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GSM Based Fingerprint Student Attendance System

S.Gowthami[1], R.Kokila[2], M.Vasumathi[3], G.Senthilrajan[4]

[1,2,3]UG Student , Department of EEE,
Sengunthar Engineering College. Tiruchengode (India)
[2]Associate Professor, Department of EEE,
Sengunthar Engineering College, Tiruchengode (India)

ABSTRACT

In this paper provides the design method of portable fingerprint based student attendance system using GSM. The system includes terminal fingerprint acquisition module and attendance module. It can realize automatically such functions as information acquisition of fingerprint, processing, and wireless transmission, fingerprint matching and making an attendance report. After taking the attendance, this system sends the attendance of every student to their faculty's mobile through GSM. Attendance system facilitates access to the attendance of a particular student in a particular class. This system eliminates the need for stationary materials and personnel for the keeping of records.

Keywords*: *Attendance system, Data, Fingerprint identification, Module, Wireless communication.

I.INTRODUCTION

The most common means of tracking student attendance in the classroom is by enforcing the students to manually sign the attendance sheet, which is normally passed around the classroom while the lecturer is conducting the lecture. There are numerous disadvantages of using such system. The attendance sheet is passed around the class; some students may accidentally or purposely sign another student's name.

Currently, the magnetic card attendance system is widely used in General Biometric System. For example, the card is easy to lost and damage. And most of all, parents are not aware if their children are absent from the class. Aiming at the disadvantages of traditional attendance system, a design method of wireless fingerprint attendance system based on GSM technology is proposed. In this system students report their attendance via biometric system and faculty can receive SMS notification of attendance finger print based attendance system. The fingerprint has a lot of advantages, such as unique, permanent, good anti-fake and easy to use. So it is recognized increasingly by people enrollment ID.

General Biometric system shows the general architecture of a biometric system fingerprint device. GSM is the Global System for Mobile Communications. It is called 2G or Second Generation technology. It is developed to make use of same subscriber units or mobile phone terminals throughout the world SMS is a bidirectional

service for short alphanumeric messages. Messages are transported in a store-and-forward fashion. For point-to-point SMS, a message can be sent to another subscriber to the service, and an acknowledgement of receipt is provided to the sender. Messages can also be stored in the SIM card for later retrieval.

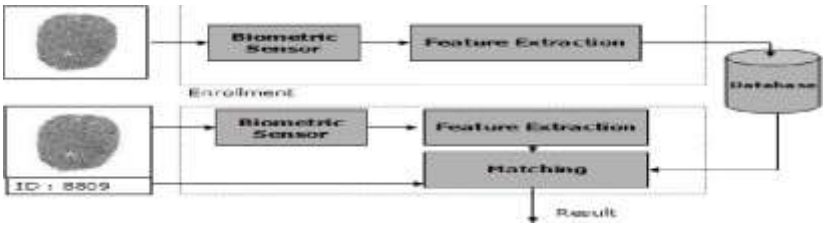

Figure 1: General biometric system

II. SYSTEM STRUCTURE

The system consists of fingerprint acquisition module and a GSM modem. Fingerprint acquisition module is used for capturing the fingerprint and pre-treatment. GSM modem is used to send the attendance of the students to their faculties in the form of SMS.

III. SYSTEM HARDWARE DESIGN

The system hardware includes: fingerprint acquisition module, GSM modem, microcontroller, RTC, EEPROM, MAX-232, and LCD.

3.1. SYSTEM BLOCK DIAGRAM

Figure 2: Fingerprint based attendance system

Attendance is marked after student identification. For capturing the fingerprint, a fingerprint scanner is used. After capturing the fingerprint by the fingerprint scanner, system matches this captured data with 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, weekly attendance is sends to the faculties 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 as shown in enrollment ID.

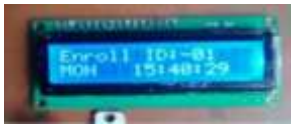

Figure 3: Enrollment ID

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.

3.2. FINGERPRINT ACQUISITION MODULE

Fingerprint acquisition equipment mainly has three kinds, Optical Fingerprint Sensors, Semiconductor Fingerprint Sensors and Ultrasonic Fingerprint Sensors. In this system SM630 fingerprint sensor is used shown in Fingerprint device. It consists of optical fingerprint sensor, high performance DSP processor and Flash. It has 64kb user flash memory. It can store 768 fingerprint templates. It boasts of functions such as fingerprint login, fingerprint deletion, fingerprint verification, fingerprint upload, fingerprint download, etc. When reading fingerprint images, it has self-adaptive parameter adjustment mechanism, which improves imaging quality for both dry and wet fingers.

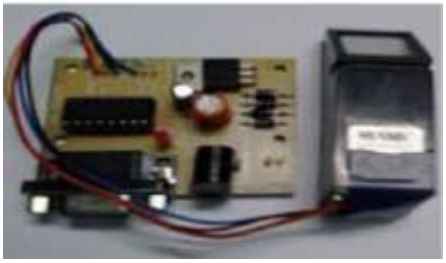

Figure 4: Fingerprint Device

A fingerprint scanner system has two basic jobs - it needs to get an image of the finger and it needs to determine whether the pattern of ridges and valleys in this image matches the pattern of ridges and valleys in pre-scanned images. The heart of an optical scanner is a charge coupled device (CCD). A CCD is simply an array of light-sensitive diodes called photo sites, which generate an electrical signal in response to light photons. The scanning process starts when the finger is placed on a glass plate, and a CCD camera takes a picture.

3.3. GSM MODEM

GSM stands for Global System for Mobile Communication land is an open, digital cellular technology used for [transmitting mobile voice and data services. TDMA is a technique in which several different calls may share the same carrier. Each call is assigned a particular time slot. 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.

Figure 5: GSM modem

3.4. MICROCONTROLLER

Microcontroller forms the backbone of the system. In this system P89V51RD2 microcontroller is used. It is an 80C51 microcontroller with 64 kB Flash and 1024 bytes of data RAM. It is also In-Application Programmable (IAP), allowing the Flash program memory to be reconfigured even while the application is running. It drives the control logic behind every functionality, some of which are mentioned below:

- Power up and initialize it and dependent modules.
- Check for interrupts, faults while the modules get initialized.
- Command the fingerprint module to function as requested by the software interface.

IV. SYSTEM SOFTWARE DESIGN

4.1. DATABASE GUI

Hyper Terminal V1.5 is used for making the database of the system. Hyper Terminal presents the user with a basic graphical user interface (GUI) which highlights the core functions of Hyper Terminal: message box for displaying connection activity and status, several menus, associated buttons and icons for several functions at the user's disposal.

V. RESULT OF PROJECT

The proposed system scanned the fingerprints placed on the device sensor and compared them against those stored in the database successfully. The performance of the system was acceptable and would be considered for full implementation especially because of its short execution time and reports generation.

Figure 6: SMS received in parents mobile

Reports can be easily generated in the proposed system so user can generate the report as per the requirement (monthly/weekly) or in the middle of the session. User can give the notice to the students so he/she become regular.

VI. CONCLUSION

The main purpose is to monitor the student attendance in lecture, tutorial and laboratory sessions in more efficient way and send this attendance to their faculties. This system resists students from bunking classes through SMS sending feature to faculties. Biometrics has effectively used for more than a decade for time and attendance system.

VII. FUTURE SCOPE

- Student is regularly absent within four day or six days free voice call to call the faculty mobile number by using GSM technology.

•The system could be modified into a web based system so that reports could be generated anywhere.

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