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Biometric Voter Registration and Polling

S.Prasanthasurya¹, M.Sri Moulika², V.Suganya³, P.Thilagavathi⁴, Prof. G.Kanagaraj⁵

U.G. Student, Department of Electronics and Communication Engineering, AVS Engineering College, Salem,
Tamilnadu, India^{1, 2, 3, 4}

Assistant Professor, Department of Electronics and Communication Engineering, AVS Engineering College, Salem,
Tamilnadu, India⁵

ABSTRACT In this digitized decade, most of the countries are conducting their elections using Electronic Voting Machine (EVM). India, being a high populous country is using Electronic Voting Machine as the replacement for balloting system. The problem in the existing system is, the voter cannot verify their identity and whether their vote is casted or not. It increases the vote casting efficiency, but there may be a chance of fraudulent activities. To eliminate multiple and illegal voting, we have designed an advanced system using Arduino. This paper proposes the design of a Biometric voting machine using a Fingerprint module along with Radio Frequency Identification tags. The RFID tag acts as a voter's identity card, which will be read first and the candidate's information is obtained. The voter is allowed to vote using their fingerprint. The fingerprint is then matched with the stored database. If the fingerprint is matched with the database, the verified voter is eligible to cast their vote. If the fingerprint of the voter is not matched with the database, an alert will be sent to the polling officer. An LCD is available to display the respective information of the voters. Also, a confirmation message will be sent to the voter's mobile number after casting their vote using GSM module. After the polling, the result will be shown as per the number of votes received by respective candidates.

KEYWORDS: Fingerprint, RFID tag, Electronic Voting, Arduino, Biometrics, LCD, GSM Module.

I. INTRODUCTION

Our Indian Constitution gives every citizen 'the right to vote'. Every citizen must cast their vote. Their precious vote will be given to the right candidates. The establishment of a fair government can be done through fair elections. During Elections, the voter will be verified with their details in the voter ID card manually. This manual process will reduce the accuracy and leads to impersonating and multiple voting. The main objective of "Biometric Voter Registration and Polling" is replacing the manual verification method of the voters with biometric verification. The voting efficacy and reliability can be increased. This system comprises of fingerprint module to receive biometric information from the voter, tagging the identity cards with RFID to transfer data and an LCD to display the result.

This Paper is organized as follows: Section II represents the existing voting system, Section III represents the proposed method of the voting system using biometrics, Section IV explains the description of hardware and components used in this system, Section V describes software requirement and Section VI gives the conclusion of the paper.

II. ELECTRONIC VOTING SYSTEM

The electronic voting machine is an integrated set of computers, controller interface and voting tools are introduced, in order to improvise the conventional balloting system. Upon the different types of voting systems, any of the frameworks can be utilized to conduct the election. The EVM machine is integrated with a microcontroller which is aided to cast and count the votes during the election.

An EVM machine comprises of:

- Control Unit
- Balloting Unit

The control unit is supervised by the polling or the booth officer. The balloting unit is available in the voting booth where the voters can cast their vote. The voter can press the button against the participant's name. The program coded during the manufacturing of EVM machines is not supposed to change at any cost. The main issue with the existing



system is the exact identification and verification of the voters. The manual verification process leads to impersonation, illegal and multiple voting. These fraudulent activities may substantially reduce the accuracy and reliability of the elections.

III. METHODOLOGY

A biometric system allows recognition of an individual using biometric data. There is a wide scope of uses of biometric frameworks. The physiological biometric traits of an individual include face recognition, fingerprint pattern, iris scanning, hand geometry, voice recognition etc. Among these, fingerprint pattern is unique to every person and never change during lifetime. The reliability of polling can be improved using biometric voting system. The eligible voter can be verified accurately using their finger imprints. It eliminates impersonating and multiple voting during elections.

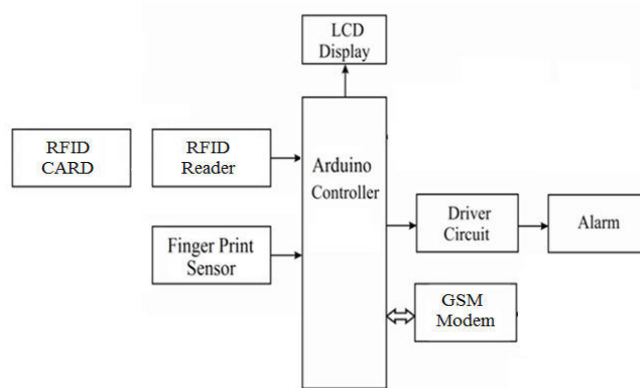


Fig: System Block Diagram

IV. HARDWARE REQUIREMENTS

a) Arduino Uno

Based on ATmega328P, Arduino Uno microcontroller board is used in this system. There are 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 pins of analog inputs. It is connected to the computer through an USB cable. This includes all components needed to support the microcontroller; can be connected using a USB cable to the computer or can be powered it with an AC-to-DC adapter or battery to get started.



Fig: Arduino Uno

b) Fingerprint Sensor

The fingerprint of a person is the input given to the sensor. Every minutiae, ridges and finer lines are captured and converted into a pattern. The pattern is then compared with the library templates of fingerprint patterns. The possible match will be the output. A piezoelectric material is used in this sensor. The finger is placed on the contact surface, exercises a contact pressure. A new charge distribution is produced.



Fig: Fingerprint Sensor

c) GSM Module

Applications such as NowSMS are interfaced with the GSM module to send and receive messages quickly. If it was performed directly on a mobile phone, the mobile operator must charge for this messaging service. To play out these undertakings, a GSM modem must support an “extended AT command set” for sending/accepting SMS. GSM modems are the fast and efficient way to communicate through SMS, there is no subscription required to the service provider. Across worldwide, GSM modems are the cost effective solution for receiving SMS, because the sender is paying for the messaging services.



Fig: GSM Module

d) LCD Display

A **liquid crystal display (LCD)** is a modern optical device having electronic visual display. It utilizes the light modulating properties of liquid crystals and emits the light signals. In most of the applications, the LCD's became the replacement of the Cathode Ray tube (CRT) displays nowadays. They are typically more conservative, lightweight, versatile, more affordable, solid, and simpler to the vision. As it consumes less power, the device is moderated as a battery-powered equipment.

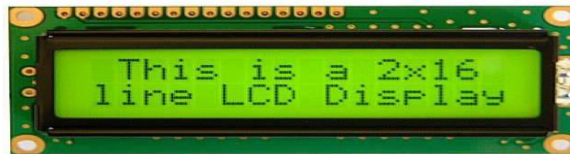


Fig: LCD Display

e) Alarm

An alarm provides an audible or visual indication about a problem or condition. A buzzer, which is a signaling device used in this system, usually an electronic equipment, typically used in wide range of appliances. When the button was pushed or the preset time has been elapsed, it usually illuminates a light on the appropriate button or control panel, and provides a warning in the form of a continuous or intermittent buzzing.

V. SOFTWARE REQUIREMENT

Arduino IDE

The Arduino Integrated Development Environment Software (IDE) is used in this system for writing code. It makes the device easy to use, cost effective and no external programmer is needed. This software allows the Arduino hardware to upload programs and perform the tasks.

VI. CONCLUSION

This proposed system gives the best solution related to the problems faced by our voting system. As they are vulnerable to security attacks, confidential biometric information could also be revealed due to insecure network connectivity, system or machine hacking. Complete implementation isn't a smooth venture; it involves political, financial and regional issues. Illiteracy is the main hurdle in this project to come true because this is difficult for them to work with the proposed machine interface.

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