Finger Vein Based Electronic Voting Machine

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Abstract- Voting is one of the fundamental rights of every citizens of a country. In Democratic countries like India, the voting system plays a major role during elections. Electronic voting machine is simply called as "EVM".This idea was mooted by the chief election commissioner in 1977.The EVMs were devised and 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 now manufactured by the above two undertakings. The current EVM machines used in India are time consuming; require more man power and they are less trustworthy. We proposed a system based on the biometric authentication which is very much secure for casting of votes.

Keywords- Finger vein, authentication,EVM, Election.

I. INTRODUCTION

In the past we had ballot paper method for voting. It is a time consuming process and more storage place is required.In this method counting of votes is very big challenge. As the technology development bought Electronic voting machine in use. It is used to take care of chores of casting and counting votes.Initially voting machine is designed with two units,one is control unit and another one is ballot unit. In the existing machine, it fails to deliver up the voters trusts. Even though this method is more reliable than the traditional voting method .it fails to satisfy few security aspects which is very essential during the process of voting. Considering these problems, a new method of voting is proposed in this paper that is finger vein based voting system .This comes under biometric identification based voting system. The major technology used here is finger vein.

1.1EXISTING SYSTEM:

Existing system consist of methods like paper based voting, lever voting machine, punch card and optical voting machine. The main problem with existing system was time consuming process for voting and it requires lot of human resources, the storage place requirements is higher and the paper works will be increased .

1.2 PROPOSED SYSTEM:

We proposed a system based on electronic voting machine using finger vein.

1. Identification: The system is able to identify the voters by getting their finger vein as an authentication.
2. Authentication: Whenever the system receives a finger vein as input then it will match it with the database.
3. Verification: If voter shows the wrong finger in the scanner then it shows a warning message and alerts them. If second vote is casted by the same personthen the camera will capture the image of the person and send the picture to higher authority and buzzer will alert the security officers so that they can catch the person.

II. BLOCK DIAGRAM

We have designed two different blocks for the security purpose.

2.1 Machine Security Block
2.2 Room security Block

These blocks are mainly used to secure the votes and the voting machine.

2.1 MACHINE SECURITY BLOCK:

In figure 2.1 shows the block diagram of machine security. At first vein is taken as the input for casting votes. If the voter is placing their finger then it will scan the vein of the voter and if the vein is matched with the database then the vote can be casted for one time. If the voter is placing the wrong finger on the scanner then a warning message is thrown in the display for the first time. If a same person is casting his votes twice then the camera will capture the image of the person and send it to the higher officials and buzzer will alert the security guards and that vote will not be taken to consideration.
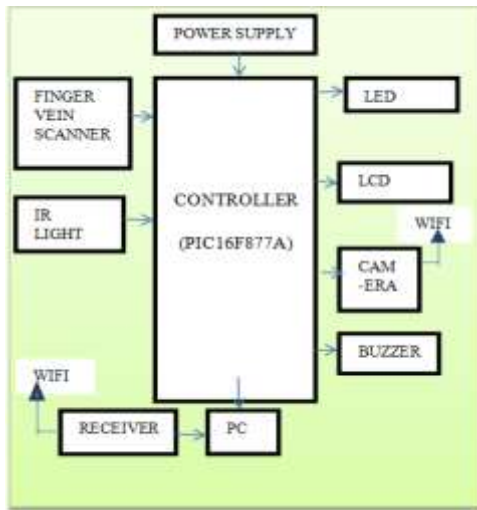
Figure 2.1.Machine security block.

i.   **PICController(PIC16F877A):**PICmicrocontroller is a family of specialized micro controller chip. The acronym PIC stands for "peripheral interface controller".PIC controller appeal to hobbyists and experimenters, especially in the field of electronic and robotics.key features includes wide availability, low cost ease of reprogramming with built in EEPROM. A typical microcontroller includes a processor,memory and peripherals.The PIC has 256 bites of EEPROM data memory, self-programming 2comparators and 8channels of 10bits ADC.

ii.   **Finger Vein Scanner:**Figure2.2.Shows the vein scanner.A finger vein scanner is a device that captures the pattern of the veins of a fingerand uses them to authenticate a person's identity.Images are taken and then verified through pattern-recognition techniques. It has recently gained attention and favor owing to its high authentication accuracy, so much so that it has received wide acceptance as a security measure in banks. Moreover, finger vein scanneris comparatively cheaper than other biometric authentication devices.

Figure 2.2.finger vein scanner

iii. **IR Light:**Infrared light is electromagnetic radiation with longer wavelength than those of visible light .the wavelength of IR is up to 1050nm.

iv.   *LCD:*LCDStands for "Liquid Crystal Display." LCD is a flat panel display technology commonly used in TVs and computer monitors. It is also used in screens for mobile devices, such as laptops, tablets, and smartphones.LCD screens use liquid crystals to switch pixels on and off to reveal a specific color. Liquid crystals are like a mixture between a solid and a liquid, where an electric current can be applied to change their state in order for a specific reaction to occur.

v.   **LED:**LEDis a light emitting diode. It is a semiconductor device that emits light when an electric current is passed through it. It is mainly used for indication .it work in the voltage range between 1.8 V to 3.3V.

vi.   **Buzzer:**a buzzer is an audio signaling device, which may be mechanical, electromechanical or piezoelectric. Operating voltage for a magnetic buzzer is 1.5V to 24V and piezo buzzer is from 3V to 220V.

2.2. ROOM SECURITY BLOCK:

The figure 2.3 shows the block diagram of room security. In this the PIR sensor will monitor the particular area. The predefined time will be set in the controller, which has a real time RTC build inside it. If the set time matches to the RTC then only the door can be open and we can count the votes. Even though some person are trying to steal the vote then the camera will capture the image of the person and send to higher authority and the alarm will alert the security
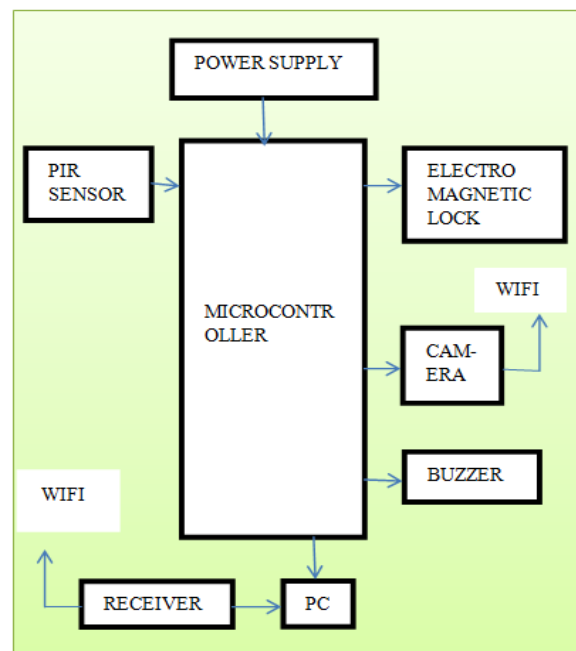
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Figure 2.3.Room security block.

i. **Electromagnetic Lock:**Figure 2.4.Shows the EM lock. It consists of an electromagnet and an armature plate. Locking device can be either "fail safe or fail secure". A secure locking device remains locked when power is lost.

Figure2.4. Electromagnetic lock

PIR Sensor: Abbreviation of PIR is passive infrared sensor. It measure IR light radiating from object in its field of view.It is mainly used for motion detectors. Figure 2.5 shows the pir sensor.

Figure 2.5.PIR sensor

III. WORKING

The main theme of this paper is to eradicate the fake votes and the election should be conducted in a good manner. Hence we designed a model of voting machine that can reduce the tampering and rigging of votes. The working of different hardware blocks are explained below:

a. **Finger Vein Scanner:**It is a method of biometric authentication that uses pattern recognition techniques. The hemoglobin in the blood absorbs near infrared LED light, which makes the vein system appear as a dark pattern of lines that is shown in Figure3.1. The vein can be scanned by two ways. They are by passing the IR light above the finger, which is called light transmission method and passing IR below the finger, which is called light reflection method these are shown in figure 3.2**.**
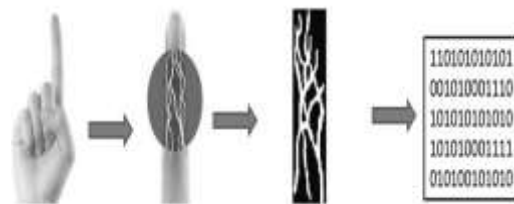

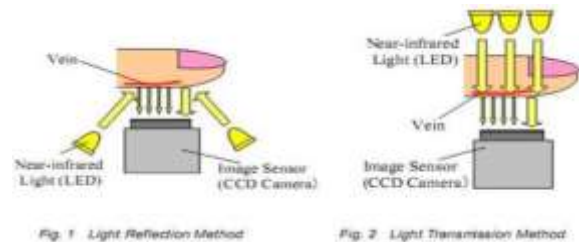**Figure3.1. Pattern recognition technique**

Figure3.2.Types of passing IR light

b. **Camera:**The main role of the camera is to capture the image of the person those who are voting illegally and those who are trying tosteal the machine. The taken image will be sent to higher officials through the email.

c. **Electro Magnetic Lock:**Magneticlocks use electromagnetism to control the entire locking mechanism. When the magnet is energized, it bonds to the armature and locks the door. To allow access or egress, a switch must be provided to de-energize the magnet. As the electric power activates the magnet, the bolt locks the door.

3.1Advantages:

* Rigging will be eliminated completely
* Highly tamper – proof.
* Finger vein based authentication is more accurate.
* Preserves voting secrecy, No scope for invalid votes.
* Facilitates quick and accurate counting – possible to declare results instantaneously.
* Re-usable by simply erasing votes recorded in earlier poll.
* Easier to manage with less demand on man-power.

3.2 Applications:

* Fast track voting which could be used in small scale elections, like resident welfare association, "panchayat" level elections and other society level elections.
* It could also be used to conduct 'opinion polls' during annual share holders meeting.

- It could also be used to conduct 'general assembly elections' where number of candidates are less than or equal to eight in current situation.

IV.DESIGN PROCEDURES

- **Steps1: For.**

Figure4.1.Storing finger vein

At first the finger vein of the voters should be stored in the database for the voting process. That will be displayed on the display.It is shown in Figure4.1.

- **Step2:For scanning finger vein.**

Figure4.2.scanning finger vein

Figure 4.2 shows the before casting votes, the voters need to scan the finger vein that will be verified and considered as an authentication.

- **Step3:For casting vote.**

Figure 4.3.casting vote

Figure4.3shows the next step, if the scanning is completed and the authentication step was over then the voting machine allows us to cast the voter for needed parties.

- **Step4:For total vote counting.**

Figure4.4Total vote counting

Figure4.4 shows the final result of the votes that has been taken by each party during the period of election.

V. HARDWARE SETUP

Figure 5.1 and Figure 5.2 shows the system security and room security design. The system security is mainly used to protect the voting machine from the attackers and those who are trying to cast their votes illegally. To avoid the illegal voting, complete security with authentication is done. If any person is trying to put his vote illegally then their image will be captured in the camera and the buzzer will alert the security.The room security block is used to protect the voting machine which is stored. If any illegal person is trying to enter the room then the pir sensor will detect it and capture the image of the person and buzzer will alert the security officers.

Figure 5.1.System security design.

Figure5.2. Room security design

VI. CONCLUSION

It is more advantage than the traditional way of voting because it has lower risk of human and mechanical error. It provides security and privacy on high level with no compromise. This e-voting provides some authentication parameters like finger vein.

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