IOT BASED BIOMETRIC ATTENDANCE SYSTEM

IAEME Publication

IAEME Publication

International Journal of Electrical Engineering & Technology (IJEET)
Volume 11, Issue 2, March-April 2020, pp. 156-161, Article ID: IJEET_11_02_019
Available online at http://www.iaeme.com/IJEET/issues.asp?JType=IJEET&VType=11&IType=02
ISSN Print: 0976-6545 and ISSN Online: 0976-6553
Journal Impact Factor (2020): 10.1935 (Calculated by GISI) www.jifactor.com

IOT BASED BIOMETRIC ATTENDANCE SYSTEM

Tripti Jain, Urvashi Tomar, Umang Arora and Swati Jain
Department of CSE, MIET, Meerut, India

ABSTRACT

The efficacy in the procedure of getting students attendance can be maximized when the IOT Based Biometric attendance system i.e. smart attendance system is used. The student's attendance is recorded using biometric scanner which is fingerprint based and then the data is secured safely over a cloud storage. The system averts the proxy attendance, time will also be saved, thereby the reliability of student's attendance information is also maximized. The student's data are loaded securely over the cloud and can be easily fetched according to the need. This research paper throws a light on simple, easier and portable method for students' attendance in which internet of things is used.

Keywords: IOT, FPS, Biometric, Fingerprints, Fingerprint Scanner, Attendance

Cite this Article: Tripti Jain, Urvashi Tomar, Umang Arora and Swati Jain, IOT Based Biometric Attendance System, *International Journal of Electrical Engineering & Technology*, 11(2), 2020, pp. 156-161.
http://www.iaeme.com/IJEET/issues.asp?JType=IJEET&VType=11&IType=2

1. INTRODUCTION

In this smart attendance system, the notion of Internet of Things is put-in into an attendance system of a classroom. Due to the increasing development in the area of cloud-based computing, there are various storing systems in which the data is often precisely stored and can be fetched anytime. Basically, fingerprints are considered as the foremost reliable type of thing to be used in biometric systems. The project contains an FPS that identifies the identity of student by scanning the fingerprint. If the biometrics of the fingerprint of a particular student which is scanned get matched with the data records which is present on the database of the cloud, then the attendance of that student is marked as present. This attendance system saves the time and it proves to be highly secured than the usual manual attendance system. The proposed system requires connection to the web, that can be accomplished through a Wi-Fi.

2. PROPOSED WORK PLAN

2.1. The main aim of the project is to automatize the procedure of attendance

The flow chart will be as follows.

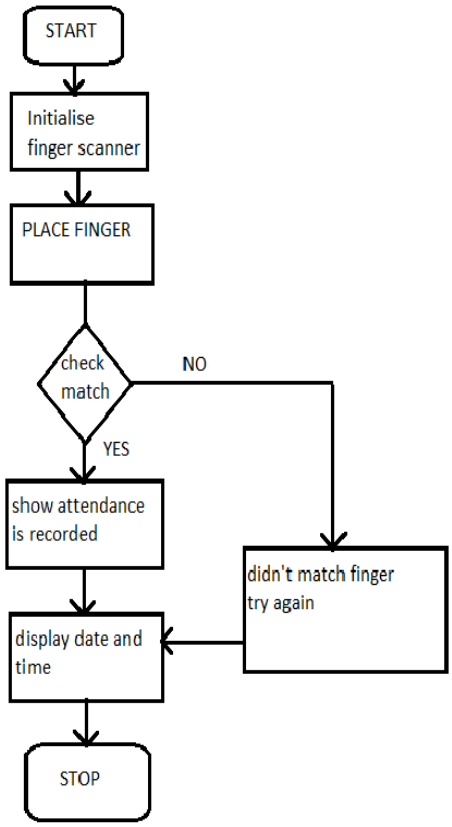

Figure 1 Flow chart of implementation

2.2. Description of various modules of the system

2.2.1. Hardware Requirements

2.2.1.1. Arduino Uno

The operations which are involved in taking attendance are controlled here by using Arduino UNO. The operations that will take place are four in number and they are enrol, verify, delete and reset. We are using Arduino uno because it consists of many modules which are very useful as they add some features to Arduino board. Arduino is easy to use, code and handle.

Figure 2 Arduino UNO

Figure 3 16X2 LCD display

*2.2.1.2. 16*2 LCD Display*

The clear message should be conveyed to the user so that there is a better interaction with a device, so a 16*2 LCD Display is used here. There is generally a green light in the background in LCD display in which characters are displayed on it which are black in colour and in 7X5 matrix.

2.2.1.3 GT511C3 Finger print sensor (FPS)

The GT-511C3, an embedded module used as a fingerprints scanner or FPS which has high speed and high accuracy. There is a small circuit board on which there is an optical sensor mounted it. The fingerprints are scanned by optical sensor and functionality is provided to the modules by the microcontroller and the fingerprint is processed automatically.

Figure 4 GT511C3 Finger Print Sensor

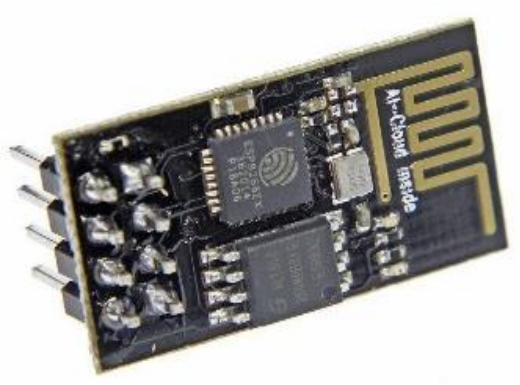

Figure 5 ESP8266 Wi-Fi Module

2.2.1.4. ESP8266 Wi-Fi Module

The ESP8266 Wi-Fi Module is used in internet of things. It is integrated with TCP/IP protocol stack. Its main purpose is accessing the Wi-Fi network using a microcontroller. Both the hosting of an application or offloading of all the functions of Wi-Fi networking, either can be done with the help of this module. This module connects to the Wi-Fi network using TCP/IP connections.

2.2.2. Software Requirements

2.2.2.1. THINGSBOARD

Thingsboard is one of the IOT platform which is open source and can be utilised for collection of data, visualization, processing of data, and device management. Some of the industry standard IOT protocols which are used to enable the device connectivity are–Message Queuing Telemetry Transport, Common Offer Acceptance Portal and Hyper Text Transfer Protocol. Both on-premises and cloud deployments are supported by Thingsboard. This open soured platform combines fault-tolerance, scalability and performance so that our information or data can never be loosed.

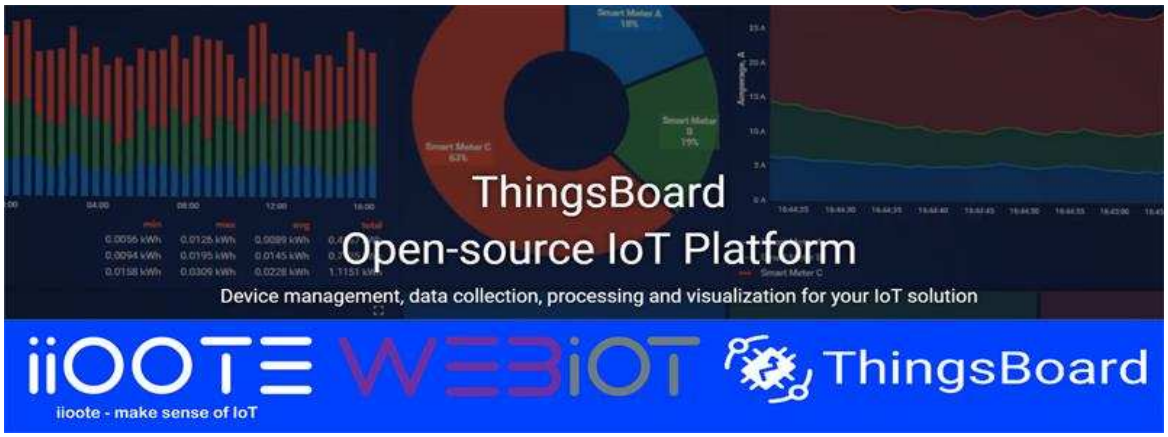

Figure 6 Thingsboard (Open source IOT platform)

2.2.2.2. Arduino IDE

Arduino IDE, a software which is used for Arduino, Node-MCU and other electronics boards' codes. It supplies many software libraries which are used in input and output procedures. The program is written in text area of Arduino IDE and is known as Sketch. The message area or Output Pane displays the feedback of saving or exportation of code.

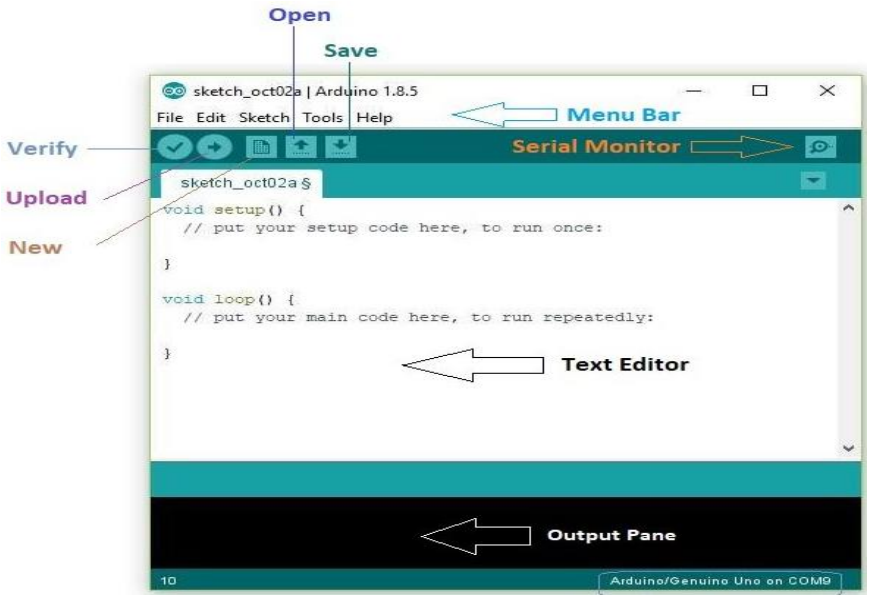

Figure 7 Arduino IDE

2.3. ALGORITHM

1. Procedure Starts
2. Selection of choice of enrolling a new fingerprint or deleting the previous ones.
3. Scans for the Wi-Fi network (if nothing is selected).
4. Then it displays all the available networks.
5. It starts scanning for the fingerprints when the connection is established successfully.
6. Students can scan their fingerprints now.
7. When it analyses and matches any student's fingerprint, it uploads their fingerprint ID to the server.
8. As far as the server acquires the biometric data from the system, it updates the presence of the student.

3. EXPERIMENTAL RESULT ANALYSIS

The IOT based biometric attendance system can store the biometrics of every student, thereby making the process easier and more reliable. While enrolling the fingerprints, fingers must not be swollen and should not have scratches. Also, they should be neither damp nor dry. Student's fingerprints must be properly clean. Orientation of fingers on FPS is also necessary.

Table 1 Problem that may occur during fingerprint scanning

Problems	Fingerprint Snapshot	Problems	Fingerprint Snapshot
Finger misplacement		Dirty finger	
Orientation		Skin problem	
Wet finger			

The result after the implementation is as follows: -

Table 2 Results after implementation

Some of the points that can be estimated from above implementation are

- Execution of attendance of enrolled person takes 0.1 second while for the person who is not enrolled, it takes 3 to 4 seconds.
- History can also be estimated in this system.
- Manual attendance system takes twice or thrice it's time.

3.1. Application

- The system can be use in biometric attendance of students.
- This technique is often used for real time monitoring of any class's strength and maintaining the attendance records in real time.
- It can be used for security purposes where high-level security is desired.

4. CONCLUSION

The usual procedure of taking manual attendance and keeping students' attendance is very difficult, inefficient and highly time-consuming task. The IOT based biometric attendance system is supported with biometric identification features which has the capability to automatize whole process. An attendance system with 3 broad features i.e. Internet of Things (IoT), Cloud computing and FPS yields a huge value to various institutions. Due to these considerations, it manifests that it is highly reliable with high security. This system is user friendly due to its lack of complexity.

REFERENCES

[1] Colin Dow, "Internet of Things Programming Projects: Build modern IOT with the Raspberry Pi 3 and Python", Paperback, October 31,2018, Packt Publishing.

[2] Pradeeka Seneviratne, "Hands-On Internet of Things with Blynk: Build on the power of Blynk to configure smart devices and build exciting IOT projects", Paperback, May 28,2018, Packt Publishing.

[3] Snehal R. Shinde, A. H. Karode and Dr. S. R. Suralkar, Review on IOT Based Environment Monitoring System, International Journal of Electronics and Communication Engineering and Technology, 8(2), 2017, pp. 103–108.

[4] Leo Louis. "Working Principle of Arduino and using it as a tool for study and research", IJCACS, April, 2016.

[5] Viswanath Naik. S, S. Pushpa Bai, Rajesh. P and Mallikarjuna Naik. B, Iot Based Green House Monitoring System, International Journal of Electronics and Communication Engineering & Technology (IJECET), Volume 6, Issue 6, June (2015), pp. 45-47.

[6] Pradip Patil,Sumit Sharma,R. B. Gajbhiye, "A Study- Impact of Internet of Things (IOT) For Providing Services for Smart City Development", June 2015.

[7] Trideep Singha Roy, Soumalya Ghosh, Rimpi Datta, Arpita Santra, IoT Based Home Automation Using Raspberry PI, International Journal of Computer Engineering and Technology 10(3), 2019, pp. 70-74.

[8] Pranava Madan, Lakshay Dhama , Rajiv Dahiya , Ruchika Doda, " A Review Paper on Arduino Research Papers", International Journal for Research in Applied Science & Engineering Technology (IJRASET), March,2019.

[9] M N Rajaprabha, P Jayalakshmi, R Vijay Anand and N Asha, Iot Based Smart Garbage Collector for Smart Cities, International Journal of Civil Engineering and Technology, 9(12), 2018, pp. 435–439

[10] Manan Mehta, "ESP 8266: A BREAKTHROUGH IN WIRELESS SENSOR NETWORKS AND INTERNET OF THINGS," International Journal of Electronics and Communication Engineering & Technology (IJECET) Volume 6, Issue 8, Aug 2015**.**

[11] Dr. Samir Mohammed Chassib, Dr. Sa'ad Fahad Resan, Mohammad Salah Gejan, Murtadha Jabar Salih, Ali Mohsen Hasan, Developing Sustainable Lightweight Bubbled Ferrocement Slab Using Enhancing Cementitious Agents, International Journal of Civil Engineering and Technology (IJCIET) 9(11), 2018, pp. 749–765.

[12] Mesquita, Joao & Guimaraes, Diana & Pereira, Carlos & Santos, Frederico & Almeida, "Assessing the ESP8266 WiFi module for the Internet of Things", IEEE, 2018.

[13] Lalit Chettri**,** Rabindranath Bera, "A Comprehensive Survey on Internet of Things (IoT) Toward 5G Wireless Systems.