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IRIS Biometric Based Voting System

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Abstract:
In Democratic countries, the voting system plays an important role during elections. In the election process, the election commission is facing a lot of troubles. The most familiar issue faced by the election commission is the arrangement of casting the votes, duplication or illegal casting of votes. In electronic voting machines which need more manpower, time-consuming and also they are less trustworthy. In this project, a secure and new voting system is developed to improve the existing voting system using iris recognition. Iris is one of the most secure biometric of the person identification. The main goal of this project is to avoid the duplication of casting votes.

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I. INTRODUCTION

The Election process is a central administrative work in each country. It has a variety of processes implemented and all are human work. Now a day, voting processes is converted in electronically and implemented in various computerized work. This reduces traditional paper work and will increases time. E-voting is a computerized voting system implemented in both the online and offline process. Each voter details are register with a unique ID and it stored in the database. Whenever the ballot method implements, every voter details are retrieved and verified. This process implemented in several stages. They are voter details collection, voter details matching with high security, voting tabulation with central administration. Voter identification is an important factor in E-voting system. This process is implemented in two stages. One is data security and another one is human identification. Data security is implemented by a variety of encryption/ decryption algorithms and human identity is implemented in human biological features. Data security focuses voter details with a unique ID. These details are encrypted and stored securely. Simply it is converted into digital format as a result of citizen details matching process is a simple one when accessing digital data. This counting process is automated and secured in this system. Human identification is placed a vital role in E-voting system as a result of some security violations detected during this system such as human malpractices. Biometric security features are implemented in this system such as fingerprint recognition, iris recognition. This paper focuses data security in human identities, such as iris based e-voting system and analyses accuracy and efficiency in this system.

II. RELATED WORK

S.Agnes Shifani, S.Kalaiselvi [1] has to the traditional voting systems such as paper Ballots, Lever voting machines etc. It has lots of drawbacks to overcome. This paper uses biometric method so that more securere and flexible real time application can be gained. As this system has automatic counting, we can able to make the result to be published faster and better. This paper has ARM processor & fingerprint module as basic modules and certain other facilities such as indicator, touch screen, PC, LCD display, Printer etc. The author insists that the Aadhar card system has been a developing method so that we can get an easier way of voting system without any misconceptions.

Sunith Kumar Bandi, Venkata Raghav [2] has provides the E-voting system is the voting process electronically, without the use of ballot boxes. In this system, election data will be stored, recorded and processed primarily as digital data. E-voting system is used to count the casting vote in the digital manner. E-machine consists of buttons and symbols of respective candidate when the voter pressed the button, the count of votes gets stored in the EVM, but this system is not resolved the fake votes. So, further development should be implemented to prevent these forms of activities.

Muhammad Saufi, Mohamat [3] has contains two verification steps. First, RFID tag is used which contains the verification data which is already stored in PIC. RFID tag contains its own ID. Once we place this RFID tag close to the RFID reader, it reads the RFID tag ID. It will be checked with the database of the PIC

whether the voter belongs to that particular polling booth or not. Second, the Fingerprint scanner is used in this system, it will check whether the RFID is belongs to that particular person or not. If these two steps are verified successfully then PIC activate the keypad to cast vote for a particular political candidate.

Dr.R.Viswanathan, L.Vetrivendan [4] has three level of security in the voting process. The primary level is that the verification of unique id number (UID), second level is that the verification of election id number (EID) and third level verification is face matching. The safety level of our system is greatly improved by the new application method for every citizen. The user authentication process of the system is improved by adding face recognition in an application which will determine whether the particular user is authenticated user or not. If the captured image is matched with the respective image of the voter within the database, then a voter can cast their vote in the election.

III. PROPOSED SYSTEM

The aim of this proposal is to design an efficient & intelligent system to safeguard our valuable vote. In this system is to check the capture the voter iris image by using iris scanner. Match the captured iris image database using hamming distance. If the iris image is not matched to the database, then it will stop the process. On the other hand, if the iris image is matched to the smart card database then allow the voter to give a vote and update the voting record of the voter. It is safer than the traditional ballot paper voting system. This system is very much time effective and fast.

3.1 BLOCK DIAGRAM

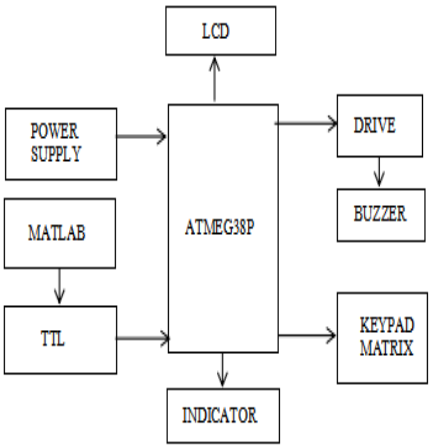

Figure 1 Block diagram of the proposed system

It consists of ATMEGA328P Microcontroller, Keypad matrix, indicator and buzzer. The Microcontroller is programmed to access the data stored in its memory. First, we captured the voter iris image by using iris scanner. Then, it will match the captured iris image in the database using hamming distance. If the iris image is not matched to the smart card database then stop the process. On the other hand, if the iris image is matched to the smart card database then allow the voter to give a vote and update the voting record of the voter. The illegal voting will be reduced. During this method, we will realize the illegal voter and exclude the voter. If one person gives votes in one place the information can updated globally that this person has given the vote. If the voter will go another place than after scanning the eye it will be shown that this person has already given the vote. There is no need to ought to index finger by the inedible ink. The information will be updated when a person gives the vote.

IV. HARDWARE DESCRIPTION

4.1 TTL Converter

Figure 2 TTL Converter

Transistor-transistor logic (TTL) is logic family build from bipolar junction transistors. It will create a communication channel between PC and the Microcontroller via UART serial port. We will be using a serial USB-To-TTL converter module. We will develop the specified firmware/software in order to configure the MCU for data transmission, and our PC for receiving and monitoring data respectively. The process is as follows: A variable in the RAM of the PC is sent to the display device of the same computer. Despite having your variables stored in the RAM, you still have no way to display them other than using the parallel/serial ports. Using the parallel IO ports is kind of inefficient way to do so as you will be unnecessarily using a whole bunch of IOs and still getting binary output which may not make that much of sense in several situations.

4.2 ATMEGA328P Microcontroller

ATmega328P has Electrically Erasable Programmable Read Only Memory (EEPROM). This property shows if the electric supply supplied to the micro-controller is removed, even then it can store the data and can provide results after providing it with the electric supply.

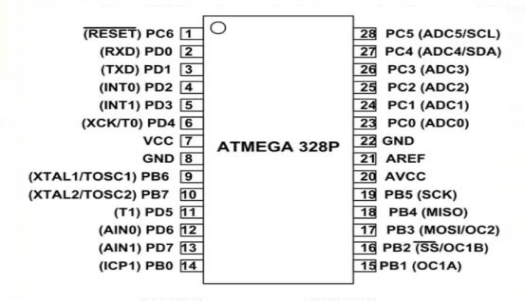

Figure 3 ATMEGA328P Microcontroller

It has 2KB Static Random Access Memory (SRAM). It consist of advanced RISC architecture, good performance, low power consumption, real timer counter having separate oscillator, 6 PWM pins, programmable Serial USART, programming lock for software security etc. It is one of the high performances AVR technology micro-controllers with a large number of pins and features. This IC comes with internal protections and multiple programming methods which helps the engineers to priorities this controller for different situations.

4.3 Buzzer

A buzzer is an audio signaling device that are mechanical, electro-mechanical or piezoelectric. Typical uses of buzzers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke. Buzzer is an integrated structure of electronic transducers, DC power supply, widely used in computers, printers, alarms, telephones, timers and other electronic products. Active buzzer 5V Rated power is directly connected to a continuous sound.

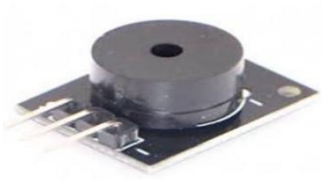

Figure 4 Buzzer

Now, micro computers are widely used for microwave ovens, air conditioners, timers and other alarm equipment. Externally driven piezoelectric sounders are used in digital watches, electronic calculators and other equipment. They are driven by a signal (2048Hz or 4096Hz) from an LSI and provide melodious sound.

4.4 LCD

A liquid-crystal display is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals combined with polarizers. Liquid crystals don't emit light directly, instead using a backlight or reflector to produce images in color or monochrome. LCDs can either be ON (positive) or OFF (negative), depending on polarizer arrangement. For example, a character positive LCD with a backlight will have black lettering on background that is the color of the backlight, and a character negative LCD will have a black background with the letters being of the equivalent color because the backlight.

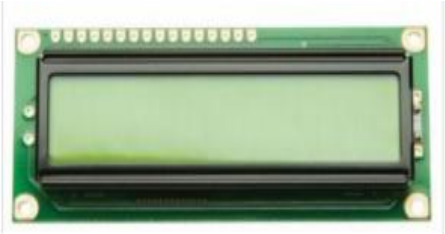

Figure 5 LCD

LCD screens are used on consumer electronics products such as DVD players, video game devices and clocks. LCDs are slowly being replaced by OLEDs, which can be easily made into different shapes, and have a lower response time, virtually infinite color contrast and viewing angles, lower weight for a given display size and slimmer profile and potentially lower power consumption.

V. SOFTWARE DESCRIPTION

5.1 MATLAB

MATLAB ("matrix laboratory") may be a proprietary multi-paradigm programming language and numeric computing environment developed by mathworks. It permits matrix manipulations, creation of user interfaces, plotting of functions, implementation of algorithms, and interfacing with programs written in another language. It supports object-oriented programming including classes, inheritance, and pass-by-value and pass-by-reference semantics.

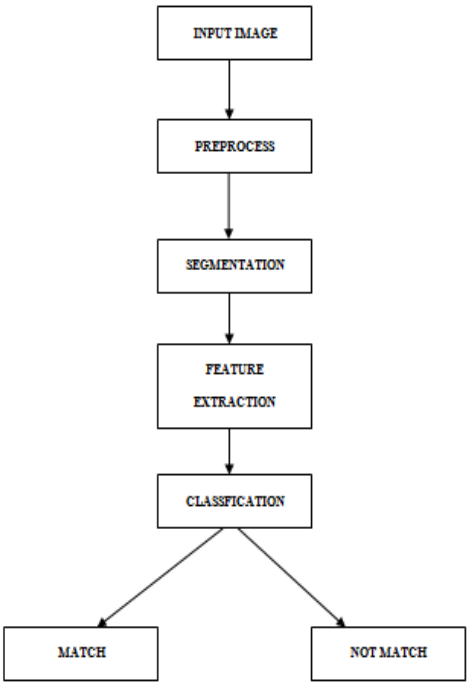

Figure 6 Flow Chart of MATLAB

INPUT IMAGE

Image acquisition deals with capturing sequence of iris pictures from the subject using cameras. These pictures should clearly show the complete eye particularly iris and pupil part, and so some pre-processing operation is also applied to improve the quality of image e.g. histogram equalization, filtering noise removal etc.

SEGMENTATION

For segmentation, Hough transform is best than Integro-Differential Operator. The edge detection technique is applied before Hough transform technique. For this reason, we decided the 'canny edge' to extract the image. We will find all the edges in the iris image. We use Canny edge detector, when finding edge detection point, at every edge point draw a circle with center at the point with the required radius. In this way, the inner and outer boundary of iris can be detected by using circular Hough transform.

FEATURE EXTRACTION

Feature extraction is implemented by the normalized iris pattern is convoluted with 1D Log-Gabor wavelet. First 2D normalized iris pattern is broken up into a number of 1D signal and then Gabor filter is used to those 1D signals. The encoding process produces a bitwise model containing variety of bits of data, and a corresponding noise mask that corresponds to corrupt areas among the iris pattern, and marks bits within the model as corrupt.

MATCHING

For matching, we use the hamming distance. Hamming distance of two models is calculated by shifting one template left and right bit-wise and a variety of Hamming distance values are calculated from consecutive shifts. It is defined as one shift left, and one shift right of a reference model.

VI. RESULTS AND DISCUSSION

The output of the proposed system is shown in the figure 7.

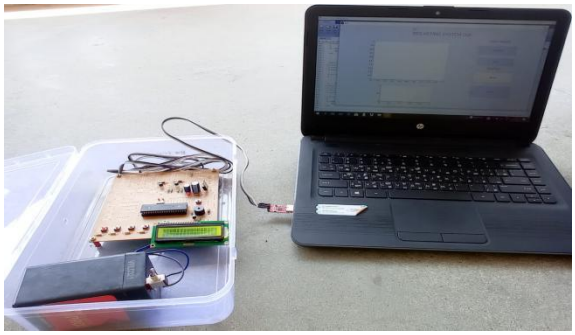

Figure7 Output of the Proposed System

When the image will capture, it will match the captured iris image in the database. If the iris image is not matched to the database then stop the process. Otherwise, it allows the voter to give a vote and update the voting record of the voter.

VII. CONCLUSION

With the increasing the population day by day, the improvement of voting system is necessary. Undoubtedly the proposed voting system is techniques are especially good. We have used iris recognition and smart card for improving this system. Many biometric methods are available but iris recognition has high accuracy rate. Using the smart card, it is likely to poll from any polling booth rather than the particular polling booth. The iris pattern of the person is obviously unique. It reduces the polling time which is most important. It completely rules out the possibility of invalid vote. It can make mistakes with the dryness or dirty of the fingerprint's skin. Although fingerprints do not naturally change over the course of person's lifetime, it is possible for fingerprints to become damaged to the point where they are not useful for identification. Injuries to the fingertips can all cause a person's fingerprints to become different, unreadable or even eliminated. With the age, the fingerprints endure certain changes which can pose uncertainty in identification.

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