HIGHLY SECURED ELECTRONIC VOTING MACHINE USING AADHAAR IN IOT PLATFORM

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Abstract: **This plan proposes to develop an Electronic voting machine using Aadhaar database, which is a safe and secure system to avoid the misconception and false voting takes place in the elections. Now the Government has recently linking various details such as smart card, bank accounts and now its linking even mobile number of each person to their Aadhaar database. At the time of aadhaar database enrolment process, our Government enrolled fingerprint, iris and various other information of the resident of India. So when Government attaches the voter identity to the aadhaar database, everyone can easily cast their votes easily using fingerprint authentication. So in this paper, voting process is done by providing aadhaar and fingerprint authentication with the control of low cost host PIC Microcontroller. When the individual cast their vote, the count of the vote will be updated directly to PC using the Internet of Things.**

Keywords: **PIC Microcontroller, MAX232, Fingerprint Sensor, Aadhaar, IOT, PC.**

I.   INTRODUCTION

In a democratic country like India, vote of every person matters and people are given right to vote by their own choice. The Election Commission of India was established in India for carrying out the election processes in the year of 1950 whose functions are performed by following the set of guidelines made by the committee. As per the guideline, the Citizens of India, who are aged above 18, are considered to be eligible voters and they are given full rights to choose their own representative under the basic principle of right to vote. The Voters make their choice by polling process and the candidate opted for the election who secures the highest number of votes is declared as leader. Since large scale election frauds are taking place in the current scenario, this paper explains the advantage of using aadhaar and biometric authentication to make voting process reliable and secure.

II.   EXISTING SYSTEM

Electronic Voting Machines are mostly used by the developed countries to count the votes during the election process. Earlier, vote process was done by paper ballot. With the advancement in the Voting Machine came into reality which has been manufactured by the Government undertaken companies, Electronic Corporation of India Limited (ECIL) at Hyderabad and Bharat Electronics Limited (BEL) at Bangalore. These EVM consists of two main units, namely Control unit and Ballot Unit. Both are interconnected by means of few meters cable. The polling workers in the booth uses a control unit and whereas the ballot unit is used by individual voters to cast their vote. The voter need to show their voter ID to the polling officer before entering into the polling booth and after verifying his identity, the signature is obtained on the register kept for records of the voters and his left hand forefinger will be marked with indelible ink. Thereafter the voters can be able vote in ballot unit after ballot key is pressed in control unit by polling officer.

There are many disadvantages present in the existing system which is given below.

- Even the person without voter

ID can be able to vote when the dishonest insiders present in the polling booth and even the individual can cast multiple votes.

- Since the result in the current machine is stored inside the memory, lot of security with police force is needed till the result announcement and also transportation of EVM to consolidate the results countrywide takes time. In between the result announcement times, voting can be modified.

- Many manual works in the existing system are preparation of paper work for all the polling booth, checking voter ID in the verification form and getting signature or fingerprint on the register of voters.

- To avoid double voting, the ink is marked on the right index finger, but it is removed for casting illegal voting.

III. PROPOSED SYSTEM

The proposed system shows the design of Electronic Voting Machine using Aadhaar and fingerprint authentication. The entire Indian citizen has been issued a 12-digit unique identity number which was collected by the Unique Identification Authority of India (UIDAI) as a database. The essential services such as bank accounts, PAN card, mobile services, driving license and various other entities has been made a collaboration with aadhaar for verification. With 120 crores of aadhaar enrolments, India remains the world largest

Unique Identity provided country, made secure way for digital India. In this system, biometric being the main authentication has been collected face recognition alongside Iris or Fingerprint scan and database in stored in the Central Identities Data Repository (CIDR). The aadhaar card helps every resident of India to authenticate anytime anywhere in time efficient manner as per the Aadhaar act of 2016. After the authentication, voters are allowed to vote in the ballot unit and the result is instantly updated to PC and to the global server using IOT.

IV. BLOCK DIAGRAM OF PROPOSED SYSTEM

The architecture of Electronic Voting Machine uses its main component as PIC microcontroller which interfaces all other components.

The two main units of the proposed system are,

- Voting Unit
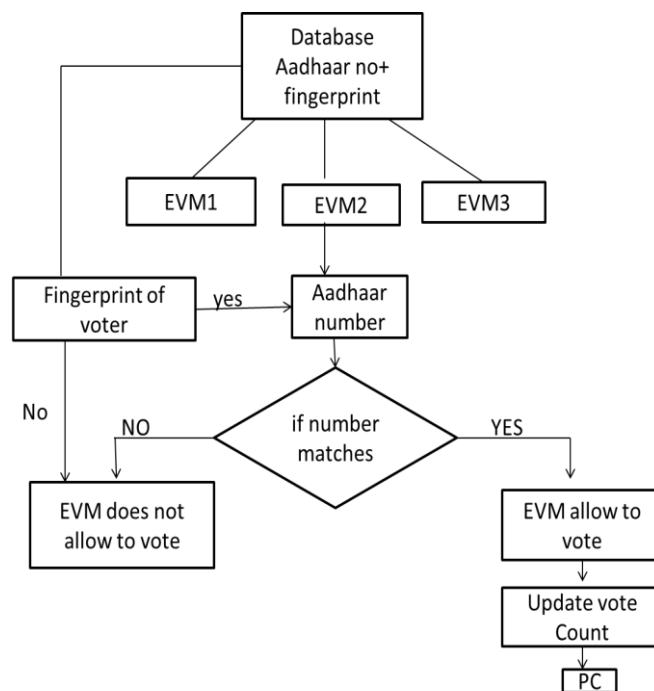
- Database unit

1. VOTING UNIT:

The Voting Unit has fingerprint sensor which is used to scan the fingerprint of the individual and keypad to enter aadhaar number, then compared with the fingerprint already stored in the Aadhaar database using PIC microcontroller from the stored database.

Then the unit consists of ballot keys, LCD for displaying purpose and buzzer. The individual voters use to cast the vote. After casting the vote, it is updated to the computer using IOT module.

When the given fingerprint does not match with the stored details, the host device will not allow the voter to cast their vote.
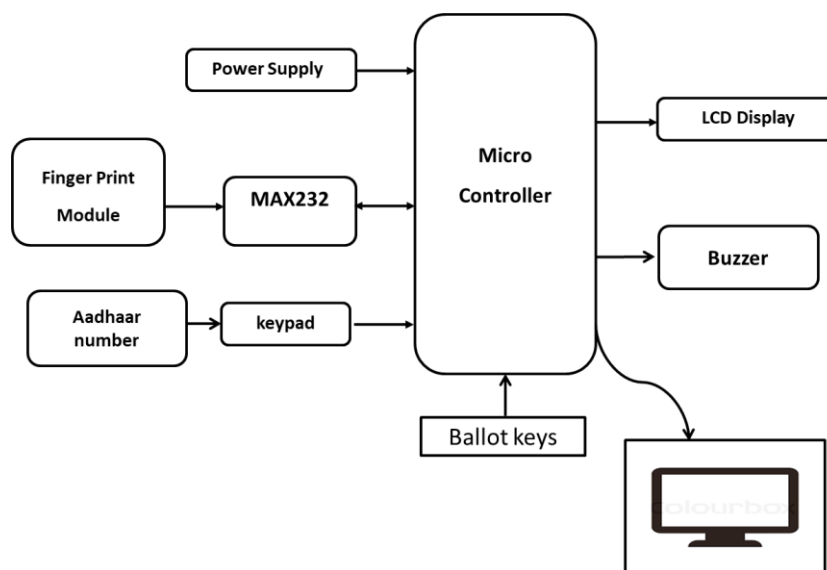
BLOCK DIAGRAM OF PROPOSED EVM SYSTEM

FLOW DIAGRAM OF THE PROPOSED EVM

2. DATABASE ENROLLMENT UNIT:

The voter enrollment process is carried out in this unit. The aadhaar database along with the National voter ID database is linked and updated as a database which is used for verifying each voter with their aadhaar number and fingerprint.

V. COMPONENTS DESCRIPTION

1. PIC MICROCONTROLLER:

This micro-controller by Microchip is a 40 pin high performance RISC with only 35 single word instructions. It also has 8Kb of flash memory program, 368 bytes of data memory, five I/O ports, 3 internal hardware timers. It has built in USART for serial communication. It has 15 interrupts.

The main advantages of using this 8 bit architecture is – 1) Small ISA to learn 2) Built in oscillator with selectable speeds 3) Development is easy 4) Inexpensive
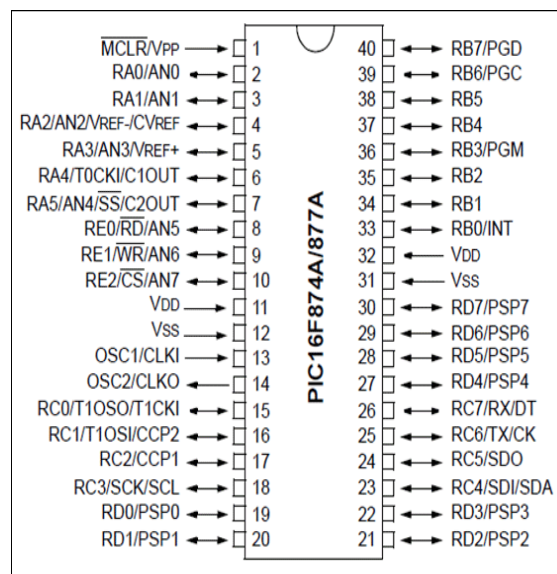
2. FINGERPRINT SENSOR:

Biometrics is the term given to the analysis of biological traits or behavioral characteristics of a person. To identify a person, the traits may be fingerprints, hand gestures, retina patterns, facial characteristics, speech recognition and handwriting recognition. It is a technology of collecting and processing of biological data of human being which can be used for authentication process with the use of human body characteristics like DNA molecules, fingerprint, voice patterns and hand measurements in region like airport, office and many other important places.

SM630 integrated fingerprint verification module is a low cost, easy to use optical technology released by Maxis Biometrics Co., Ltd. It consists of optical fingerprint sensor, high performance DSP processor and flash. It can perform various functions like updating fingerprint, inserting, deleting as well as downloading.

Fingerprint enrollment time	<250ms
Fingerprint search time	<1s（100 fingerprint, average value in test）
Resolutions	500DPI
Capacity	768 templates
FAR	<0.0001%
FRR	<0.01%
Supply power	4.3V~6V
Working current	<80mA
Peak current	<90mA
Communication interface	TTL
Communication Baud rate	57600bps
Working temperature	-10℃~+40℃
Working humidity	40%RH~85%RH（no dew）
Module dimension	60.0×21×25mm （L*W*H）

By using fingerprint authentication in the voting machine, the illegal vote casting can be eliminated.

3. ZIGBEE MODULE:

ZigBee is an IEEE 802.15.4based specification for a suite of high-level communication protocols used for wireless networking. It is a wireless technology developed as an open global standard to address the unique needs of low-cost, low-power wireless M2M networks. ZigBee (CC2500) is a low cost true single chip 2.4 GHz transceiver designed for very low power wireless applications. The RF transceiver is integrated with a highly configurable baseband modem.

FEATURES:

- Supply voltage: 5v DC

- Detection range: (10-300) m

- RS232 Output

- TTL UART also provided

- Frequency: 2.4GHz

- Tx and Rx Status LEDs

4. UART:

A UART (Universal Asynchronous Receiver Transmitter) is an integrated Circuit used for serial communication over a computer or other peripheral devices.

The transmitting UART receives data parallel from the controller and converts it into serial data, then transmits to receiving UART in serial form by including start bit, Stop bit and parity bit. After received by the receiving part serially, it removes all the added bits and gives the parallel to the data bus. A UART uses only two wires to transmit and receive the signal and its does not use any clock signal separately.

The two generally used UART are

- RS232

- MAX232

MAX232:

Max232 is designed by Maxim Integrated Products. This IC is widely used in RS232 Communication systems in which the conversion of voltage level is required to make TTL devices to be compatible with PC serial port and vice versa. This chip contains charge pumps which pumps the voltage to the Desired Level. It can be powered by a single +5 volt power supply and its output can reach +_7.5 volts. MAX232 comes in 16 Pin Dip and many other packages and it contains Dual Drivers. It can be used as a hardware layer convertor for 2 systems to communicate simultaneously. Max232 is one of the versatile IC to use in most of the signal voltage level conversion problems.

5. LCD:

A 16 X2 Liquid Crystal display is used to display the commands given to the user by programming it, which has interface microchip and its associated components to use LCD with other controller devices. It is programmed in python language to send appropriate commands to the LCD through GPIO and displays the needed commands on its screen.

6. BUZZER:

A buzzer is an electronic device which is used to generate audio signal by using mechanical, electromagnetic and piezoelectric. The buzzer in the EVM used to indicate the person that the vote has been casted.
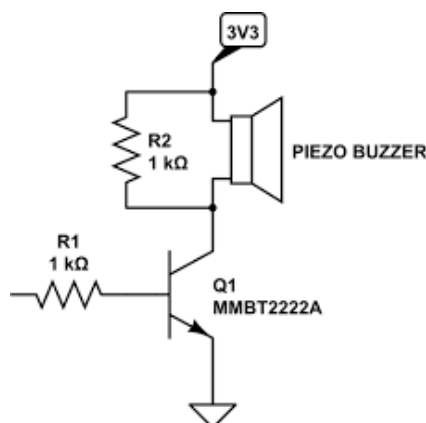
When the supply voltage is given, the circuit gets short circuited which makes the buzzer works and produces a beep sound.

7. POWER SUPPLY UNIT:

The major blocks of power supply are given below Transformer, Rectifier, Filter, 7805 voltage regulator .These will provide the regulated power supply to the unit which is first converted into 12V AC. 12V AC is converted into DC using rectifier circuit .Finally the 7805 voltage regulator provides constant 5V DC supply which will be given to circuit
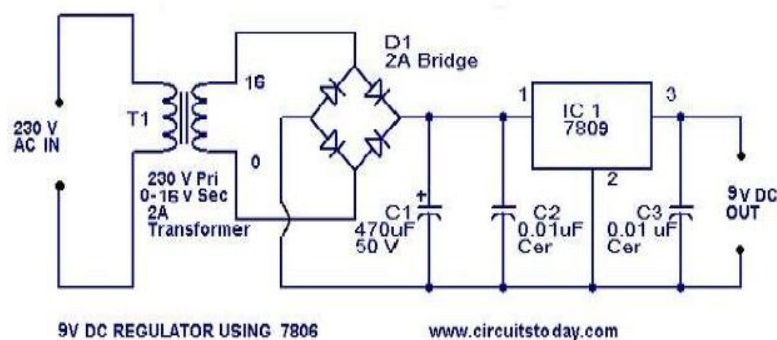
VI.   RESULT ANALYSIS

The design of Electronic Voting Machine with Aadhaar and fingerprint authentication is done successfully and result can be updated instantly to the computer of the Election Commission Office with IOT technology. Thus it has been proved that it satisfies the various objectives of providing verifiability, privacy and accuracy by maintaining the transparency of the system. The disadvantages in the existing system have been overcome by eliminating the rigging takes by illegal voting with double authentication and updating the result fast directly to the server. The voting machine is user friendly and ecofriendly as it reduces the paper work of the election process.
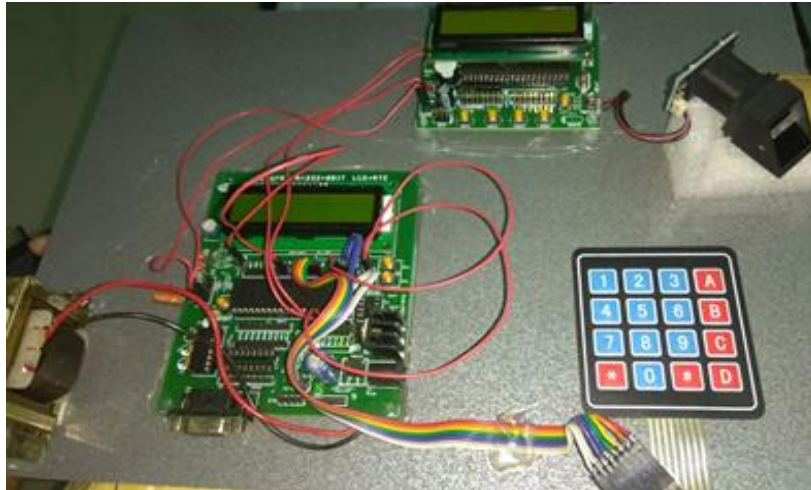
VII.   CONCLUSION & FUTURE SCOPE

It has been concluded that the Electronic Voting Machine works in a efficient manner and updates the result instantly to the computer. The future scope of this system is that it can linked with mobile application for the convenience of voters in abroad by providing high security and the confirmation message can be send to the individual mobile number given in the aadhaar database with the help of GSM technology.

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