Smartphone based fingerprint Ad-hoc Network for monitoring student's attendance

Ms.A.Deepalakshmi[1], Mr.S.MohanaPrakash[2], Mr.V.PrasathKumar[3], Ms.K.Rigana[4]
[1, 2, 3, 4] Sri Shakthi Institute of Engineering and Technology, Coimbatore, Tamil Nadu

Abstract- *Taking attendance in class of schools, Universities and colleges are time consuming process especially when the student's strength is high. Now-a-days all the students having their own smart phones. In this paper, we proposed ad-hoc network in which student's attendance will be recorded using fingerprint scanner in their smart phones. The staff's PC or Mobile device will work as workstation and All the recorded attendance will be sent to Head of Department's personal computer which is connected by using Local area network. The designed smartphone based attendance monitoring system is low-cost, time-saving, real-time and efficient which will be very useful for both companies and colleges.*

Keywords- Fingerprint scanner, Attendance Management, SMS alert, Ad-hoc Network, Smart-Phones.

I. INTRODUCTION

Monitoring Student's attendance is one of the most important duty of all the lecturers. But most of the colleges are following only manual attendance method till now such as calling students name or roll number one by one or passing the attendance sheet in which student's will sign and pass back to lecturer. But there are many drawbacks associated with this manual attendance method. Drawbacks are

1. The lecturer may loose the attendance register or sheet. As a consequence, lecturer may not be able to track the student's attendance for whole semester.
2. The students may give proxy to their friends by saying attendance orally or by signing in attendance sheet instead of their friends.
3. While uploading attendance in College or Web portal there is a chance for mistake data entry by which student's original attendance will be deviated.
4. It is difficult for a lecturer to take attendance during PT, Library due to the environment is vast and its difficult to track each students or it may be crowded during special occasions where and which all other classes students will be also there.

All the above mentioned issue can be overcome by this smart phone based fingerprint attendance system and it is easy to track each student's attendance and deviations like lack of attendance and absentees report will be send to the HODs immediately in order to help them to take necessary action.

II. EXISTING SYSTEMS

There are few attendance monitoring systems which replaces manual system. They are

1. Remote monitoring of attendance using Radio Frequency Identification and Global System for Mobile communication. It uses Radio waves with frequency of 3KHz to 300GHz. Two important component used by this system is RFID tag and reader. The RFID reader act as transceiver of data to and from tag. Thus, the student's tag will be read and attendance will be recorded. But the major disadvantage of this system is the RFID tag which is used uniquely to identify a student can be misused in such a way the tag can be carried by their friends and thus proxy will be recorded.
2. In another system called ZigBee based student attendance system, the fingerprint scanner (called as fingerprint terminal acquisition) is used to avoid proxy. But this scanner need to be passed all around the class for students to record this finger print, which is again time consuming and also in environment like grounds and auditorium this system will not work as it requires to pass the fingerprint scanner to individual student of certain class to record the attendance.

Figure 1 ZigBee based student attendance system

III. PROPOSED SYSTEM

In our proposed system we are going to use student's smart phones instead of fingerprint scanner so that each student can record their attendance using their own smart phones. Already many smart phones such as Vivo, Lenovo K6 note, Xiomo Redmi Note 4, Samsung Galaxy J7 prime are coming with inbuilt fingerprint scanner to provide authenticated users only to unlock the phone. There are also many apps available in Play store such as ICE Unlock Fingerprint Scanner, Screen lock etc. to securely lock and unlock phone. Some of these apps use only mobile phone's existing camera which take picture of user's fingerprint without any additional hardware.

IV. WORKING

The system consist of handheld Mobile device, Transceiver Module and attendance management module. Mobile device module is mobile handset of students which is used to recognize fingerprint of student. Transceiver module is used to send the fingerprint image to computer. Attendance management workstation is used to realize fingerprint extraction and matching in order to realize attendance function. If the fingerprint in database matches with the sent fingerprint from mobile, attendance will be provided to the students and acknowledgement is sent to student for that particular period. Wireless alarm send messages to the concerned mobile phone by GSM module through which is connected with GSM network. And it is also sent to The PC alarm monitor.

a. Smart phone Module:

Now-a-days all the college students having high-end model smart phones. These smart phones having good battery backup, Bluetooth technology, good internal memory and it is easy to install many mobile applications. In turn we could able to use these smart phones to obtain finger print from students as finger print scanner and also as validating device which is used by staff to save the finger print of students temporarily for 12 hours. This facilitates that staff could get attendance easily anywhere regardless of environments such as play ground, library or even auditorium where they will be having crowd of other students. Since both staff and student using mobile phone only to register and verify attendance it is easy to carry and attendance can be taken anytime and anywhere.

b. Fingerprint scanner algorithm:

Our Fingerprint algorithm consist of two primary functions such as capture and send. Fingerprint image from the sensor plays an important role. It identifies the minutiae features of fingerprint such as ending, bifurcation and short ridge. By that way it can able to recognize anyone's fingerprint and store it database or send to lecturer node for attendance entry.

c. RS 232

PC in general cannot directly communicate with peripherals that are available. The reason behind this is the difference in their working logic. PC generally works in positive logic. The microcontroller that actually acts as the peripheral here works in negative logic. It becomes important to change the logic between them when they communicate with each other. RS232 is very important for standard serial interfacing with PC where change of logic is achieved. PC communicates with peripherals through serial com1 or com2.

d. GSM Module PC

The GSM unit contains security features through software components through which the area security can be controlled and monitored. The hardware of 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. Cell phone can be attached at the place of GSM hardware but it limits the hardware functionality such as sending or receiving of SMS

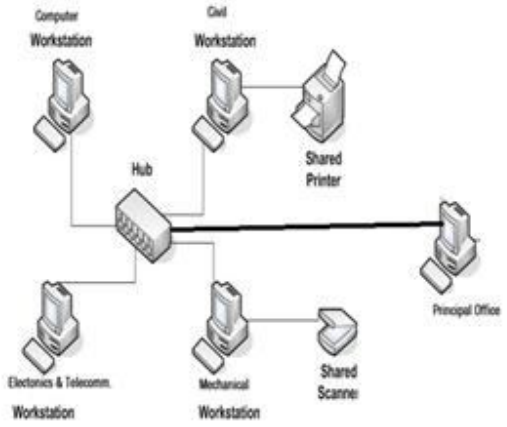


Figure 2 Local Area Network of college

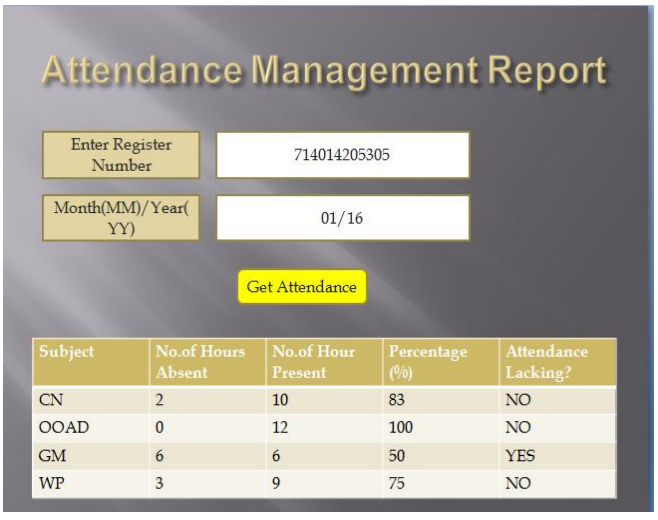
e. LAN Networking

LAN network(Local area network) can be established inside the college campus by both wired and wireless medium. Thus the lecturer's mobile device which is acting as workstation will be connected to LAN by Wi-Fi and the attendance data will be forwarded to Head of Department's PC which is also connected by LAN. Here in HOD's system all

the algorithm is applied to verify the student's attendance. Already there should be a database in which students name, register number, finger prints and mobile number are mapped and saved. Once the finger print reaches the HOD's workstation, it will be validated and verified. Only after the verification students will be marked as present. Once this verification is done, the software will send an alert message through GSM module to the students using their mobile number which is available in database.

V. RESULTS

Once the lecturer entered the class he/she can use fingerprint acquisition in his/her mobile to mark her period. Once if staff marked their finger print the port for students finger print is automatically open. But it will be open only for 10 minutes to avoid late entrance of students. Once if it is transfer to HOD's workstation, Using lecturer's finger print it will mark automatically the period, time, subject which will be available in database. There in HOD's work station a software which main functionality is to identify finger print, match it with database and mark students attendance. Once after the attendance entry is made, it will generate report. The report will be send to HOD and particular staff for monitoring student's attendance. The GSM module will send an alert message through SMS to student's number if they are marked as present. If they are marked as absent the message will be send to both absentees number and their parent's number, so that parents can keep an eye on their children even if they are staying far away from home or in hostel. This software can keep records for 5 years. So it be easy to monitor each students attendance.



A particular student's detail can be viewed by selecting the register number of that student.

VI. CONCLUSION

Thus the developed system provides modules for fingerprint acquisition and attendance management module in personal computer. Functions like fingerprint verification, marking attendance, calculating monthly attendance, subject wise attendance, sending attendance SMS to students, absentees report to parents will be done automatically by the attendance management software. Thus reducing the workload for lecturers, class advisors and HODs in monitoring student attendance. At the same time student, can also get acknowledgement through SMS. So, they will show concern about their attendance.

REFERENCES

[1] Murizah Kassim, Hasbullah Mazlan, Norliza Zaini, Muhammad Khidhir Salleh "Web-based Student Attendance System using RFID Technology" 2012 IEEE.

[2] B. Rasagna, Prof. C. Rajendra "SSCM: A Smart System for College Maintenance" International Journal of Advanced Research in Computer Engineering & Technology, May 2012.

[3] LI Jian-po, ZHU Xu-ning, LI Xue, ZHANG Zhi-ming "Wireless Fingerprint Attendance System Based on ZigBee Technology" 2010 IEEE.

[4] O. Shoewu, O.A. Idowu "Development of Attendance Management System using Biometrics" The Pacific Journal of Science and Technology, May 2012.

[5] "How does a fingerprint sensor work" Online Available: http://wiki.answers.com/Q/How_does_a_fingerprint_sensor_work [Accessed: Sept. 15, 2013].

[6] Prajakta S. Joshi1, Shubham S.Joshi "Zigbee Based Student Attendance System Using Lan Networking "IOSR-JECE, Nov - Dec. 2014