IJESRT

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY
ANDROID BASED FINGERPRINT SENSOR ATTENDANCE SYSTEM

Kaliprasanna Swain*, **M.V.S.V Prasad, Anwesha Dash**
*123 Electronics and Communication Engineering, GITA, Bhubaneswar, India

ABSTRACT
In this paper, the development of an attendance management system using biometrics is proposed. As the manual method of attendance system produced errors and taking lot of time during lecture period, an efficient and organized biometrics system for students' attendance is purposed. The electronic system not only used to take attendance for the students, but a database is also mentioned to store all the information which can be manipulated further in future. This biometric system, which is involved in the identification and verification of each individual student by scanning the characteristics of fingerprints. This type of verification is widely used in various aspects of life for different purposes, like in security, police identification, etc. In addition to this, once the students are registered, then respective parents and proctors are also being updated through the SMS generated by a GSM modem interfaced with the system and also an Android App is also developed to check the daily database of the student database.

KEYWORDS: Fingerprint Sensor, Microcontroller, GSM Modem, Android App

INTRODUCTION
The attendance is having a great significance benchmark not only in many institutional organizations, but also in other branches of different office. The prime intention of any attendance system includes keeping update records of students or employees, calculation of promotional activities, consistency in students or employee performance, etc. Also, minimum percentage of attendance is mandatory in many educational organizations. The manual system of taking attendance leads to time taking process and leads to lots of paperwork which causes human errors and insecurity. Hence, there is a demand of automatic process which can eliminate all the above problems in the traditional attendance system.

An automated biometric attendance system may be a better solution for this. It is an amalgamation of software and hardware based attendance system which not only records the date and time of the existing students or employees but also can accept the new entrant. Instead of signing in an attendance sheet, a student can put his/her thumb in the biometric scanner system, then it is correlated with the existing or registered users and after the conformation, the student is admitted to enter into the class. Finally, a report is generated which shows the daily or monthly attendance sheet. In some system, automatically a message is generated by the GSM MODEM to the concerned parents or proctor of college.

RELATED WORK
In [1], the fingerprint verification is done by using extraction of minutiae technique and the study was conducted using a quantitative approach by designing a questionnaire as the data collection instrument based on fingerprint matching biometric technologies.

In [2], the attendance was taken electronically with the help of a fingerprint recognition system, and all the documents are conserved for future manipulation and do further calculations of monthly attendance summary in order to reduce human errors during calculations. In addition to this, the system can be employed in curbing the problems of unpunctuality, proxy attendance and absenteeism in any institution, organization or establishment. After taking the attendance, the system sends the attendance of every student to their parent's mobile through GSM described in [3].

In [4], a novel fingerprint reconstruction algorithm is proposed to reconstruct the phase image, which is converted into the grayscale image afterwards. The algorithm used in this work to reconstruct the phase image from the minutiae. The proposed reconstruction algorithm has been evaluated with respect to the success rates of type-I attack (match the reconstructed fingerprint against the original fingerprint) and type-II attack (match the reconstructed

fingerprint against different impressions of the original fingerprint) using a commercial fingerprint recognition system.
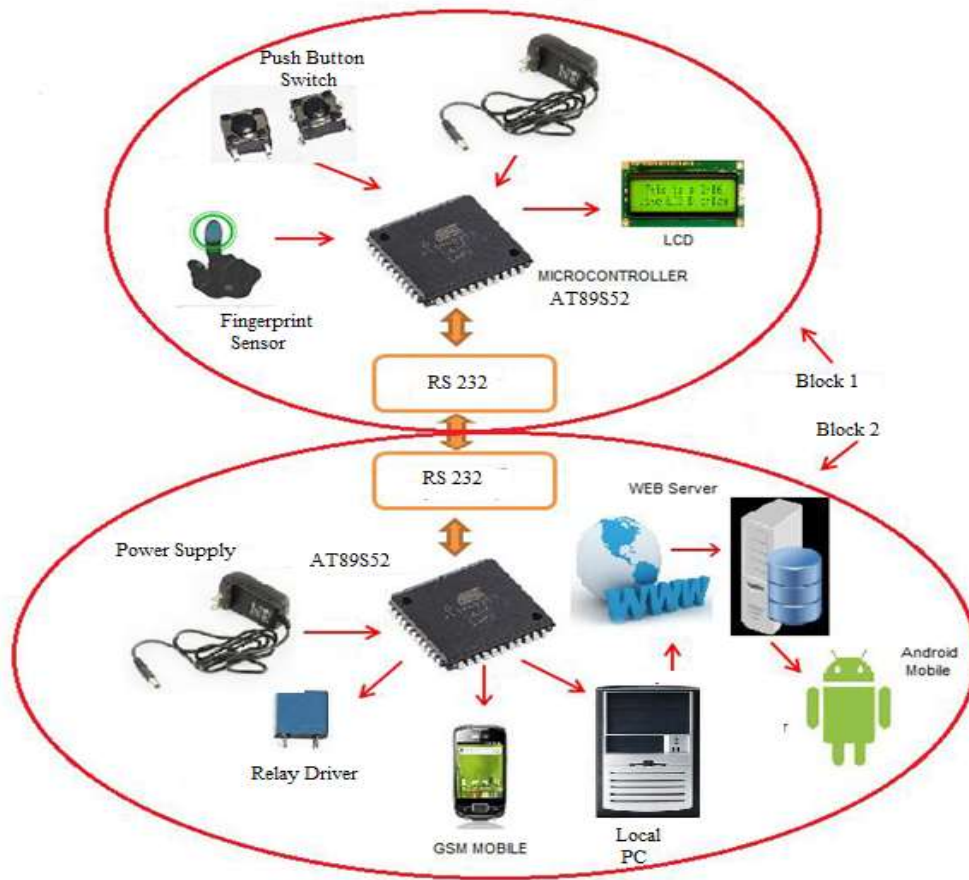
PROPOSED ARCHITECTURE

Fig. 1: Proposed Architectural Block Diagram

The purposed block diagram represents our overall set up. It consists of two separate blocks interconnected by RS232 cable. The major components of the first block are microcontroller (AT89S52), LCD, Keypad fingerprint sensor and power supply module, whereas the other block consists of a microcontroller (AT89S52), GSM Modem, Relay, and power supply. This system takes attendance electronically with the help of a fingerprint recognition system, and all the records are saved for subsequent operations. Here fingerprint sensor is used for attendance of students and once students are registered then automatically a message will sent to their parents and their respective proctor of the college through   GSM modem and also daily database can be maintained through a server PC. Three push button switches are used as input device which gives the user information to the microcontroller by pressing one particular key. The functions of the keys are; 1st key is for adding new user, 2nd key is for scanning database, 3rd key is for deleting the database. An LCD of two rows of 16 characters is used in this to display the functionalities. The protocol RS232 is used along with MAX 232 for communicating between two microcontrollers and other peripheral as well. GSM MODEM (SIM 300) which works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS1900 MHz is interfaced to generate SMS automatically for the intimation of the current status to the concerned authority.

Fingerprint sensor (SM 621) of Miaxis Biometrics Co. Ltd is an optical electronic sensor which consists of a high performance DSP processor with its own flash memory used to capture the Minutiae. The Minutiae, which is extracted by some algorithm represents all the information related to fingerprint and also responsible for all the operations such as fingerprint storage, verification, searching, etc.

WEB SERVER

In this work, a server is used to log data into the database [7]. For hosting purposes locally, XAMPP [8] is used which is a completely easy to use package of Apache web server, MySQL, PHP and Perl. It is a completely free, community built Software package used for deployment of Web applications. In case of data storage, MySQL database is used. MySQL [9] is again a free and open source software licensed under GPL (version 2) and owed by Oracle Corporation. SQL is abbreviated as Structured Query Language which is basically a language used to execute queries to store data onto a database. MySQL is terminal based DBMS so its data structure can be visualized using a third party web application such as "phpmyadmin". MySQL database is used to log the data, but a popular server side scripting language PHP is used to fetch and display data.

For Interfacing from hardware to the web/Local server, Java Programming language is used. Java [10] is a platform independent programming language which means program written for one platform can be deployed on another platform without any problem. A pre-written Java Library jSSC (Java Simple Serial Connector) is used in this work, [11] which is again an open source library for Serial Communication.

IMPLEMENTATION AND RESULT

Fig. 2: Overall Experimental setup

The Fig. 2 shows the total experimental setup. It comprises of two boards, one board consists of a power supply, LCD, Microcontroller(AT89S52), keypad and fingerprint sensor module, whereas the other board consists of GSM MODEM, Relay Circuit, power supply, and microcontroller(AT89S52).
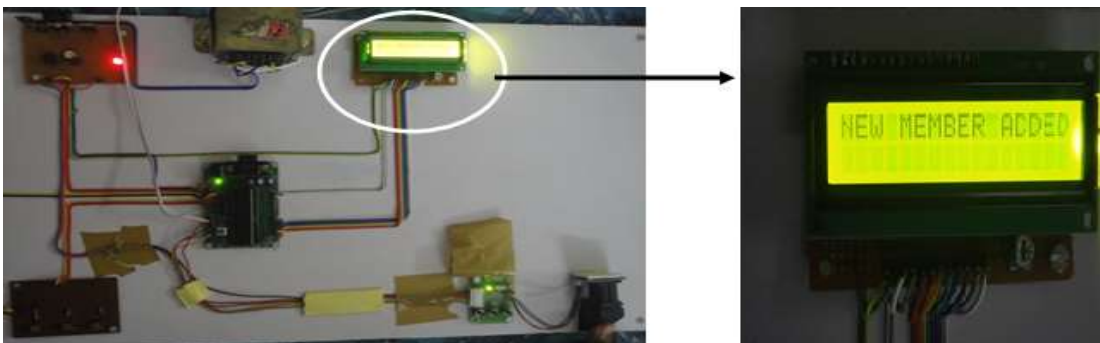

Fig. 3: Registration of a new member

The Fig. 3 shows "NEW MEMBER ADDED" on the LCD screen. It is when a person puts his/her finger on the fingerprint sensor module, and then add button of the keypad was pressed, after that the member was added to the database.
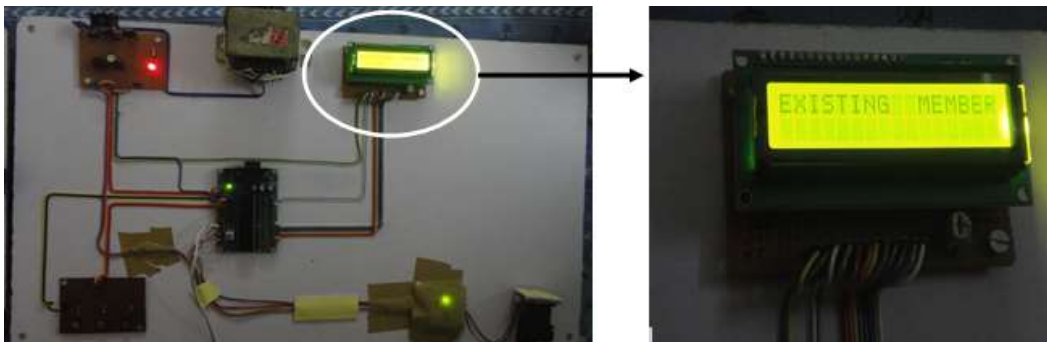

Fig. 4: Comparison of a person's fingerprint

The Fig. 4 shows "EXISTING MEMBER" on the LCD screen. After a member is added, when that member again puts his/her finger on the fingerprint sensor for scanning, and the search button of the keypad is pressed, then it shows EXISTING MEMBER.

Fig. 5: Fingerprint Output on PC through hyper terminal

The Fig. 5 shows the output of fingerprint sensor on a PC through hyper terminal to display all the records.

Fig. 6: Biometrix Android App installed on Smart Android based phone

Fig. 6 represents the front screen of installed Android App on a smart phone, whereas, Fig. 7 represents the sequential occurrence of the whole process when the App is open
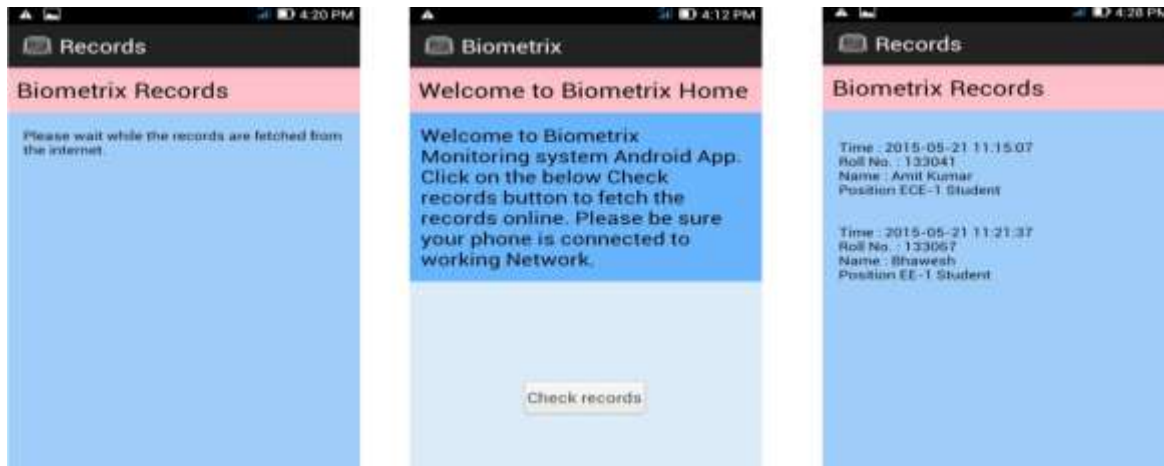

Fig. 7: The sequential process diagram of Biometrics Android App when open

CONCLUSION

In this work, a secure, fast, reliable and an efficient fingerprint sensor and Android based attendance system have been developed by replacing a manual and unreliable system. The fingerprint sensor captured new fingerprint images to be stored in the database and compared them with those stored already in the database successfully. After comparison, if the record already exists present in the database, then a confirmation message displayed on the LCD and at the same time an SMS is generated to the mobile number already registered. Finally, a web database has been maintained and individual record can be checked by an Android App which can be installed in any Android based smart phone.

REFERENCES

[1] Seema Rao, Prof.K.J.Satoa, " An Attendance Monitoring System Using Biometrics Authentication", International Journal of Advanced Research in Computer Science and Software Engineering, Volume 3, Issue 4, April 2013

[2] K. S. Adewole, S. O. Abdulsalam, R. S. Babatunde, T. M. Shittu and M. O. Oloyede, "Development of Fingerprint Biometric Attendance System for Non-Academic Staff in a Tertiary Institution", Computer Engineering and Intelligent SystemsVol.5, No.2, 2014

[3] Pallavi Verma, Namit Gupta, "Fingerprint Based Student Attendance System Using GSM", IJSR, Volume 2 Issue 10, October 2013

[4] R. Josphineleela, M.Ramakrishnan, "An Efficient Automatic Attendance System Using Fingerprint Reconstruction Technique", IJCSIS, Vol. 10, No. 3, March 2012.

[5] Miaxis Biometrics Co., Ltd., http://www.miaxis .com

[6] M.A.Mazidi and J.G.Mazidi, "The 8051 microcontroller and embedded system", Pearson Education,2005

[7] K. Swain, J. Sahoo, M.V.S.V Prasad, G. Palai, "Fault Detection System in an Optical Fiber Using Arduino", IJAER, Vol. 10 No.44, 2015

[8] XAMPP, available at https://www.apachefriends.org/index.html

[9] MySQL, available at http://www.mysql.com/

[10] Java, available at http://java.com/en/

[11] jSSC, available at http://code.google.com/p/java-simple-serial-connector

AUTHOR BIBLIOGRAPHY

Kaliprasanna Swain
Working as Asst. Prof in the department of Electronics and Communication Engineering at G.I.T.A. Bhubaneswar, Odisha, India. Email: kaleep.swain@gmail.com

M.V.S.V Prasad
Persuing his Bachelor Degree in Electrical and Electronics Engineering from G.I.T.A. Bhubaneswar, Odisha. Email: saiprasad1996@hotmail.com