

Biometric Attendance Recording and Communication System

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Abstract- This paper deals with biometric, fingerprint attendance recording system. This paper focuses attendance recording system of students in educational institute. Truly it is an electronic attendance monitoring system which reduces the risk of false attendance recording. It also reduces the problems like keeping the paper attendance record, damage of paper record or loss of paper attendance record. It will record the attendance of subject teacher and students for a particular class and subject. Attendance of student will be also communicated to respective authorities through GSM module. The objective of this paper is very simple to go for paperless attendance recording system and to save papers, save environment i.e. go Green.

Keywords: fingerprint, attendance, GSM module

I. INTRODUCTION

Presently in most of educational institutes the attendance of students in a classroom is taken in conventional method by circulating a sheet of paper for signature of students. Sometimes total number of students in class is large and it takes more time to circulate sheet in class, and sheet may not reach to each and every student. Also there is a chance of damage of paper. To enter the fake attendance is also one of the major problems of this system. Teacher has to do all the calculations manually such as monthly attendance record, cumulative attendance, percentage attendance. It takes much time to prepare records in different formats. Another method usually followed is teacher marks the attendance by calling the name or roll number of student. But again problem is it takes around ten minutes to take the attendance, so there is direct academic loss of around twenty percent time for every lecture. Another important thing is some students generally do not communicate poor attendance information to their parents. The class teacher has to communicate the attendance to parents by sending letters.

Appropriate solution for this problem is to design fully automatic system. Biometric-fingerprint Identification systems are widely used for unique identification of person. Use of biometric in student attendance system is secure and reliable approach. Many approaches of biometric systems like fingerprint recognition, face recognition, voice recognition, iris recognition are there.

Considering the disadvantages of traditional attendance system, a design method of Fingerprint attendance system is proposed [1]. In this system students report their attendance via fingerprint system and authorities can receive SMS notification of attendance of each student and staff. Finger print is easy to use, secure and does not change in lifetime. Computation and simulation of fingerprint is simple. Fingerprint attendance recording system is not only faster but also fingerprint module requires less power for operation. Using fingerprint module with microcontroller and Zigbee module will help to send the attendance to PC and GSM module will help to communicate[2,3]. This will keep on updating the record also.

II. PROPOSED SYSTEM

Proposed system consists of one fingerprint module. It is the heart of the system. This unit is circulated in class during every lecture. This is battery operated device which can be moved very easily in class for attendance recording. Zigbee Module is connected to fingerprint module and Microcontroller. Using Zigbee module the attendance entered in class by the students will be transmitted to PC where Zigbee receiver is connected. As all the data will get stored on PC memory problem of hardware is solved. When GSM module will be connected to the PC the attendance record of staff, student will be send to the defined mobile numbers [4]. Start and end of lecture time will be also communicated to authorities after every lecture as per the system design. Programming will allow compiling attendance in different formats as per the requirement.

III. HARDWARE DETAILS AND CIRCUIT DIAGRAM DESCRIPTION

Basic block diagram of system is shown in fig.1. It consists of fingerprint module, microcontroller, Zigbee module, keyboard and LCD display unit. This is handheld setup for circulation in class.

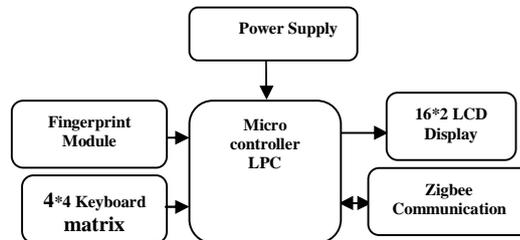


Fig.1.Hardware Interface Diagram

The unit shown below in fig.2 is at remote place but in the range of Zigbee transmitter. It receives the attendance record from class and stores it in PC. Transmitter receiver modules must be in the range defined.

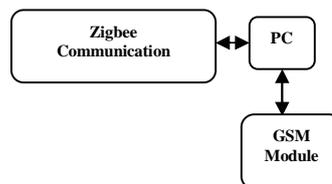


Fig.2. PC section

A. Fingerprint Module

Fingerprint module is the main part of this system. It consists of optical fingerprint scanner. It is interfaced with microcontroller. Sensor inside identifies the human finger and stores the data in 32 bit data frame format. Fingerprint module is interfaced with microcontroller and Keyboard. Using these standard figure print module commands, we can register the user and compare the user with existing data. We can delete the user from this module. Fingerprint module has TTL UART interface. Large image capture area 15-18 mm and very less verification speed of 0.3 sec are the key features of this module.

During enrolling user will enter two images and system will process two time finger images, generate templates and store it. During matching user will enter fingerprint through scanner and system will generate template. In return system will generate result as success or failure.

B. Microcontroller

LPC 2138 microcontroller is selected for this system. The microcontroller is actually responsible for all the process being executed. The main task is to continuously scan the data available from fingerprint scanner, to display the messages on the LCD, to communicate with the network etc. In short we can say that the complete intelligence of the project is in the software code embedded in the microcontroller. Where miniaturization is key requirement, these microcontrollers are ideal as they have tiny size and low power consumption. With their specifications microcontroller is suitable for voice recognition and low end imaging providing large buffer size and high processing power. Microcontroller has two UART ports one is used for Zigbee Communication and second is used for Fingerprint module connection.

C. Keyboard

4*4 matrix keyboard interface is used. This will help us to assign roll number of student and staff subject while enrolling. It also helps to delete a name from list.

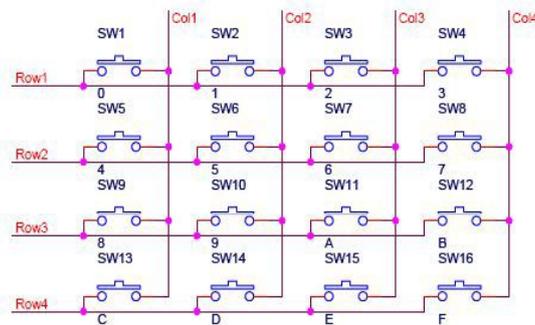


Fig.3. (4*4) keyboard matrix interface

D. LCD Display

16*2 LCD display is used which is interfaced with microcontroller. During matching of fingerprint, students will see the result on display as attendance recorded.

E. GSM Module

SIM 900 GSM/ GPRS module is used for communication purpose. Using AT commands the information is communicated to authorities. Presently it is proposed to communicate the daily attendance report of students for every subject along with start time and end time of lecture to head of the department.

F. Zigbee Module

Zigbee series 2 OEM RF module is selected. This module operates in Zigbee protocol and supports the important features as low cost, low power consumption. It works in around 40 meters range and hence will transfer the attendance data from classroom module to centrally located PC.

G. PC Interface

Once subject teacher will mark fingerprint it will indicate beginning of the lecture and students will mark their attendance using fingerprint module and same is communicated to PC via Zigbee. Finally again teacher will enter fingerprint which will indicate that lecture is finished. Zigbee transmitter connected to fingerprint module and microcontroller will form single unit. Zigbee receiver is connected to PC will receive the attendance record of every student and data will get stored on PC. GUI is designed which will help to get the data in different forms. By programming this will become easy to take the data and generate the record in different formats. The formats selected are roll number, total number of lectures, number of lectures attended by student, percent attendance, and monthly attendance for one subject. GSM module is also connected to PC and programming is done to send the attendance record of on specific mobile number. Basic GUI is designed to enter the information of all the students.

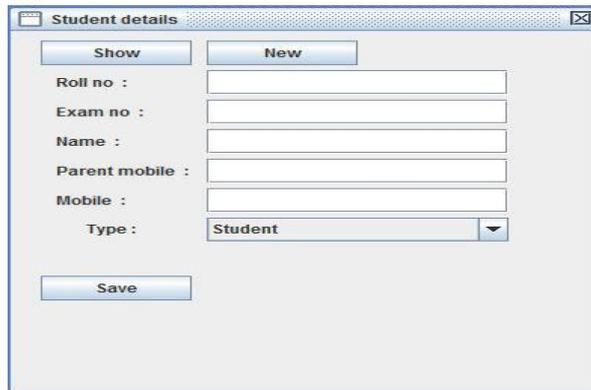


Fig.4. GUI for student's registration

Another GUI is designed which will help to generate record in different formats. Attendance for particular date or total attendance will be obtained. Mobile number selection is also available.

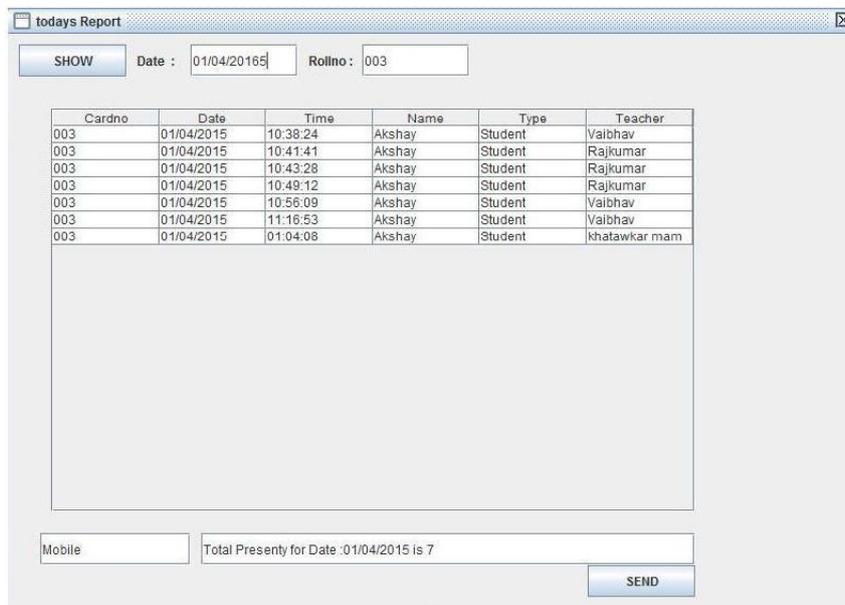


Fig.5. GUI design for student's attendance record

IV. RESULT

Prototype of fingerprint attendance recording system is developed. The device is tested with three students and two teachers. System works without properly. Also data is communicated to mobile numbers.

V. CONCLUSION

Student's attendance recording system is developed successfully. Beginning of lecture is authenticated by fingerprint of respective subject teacher, then students will enroll their attendance, end of lecture is also authenticated by fingerprint of subject teacher, so system is much reliable and accurate. It also indicates the total time for which teacher has conducted the lecture. Communicating with PC will help to produce attendance in required formats. Communicating through GSM module will update all details to higher authorities and is proposed to send the data to all parents weekly. So fingerprint attendance recording and communication system will be fast ,accurate solution.

REFERENCES

- [1] Mohamed Basheer K P , Raghu C V , “*Fingerprint Attendance System for classroom Needs*”, India Conference(INDICON), Annual IEEE 2012.
- [2] M A Meor Said,M H Misran, M A Othman, M M Ismail, H A Sulaiman,A Salleh, N Yusop, “*Biometric Attendance*”, 2014 International Symposium on Technology Management and Emerging (ISTMET 2014).
- [3] LI Jian-po, ZHU XU-ning , LI Xue, ZHANG Zhi-ming, Ji Sheng SUI ,“*Wireless fingerprint attendance system based on Zigbee Technology*”, IEEE 2010 2nd international workshop on intelligent systems and applications.
- [4] Amir Nizam Ansari, Arundati Navada, Sanchit Agarwal, Siddharth Patil, Balwant Sonkamble, “*Automation of Attendance system using RFID ,Biometrics, GSM modem with.. Net framework*”, IEEE 2011 International conference on multimedia technology.
- [5] Zhang Yongqiang ,LIU Ji, “*The design of wireless fingerprint Attendance system*”, IEEE 2006 International conference on communication Technology.
- [6] Nur Izzati Zainal, Khairul Azami sidek, Teddy surya Gunawan, Hasmah Mansor Mira Kartiwi, “*Design and development of portable classroom attendance system based on Arduino and fingerprint Biometric*”, IEEE 2014 international conference on information and communication Technology.