Fingerprint Attendance System

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Abstract: This paper is a study of a fingerprint attendance system based on minutiae based fingerprint algorithms used in various techniques. This line of track mainly involves extraction of minutiae points from the model fingerprint images and fingerprint matching based on the number of minutiae pairings among two fingerprints. This paper also provides the design method of fingerprint based student attendance using Atmega8. This system ignores the requirement for stationary materials and personnel for keeping of records.

Keywords*: fingerprint module,biometrics,microcontroller, LCD .*

I.   INTRODUCTION

Fingerprints are one of the main forms in biometric field
which used to identify the individual and their uniqueness. Due to their consistency and uniqueness it is used widely. This fingerprint attendance system is highly secure and cannot be forged easily. This paper presents the attendance management system using fingerprint technology in a university environment. It consists of two processes namely; enrolment and authentication. During enrolment, the fingerprint of the user is captured and its unique features extracted and stored in a database along with the users identity as a template for the subject. During authentication, the fingerprint of the user is captured again and the extracted features compared with the template in the database to determine a match before attendance is made. Attendance management system is one of the most advanced applications in biometric technology. . The Fingerprint authentication has many advantages such as very high accuracy, the most economical biometric PC user authentication technique . It is one of the safest biometric authentication methods widely used. It is very easy to use. Small storage space required for the biometric template, reducing the size of the database memory required and it is standardized.

2. BLOCK DIAGRAM
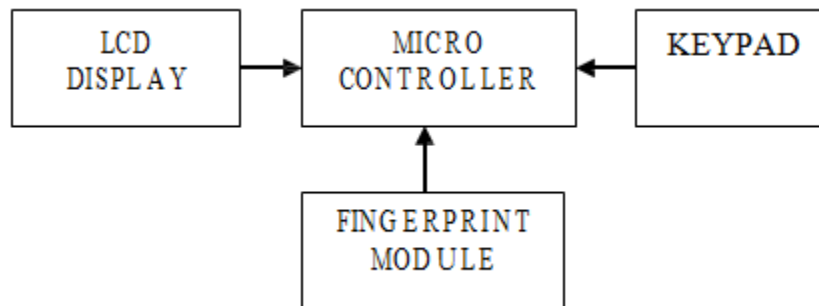
Fig:-Block diagram of fingerprint attendance system

Finger print identification is based on the fact that no two persons will have the same finger print in this world. This is because of the peculiar genetic code of DNA in each person. Finger print module differentiates between two

fingers based on the ridges and valleys on finger print. When the finger print is given it stores the points where there are changes in the direction of ridges and valleys using some algorithms. Inside the finger print module a DSP processor is present to implement and analyze the algorithm. Main heart of the circuit is finger print module. This sends commands to the controller when ever finger print is matched. Microcontroller receives these commands from the finger print module and uses the internal EEPROM to store the attendance. Keypad is used to send the requests to the controller either enroll the new one or to save the attendance or to exit.LCD display displays the messages related to the commands received.
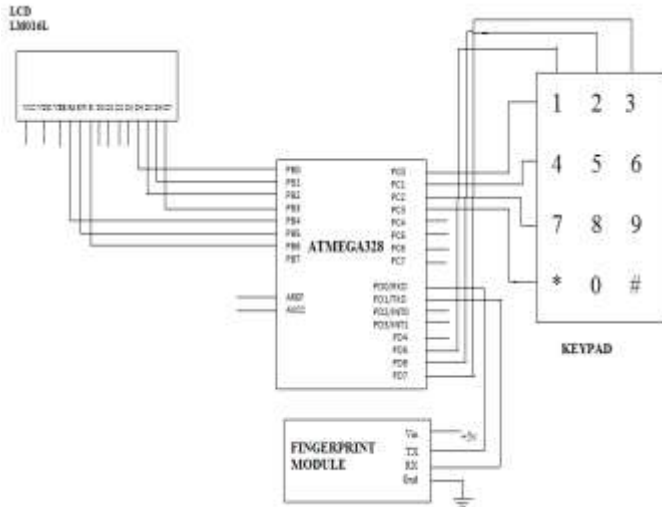
3. Model configuration and working

Fig:-Circuit diagram of fingerprint attendance system

Here, we used an ATmega328 microcontroller which is an AVR family microcontroller. It is 8 bit microcontroller Atmel, AVR advanced RISC architecture and has 28 programmable input and output pins. It has 32
KB of programmable Flash, IKB of EEPROM, 2KB SRAM, 10,000 Write Erase cycles for Flash and 100,000 for EEPROM. Biometric module used here is R305
series fingerprint module. It supports USART communication protocol. Here, USART protocol is used for communicating with microcontroller. USART is universal synchronous and asynchronous receiver and transmitter. This module has four pins out 1) Transmit, 2) Receive, 3) Vin, 4) GND. Transmit pin is connected to the receive pin of the microcontroller. Receive pin should e connected to the transmit pin of the microcontroller. Vin is applied with a voltage of 5V and GND is connected to the ground. Data can be transmitted or received using serial communication.
Fingerprint processing involves twosteps.1)finger enrollment and 2) finger matching. Initially, to enroll the finger user must give his finger twice to the module. Module checks these two images and generate a template image and stores it. In the second step of finger matching, for 1:1 matching input is matched with the template image generated and it generates an acknowledgment. For 1:N matching input is matched with the images in the library. It gives the matched image, a page id of the matched image is generated. Keypad used in this project is 4*3 keypad i.e. it has four rows and three columns. Columns of the keypad are connected to the PORT D pins of the microcontroller. PD5 to PD7 pins are connected to the three columns of the keypad. Rows are connected to the PORT C of the microcontroller. PC0 to PC3 pins are connected to the rows of the keypad. To give attendance, press 1 from the keypad and press 2 from the keypad, to clear all the data press 3 from the keypad.
LCD is used for displaying the messages. This is interfaced to PORT B of the microcontroller. LCD in 4 bit mode is connected to the microcontroller. D4-D7 pins are connected to the PB0-PB3 pins of the microcontroller. RS pin is connected to the PB4, RW pin is connected to the PB5 and Enable pin is connected to the PB6 pin.
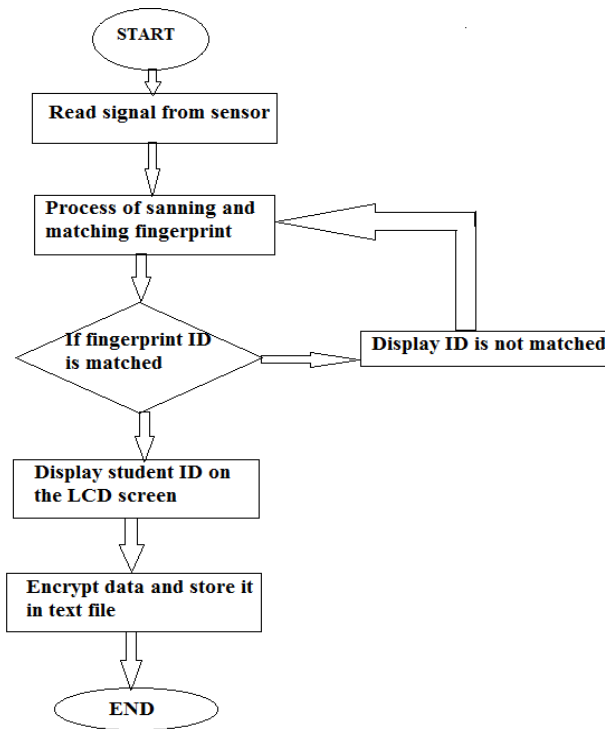
Fig:-Flow chart of fingerprint attendance system

4. Results and conclusions

The attendance can save each student's fingerprint, hence
makes the system more robust. During enrolment the Student's fingerprints is assumed to be clean, not dry or damp, no scratches and not swollen. Students are required to place their fingerprint. After the enrolment stage, the data will be saved in the fingerprint scanner and the verification system takes place by comparing the capture fingerprint characteristic with the previously enrolled data. This paper has presented the design and development of portable attendance system which is based on fingerprint identification. The system helped to reduce many issues such as, denying the possibilities of cheating in recording the attendance, helps to ease the lecturers to keep data of students' attendance, the encryption technique adds more security so there will be no anonymous fingerprint which is able to tamper with the recorded data, and the portability saves time in taking attendance instead of queuing in a line.

6. Future work and Expectations

It consists of creating the database of students which
contains the academic details of the students. We can send the academic details of the students periodically to the parent's mobile along with the attendance report. So in near future we can use finger vein recognition in this attendance system which very unique compared to the fingerprint authentication. The authentication can also be made as more secure by using human odor for the Security purpose. . Future works will be making this system wireless and using IOT (internet of things) concept.

5. References

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