



# STUDENT'S ATTENDANCE MONITORING SYSTEM USING FINGERPRINT MODULE

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**ABSTRACT:** Maintaining the attendance is essential in every one of the foundations for checking the performance of student's and teacher's. Each organization has it's own technique for this. Traditionally student's attendance is taken by the teacher's and the teacher's attendance are taken manually by using the attendance sheet given by the faculty member's to each class. Another technique used for attendance registering is RFID based attendance registering system. But it is highly time consuming and non-efficient. So to overcome these problems designing an efficient attendance management system for student's to maintain the records with ease and accuracy is an important key behind motivating this project. We introduce an 'Student's Attendance Monitoring System Using Fingerprint Module' which automatically registers the attendance of student's using fingerprint method.

## INTRODUCTION :

Fingerprint of a person is scanned and attendance is instantly updated in an android application. The system automatically finds the absentees and informs their parent's by sending alert messages. There is also a provision for class rating by the student's for each hour. Attendance along with average class rating can be viewed by authorized person through an android application. The system is an effective method for monitoring the attendance system. Sending alert messages to the absentees' mobile is also possible. Using this system paper work for attendance marking can be reduced. Attendance proxy can be reduced. The above framework is a better and reliable solution from every perspective of time and security. Many organizations are trying to identify accurate, safe and reliable techniques to protect access rights to their existing services or operation. Fingerprint is one answer to these concerns. Fingerprint offers a secure method of access to sensitive services. We have developed an identification system which is faster in implementation than any other available today in the market. Although we are using this fingerprint identification system for employee identification purpose in our project, the matching results are so good that it could perform very well on large database.

## FEATURES

- Integrated image collecting and algorithm chip together, All-in-one
- The fingerprint reader can conduct secondary development, can be embedded into a variety of end products
- Low power consumption, low cost, small size, excellent performance
- Professional optical technology, precise module manufacturing techniques
- Good image processing capability

## AIM

This project aims on taking attendance based on fingerprint using a portable device and to monitor it by the concerned authority using an android application.

## EXISTING SYSTEM

- Taking attendance physically  
Attendance register is a helpful tool that allows you to record student presence or participation in course related sessions. They allow you to add information such as class lists and events in order to quickly and easily record



Figure 1.1 Attendance taken physically



## Advantages

- 1 Recording and keeping attendance manually
- 2 Sending the information to another number of staff for analysis

## Disadvantages

- 1 Highly time consuming
- 2 Inefficient

## PROPOSED SYSTEM

## INTRODUCTION

In this project IOT Biometric Project, we learn to build Student's Attendance Monitoring System Using Fingerprint Module, Node MCU ESP8266 12E, Oled display & R305 Fingerprint Sensor. The ESP8266 Wi-Fi Module will collect the fingerprint data from the multiple users and sends it over the internet to a website. The enrolment of fingerprints is done on the server using R305 or R307 or any other compatible fingerprint sensor and verification is done on the client with the transmission of fingerprint templates over the network.

The website that is coded in PHP has a data base and records of attendance .By logging into the website, can collect all the attendance records of each user including personal details as well as incoming & outgoing timing. The data can also be downloaded and exported to an excel sheet.

ID   NAME	SERIAL NUMBER	GENDER	FINGER ID	DATE	TIME IN
5   Abraham	104	Male	4	2019-08-22	00:00:00
4   Smith	103	Female	3	2019-08-22	00:00:00
3   Lucinda	102	Female	2	2019-08-22	00:00:00
2   Alex	101	Male	1	2019-08-22	00:00:00

Figure 1.2 Data sheet

The conventional authentication technologies like RFID tags and authentication cards have a lot weakness, biometric method of authentication is a prompt replacement for this. Biometrics such as fingerprints, voices and ECG signals are unique human characters that cannot be tampered or replicated. This facilitates real-time system implementation. Biometric attendance systems are commonly used systems to mark the presence in offices and schools. This project has a wide application in school, college, business organization, offices where marking of attendance is required accurately with time. Thus, by using fingerprint sensor, the system will become more secure for the users.

## SPECIFICATION

- 1 Fingerprint sensor type : Optical
- 2 Sensor life : 100 million times
- 3 Static indicators : 15kv Backlight : bright green
- 4 Interface : USB 1.1/UART(TTL logical level)
- 5 RS232 communication baud rate :4800BPS-115200BPS
- 6 Dimension : 55x22x1.5mm
- 7 Image capture surface : 15-18 mm
- 8 Verification speed : 0.3 sec
- 9 Scanning speed : 0.5 sec
- 10 Character file size : 256 bytes
- 11 Matching method : 1:N
- 12 Operating environmental temperature – 20 to 45degree centigrade



**CIRCUIT DIAGRAM**

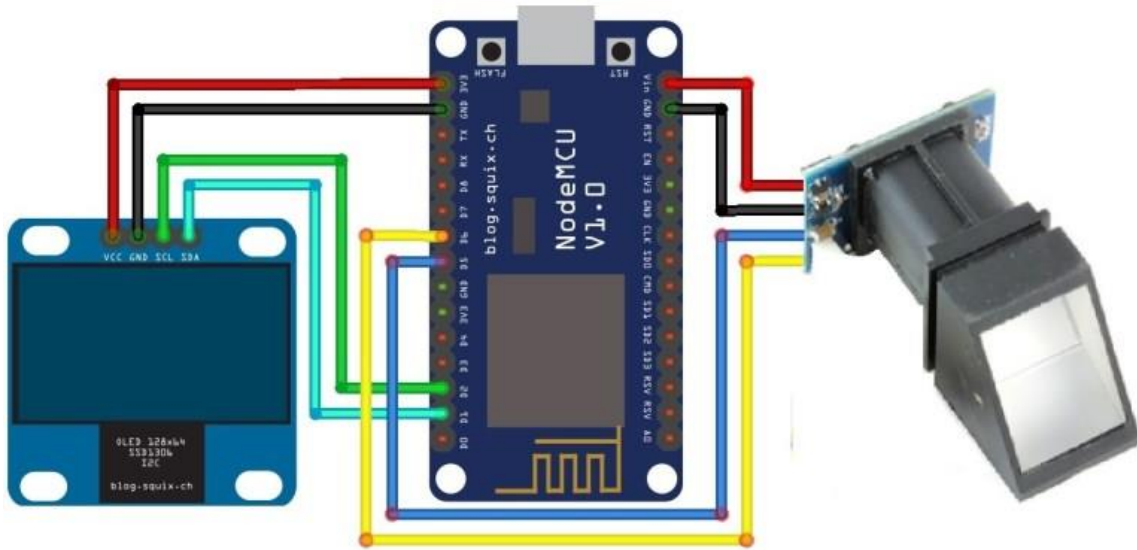


Figure 1.3 Circuits

The above circuit diagram shows how an OLED Display & Fingerprint sensor is interfaced to Node MCU ESP8266Board. The I2C pins of OLED Display, i.e. SDA & SCL is connected to Node MCU D1 & D2 pins respectively. Similarly fingerprint sensor is connected to UART pins D5 & D6. The fingerprint sensor TX and Rx wires color may vary. In our case the color is yellow and blue where yellow is TX and blue is Rx. So connect it by finding appropriate color wires else the module won't be detected by Node MCU

The R305 fingerprint sensor is supplied with 5V through V in pins of Node MCU. In our case, the sensor didn't work at 3.3V. Similarly sensor connect

OLED Vcc pin to 3.3V of Node MCU. COMPONENT'S EXPLANATION :

- R305 FINGERPRINT SCANNER SENSOR MODULE

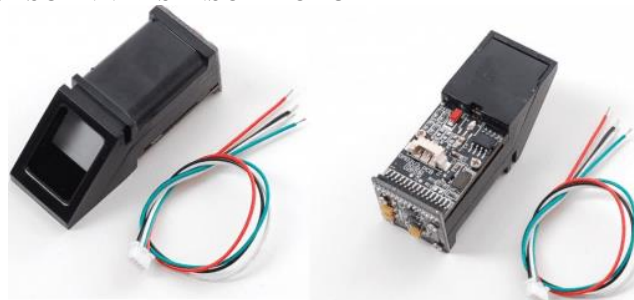


Figure 1.5 Fingerprint Module

This is a finger print sensor module with TTL UART interface for direct connections to microcontroller UART or to PC through MAX232 / USB-Serial adapter. 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 Fingerprint module can be directly interfaced with any microcontroller as well as Arduino Board. This optical biometric fingerprint reader with great features and can be embedded into a variety of end products like access control system, attendance system, safety deposit box, car door locking system.

- 0.96" 12 C OLED DISPLAYS



Pin 1: GND

Pin 2: 3.3V to 5V

Pin 3: SCL - Serial Clock

Pin 4: SDA - Serial Data

Figure 1.6 0.96''12 C OLED DISPLAYS

This is a 0.96 inch blue OLED display module. The display module can be interfaced with any microcontroller using SPI/IIC protocols. It is having a resolution of 128×64. The package includes display board, display, 4 pin male header pre-soldered to board.

OLED (Organic Light-Emitting Diode) is a self-light -emitting technology composed of a thin, multi-layered organic film placed between an anode and cathode. In contrast to LCD technology, OLED does not require a backlight. OLED possesses high application potential for virtually all types of displays and is regarded as the ultimate technology for the next generation of flat-panel displays.

- NODE MCU



Figure 1.7 Nodes MCU

**Node MCU** is an open source IOT platform. Includes firmware which runs on the ESP8266 from Espressif System, and hardware which is based on the ESP-12 module. The term Node MCU by default refers to the firmware rather than the development kits. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson and SIPFFS

## RESULT

### ➤ IMPLEMENTATION

Once the Code is uploaded the Node MCU will boot up with Adafruit logo. And then it will try connection to the Wi-Fi. Once it get Connected it will display Connected. This log can be viewed on Serial Monitor as well as in OLED Display

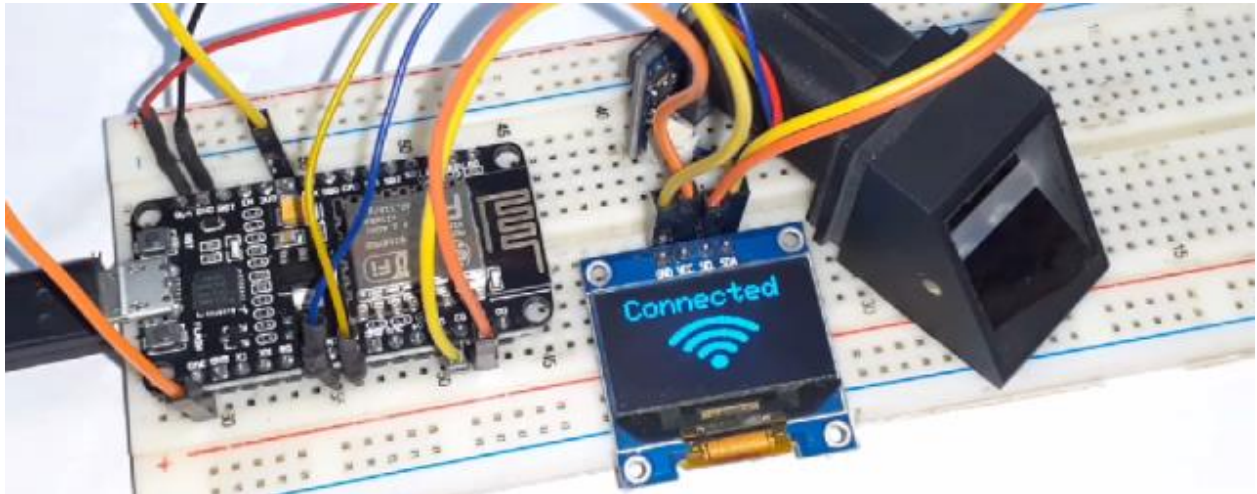


Figure 1.8 Connected

So now you can start registering the user using website. The whole process of registration is explained in the video below. You can follow the video for registration process. The user fingerprint is taken twice and stored in EEPROM of fingerprint Sensor. It is to be noted that only 127 fingerprint can be stored in this R305/R307 module.



Figure1.9 No matched fingerprint

So once the fingerprint of multiple users is stored, you can start scanning and registering the attendance. In case if fingerprint is not matched it will display error message as shown in the figure below.

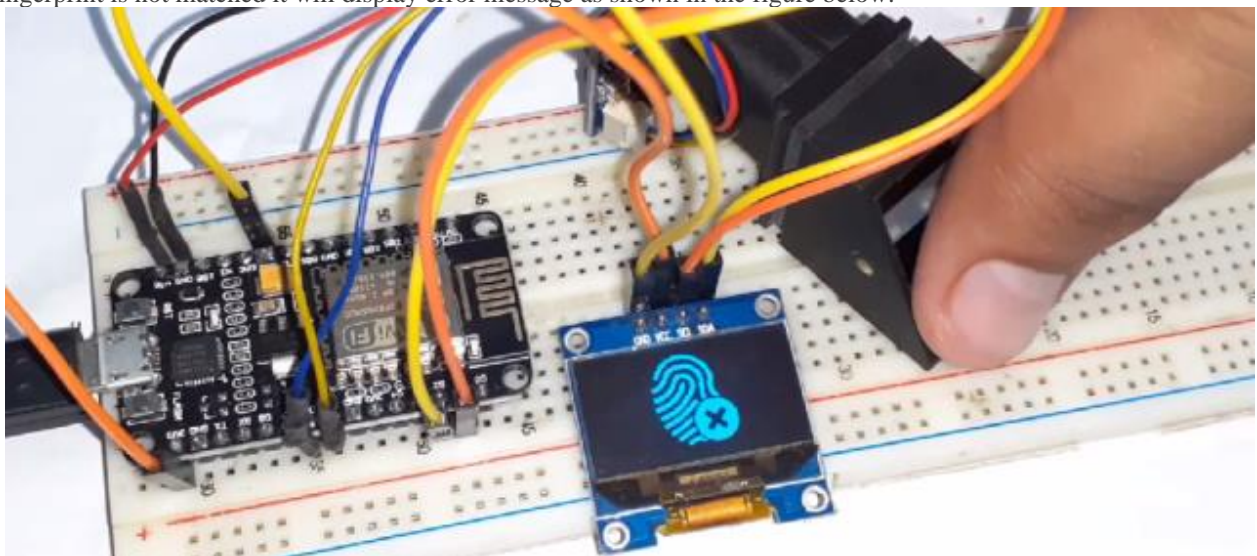


Figure 2.0 Errors

When a registered user scans his finger for the first time it will display the welcome message.

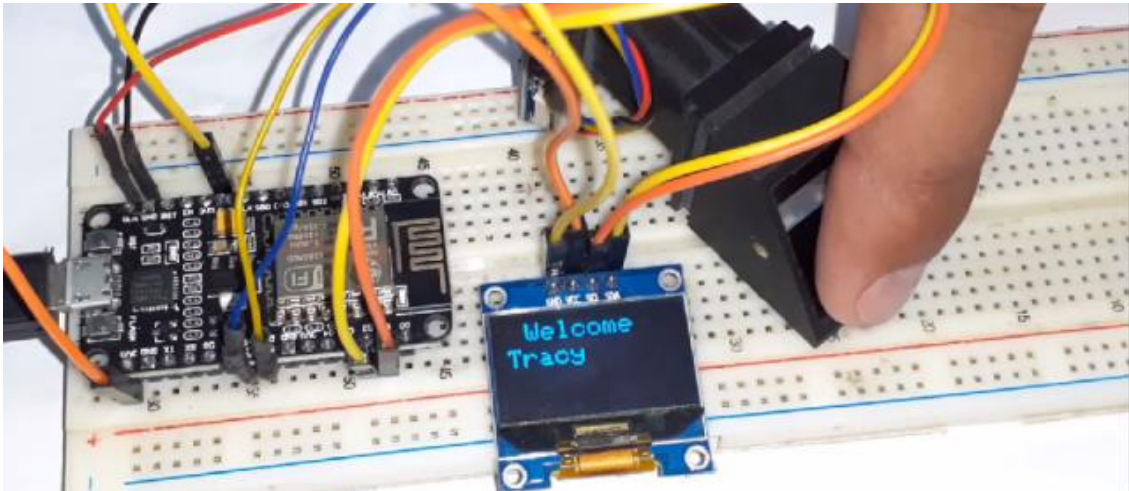


Figure 2.1 Displayed Welcome

When a registered user scans his finger for the second time it will display the Good-Bye message.

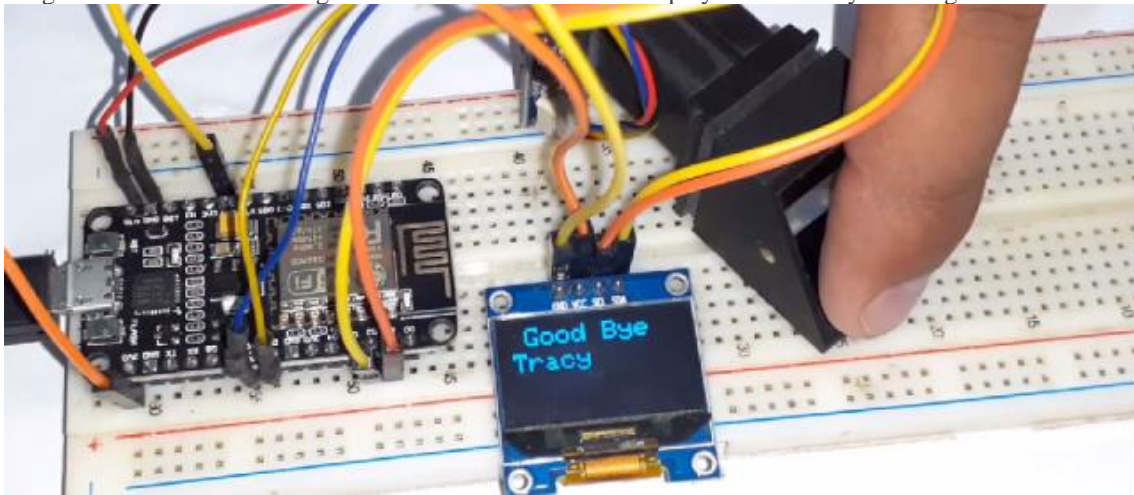


Figure 2.2 Good bye

Finally can see the entire data of the users on the website as shown below:

ID	NAME	SERIAL NUMBER	FINGERPRINT ID	DATE	TIME IN	TIME OUT
19	steffin	3	3	2019-11-22	11:06:57	11:07:02
18	sreelakashmy ck	4	4	2019-11-22	11:02:16	00:00:00
17	sreelakashmy ck	4	4	2019-11-22	11:01:25	11:02:12
16	afshad	1	1	2019-11-22	10:56:57	11:02:37
15	afshad	1	1	2019-11-22	10:56:29	11:02:37
14	afshad	1	1	2019-11-22	10:55:59	11:02:37
13	kb	2	2	2019-11-22	10:49:16	10:49:20
12	afshad	1	1	2019-11-22	10:48:03	11:02:37
11	studdin	3	3	2019-11-22	10:47:39	11:07:02

Figure 2.3 Entire Data

**ADVANTAGES**

- Less Time Spent During Payroll



Biometric attendance systems are instantaneously recorded and logged into a time and attendance system, managers can quickly identify missed punches and fix timekeeping issues before it's submitted to payroll. Biometric attendance systems reduce missed punches and allow corrections before payroll is involved.

- Reduction in Time Theft

Biometric attendance systems eliminate buddy punching and time theft by requiring each employee be at their specified worksite to punch in. No one can steal or fake a fingerprint and with specific terminals to clock in and out, there's no chance of leaving early. Biometric attendance systems are one of the best ways to eliminate time theft in your organization.

- Ensure Attendance

One of the new forms of time keeping device allows students to clock in from their smart phones or computers. While this seems like a great idea, requiring no additional technology to implement, in reality, these types of attendance system is a lightning rod for non-compliance. Employees end up clocking in from the parking lot or clocking out long after they leave. A biometric attendance system requires attendance at the worksite, not from blocks or miles away. If you need to ensure employee attendance at their job site, biometrics is the way to go.

### DISADVANTAGES

- Physical Traits Are Not Changeable

Most of the biometric modalities work with physical traits such as fingerprint, iris, palm vein, etc. We all have only a pair of eyes; a certain number of fingerprints, and other body parts that are unchangeable. We can reset a password, but we never can change our fingerprints or retina, these are fixed. Our biometric data is stored in respective government's databases or companies who enable such services.

- Error Rate

The error rate in some cases is so high that it creates great chaos for the entire security system. It could happen due to weather, physical condition, age and other issues. Turmoil could happen with an error rate of as low as 1% in a large-scale authentication process.

- Cost

The cost of biometric devices is comparatively higher than other traditional security devices. The costs of biometric software, devices, programmers, server and other relative equipment combined is a large amount

### SCOPE

The system can be improved by encasing it in a plastic covering. This would make it more compact and easy to use in a classroom setting. The system can be configured to enable lecture – wise attendance taking. It can be further be improved to automatically calculate attendance percentages of student's and intimate the teacher's if a student's attendance is below a certain percentage. It can also be modified to fit the corporate environment.

### CONCLUSION

The traditional process of manually taking and maintaining student attendance is highly in efficient and time consuming. The attendance monitoring system based on biometric authentication has a potential to streamline the whole process. An Internet Of Things (IOT) based portable biometric attendance system can prove to be of great value to educational institution in this regard as it proves to be highly efficient and secure. The cost involved in making this system is quite less, when compared to conventional biometric attendance system. The use of cloud computing to store the attendance record makes all the data easy to access and retrieve as end when required by the teachers. The use of fingerprints scanner ensures the reliability of the attendance record. The system, due to its lack of complexity proves to be easy to use and user friendly.

### ACKNOWLEDMENT:

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