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Secured Electronic Voting Machine using Biometric

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Abstract

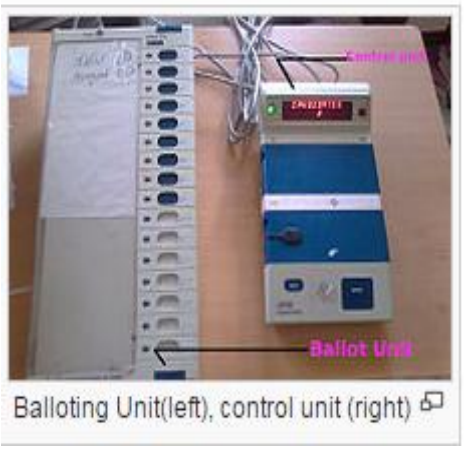
Firstly discussing about Biometrics we are concentrating on Fingerprint scanning. For this we are using FIM 3030N high voltage module as a scanner. This module has in-built ROM, DSP and RAM. This module can operate in 2 modes they are Master mode and User mode. We will be using Master mode to register the fingerprints which will be stored in the ROM present on the scanner with a unique id and in Master mode we can register only 20 users.

Introduction

According ancient Greek scripts BIOMETRICS means study of life. Biometrics studies commonly include fingerprint, face, iris, voice, signature, and hand geometry recognition and verification. Many other modalities are in various stages of development and assessment. Among these available biometric traits Finger Print proves to be one of the best traits providing good mismatch ratio and also reliable.

Existing system

Indian voting machines use a two-piece system with a balloting unit presenting the voter with a button (momentary switch) for each choice connected by a cable to an electronic ballot box. An EVM consists of two units, control unit and balloting unit. The two units are joined by a five-meter cable. The control unit is with the presiding officer or a polling officer and the balloting Unit is placed inside the voting compartment. Instead of issuing a ballot paper, the officer in-charge of the Control Unit will press the Ballot Button. This will enable the voter to cast his vote by pressing the blue button on the balloting unit against the candidate and symbol of his choice. The controller used in EVMs has its operating program etched permanently in silicon at the time of manufacturing by the manufacturer. No one (including the manufacturer) can change the program once the controller is manufactured.



Balloting Unit(left), control unit (right)

Draw back

There is a chance for malfunction due to repeated voting by same person

Proposed system

When this module is interfaced to the LPC2148, we will be using it in user mode. In this mode we will be verifying the scanned images with the stored images. When coming to our application, only authorized persons can be available for voting and they should not vote for a person more than once, thereby avoiding rigging.

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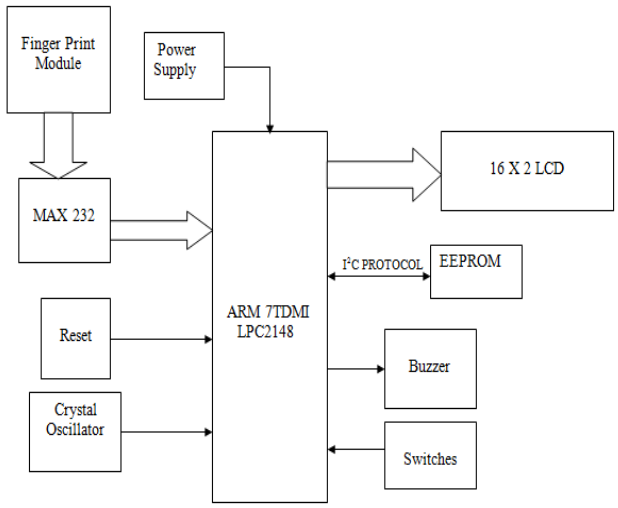
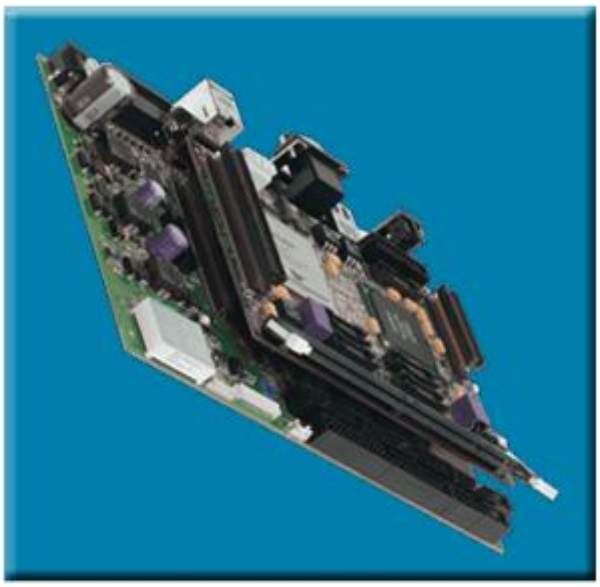
This scanner is interfaced to LPC2148 microcontroller. By using this controller we will be controlling the scanning process. After the scanning has been completed the person has to press a key among available switches, immediately one vote is credited and stored in the EEPROM. After the voting has been completed if he presses the switch again, the vote will not be considered. If an unauthorized person tries to scan his image then an indication will be given by a buzzer which is interfaced to the controller.

BLOCK DIAGRAM:



ARM PROCESSOR



ARM7TDMI Processor Core

- Current low-end ARM core for applications like digital mobile phones
- TDMI
  - T: Thumb, 16-bit compressed instruction set
  - D: on-chip Debug support, enabling the processor to halt in response to a debug request
  - M: enhanced Multiplier, yield a full 64-bit result, high performance
  - I: Embedded ICE hardware
- Von Neumann architecture

This project uses two power supplies, one is regulated 5V for modules and other one is 3.3V for LPC2148. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.

Finger print identification

The fingerprint identification process will change slightly between products and systems. Standard systems are comprised of a sensor for scanning a fingerprint and a processor which stores the fingerprint database and software which compares and matches the fingerprint to the predefined database. Within the database, a fingerprint is usually matched to a reference number, or PIN number which is then matched to a person's name or account.

The basic information about fingerprint is that it is unique for each person. Even a twin brother will not have the same fingerprint. Thus each fingerprint is used to store a unique identifiable piece of information. The uniqueness in each fingerprint is due to the peculiar genetic code of DNA in each person. This code causes the formation of a different pattern of our fingerprint.

A fingerprint consists of ridges and valleys. They together provide friction for the skin. The main identification of the skin is based upon the minutiae,

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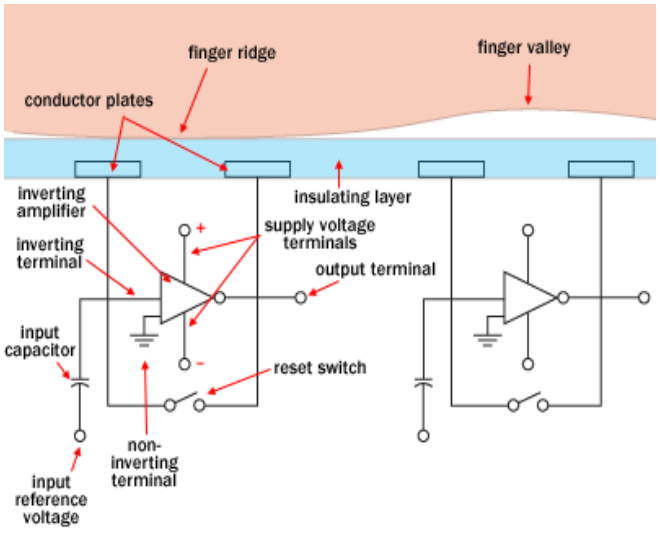
which actually is the location and direction of the ridge endings and splits along a ridge path.

Capacitance Scanner

Capacitance scanner uses electrical current to display the image. The principle of capacitance is used in this device. As shown in the diagram, each sensor consists of arrays of cells. These cells have two conductor plates, which are covered with an insulating layer. Thus, they form a simple capacitor which is used to store the charge. The cells are so small that their actual size will be smaller than the width of a ridge from our finger. These sensors will then be connected to an integrator. The output of the integrator will be given to the input of an inverting operational amplifier. This op-amp will consist of hundreds of transistors, resistors and capacitors. This op-amp is alters the input voltage with respect to the reference voltage provided to the other input. The non-inverting input is connected to the ground. The inverting input is given to the reference voltage and then to the feedback circuit. This feedback circuit is given to the amplifier output and also includes the two conductor plates.



When the finger is placed for recognition, it acts as another capacitor plate. It is separated with the help of insulating layers. When moving the finger from one point to another, the capacitance changes due to the variation in distance between the capacitor plates Thus, the output voltage is recorded with the change in output voltage according to the appearance of ridges and valleys. A perfect output image of the fingerprint is thus obtained.

This device is much better than an optical scanner as it is very compact and harder to trick. The device needs a real fingerprint shape to get the output. The optical scanner a dark and light pattern is more than enough to make an output image. Though an optical scanner needs CCD devices for sensing, a capacitance scanner needs only semi-conductor chips.

Advantages of fingerprint reader:

You are actually able to provide a physical evidence of yourself.

This type of an identity cannot be easily faked like identity cards.

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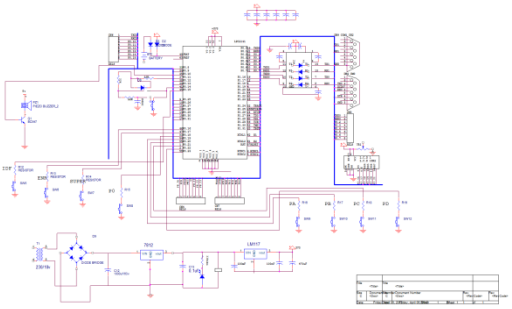
Though you can guess a password of another person, it cannot be done so in the case of a fingerprint.
You may lose your identity card. But, you are not going to lose your fingerprint; the same will be the case of a password.

Interfacing diagram



Advantages:

- No manual errors
- No false Voting
- Need not remember any password
- Need not to carry any card

Applications

- Government Elections
- Company / Corporate internal elections
- Union Elections

CONCLUSION

In this project work, we have studied and implemented a complete working model using a controller. The programming and interfacing of microcontroller has been mastered during the implementation. This work includes the study of FINGERPRINT module. Hence, this project can be very much useful and can be implemented in real time applications.

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