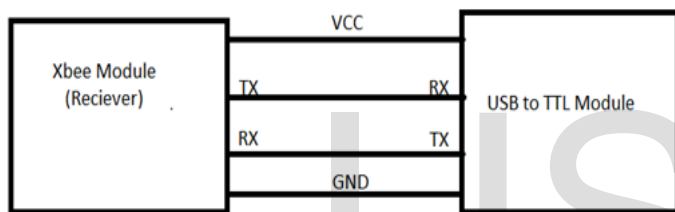


Fig 9 receiver section

6 SOFTWARE USED

6.1 Arduino

The coding of microcontroller is done using this software it automatically generates .hex file in the temporary file location of the c drive

6.2 Proteus

It is an software for microprocessor simulation schematic capture and printed circuit board (PCB) design. When we connect all the devices and giving the correct path .hex file in microcontroller, the desired output can be obtained

7 CONCLUSION

The biometric voting machine using the fingerprint and the ZIGBEE module has been designed successfully. We are saving the fingerprint of each voter in the database of the microcontroller and name corresponding to each fingerprint is also saved. The fingerprint of the voters in the voter list should be collected and updated before the election. This system put forward a security system in the voting. And we can also interlink all the polling booth within a large area to consume the time and the man power. This system is more reliable, flexible and the data transmission is done using low power consumption. this

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