



# Biometric Attendance Registration System Using Arduino

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**ABSTRACT :** 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. In the previous projects, other electronic attendance system are designed using RFID, etc which is not very efficient in real time. In this project, we used fingerprint Module and Arduino to take and keep attendance data and records. By using fingerprint sensor, the system will become more secure for the users. First the fingerprints of the students are registered with unique ids using the fingerprint sensor. The system is interfaced with RTC module which detects the date and time. Whenever the student enters the class between 8am to 10.30am an alert message indicating the presence of students is sent to the HOD as well as the class teacher. When the student not enters the class within 10.30am, a message to his parent is sent indicating the absence of the student. Using this we can be able to control the students from bunking the classes.

**KEYWORDS:** Arduino UNO, RTC, GSM module, Finger print sensor.

## I. INTRODUCTION

Student academic attendance is very important since it will affect the students from gaining knowledge and skills as well as their grades. This project has related about the student attendance system through the matching of their fingerprint to confirm their attendance. The main purpose of carrying out this project is to develop a hybrid student attendance system for which desktop-based application is developed to obtain the attendance of student by fingerprint and post/review the attendance results using web-based student attendance system. As we know, there is one and only one fingerprint occurs in the world for each person which will never has duplication. So, fingerprint attendance system can be known as the best authentication to detect the individual student attendance record. In addition, according to the technology nowadays, it is not unusual anymore to take the attendance of students through their fingerprint. Nowadays, most universities and colleges are still using the traditional attendance system which requires student to sign on a piece of paper every time they attend a class throughout the whole semester. Using the traditional attendance system, we can obviously see that there are few problems such as it will be no backup for the attendance records once the lecturer accidentally lost the attendance sheet, course mate help those who did not attend the class sign the attendance which also known as buddy-signing as well, hard in analyzing and tracking student performances based on attendance factor, student lack of knowledge and skills due to the poor attendance in attending classes, and etc. It is important to overcome these problems since it will help in improving the academic performance of students as well as the teaching environment of the lecturers. Hence, the purpose of carrying out this project is to prevent unwanted situation occur and to find out the problems that causes these problems as well as find the solutions to overcome these problems. Thus, through the problems analyzed, the objective of this project is to develop a fingerprint student attendance system in recording their attendance effectively in every class in order to prevent student skip classes. By implementing the developed system, lecturers will no more facing the empty classroom every time while they are lecturing in front the stage. Other than that, student will not be able to ask their buddy to sign for them anymore since the system requires their fingerprint to prove their attendance in the class. In addition, it will be easier to evaluate and analyze the student performance based on their attendance since the system will record the attendance more accurately and efficiently with minimum possible error. Furthermore, student academic performance will increase as well since they cannot fake their attendance through the developed system which means they have to attend all the classes in order to prevent them from get bar.



## II. LITERATURE SURVEY

### 2.1 RFID Based Attendance Management System

In the article paper of “RFID Based Attendance Management System” (Microtronics Technologies, 2013), it had known that the attendance is needed to be taken in several places like school, college, university, and workplaces. This article paper main objectives had concerned about to replace the old traditional attendance system technology with Radio Frequency Identification (RFID) technology. It is carry out to overcome some existing problems occur in the traditional attendance system. In the article paper, it also mentioned that the RFID system is developed and is suitable to take the attendance of the students as well as employees. There are two modules introduced in the article which includes reader module and RFID module. In details, each student/employee must have a valid RFID card of RFID tags with them in order to communicate with the RFID reader placed on their workplace/school. As mentioned in the article, the RFID reader will automatically detect the student/employee attendance and record it while the RFID card gets closer to the RFID reader which means it is using the non-contact type of reader and passive types of card. From the article paper, we can get to know that the attendance system using RFID technology is much better than the traditional attendance system in school/workplace as almost whole the system is done in automation and with high transparency process.

### 2.2 Bar Code Scanner Based Student Attendance System (SAS)

In the journal paper of “Bar Code Scanner Based Student Attendance System (SAS)” (Subramaniam H. et al., 2013), it had known that student attendance and participation among a class is very important in order to achieve good academic outcome of a student and school. This journal paper main objectives had concerned about to replace the non-automated attendance record system with the barcode scanner technology in order to record and manage the student attendance records more efficiently and effectively. As mentioned in the journal paper, RFID-based technology and biometric-based technology is sometime too costly to implement into a school since it requires purchasing of certain hardware in order to get the system work. Compare to both RFID-based technology and biometric-based technology, barcode technology obviously shown that it is cheaper than both the technology. So through the journal paper, barcode scanner attendance system had been introduced to improve the admin staff managing process such as process daily, weekly and yearly student attendance report. In the barcode scanner technology, student will be issued a student card for each of them with the barcode displayed on the card for a scanning purpose every time they attend the classes. Student attendance status will be automatically checked and record into the system once lecturer scan their student card with barcode scanner. From the journal paper, we can get to know that the attendance system using barcode scanner technology is much better than the traditional attendance system in school as the lecturer just requires to scan the barcode of the student cards as prove that the student attend the class.

### 2.3 Integrated System for Monitoring and Recognizing Students during Class Session

In the journal paper of “Integrated System for Monitoring and Recognizing Students during Class Session” (Mohammad A. et al., 2013), it had known that the attendance system using face recognition is more efficient than other student attendance system methods. As mentioned in the journal paper, it is because they believe that the face recognition method is the most accurate and fastest method among the biometric attendance system. The journal paper main objectives had concerned about to replace the manual attendance record system with the face recognition technology in order to eliminate the waste of using paper and response time from students. As mentioned in the journal paper, face detection is the best among all the biometric attendance system because face can represent the identity of an individual. In the journal paper, it has mentioned that the picture of whole class will be taken by classroom’s camera and upload to the system to do face filtering and then the attendance of the student will be checked automatically by the system once the face matching of a student is successfully performed. The system also allows the lecturer to drag and drop their student’s picture into the system if the system failed to recognize their student face. From the journal paper, we can get to know that the attendance system using face recognition technology is much better than the manual attendance system in school as the lecturer just requires to active the classroom’s camera that allocated inside the classroom in order to capture the picture of whole class.

### 2.4 Wireless Attendance Management System based on Iris Recognition

In the journal paper of “Wireless Attendance Management System based on Iris Recognition” (Kadry S. et al., 2010), it had known that iris recognition is one of the biometrics method that is a very reliable identification methods for every person. From the journal paper, it had mentioned that iris recognition was once ago still a science fiction. Due to the



rapid evolvement on technology, iris recognition had successfully implemented to some applications for use in verification and identification. Reason of implementation of iris recognition in attendance system is because of it can obtain easily, unalterable, unique, and etc. like any other biometrics method. The journal paper main objectives had concerned about to apply the biometrics to wireless attendance management system to make the user’s attendances more easily and effectively. From the journal paper, we can get to know that iris recognition is one of the ways to make the attendance of students/staffs to be manageable in more effective and automated ways. In the iris recognition, the system will requires to acquire the iris image of students/staffs and store inside the database after go through several process by the system. The journal paper also had mentioned that the use of traditional methods in attendance management system such as magnetic card, barcode scanner, identification card, and etc. is unable to avoid those students/staffs to fake their attendance since cards can be easily separated from the owners.

### III. PROPOSED SYSTEM

#### FINGERPRINT IDENTIFICATION SYSTEM

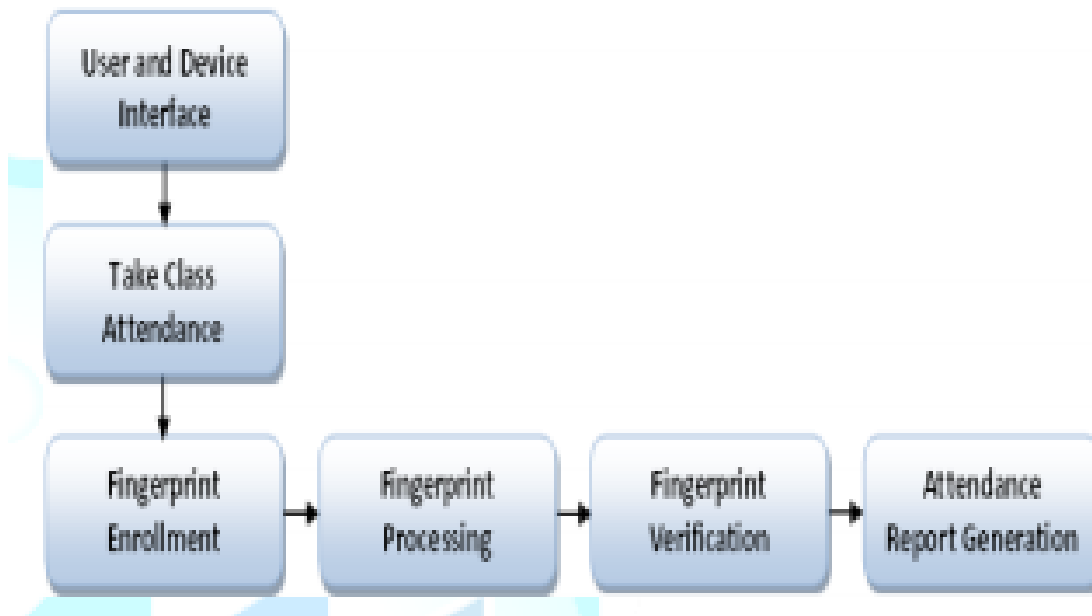
An identification system is one which helps in identifying an individual among many people when detailed information is not available. It may involve matching available features of candidate like fingerprints with those already enrolled in database.

#### 3.1 HOW FINGERPRINT RECOGNITION WORKS?

Fingerprint images that are found or scanned are not of optimum quality. So we remove noises and enhance their quality. We extract features like minutiae and others for matching. If the sets of minutiae are matched with those in the database, we call it an identified fingerprint. After matching, we perform post-matching steps which may include showing details of identified candidate, marking attendance etc. A brief flowchart is shown in next section.

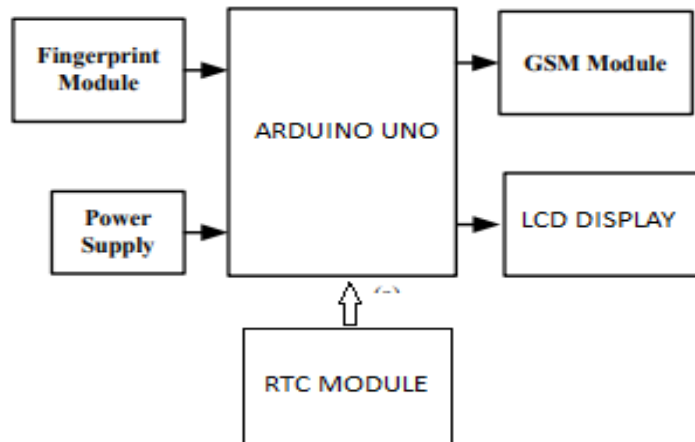
#### 3.2 FINGERPRINT IDENTIFICATION SYSTEM FLOWCHART

A brief methodology of our Fingerprint Identification System is shown here in following flowchart.





### 3.3 BLOCK DIAGRAM OF THE PROPOSED SYSTEM



**FIG 3.1 BLOCK DIAGRAM**

### 3.4 WORKING

From the above block diagram the working can be analysed. We have used Arduinouno which has atmega328 controller for the control purpose. A fingerprint sensor for recognizing the fingerprint of the student. RTC module to detect the time for taking the attendance. An LCD display which will output the students attendance status when scanned by the fingerprint. A GSM module is used to send messages to parent and HOD regarding the presence and absent of the student. First the fingerprints of the students are registered with unique ids using the fingerprint sensor. The system is interfaced with RTC module which detects the date and time. Whenever the student enters the class between 8am to 10.30am an alert message indicating the presence of students is sent to the HOD as well as the class teacher. When the student not enters the class within 10.30am, a message to his parent is sent indicating the absence of the student. Using this we can be able to control the students from bunking the classes.

## IV. FIGURES

### 4.1 FINGER PRINT SENSOR



**FIG 4.1 FINGERPRINT SENSOR**



## 1.2 GSM MODULE



FIG 4.2 GSM MODULE

## 4.3DS1307-RTC

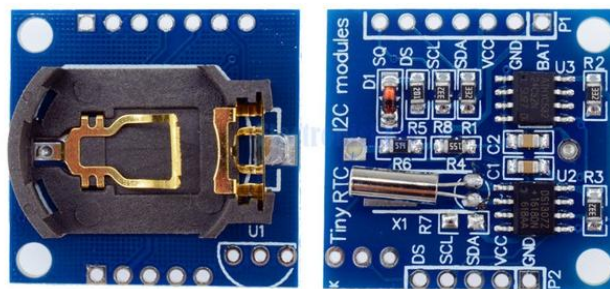


FIG 4.3 RTC MODULE

## V. CONCLUSION

It can be concluded from the above discussion that a reliable, secure, fast and an efficient system has been developed replacing a manual and unreliable system. Results have shown that this system can be implemented in academic institutes for better results regarding the management of attendance. This system will save time, reduce the amount of work the administration has to do and will replace the stationery material with electronic apparatus. Hence a system with expected results has been developed but there is still some room for improvement. Having presented a biometric identity based fingerprint scheme. I have utilized, extended and implemented ideas in the areas of error corrected string construction from biometric data, key generation, and pairing based fingerprint schemes to form the components of the system. This project presented the application of such a scheme to repudiation situations. Discussion on advantage of using the biometric data in the public key and described the utility of using biometric evidence in disputes that may arise. This work has been an insight into the hidden problems; the manual attendance system tends within daily activities. The problems are fair and need computerized authentication system to replace the manual student attendance system.

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