Smart Voting Machine using Fingerprint Recognition

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Abstract: *In Democratic countries like India, the voting system plays a major role during elections. The conventional voting method both in state and general elections is done by basic electronic machine. There may be possibility that instead of one eligible person, someone can vote for the person who is eligible to vote. For avoiding misconceptions during elections, we propose the concept of getting the fingerprint impression of a voter which is entered as input to the system. Raspberry pi was used as microcontroller to detect the valid voter which has been entered into the system. The result will be declared instantaneously and counting will via IOT.*

Keywords: **Raspberry Pi, FTDI Module, Fingerprint Sensor, LCD Display.**

1. Introduction

The fundamental right of the citizen is to vote in the election for selecting their representative from the basis for the democracy. The intention of the election process is to allow voters used to their rights to show their choices regarding specific issues, pieces of legislation, citizen initiatives, constitutional amendments, recalls and to choose their government and political representatives. Even though Electronic voting machine is fast and accurate, system needs more manpower and is also not much more reliable. To increase the credibility of the voting, many algorithms have been introduced. One of the major idea is to use the person's identity for developing the system. Each and every person has its unique identity and i.e. his fingerprint. Not only the developers use this biometric, the government also has taken necessary steps to collect the biometric data and stored into a database. The government also issued Aadhar card to identify the person's unique identity. Using the Aadhar card, we can easily make the voters to cast the vote without difficulty. Due to the advancements in upcoming technologies, we will also able to collect and count the votes during a faster manner and therefore the counting process starts simultaneously as soon as the voting process ends.

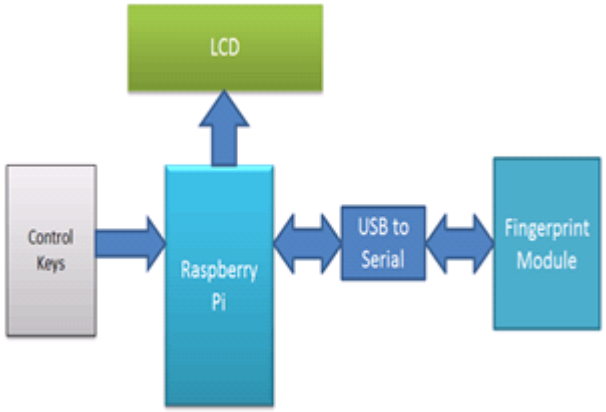
2. Literature Survey

[1] The paper "Fundamentals of Biometric authentication technologies", J. L. Wayman, was previously published in part in the IEEE Security Privacy Magazine and the Handbook of Fingerprint Recognition. A. K. Jain is with the Department of Computer Science and Engineering, Michigan State University, East Lansing, A. Ross is with the Lane Department of Computer Science and Electrical Engineering, their study started with Biometrics later on extended to fingerprint applications. Alphonse Bertillon developed the idea of using a number of body measurements to identify criminals in the mid-19th century. Although Biometrics emerged from its extensive use in law enforcement to identify criminals, but now it has applications in ID cards, bank cards etc. we extend the above idea of storing the data previously and comparing that with given data, and Aadhar card can be used as a smart card in the system.

[2] L. Alyea and Wayman studied the field of Biometrics-2000, and published a paper entitled "Advanced identity verification" springer-verlag, Accordingly Biometrics can be used to verify the identity of an individual, and include fingerprint verification and signature verification. Biometric authentication is considered the automatic identification of per person. It using either a biological feature they possess biological characteristic like a fingerprint or physiological characteristic like signature. Recognition techniques are accomplished by any one of three Something you possess: basic tokens are manual and automated. Example of manual tokens are paper ID documents and passports. On the other hand, automated tokens are memory cards, smart cards. Something you know: the knowledge shouldn't be commonly held, but secret. Ex: passwords, pin numbers. Something you are: recognizing an entity through what "they are" requires measuring Biological features like fingerprints Thus we use above theory and develop a system.

[3] A study of Biometric voting machine based on the project "Biometric voting machine" implemented by MSRIT students-Bangalore, May 2011 was a voting based project but it had a drawback of security and the display of count of votes to election commissioner was not present. In our paper, we make modifications to improve the security and make it more reliable. For security, we have used verification of one digit unique key. External memory is often provided for storing the finger print image, which may be later accessed for comparison. Also Smart Card (Aadhar card) can be introduced with the existing module so that 12 digit number can be used for further security.

3. Block Diagram



Block Diagram 3

In this project Raspberry pi model 3B is used as a controller, we have used a Push buttons for casting a vote to candidates. A LED is employed for indication that fingerprint sensor is prepared to require finger for matching. Here we've used a fingerprint module which works on UART. So here we have interfaced this fingerprint module with Raspberry Pi using a FTDI module i.e. USB to serial converter. Fingerprint module is connected to Raspberry Pi USB port by using USB to Serial converter. A 16x2 LCD is employed for displaying all messages. A 10k pot is additionally used with LCD for controlling the contrast of an equivalent. Fingerprint module detect the person fingerprint and send it to the controller. The controller then analyzes whether the given fingerprint matches in the databases and is eligible to vote or not.

4. Description

4.1 Raspberry Pi: The Raspberry Pi 3 Model B is the earliest model of the third-generation Raspberry Pi. We are used Raspberry Pi Board for making Smart Voting Machine. It has 4 quad processor with 1.2 GHz 64 bit. This model has standard form factor. It uses 26 pins GPIO. Raspberry Pi 3b model uses a Broadcom BCM3837 SoC.

Fig 4.1 Raspberry Pi

4.2 Fingerprint sensor: A fingerprint sensor is an electronic device will capture a digital image of the fingerprint pattern. The captured image is called a live scan. MAX232 / USB-Serial adapter. The user can store the fingerprint data in the module of Raspberry pi. The data can configure it in 1:1 or 1: N mode for identifying the person. It is an input device that consist of flash, fingerprint sensor and processor used for fingerprint processing which includes two parts fingerprint enrolment and fingerprint matching when enrolling, user needs to enter the finger two times.

Fig 4.2 Fingerprint Sensor

4.3 LCD Display: Display results whether the user is valid or not valid to vote. It also display the name of party to which user has voted.

Fig 4.3 LCD Display

4.4 FTDI Module: FTDI module is USB to TTL converter module. It develops, manufactures and support devices also their related software drivers for converting RS-232. FTDI provides application specific integrated circuit design services. Its high integration. It is built-in USB2.0 full-speed function controller.

Fig 4.4 FTDI Module

5. Conclusion

With a government elected by its citizens which effects every aspect of our lives from schools to health care to Homeland Security, voting may be a crucial right in our society. And this paper focuses on the voting technology that provides assurance to the people who really have right to vote in the constitution and ensures secured voting method of fingerprinting as it provides security (fingerprint authentication and verification), at the same time the Election Commissioner can get first-hand information about the voting status of all the voting booths for his perusal. We are sure that above system will create revolution among the people in electoral voting system.

6. References

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