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Biometric Attendance System

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Abstract: **— our project aims at designing student attendance system which could electively manage attendance of students at institutes. Attendance is marked after student identification. For student identification, a fingerprints recognition based identification system is used. Fingerprints are considered to be the best and fastest method for biometric identification. They are secure to use, unique for every person. Fingerprint recognition is still identifying individual from a set of enrolled fingerprints a time taking process. It was our responsibility to improve the fingerprints identification system for implementation on large databases e.g. of an institute. . This system is designed not only to reduce paper work and operational time but also to provide data security. This system is useful for many industries, organizations, security system, schools, colleges and banking sectors.**

Index Terms- **Biometric identification, Attendance system, Wireless communication.**

I. INTRODUCTION

The most common attendance system is either roll calling or enforcing the students to manually sign attendance sheet, which is passed around the classroom while the lecturer is conducting the lecture. There are some demerits, this sheet is passed around the classroom some students make sign of absent student. Sometimes the record data sheet may lose. In recent years the RFID card system are used for attendance system. But disadvantage is easy to lose of card or damage. This demerit is reduced by biometric attendance system. The biometric system is used for automatic identification of the person. There are two types of identification physiological and behavioral characteristics. In this system the attendance of students is given to their parents through the SMS using GSM module.
The GSM modem is used to transmissions and reception of the messages where the student is present or absent in class. GSM is most successful digital mobile communication system in the world today.GSM is a second generation system replacing the first generation analog systems. The module is serial communication compatible and can be connected to pc as well as microcontroller with RS-232 interface.
It is applicable for SMS, voice call and data transfer. The baud rate of GSM varies from 9600-11500 through AT command.

II. HARDWARE DESIGN

Figure shows block diagram of biometric attendance system. The system hardware includes the finger print module R305, Driver, Power supply, Micro-controller PIC16F877A, LCD, GSM SIM 300. In which finger print module is most important part because of the attendance is marked after capturing the fingerprint for identification. This captured data matches to the data stored in the memory chip. If it is matched attendance is marked of that student and the ID number of that student is display on the LCD screen. After that, attendance is sends to the parent's mobile through GSM modem.

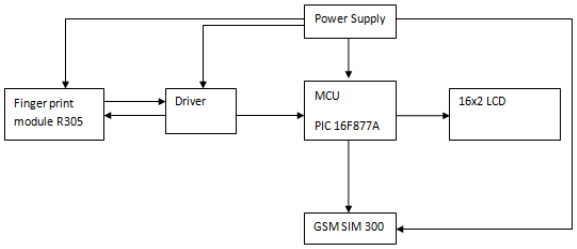

Fig: 1 Block diagram of Biometric attendance system.

1.1 fingerprint module:

Fingerprint sensor is an electronic device used to capture a digital image of the fingerprint pattern. This captured image is digitally processed to create a biometric template which is stored and used for matching.

Fingerprint processing includes two parts: fingerprint enrollment and fingerprint matching. When enrolling, user needs to enter the finger two times. The

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system will process the two time finger images, generate a template of the finger based on processing results and store the template. 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. In both circumstances, system will return the matching result, success or failure.

1.2 Micro-controller:

In this system PIC16F877A microcontroller is used. It has 8K x 14 words of Flash Program Memory, 368 x 8 bytes of Data Memory (RAM) and 256 x 8 bytes of EEPROM Data Memory.

1.3 GSM SIM 300:

GSM stands for Global System for Mobile Communication. It is the digital cellular technology used for transmitting mobile voice and data services. It uses narrowband Time Division Multiple Access
Technique for transmitting signals. A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone.

GSM Modem allows the capability to send and receive SMS to and from the system. The communication with the system takes place via RS232 serial port. In this system SIM 300GSM module is used. It is an industrial GSM module which provides four transmission modes including voice, data, short message, and FAX. It works in frequency band 900MHZ or I800 MHZ, power voltage 3.4V to 4.5V and baud rate is 300 bps to 115 kbps, where between 1200 to 115 kbps is automatically configured. With a tiny configuration of 40mm x 33mm x 2.85 mm, SIM300 can fit almost all the space requirement in your application, such as Smart phone, PDA phone and other mobile device. The SIM300 is designed with power saving technique.

1.4 LCD:

LCD Display used here is 16 characters by 2 line display. In our project the LCD is interface with the port B (D4-D7) from pin number 37 to pin number 40. Pin RS is directly connected to Pin 35 of controller and one more another important pin EN (LCD enable) is directly connected to pin 36 of the controller. On the other hand pin R/W of LCD is connected to ground. The LCD interfacing is done here for indicating various display messages for the user.

The LCD having two registers namely command register and data register. The command register is store the command instruction like LCD initialization, clear screen, setting the cursor position etc.

III. WORKING:

In this biometric attendance system attendance is marked after capturing the fingerprint for identification. This captured data matches to the data stored in the memory chip. If it is matched attendance is marked of that student and the ID number of that student is display on the LCD screen. After that, attendance is sends to the parent's mobile through GSM modem. When the attendance of a student is marked enrollment number of that student is display on the LCD screen with date and time. Students will hand over the device to other students whose attendance is not marked. After a time interval, device will not input any attendance. The main function of the device will be fingerprint identification of students followed by report generation and sending report through GSM. Fingerprints are considered to be the best and fastest method for biometric identification. This system has advantage to track the attendance of the student by their parents.

Flow Chart

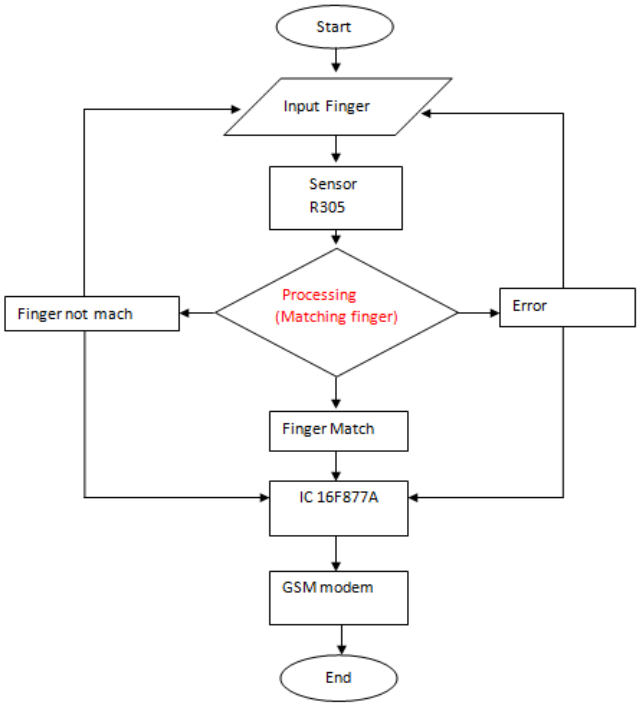

Fig: Design Flow of Biometric Attendance System.

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ADVANTAGES

1. Scientific research and studies have proved that fingerprints do not change as you grow up.
2. Using Fingerprint saves time to gain access as compared to other methods like RFID card or written attendance in register book.

FUTURE DEVELOPMENT

1. We can use non-contact fingerprint sensor. Which is also called as touch less 3D fingerprint scanner

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