



# **PRESIDENCY UNIVERSITY**

A Report on

## **“FINGERPRINT SENSOR BASED BIOMETRIC ATTENDANCE SYSTEM”**

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## **Aim:**

The aim is to create Biometric attendance system using Arduino uno and Finger print sensor, LCD display, RTC Module.

## **Components:**

- Arduino UNO  
Arduino UNO R3 development board.
- Fingerprint Sensor R305  
Fingerprint Sensor Module.
- RTC Module DS3231  
Real Time Clock Module.
- LCD Display  
JHD162A 16\*2 LCD Display Screen.
- Push buttons  
4 required to register, delete, forward and back.
- Buzzer  
5 V Active Buzzer.
- LED 5mm  
LED, Red in colour.
- Connecting wires  
Around 20 jumper wires.
- Breadboard

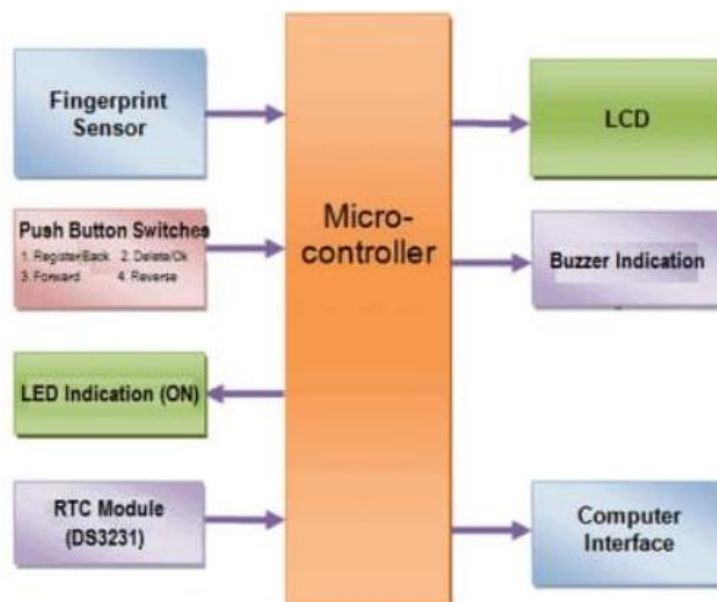
## **Abstract:**

This study has mainly focused to develop IOT based biometric attendance system, that is able to keep record of attendance and count the data for daily

purpose. In this project we are going to design Fingerprint Sensor Based Biometric Attendance System using Arduino. Simply we will be interfacing fingerprint sensor with Arduino, LCD Display & RTC Module to design the desired project. In this project, we are using fingerprint Module and Arduino to take and keep attendance data and records.

Attendance systems are commonly used systems to mark the presence in offices and schools. From manually marking the attendance in attendance registers to using high-tech applications and biometric systems, these systems have improved significantly. This project has a wide application in school, college, business organization, offices where marking of attendance is required accurately with time. By using the fingerprint sensor, the system will become more secure for the users.

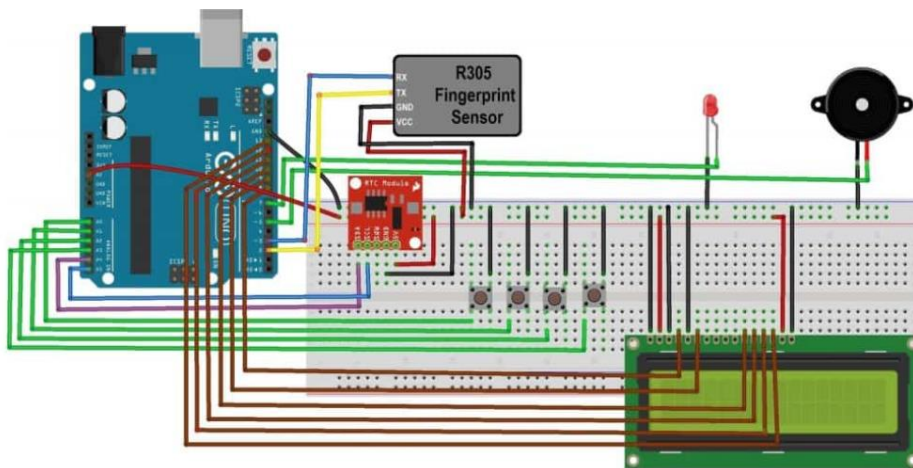
## Introduction:



In this Fingerprint Sensor Based Biometric Attendance System using Arduino, we used a Fingerprint Sensor module to authenticate a true person or employee by taking their finger input in the system. Here we are using 4 push buttons to register new fingerprint or delete stored fingerprint or match stored fingerprint. The 4 push buttons are used as an input unit for these tasks. Similarly, RTC Module DS3231 is used for registering scanning/entering/existing time of the user.

The LCD displays the time record and every function happening via push button. Buzzer indicates different functions and happening whenever an interrupt is detected. The LED is used for power indication.

## Architecture:



## Code:

[file:///C:/Users/vaish/Downloads/Biometric\\_attendance\\_System\\_Code.pdf](file:///C:/Users/vaish/Downloads/Biometric_attendance_System_Code.pdf)

```
Fingerprint_IOT | Arduino IDE 2.0.0-rc7
File Edit Sketch Tools Help
No board selected

Fingerprint_IOT.ino
1 #include "Adafruit_Fingerprint.h" //fingerprint library header file
2 #include<EEPROM.h> //command for storing data
3 #include<LiquidCrystal.h> //lcd header file
4 LiquidCrystal lcd(8,9,10,11,12,13);
5 #include <SoftwareSerial.h>
6 SoftwareSerial fingerPrint(2, 3); //for tx/rx communication between arduino & r305 fingerprint sensor
7
8 #include <Wire.h>
9 #include "RTClib.h" //library file for DS3231 RTC Module
10 RTC_DS3231 rtc;
11
12 uint8_t id;
13 Adafruit_Fingerprint finger = Adafruit_Fingerprint(&fingerPrint);
14
15 #define register_back 14
16 #define delete_ok 15
17 #define forward 16
18 #define reverse 17
19 #define match 5
20 #define indFinger 7
21 #define buzzer 5
22
23 #define records 10 // 10 for 10 user
24
25 int user1,user2,user3,user4,user5,user6,user7,user8,user9,user10;
26
27 DateTime now;
28
29 void setup()
30 {
31   delay(1000);
32   lcd.begin(16,2);
33   Serial.begin(9600);
34   pinMode(register_back, INPUT_PULLUP);
35   pinMode(forward, INPUT_PULLUP);
36   pinMode(reverse, INPUT_PULLUP);
```

## Working Model:



The experimental model was made following the circuit diagram and the desired results were obtained. Every time someone places his finger on the sensor the sensor reads the data and stores it in the cloud. Next time someone wants to check the fingerprint he/she places the finger on the sensor. The sensor reads the data and searches and cross-checks the data with stored fingerprints. If it matches with any of them then it displays the username, date, and time. If not, then says fingerprint doesn't match. That's how the whole system works.

### **Advantages:**

- Very accurate fingerprint reading & storing.
- Cost Effective.
- Can be installed in small spaces.
- Fingerprint is stored via cloud.
- Can store up to 1000 fingerprints.
- LCD display for username, date, and time of the operation.
- Alarm signal for attention of the observer.

### **Conclusion:**

The traditional process of manually taking and maintaining student attendance is highly inefficient 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 institutions 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 records makes all the data easy to access and retrieve as and when required by the teachers. The use of fingerprint scanner ensures the reliability of the attendance record. The system, due to lack of its complexity, proves to be easy to use and user-friendly.

The system is improved by encasing it into a box-covering. This makes it more compact and easier to be used in a classroom setting. The system can be configured to make lecture-wise attendance taking. It can further be improved to automatically calculate Student's attendance percentage and intimate the

teachers if a student's attendance is below a certain percentage. It can also be modified to fit the corporate environment.