BIOMETRICS BASED STUDENT ATTENDANCE MONITORING SYSTEM

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ABSTRACT: In this project, The Biometric Access Control System based is designed and implemented on IOT. These system can be used for security purpose of an environment so that only the authorized persons are allowed to pass or also for attendance measuring purposes. Biometric confirmation is the best among security frameworks. These frameworks are included biometrics, like , unique mark, iris, and so on. Unique mark based biometric framework is a decent mix of minimal effort and high précision. Assessment of individual's confirmation is finished by refreshing time, participation and all related data to a Web server. Biometric understudy participation framework builds the effectiveness of the way toward taking understudy participation. This paper shows a basic and compact way to deal with understudy participation as an Internet of Things (IOT) based framework that records the participation utilizing unique mark based biometric scanner and stores them securely on the cloud. This framework plans to robotize the bulky procedure of physically taking and putting away understudy participation records. It will likewise anticipate intermediary participation, subsequently expanding the unwavering quality of participation records. The records are securely put away and can be dependably recovered at whatever point required by the educator.

***KEYWORDS*: Biometrics, Access Control System, Authentication, Internet of Things (IoT)**

I. INTRODUCTION

Earthlings are gifted with some uncommon and inflexible characteristics. This feature among us can be applied smartly to ensure security while using less manpower. Biometric confirmation is thought to be the personality check of an individual utilizing either an organic component which has physiological trademark like a unique mark or a social trademark like a mark. As human, fingerprint is inflexible over time and unique. It can most certainly be used in all applications pertaining to security or attendance over other biometrics. Attendance plays a major role in educational institutions. The most well-known methods for taking Attendance in the classroom is by getting out the move quantities of understudies or asking the understudies to physically sign the Attendance sheet, which is passed around amid the address. The process of manually taking and maintaining the attendance records becomes highly unmanageable. Biometric systems have reached a sufficiently advanced stage wherein they can now be deployed in systems without obstructing portability. With the recent development of various cloud based computing and storage systems, data can be safely stored and retrieved whenever required. Primarily, fingerprints and iris images are considered to be the most reliable for a system that registers the attendance making use of biometric scanners and stores them safely over cloud in the form of Google Spreadsheet can help resolve issues. The system consists of a fingerprint scanner which is used for ascertaining a student's identity. If the fingerprint scanned matches with records present in the database, attendance is granted to the student by updating to the Google Spreadsheet.

II. AIM OF PROJECT

The expectation of creating Attendance Management System is to mechanize the conventional method for taking participation. Attendance Management System is a stage for day by day understudy participation in schools, universities and organizations.

III. SCOPE OF PROJECT

It encourages to achieve the attendance data of a specific studies in a specific class. It additionally maintains a strategic distance from intermediary participation. Information precision is kept up, inside a limited ability to focus time.

IV. MOTIVATION

Every association whether it be an instructive foundation or business association, it needfull to keep a legitimate record of participation of understudies or staff for appropriate working of association. Planning a viable participation administration framework for understudies so records be kept up effortlessly and exactness was a vital key behind inspiring this undertaking. This will change accurateness of attendance records because it will exclude all the burden of roll calling and will save precious time of the students as well person conducting a attendance. Picture preparing and unique mark acknowledgment are extremely best in class today as far as innovation. It was our obligation to enhance unique mark recognizable proof framework. We diminished coordinating time by apportioning the database to one-tenth and enhanced coordinating utilizing key based one too many coordinating.

V. OBJECTIVE

- To automate the attendance system
- To provide accuracy in calculation
- To provide reliable record maintenance
- To generate desired reports

VI. PROBLEM DEFINITION

Traditional understudy attendance techniques, for example, move calling, paper based attendance , or card punches are obsolete and frequently prompt pointless time spent by educators and heads to track and make up for their constraints. Notwithstanding it, with substantial gatherings of understudies manual supervision is likewise extremely intense to execute. In this way, these conventional understudy following strategies have issues which can't anticipate intermediary attendance , ID card burglary, and attendance following mistakes - every single major issue that directly affect instruction quality.

VII. LITERATURE SURVEY

6.1 **Paper Name and Author:** Prabhakar S., S. Pankanti and A.K. Jain., "**Biometrics Recognition: Security and Privacy Concerns", IEEE Security & Privacy.**, Vol. 1, No 2, pp.33-42, 2003:
This paper represents a wide assortment of frameworks requires dependable individual acknowledgment plans to either affirm or decide the character of an individual asking for their administrations. The reason for such plans is to guarantee that the rendered administrations are gotten to just by a genuine client and nobody else. Precedents of such applications incorporate secure access to structures, PC frameworks, PCs, phones, and ATMs. Without hearty individual acknowledgment plots, these frameworks are helpless against the wiles of an impostor. Biometric acknowledgment or, just, biometrics alludes to the programmed acknowledgment of people dependent on their physiological and additionally social qualities. By utilizing biometrics, it is conceivable to affirm or build up a person's character dependent on "her identity," as opposed to by "what she has" (e.g., an ID card) or "what she recalls" (e.g., a secret phrase). Proposed system give a short diagram of the field of biometrics and outline a portion of its points of interest, disservices, qualities, restrictions, and related security concerns.

6.2 **Paper Name and Author:** Sharifah Mumtazah, Syed Ahmad, Borhanuddin Mohd Ali and Wan Azizun Wan Adnan., "**Technical issues and challenges of biometric applications as access control tools of information security**", International Journal of Innovative Computing, Information and Control., Vol. 8, No 11,
This paper specifies recent advances in biometric technologies coupled with the increased threats in information security has proliferated the applications of biometric systems to safeguard information and its supporting processes, systems and infrastructures. This paper discusses the technical issues and challenges faced by biometric technologies within the physical and logical access control applications of information security. The discussion includes concerns on the system performances with regard to robustness to the actual operating environment and recognition capability of different biometric traits. It also addresses various security threats which include spoofing and replay attacks. In addition, this paper highlights the challenges in interoperability as well as needs for reliable testing and reporting. The overall discussions provide imperative insights for an effective tradeoff and risk management analyses in information security policy and decision making

6.3 **Paper Name and Author:** J.L. Dugelay, J.C. Junqua, C. Kotropoulos and R. Kuhn., "**Recent Advantages in Biometric Person Authentication**", International Conference on Acoustics, Speech and Signal Processing. Vol. 4, pp.4060-4063, 2002.
This paper elaborates that Biometrics is a rising subject in the area of flag preparing. While advancements (e.g. sound, video) for biometrics have generally been concentrated independently, at last, biometric advances could locate their most grounded job as intertwined and corresponding bits of a multi-modular validation framework. This paper includes, a short outline of voice, unique mark, and face validation calculations is given.

6.4 **Paper Name and Author:** Zhang Yongqiang and Liu Ji., "**The design of wireless fingerprint attendance system**", Proceedings of International Conference on Communication Technology. Vol.1, pp.1-4, 2006.
This paper includes, a remote unique mark attendance administration framework is structured and executed. This framework based biometrics and remote method takes care of the issue of false attendance and the inconvenience of laying the comparing system. It can make the clients' attendances all the more effortlessly and viably.

6.5 **Paper Name and Author:** D.Maio and D. Maltoni., "**Direct gray-scale minutiae detection in fingerprints**", IEEE transactions on pattern analysis and machine intelligence, Vol.19, No 1, pp.27-40, 1997.
From this paper we understand that most programmed frameworks for unique mark correlation depend on details coordinating. Particulars are basically terminations and bifurcations of the edge lines that establish a one of a kind finger impression design. Programmed particulars recognition is a to a good degree basic process, particularly in low-quality fingerprints where commotion and complexity lack can begin pixel arrangements like details or shroud genuine particulars. A few methodologies have been proposed in the writing; albeit fairly unique in relation, every one of these techniques change unique finger impression pictures into paired pictures. In this work we propose a unique strategy, in

light of edge line following, where the particulars are separated straightforwardly from dark scale pictures. The outcomes accomplished are contrasted and those gotten through a few strategies dependent on picture binarization. Notwithstanding a more noteworthy calculated unpredictability, the strategy proposed performs better both as far as effectiveness and power.

6.6 **Paper Name and Author:** Mahalinga V.Mandi, Ashwini K.S, Chaitra H.S, Kavitha R and Kavitha U., "**Biometric Based Attendance Management System Using Wi-Fi**", International Journal of Emerging Technology and Research. Vol.1, No 5, pp.32-36, 2014.
Iris acknowledgment check is a most important proof strategies in Biometrics. With the fast improvement of iris acknowledgment confirmation, some of its applications have been proposed as of not long ago including time participation framework and so forth. In this paper, a remote iris acknowledgment participation administration framework is planned and actualized utilizing Daugman's calculation (Daugman, 2003). his framework based biometrics and remote method takes care of the issue of misleading participation and the inconvenience of laying the comparing system. It can make the clients' attendances all the more effortlessly and viably.

6.7 **Paper Name and Author:** Sifatnur Rahman, Mahabur Rahman, Md Mijanur Rahman **"Automated Student Attendance System using Fingerprint Recognition"** Department of Computer Science and Engineering, Jatiya Kabi Kazi Nazrul Islam University, Bangladesh.
The venture work goes for structuring an understudy participation framework which could viably oversee participation of understudies of the division of CS and Engineering at Jtiya Kabi Kazi Narul Islam University. In this venture work, participation is set apart after understudy's biometric recognizable proof. For understudy ID, a unique mark acknowledgment based ID framework is utilized.
Unique mark highlights are viewed as the best and quickest strategy for biometric ID. These highlights are more secure to utilize and special for each individual that don't change in one's lifetime. Unique mark acknowledgment is a develop field today, yet also distinguishing individual from an arrangement of selected fingerprints is a period taking procedure. It was exceptionally important to enhance the unique mark recognizable proof framework for execution on vast databases, e.g. of an organization or a nation. In this task, the details calculation is utilized to build up the distinguishing proof framework which is quicker in usage than some other accessible today in the market. The proposed robotized participation framework dependent on unique finger impression acknowledgment was tried on a class of understudy unique mark databases and accomplished critical outcomes for taking a participation of the understudies of the Department of Computer Science and Engineering. The proposed system has been actualized utilizing C# programming worldview stage.

6.8 **Paper Name and Author:** Rajan Datt, Utsav Shah, Dharmin Shah "**Student Attendance Management System using Fingerprint Scanner"** Institute of Technology, Nirma University.
In order to identify person uniquely various things are used such as iris, lip print, fingerprint. In this paper we have developed Student Attendance Management System which is used to identify the students uniquely using their Fingerprints. For the development of this system we have used Raspberry Pi 3, Serial 16x2 Serial LCD and Fingerprint Scanner tools. By using this we have developed system which is storing information of the student, verifying detail and generate report for the future use. During the attendance verification student keep his finger against the scanner and system will find whether the record is existing in the database or not, display proper message. We have also test system with various test case and found good results. By using this system teacher can save their time and increase accuracy in the results.

6.9 **Paper Name and Author:** Akinuyite C.O*, Adetnmbi A.O, Olabode O.O, Ibidunmye E.O "Boimetric Attendance Management System" Department of Computer Science, The Federal University of Technology, Ake, Ondo State, Nigeria. Journal of Computer Sciences and Applications, 2014, Vol. 1, No. 5, 100-105.
In late time, there has been abnormal state of pantomime experienced once a day in both private and open parts, the apparition specialist disorder which has turned into a hazard over all levels of government, bosses worries about the dimensions of representative nonattendance in their work and the stress in overseeing understudy participation amid address periods. Fingerprints are a type of biometric proof which is extraordinary and does not change in whole lifetime. This paper displays the participation administration framework utilizing unique mark innovation in a college situation. It comprises of two procedures to be specific; enrolment and verification. Amid enrolment, the unique finger impression of the client is caught and its interesting highlights removed and put away in a database alongside the clients way of life as a format for the subject. The unique highlights called particulars focuses were removed utilizing the Crossing Number (CN) technique which extricates the edge endings and bifurcations from the skeleton picture by inspecting the nearby neighborhoods of each edge pixel utilizing a 3 x 3 window. Amid confirmation, the unique finger impression of the client is caught again and the removed highlights contrasted and the format in the database to decide a match before participation is made. The unique mark based participation administration framework was actualized with programing language like c# system and SQL Server 2005 as the backend. The trial result demonstrates that the created framework is very effective in the check of clients unique mark with an exactness dimension of 97.4%. The normal execution time for the created framework was 4.29 seconds as against 18.48 seconds for the current framework. Besides, the outcome demonstrates a very much anchored and solid framework equipped for forestalling pantomime.

6.10 **Paper Name and Author:** Shweta Tripathi, Kalpana Wani "**Attendance Monitoring System through a Bluetooth Enabled Handheld Mobile Device"** Fr.C.Rodrigues Institute of Technology Vashi, Navi-Mumbai.
Recent advancements in mobile and wireless technologies have contributed to the development of new software applications to be

used anywhere, anytime and in almost any device. Although there exists different techniques of attendance monitoring, using mobile phone for such application forms a new identity recognition technique. This paper explores the development of application software for mobile phones using Java 2 Micro Edition (J2ME). We aim to develop an application on phone which enables employees to mark their attendance using the Bluetooth facilities of their mobile phone. The registration of employee will be automatic, faster and more security intensive than current method of attendance monitoring. The development is being done on the Sun Java Wireless Toolkit.

VIII. EXISTING SYSTEM APPROACH

The Existing system is a manual entry for the Admin and also Faculty. Here the attendance will be carried out in the hand written registers. Maintaining the records for the Faculty is a tedious job. The retrieval of the information is not as easy as the records are maintained in the registers.

Due to student's interest in classrooms, and whose is the largest union in the study environment of university or institution, so recording absence at a department having a large number of students in a classroom is a difficult task and time-consuming. Moreover, the process takes much time, and many efforts are spent by the staff of the department to complete the attendance rates for each student. So in many institutions and academic organizations, attendance is a very important criterion which is used for various purposes. These purposes include record keeping, assessment of students, and promotion of optimal and consistent attendance in class. As long as in many developing countries, a minimum percentage of class attendance is required in most institutions and this policy has not been adhered to, because of the various challenges the present method of taking attendance presents. The process of recording attendances for students was in the form of hardcopy papers and the system was manually done. Besides wasting time and taking efforts for preparing sheets and documents, other disadvantages may be visible to the traditional one due to loss or damage to the sheets-sheet could be stolen.

fig: manual student attendance system

IX. PROPOSED SYSTEM APPROACH

In order to overcome the drawbacks in existing system, a Web application has developed for daily attendance of students. The system consists of two actors one is Admin and another is Faculty, Admin is a super user who can create any Faculty, Student, Class details and Broadcast SMS etc. Faculty user can able to update an Attendance which has been taken in the XL Sheets. It is made simple to acquire the attendance information or exact data of a specific understudy.The information regarding the attendance is sent by the Faculty to the admin for related class which has been taken using the XL Sheet given to them. This application is helpful in evaluating the attendance eligibility of a student. The purpose is to computerize the tradition way of taking attendance and generating of report automatically at the end or between of the session.

9.1 System Architecture

Square outline encourages us comprehend the interrelationships and elements of a framework. The interflowing components of the framework are as appeared in Figure.

Fingerprint scanner – R305

Fingerprint scanner is utilized here to catch and process the unique mark picture.

C8051F380 Microcontroller –

Silicon Labs C8051F380 goes about as a center MCU which plays out all information/yield tasks.

ESP8266 Wi-Fi module –

ESP8266 12 E Wi-Fi module goes about as a correspondence module among C8051F380 and web server.

Wi-Fi Router –

Its used to send approaching information from ESP to web and the other way around.

Web server –
Used to store the participation related data. **Power Supply framework** Provides control supply according to the necessities.

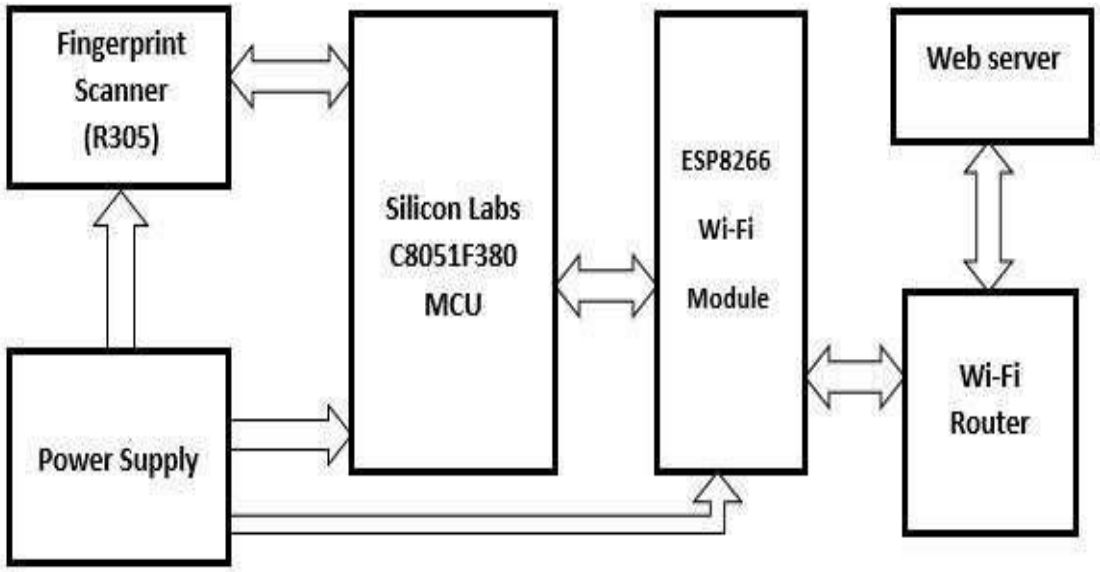

fig: block diagram of the proposed system

Fingerprint sensor used here is R305 sensor which can store up to 256 fingerprints. This is suitable for home or any small environment. But for a larger scenario such as school/company we need to store more fingerprints. So for this purpose we need a microcontroller to export fingerprint character files from scanner to web server and as there is IoT included, we need a Wi-Fi communication module. We select Silicon Labs C8051F380 as a microcontroller and ESP8266 as a communication module. Here fingerprint image acquisition and fingerprint image processing commands are given by C8051F380 to the sensor using UART interface through serial communication. C8051F380 communicates with ESP8266 also using UART interface. ESP8266 and Web server communicates via a Wi-Fi router. R305 requires 3.6V, whereas C8051F380 and ESP8266 need 3.3V each for proper functioning.

9.2 Advantages Of The Proposed System:

Accurate Attendance:
Instructive organizations can halfway and precisely screen understudy participation to forestall intermediary participation and blunders which are regular issues when utilizing conventional registration and registration strategies.
Convenience:
Biometric understudy participation frameworks give a helpful method to registration and registration into the framework by just checking their biometrics
Saves Time:
Biometric understudy participation administration frameworks chop down an opportunity to record class participation.
Increases Efficiency:
Biometric frameworks not just kill blunders identified with following participation information yet in addition accelerate information check which diminishes organization time and makes efficiencies.

X. Project Implementation and Results

1. Introduction

- Biometric confirmation is thought to be the personality check of an in- dividual utilizing either an organic component which has physiological trademark like a unique mark or a social trademark like a mark.
- Attendance plays a major role in educational institutions.
- The process of manually taking and maintaining the attendance records becomes highly unmanageable.
- With the recent development of various cloud based computing and storage systems, data can be safely stored and retrieved whenever re- quired.
- Registers the attendance making use of biometric scanners and stores them safely over cloud in the form of XML/CSV can help resolve issues.
- If the fingerprint scanned matches with records present in the database, attendance is granted to the student by updating to the XML/CSV.

2. Tools and Technologies Used

i.Tools :

- Python,
- JSP
- Atmel ATMEGA 328P
- ESP8266 Wifi-Module Nodemcu.,
- R305 FingerPrint used.

ii.Python:

- Python is a programming language.
- (Arduino Studio V-1.8.8) Editor to create arduino programs.

iii.JSP:

JSP technology is used to create web application just like Servlet tech- nology.

iv.Atmel Atmega 328P:

The high-performance Microchip picoPower 8-bit AVR RISC-based mi- crocontroller combines 32KB ISP flash memory with read-while-write capabilities, 1024B EEPROM, 2KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, a 6- channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes.

- The device operates between 1.8-5.5volts.

By executing powerful instructions in a single clock cycle, the device achieves throughputs approaching 1 MIPS per MHz, balancing power consumption and processing speed.

v.ESP8266Wifi nodemcu Module:

The ESP8266 is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability.
The ESP8285 is an ESP8266 with 1 MiB of built-in flash, allowing for single-chip devices capable of connecting to Wi-Fi.

vi.R305 :

Finger Print Sensor (R305) -TTL UART is a finger print sensor module with TTL UART interface.
The user can store the finger print data in the module and can configure it in 1:1 or 1: N mode for identifying the person.
The finger print module can directly interface with 3v3 or 5v Micro- controller. A level converter (like MAX232) is required for interfacing with PC.

XI. Results:

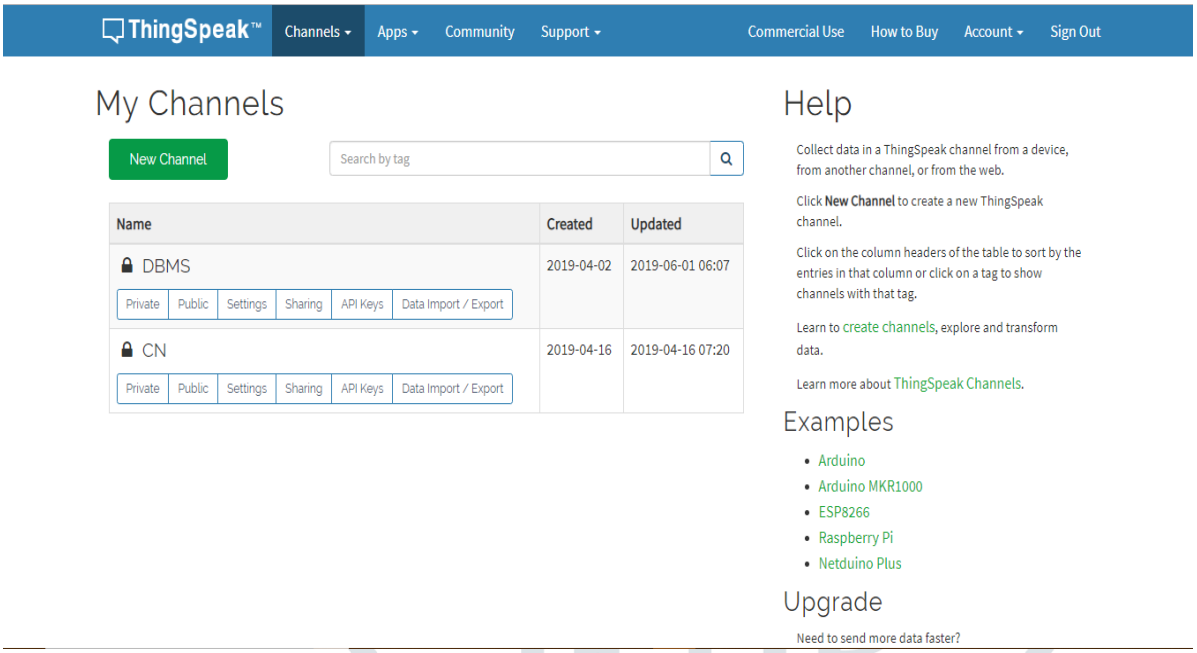

FIG:SERVER

XII. CONCLUSION

The old method of manually taking and maintaining student attendance is highly sloppy and tedious. The participation checking framework in light of biometric confirmation can possibly streamline the entire procedure.

An Internet of Things based versatile biometric participation framework can end up being of extraordinary incentive to instructive organizations in such manner as it resulted as exceedingly proficient and secure. The cost engaged with making this framework is very less, when contrasted with regular biometric attendance framework. The Cloud utilized for putting away the attendance records makes one of the information simple to deal with and recover as end when required by the overseers. The fingerprint scanner makes sure that the attendance record is reliable. The system, because of its limitation to complexity, proves to be easy to use and user friendly.

REFERENCES

[1] Prabhakar S., S. Pankanti and A.K. Jain., "Biometrics Recognition: Security and Privacy Concerns", IEEE Security & Privacy., Vol. 1, No 2, pp.33-42, 2003.

[2] Sharifah Mumtazah, Syed Ahmad, Borhanuddin Mohd Ali and Wan Azizun Wan Adnan., "Technical issues and challenges of biometric Applications as access control tools of information security", International Journal of Innovative Computing, Information and Control. Vol. 8, No 11, pp.7983-7999, 2012.

[3] J.L. Dugelay, J.C. Junqua, C. Kotropoulos and R. Kuhn., "Recent Advantages in Biometric Person Authentication", International Conference on Acoustics, Speech and Signal Processing. Vol. 4, pp.4060-4063, 2002.

[4] Zhang Yongqiang and Liu Ji., "The design of wireless fingerprint attendance system", Proceedings of International Conference on Communication Technology., Vol.1, pp.1-4, 2006.

[5] D.Maio and D. Maltoni., "Direct gray-scale minutiae detection in fingerprints", IEEE transactions on pattern analysis and machine intelligence. Vol.19, No 1, pp.27-40, 1997.

[6] Mahalinga V.Mandi, Ashwini K.S, Chaitra H.S, Kavitha R and Kavitha U., "Biometric Based Attendance Management System Using Wi-Fi", International Journal of Emerging Technology and Research., Vol.1, No 5, pp.32-36, 2014.

[7] Sifatnur Rahman, Mahabur Rahman, Md Mijanur Rahman "Automated Student Attendance System using Fingerprint Recognition" Department of Computer Science and Engineering, Jatiya Kabi Kazi Nazrul Islam University, Bangladesh.

[8] Rajan Datt, Utsav Shah, Dharmin Shah "Student Attendance Management System using Fingerprint Scanner" Institute of

Technology, Nirma University.
[9] Akinduyite C.O*, Adetunmbi A.O, Olabode O.O, Ibidunmoye E.O "Fingerprint-Based Attendance Management System" Department of Computer Science, the Federal University of Technology, Akure, Ondo State, Nigeria. Journal of Computer Sciences and Applications, 2013, Vol. 1, No. 5, 100-105.
[10] Shweta Tripathi, Kalpana Wani "Attendance Monitoring System through a Bluetooth Enabled Handheld Mobile Device" Fr.C.Rodrigues Institute of Technology Vashi, Navi-Mumbai.http\\www.Wikipedia.com and http\\www.google.com