GSM INTEGRATED BIOMETRIC RECOGNISATION BASED DIGITAL VOTING SYSTEM

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Abstract : *Biometric products such as fingerprint are designed as "access denial" secure storage for medications, jewelry, weapons, documents, and other valuable or potentially harmful items. These utilize fingerprint recognition technology to allow access to only those whose fingerprints you choose. It contains all the necessary electronics to allow you to store, delete, and verify fingerprints with just the touch of a button. Stored fingerprints are retained even in the event of complete power failure or battery drain. Biometric voting has made the voting procedure simpler. It is a revolutionary method preferred to traditional EVM voting, as it is risk defective. It is advantageous because it includes features such as avoidance of invalid votes (booth capturing), reduction of counting time and the expenditure incurred on manpower deployment and caring of photo ID cards for voters for recognition.*

Keywords: *Electronic voting machine(evm),Biometric fingerprint recognisation, Authentication center(AC),Verification Server (VS),Voting Device (Vd), collecting and Counting server (CS)*

I. Introduction

This project examines the policy regarding the electronic approaches and developments towards electronic data storage and transmission. Finger print devices for Voting machines and other existing identity documents are discussed and implemented in this project. The user has to show his voter ID card whenever he goes to the polling booth to poll his vote. This is a time consuming process as the person has to check the voter ID card with the list he has, confirm it as an authorized card and then allow the person to poll his vote. Thus, to avoid this kind of problems, we have designed a finger print based voting machine where the person no need to carry his ID which contains his entire details. The person at the polling booth has to show his Finger. This Finger print reader reads the details from the tag. This data is passed to the controlling unit for the verification. The controller reads the data from the reader and compares this data with the already existing data. If the data matches with the already stored information, the person is allowed to poll his vote. If not, a message is displayed on LCD and the person is not allowed to poll his vote. The polling mechanism carries out manually using the switches. LCD is used to display the

related messages. The objective of the project is to develop a microcontroller based security and alert system. It consists of a Finger print reader, microcontroller, the interfacing unit to allow the communication between the microcontroller and the fingerprint module,lcd .As compared to the prior work this project provides a machine that can prevent rigging during the elections in the polling booths This makes vote counting and result tabulation faster and more accurate. Althoug any election can be conducted using hand counted paper ballots, these two categories of elections can require time-consuming, costly, and error-prone hand counts

II. Literature Review

Muni Venkateswarlu, Y.V.Vijay Kumar (July – 2014) [1] Electronic voting meant for casting vote and counting votes electronically. This voting technology includes punch cards, optical scan voting systems and Direct recording electronic (DRE) voting systems. It can also involve transmission of ballots and votes via telephones, private compute r networks, or the Internet. An electronic voting system has much more advantages compared to other voting techniques. An electronic voting system can be involved in any one of a number of steps in the setup, distributing, voting, collecting , and counting of ballots, and thus may or may not introduce advantages into any of these steps. The main aim of this project is develop an Electronic Voting Machine with maxim B. Far hath Anjum1 M. Deepa Mrs. C.N. Kalaivani (May-2014)

[2] Biometric voting has made the voting procedure simpler. It is a revolutionary method preferred to traditional EVM voting as it is risk defective. It is advantageous because it includes features such as voters can able to caste their votes globally, reduction of counting time , expenditure incurred on man power deployment and carrying of photo id cards for recognition. Stored finger prints are retained even in the event of complete power failure or battery drain. He/she grants permission to the voters to vote their selected candidates if the finger print are recognized. Each person can vote for one candidate only. Finally results are being displayed, when the polling officer enters the password. .Ashok Kumar, T. Ummal Sariba Begum (JANUARY-2011) The heart of democracy is voting. The heart of voting is trust that each vote is recorded and tallied with accuracy and impartiality. The accuracy and impartiality are tallied in high rate with biometric system. Among these biometric signs, fingerprint has been researched the longest period of time, and shows the most promising future in real-world applications. for selecting their representative various analysis predicted shows that the proposed electronic voting system resolves many issues of the current system with the help of biometric technology

III. General Concept

The user has to show his voter ID card whenever he goes to the polling booth to poll his vote. This is a time consuming process as the person has to check the voter ID card with the list he has, confirm it as an authorized card and then allow the person to poll his vote. Thus, to avoid this kind of problems, we have designed a finger print based voting machine where the person no need to carry his ID which contains his entire detail. The person at the polling booth has to show his Finger. This Finger print reader reads the details from the tag. This data is passed to the controlling unit for the verification. The controller reads the data from the reader and compares this data with the already existing data. If the data matches with the already stored information, the person is allowed to poll his vote. If not, a message is displayed on LCD and the person is not allowed to poll his vote. The polling mechanism carries out manually using the switches. LCD is used to display the related messages. Voting machine using Finger print is basically an embedded system that makes the things easy in the polling booths during the time of elections. Voter card is nothing but an Finger Print which stores the details of the person like the name of the user, location of place, mobile number for contact etc. When the user is asked to show his Finger print. The Finger print module reads the data present

3.1.1 Fingerprint module

The Finger Print Sensor is one optical fingerprint sensor which will make fingerprint detection and verification adding super simple. There's a high powered DSP chip AS601 that does the image rendering, calculation, feature-finding and searching. You can also enroll new fingers directly - up to 162 finger prints can be stored in the onboard FLASH memory. There's a red LED in the lens which will light up during taking photos so that you know its working condition. It is easy to use and by far the best fingerprint sensor you can get

• Finger print enrollment

When enrolling, user needs to enter the finger two times. The system will process the two time finger images, generate a template of the finger based on processing results and store the template.

• Finger print matching (1:1 or 1:N)

When matching, user enters the finger through optical sensor and system will generate a template of the finger and compare it with templates of the finger library.

3.1.2 Electronic Voting Machine

Electronic voting system organization shows the architectural view of a generic e-voting system. There are some essential components in a generic electronic voting system and each of these components will be detailed in this section There are many different devices for users to access an electronic voting system Those devices include desktops or laptops with wired internet connections, WIFI or WAP enabled mobile devices such as personal digital assistant and smart phones, and normal cell phone

The working of our EVM can be explained in three modes

3.1.2.1. Enrolling mode
3.1.2.2. Identification and vote casting mode
3.1.2.3. Results

When the power of Ballot unit is turned on, the ballot unit awaits a "READY SIGNAL" from controller. After getting "READY SIGNAL", ballot unit displays its "welcome to EVM" message on LCD indicating that the machine is ready and waits for user input. The mode of operation depends on command given by the user from the switches. Finally GSM modem attach to system can be used to generate SMS to authority for unauthentic voting, same modem can be useful to find result after completion of voting.

3.1.3 GSM

Use of the GSM security features, in particular the authentication The proposed system suggests the function along with fingerprint biometric scanner technology inbuilt in mobile phones, which will be customized in a cost-effective way, thus providing a more viable option compared to existing systems.

Security Features in GSM

GSM is a digital wireless network standard widely used in European and Asian countries. It provides a common set of compatible services and capabilities to all GSM mobile users. The services and security features to subscribers are subscriber identity confidentiality, subscriber identity authentication, user data confidentiality on physical connections, connectionless user data confidentiality and signaling information element confidentiality. They are summarized as follows:

3.1.3.1 Subscriber identity confidentiality is the property that the subscriber's real identity remains secret by protecting his International Mobile Subscriber Identity(IMSI), which is an internal subscriber identity used only by the network, and using only Temporary identities for visited networks

3.1.3.2 Subscriber identity authentication is the property that ensures that the mobile subscriber who is accessing the network or using the service is the one claimed. This feature is to protect the network against unauthorized use.

IV. Methodology
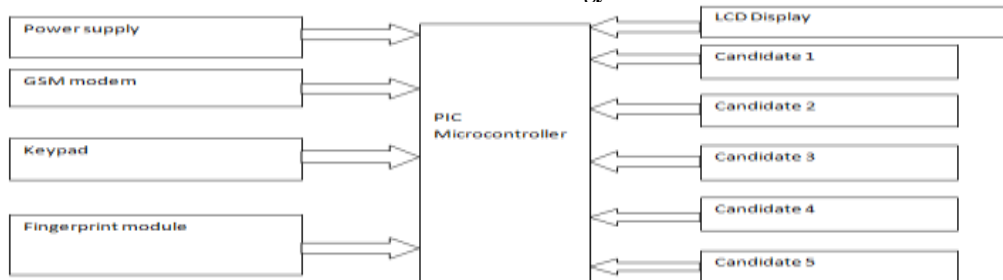
The personal computer is used to collect and store the database of the peoples before voting. The pic microcontroller processor is connected with a personal computer through the PC interface to access the database which is stored in the personal computer. A module of 16X2 dual line LCD is used to show the details of the processing which is appened in the voting machine. An optical finger print module is used to scan the finger print of the voters. The finger print scanner sends the scanned signal to the processor for the verification. The processor verifies the finger print with the database which is stored in the personal computer. A touch screen is used to give the input to the processor to select the candidate. . Finally a GSM modem is used to send the result to the corresponding authority which helps them to announce the result within short period
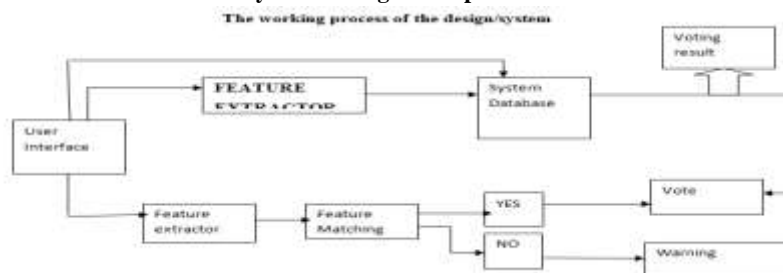
V. System Design & Implementation

Fig 5.1 Fingerprint voting system architecture

The fingerprint voting system has a fingerprint scanner as a user interface which will be replaced by fingerprint databases exist in the internet in order to test the system with.The fingerprint voting system has a fingerprint scanner as a user interface which will be replaced by fingerprint databases exist in the internet in order to test the system different type of fingerprint scanner instead of one type, as well to reduce the system' scost. The system has two modes, the enrolment and authentication modes. The enrolment mode handles the registration process in order to register the eligible users in the system; the output of the enrolment mode will be store in the database of the system. The second mode which is the authentication. mode handles the process of checking the eligibility of the user by taking the user's fingerprint and matches it with the database's fingerprints; if the system found any similar fingerprint in the database then the user is eligible to cast his vote. The vote of the user will be count and store in the database. At the end of the voting process the user can check the election result by clicking the result.button
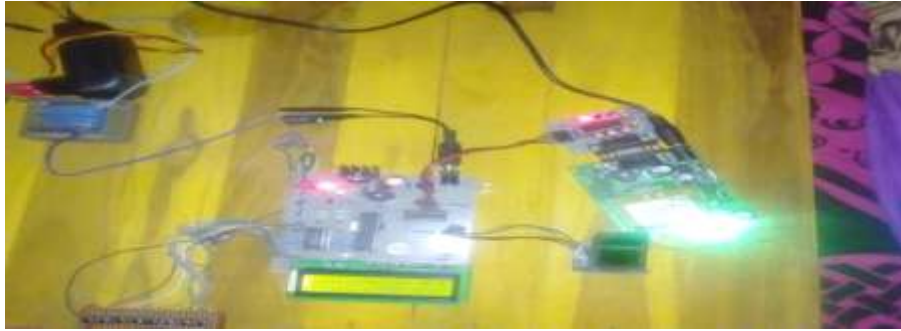

Fig 5.2: Hardware photo

VI. Result

6.1Performance testing and result Matching

In the figure below two fingerprint images have similar shape are shown. These two fingerprint images belong to two different voters. The finger code of these two images will differentiate them even if they have similar looking. The threshold has value of 715 and its represent the minimum distance between the fingercode of these two images. If the minimum distance between two fingerprints is lesser than 715, that's mean the two fingerprint are matched and belong to the same person while if the value is more than 715 then the two fingerprint is different and it's belong to two different voters. The two fingerprints in the figure below have a minimum distance of 1713.35, that's means these two fingerprints are different and belong to different persons, even if the two fingerprints appear similar.
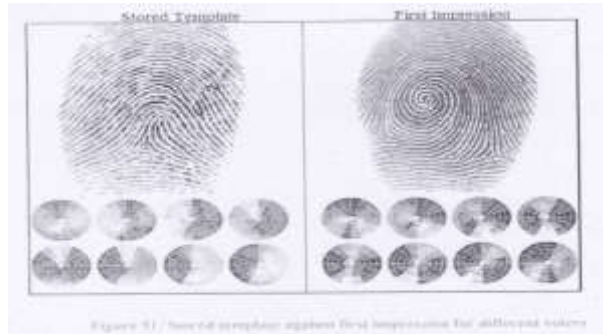

Fig 6.1: Stored template against first impression for different voters

.On the other hand 2 fingerprint images and their corresponding finger codes belong to the same person shown in the figure below. The minimum distance between these two fingerprint images is 420.2 which are lesser than the threshold value, that means these 2 fingerprint images belong to the same person and the person is eligible to cast his vote.

Fig 6.2: Stored Template against first impression for same user

6.3Voting test and result

The result of the voting test shows that after taking the voter fingerprint image and process it by the voting system. If the fingerprint matches then the voter has the right to cast his vote. If the fingerprint wasn't stored in the system's database, a warning message is shown, so the voter can't perform his vote, or in case the voter aimed to votes another time, the system going to give a warning message, in order to alter the security of the election. There are four candidates exist at the voting page, during the voting process, checking the voters identity will be the first step in the process, then the voter will be asked to vote for his favorite candidate by clicking on the button which located beside each nominee. The figure below shows the election results. The figure below is a picture was taken during the voting process testing

Fig 6.3:Registration Page

6.4Simulation and data analysis

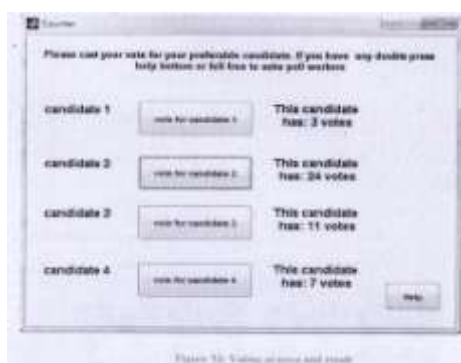**Fig 6.4:**voting Process &Result

The figure above shows the user registration page GUI. From this page the administrator can register new users to be eligible to perform his/her vote. The administrator should scan the user's fingerprint first then take picture to the person and fill all the user information in ID, TP number, First name, Last name, nationality and Contact number text bars. By clicking the register button the user will be registered and all the information will be stored in the database.It also shows the process of registering new user; the administrator scanned the user's thumb fingerprint of the left hand and took a picture to the user as a step toward the registration process of the voters/users of the fingerprint voting system.The figure shows that the administrator fills the entire requirement of registering new user and by clicking the register button all the information will be store in the database

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VII. Conclusion

Electronic voting systems have many advantages over the traditional way of voting. Some of these advantages are lesser cost, faster tabulation of results, improved accessibility, greater accuracy, and lower risk of human and mechanical errors. This proposal enables a voter to cast his vote using a mobile phone or PDA or computer without additionally registering himself for voting in advance and going to a polling place. Also, proxy vote or double voting is not possible. Any entities except for an e-voting device can't know the voting result. In this paper, we are not focusing on encryption algorithm applied for two entities. Its concern to present emoting system using a mobile terminal and to explain its process. We proposed a GSM mobile voting scheme, where the GSM authentication infrastructure is used to provide voter authentication and improve voter mobility. Authentication is always a difficult requirement to fulfill for remote voting schemes, most of which apply a public-key based signature scheme for voter authentication. Our scheme also enhances the security and provides more mobility and convenience to voter

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