



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJIRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**

# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 7, July 2021

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

**Impact Factor: 7.569**

9940 572 462

6381 907 438

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# BIOMETRIC FINGERPRINT BASED ATTENDANCE SYSTEM USING ARDUINO

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**ABSTRACT:** At the moment, most of the attending systems that are becoming employed in universities still area unit written a touch of paper. For categories, tutorials, and laboratory sessions the scholars still have gotten to sign the signature on the attending sheet. This methodology is not versatile as a result of the danger of losing the attending information is very high. If the attending sheet is missing, the attending information area unit aiming to be lost. other than that, unethical issues might even be occurring like cheating within the signature. for example, a student does not attend his category however his attending kind has been signed by another student. this method is planned to beat these issues. Besides that, since the planned system conjointly records the time, the lecturer will monitor the timing of the scholars too. “SMART attending SYSTEM” is also a system that may take attending by exploitation info extracted from the fingerprint information Handling System. Before this lecturer should use the paper to urge the student’s attending. There are heaps of issues once exploitation the paper as a student attending like cheating. this method will facilitate the lecturer to reduce the matter like that on purpose automatic attending exploitation fingerprint.

## I. INTRODUCTION

The attendance system is a vital role for any organization like workplace, companies, schools, universities than on. In a typical attending system, the academics either decision the name or identity range of the scholars or enable the scholars to sign up for the paper. it's not convenient to trace the attending for the rising range of scholars. So, it will have the issues like proxy attending and time intense. the standard system also can have the issue of manipulating the letter paper materials of the attending record and posting the attending report back to guardians. life science authentication is employed for taking attending of scholars. the foremost common use of life science authentication strategies is a unit fingerprint, facial, iris, and voice authentication. during this system, fingerprint authentication methodology is employed to record attending as a result of its simplicity to use, a lot of accuracies, and price-effective. The attending management system is an additionally concerned alerting system to perform in conjunction with guardians and also the approved person for the scholars to attend the category frequently. the most purpose of this analysis work is to create an attending management system a lot of economical, secure, portable, simple to use and fewer time intensive.

## II. SYSTEM DESCRIPTION

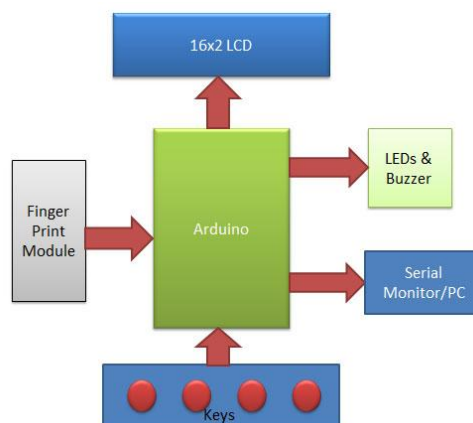


Figure 1. Block Diagram

**System Schematic Diagram**

The circuit of this fingerprint primarily based on the attending system project, as shown within the on top of the diagram is sort of straightforward. it's Arduino for dominant all the methods of the project, electrical switch for enrolling, deleting, choosing IDs and for attending, a buzzer for alerting, LEDs for indication, and LCD to instruct user and showing the resultant messages. As shown within the circuit diagram, an electrical switch is directly connected to pin A0(ENROL), A1(DEL), A2(UP), A3(DOWN) of Arduino with regard to the bottom, And the Yellow diode is connected at Digital pin D7 of Arduino with regard to ground through a 1k electrical device. Fingerprint module's Rx and Lone-Star State directly connected at Serial pin D2 and D3 (Software Serial) of Arduino. 5v provide is employed for powering fingerprint module taken from Arduino board. A buzzer is additionally connected at pin A5. A 16x2 LCD is organized in 4-bit mode and its RS, EN, D4, D5, D6, and D7 area unit directly connected at Digital pin D13, D12, D11, D10,D9, and D8 of Arduino.

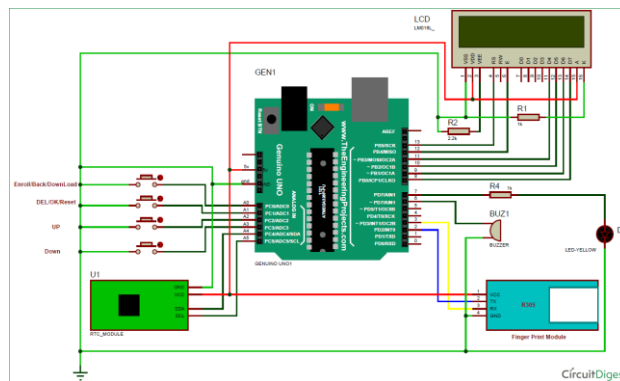


Figure 2. Schematic Diagram of the System

**III. HARDWARE AND SOFTWARE DESCRIPTION**

To reduce the quality of the planning method, straightforward algorithms, low value, and commercially offered devices are wont to implement the system.

**3. Fingerprint Reader**

Fingerprint authentication is employed for the coed attending system. It consists of 2 components. One is enrollment and another one authentication. throughout enrollment, the fingerprint of the coed is captured exploitation fingerprint reader and also the distinctive options area unit extracted and hold on within the information because of the templet with the coed ID. within the process of authentication, the fingerprint of the student is captured once more and compared with the extracted options already existing within the information for deciding match or twin. during this system, Biovo-C3 fingerprint identification integrated reader is employed to capture fingerprints as shown in Figure three. Fingerprint module primarily has 3 forms of fingerprint devices like optical fingerprint sensor, unhearable fingerprint device, and electrical phenomenon fingerprint device. The device kind of Biovo-C3 fingerprint reader is a high-definition optical device. This reader will store two hundred fingerprints. it's 256 bytes for fingerprint extraction templet size and 512 bytes fingerprint match templet size. This reader is an integrated image collection and rule chip in conjunction with a small configuration of eighteen.5mm × 14.6mm.



Figure 3. Fingerprint Reader



### 3.2 Arduino Uno

Arduino could be a code company, project, and user community that styles and manufactures laptop ASCII text file hardware, ASCII text file code, and microcontroller-based kits for building digital devices and interactive objects that may sense and manage physical devices. These systems give sets of digital and analog I/O pins that may interface to the assorted growth boards and different circuits. The boards feature serial communication interfaces, together with Universal Serial Bus (USB) on some models, for loading programs from personal computers. For programming the microcontrollers, the Arduino project provides AN integrated development surroundings (IDE) supported Arduino artificial language that is controlled by a collection of C/C++ functions. The Arduino Mega could be a microcontroller board supported by the ATmega2560. it's fifty-four digital input/output pins (of that fourteen are often used as PWM outputs), sixteen analog inputs, four UARTs (hardware serial ports), a sixteen rate quartz oscillator, a USB affiliation, an influence jack, AN ICSP header, and a push. The board will treat AN external provide of half-dozen to twenty volts. If equipped but 7V, however, the 5V pin could provide but 5 volts, and also the board is also unstable. If exploitation quite 12V, the transformer



Figure 4. Arduino Mega (ATmega2560)

### 3.3 RTC Module (DS 3231)

The DS3231 may well be a cheap, very correct I2C period of time clock (RTC) with associate integrated temperature salaried generator (TCXO) and crystal. The device incorporates battery input, and maintains correct activity once main power to the device is interrupted. the mixture of the crystal resonator enhances the long accuracy of the device more as reduces the piece-part count in associate extremely manufacturing line. The DS3231 is obtainable in industrial and industrial temperature ranges, associated is procurable in an extremely 16-pin, 300-mil so package. The RTC handles seconds, minutes, hours, days, dates, months, and year information. The date at the highest of the month is automatically adjusted for months with fewer than thirty one days, along with corrections for 366 days. The clock operates in either the 24-hour or 12-hour format with associate AM/PM indicator. two programmable time-of-day alarms and a programmable square-wave output unit provided. Address associated data unit transferred serially through associate I2C two-way bus.

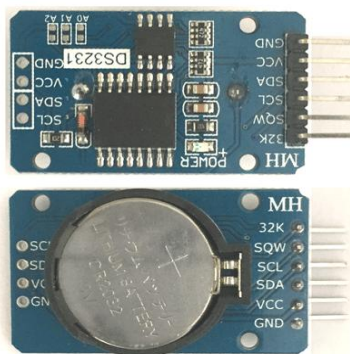


Figure 5. RTC Module

### 3.4 LCD Display (16x2)

The term digital {display|alphanumeric display} stands for liquid display. it's one fairly electronic show module used in associate exhaustive vary of applications like varied circuits & devices like mobile phones, calculators, computers, TV sets, etc. These displays unit primarily most well-liked for multi-segment light-emitting diodes and seven segments. the foremost blessings of exploitation this module unit inexpensive; simply programmable, animations, and there are no limitations for displaying custom characters, special and even animations, etc.



Figure 6. LCD Display

## IV. WORKING OF SYSTEM

Working on this fingerprint group action system project is fairly easy. initial of the user must register fingerprints of the user with the assistance of push buttons. To do this, the user has to be compelled to press the register key so the alphanumeric display asks for getting into the ID for the fingerprint to avoid wasting it in memory by ID name. therefore currently user must enter ID by exploiting UP/DOWN keys. once choosing ID, a user must press an OK key (DEL key). currently, an alphanumeric display can raise to position finger over the fingerprint module. currently, a user must place his finger over the fingerprint module so the module takes a finger image. currently, the alphanumeric display can notify take away finger from fingerprint module, and once more raise to position finger once more. currently, a user must place his finger once more and the module takes a picture and converts it into templates, and stores it by hand-picked ID into the fingerprint module's memory. currently, the user is going to be registered and he/she will feed group action by golf shot their finger over fingerprint module. By an equivalent methodology, all the users are going to be registered into the system.

Now if the user needs to get rid of or delete any of the keep ID or fingerprint, then he/she have to be compelled to press the DEL key. Once delete secret's ironed alphanumeric display can raise to pick out the ID that requires to be deleted. currently, a user must choose an ID and press the OK key (same DEL key). currently, an alphanumeric display can allow you to apprehend that fingerprint has been deleted with success.

### 3.1 How Attendance works in this Fingerprint Attendance System Project:

Whenever the user places his finger over the fingerprint module then the fingerprint module captures the finger image, and search if any ID is related to this fingerprint within the system. If fingerprint ID is detected then the alphanumeric display can show group action registered and within the same time buzzer can beep once and the junction rectifier can put off till the system is prepared to require input once more.

Along with the fingerprint module, we've conjointly used the AN RTC module for Time and date. Time and date area unit running unendingly within the system. therefore Arduino takes time and data whenever a real user places his finger over fingerprint and saves them within the EEPROM at the assigned slot of memory.



Here we've created five user houses during this system for thirty days. By pressing the push in Arduino so instantly registered key is going to be answerable for downloading group action information over the serial monitor from the Arduino EEPROM Memory.

## V.CONCLUSION

Attendance system couldn't solely speed up the method taking group action however conjointly cut back the error rate and turn out quicker verification process of authenticating student group action. This method calculates the group action of scholars and sends alert message for the absence students to relevant guardian's movable. This method can even store the information of scholars for while.

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