

Attendance system based on Fingerprint Using ARDUINO

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Abstract: Attendance System is used to detect the user identification and time management. Attendance system is required in many different places such as offices, companies, schools, organization and institution etc. Attendance system enables the user to track the working hours and late arrivals, early departures, time taken on breaks and absentees. This paper describes one of the attendance system. The main aim of the paper is to construct the attendance system using Fingerprint module and RTC module. In this system Arduino Uno and Parallax Data acquisition tool (PLX-DAQ) are the main components to display record in Excel.

Keywords: Arduino UNO, Parallax Data Acquisition tool (PLX-DAQ), Fingerprint Module, RTC Module, Attendance.

I. Introduction

In our Education system, we are using the same old methods of taking attendance like teachers call out the name of the student and attendance is marked on a sheet of paper. This causes a lot of time wastage especially when there is a large group of students. The other method is that the teacher can pass a sheet of paper in the class, but it also leads to a major drawback that the student tend to sign the attendance for his friends. So to remove this drawback we are using a new attendance system based on biometric.

Biometric attendance system captures your unique biological feature such as your hand or fingerprint, iris pattern and sometimes even your voice as a record or identity verification. In this project, we are using our fingerprint to take the attendance of students in a class, employee in office, institution etc. [1][2]

II. Layout of the Proposed System

This paper represents a Fingerprint Attendance System consisting of Arduino UNO and RTC module. The overall result is displayed on the Serial Monitor. Keys in the block diagram are used for enrolling, deleting and toggling between the users Fingerprint. The block diagram of the system is represented in figure 1.

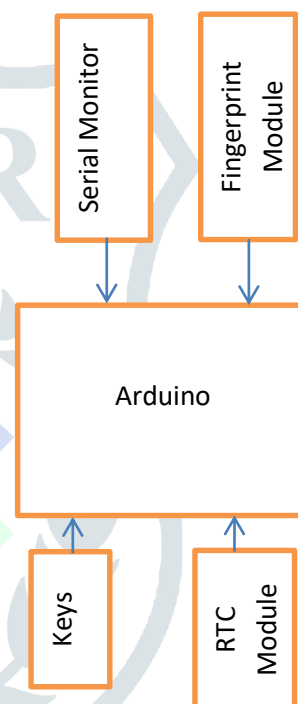


Figure 1: Block diagram of the proposed system

A circuit diagram of the proposed system is shown in figure 2. Basically this shows the interfacing/wiring connections done between Arduino UNO, Fingerprint Module and RTC Module.

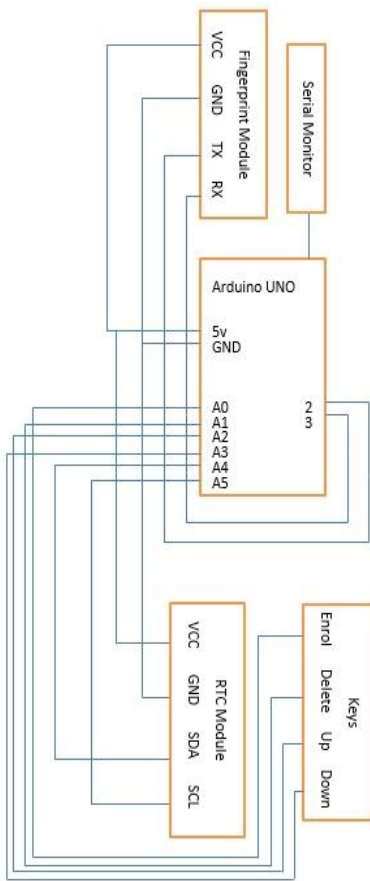


Figure 2: Circuit diagram of the proposed system

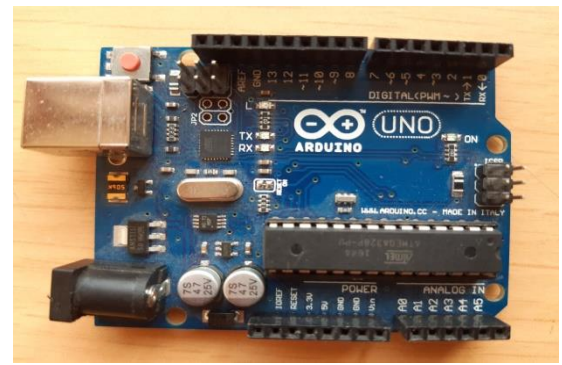


Figure 3: Arduino UNO Microcontroller

b) Fingerprint Module:

There are different types of fingerprint Sensors like Optical, Capacitive, Ultrasonic, thermal etc. In this paper, we are using Optical Fingerprint Sensor Module. It is used to scan the fingerprint of the user and save the image of the fingerprint in the memory (EEPROM) [6].



Figure 4: Fingerprint Sensor Module

III. Components and their description

The following components are used in the designing of attendance monitoring system:

1. Arduino UNO
2. Fingerprint Module
3. RTC Module
4. Parallax Data Acquisition tool (PLX-DAQ)
5. Microsoft Excel

a) Arduino UNO:

It is basically a microcontroller which is based on both hardware and software. The main purpose of this microcontroller is to store, register and display the data. In Storing, the microcontroller stores the fingerprint of the user with a particular ID Number. When the fingerprint of the user is stored then the user will register himself. In Registering, the fingerprint will be checked with the stored fingerprint and if both the fingerprints match then the ID Number of that fingerprint is displayed on the Serial Monitor and further the data is displayed on Excel [5].

c) RTC Module:

RTC module also Known as Real Time Clock Module is used as a Time and Date Remembering System. This Module is used to display the Date and Time at which the User scans his fingerprint and the result is saved in the memory [7].

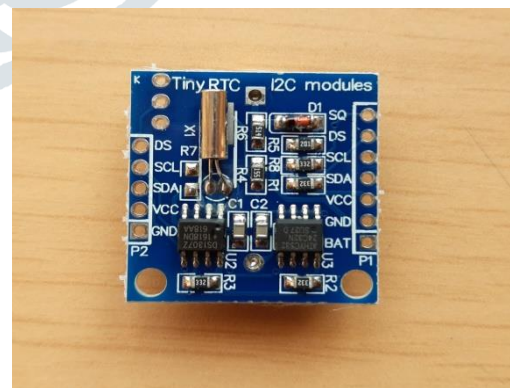


Figure 5: RTC Module

d) Parallax Data Acquisition Tool (PLX-DAQ):

Parallax Data Acquisition Tool or PLX-DAQ is an add-on tool for Microsoft Excel. It is basically used to display the data of the Serial Monitor in Excel spread sheet. The Arduino Uno Microcontroller is simply Connected to a Computer via USB cable. When we open the PLX-DAQ tool, then Excel sheet opens automatically. After that, we need to connect the PLX-DAQ by simply providing the port to which the controller is

connected at 9600bps. The Microcontroller will now send the data directly to Excel spread sheet.

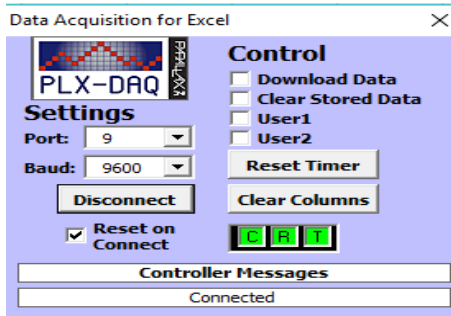


Figure 6: PLX-DAQ Tool

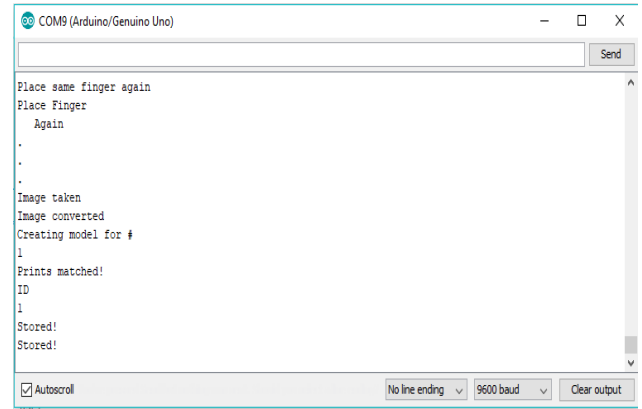


Figure 9: Storing Fingerprint

IV. Experimental Setup

i. Registering and storing the fingerprint:

The Fingerprint Module is interfaced with the Arduino Uno Microcontroller. The Fingerprint Module scans the fingerprint of the user and stores the image of the fingerprint in the memory. The time and date at which we have stored the fingerprint is determined by the RTC Module which is also interfaced with the Microcontroller. Figure (7) shows the flow chart for registering the fingerprint.

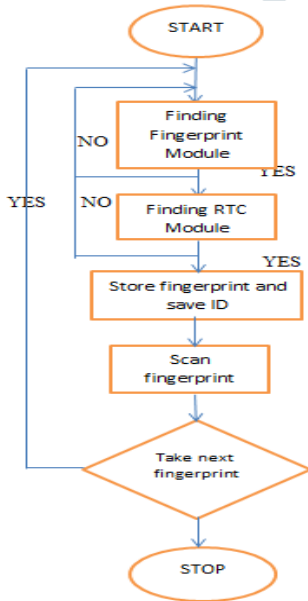


Figure 7: Flowchart for registering fingerprint

ii. Displaying the stored result:

After storing the fingerprint, the user will again scan his finger for the fingerprint to be displayed on the serial monitor as a fingerprint ID. If the fingerprint matches the fingerprint saved in memory (EEPROM) then the ID is displayed with specific time and date.

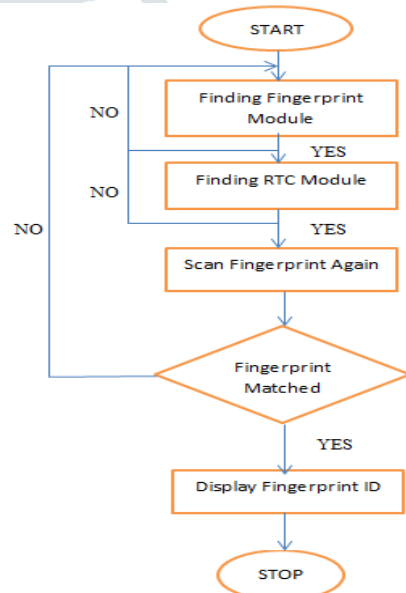


Figure 10: Flowchart for displaying the fingerprint ID

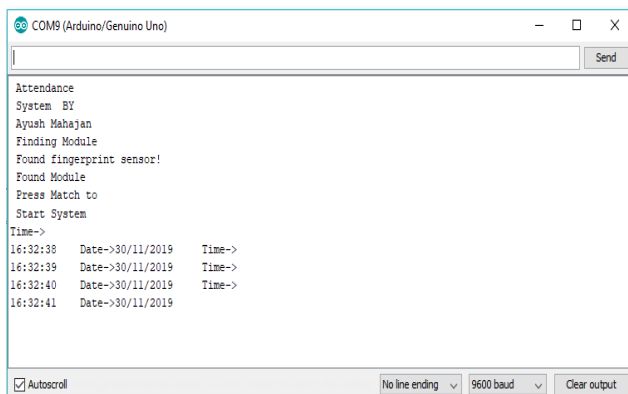


Figure 8: Finding Fingerprint Sensor Module

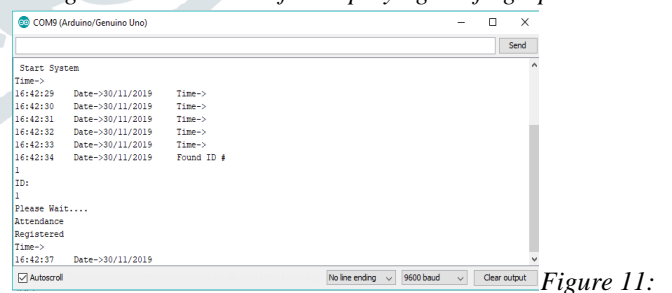


Figure 11: Fingerprint registered and displayed

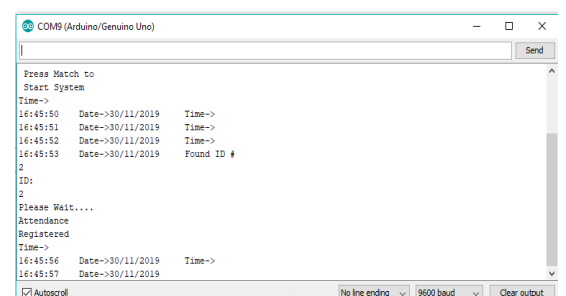


Figure 12: Fingerprint registered for different users

Test and Result for Fingerprint Attendance system in Parallax Data Acquisition tool (PLX-DAQ) is shown in Figure (13) and Figure (14).

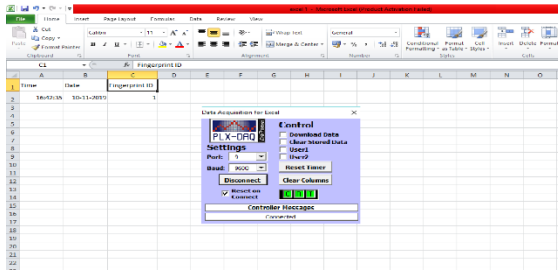


Figure 13: Data displayed in Excel Spreadsheet

Time	Date	Fingerprint ID
16:42:35	10-11-2019	1
16:45:53	10-11-2019	2
16:46:12	10-11-2019	3
16:46:48	10-11-2019	4
16:52:40	10-11-2019	5

Figure 14: Final Data displayed for Fingerprint Attendance System

V. Conclusion & Future Scope:

Biometric systems have replaced the manual and unreliable systems by presenting reliable, secured, fast and efficient system. This paper consists of one of those systems. Fingerprint based attendance system will help to detect the presence of student and employees in schools, colleges and offices etc. It is user friendly and reliable and most of all it displays the time and date to check whether the user is on time or late. It also displays ID numbers on excel sheet. This Excel sheet can be saved and is used to calculate the attendance of the User. Hence, a system with expected results has been developed but there is still need for improvement. Further enhancing the system the designed system can be interfaced with camera and GSM module through which we will be able to send SMS to the parents/security persons/concerned staff so as to take care of the attendance if any false entry is made or when recognized by unauthorized user. This enables the added advantage to the person concerned/in-charge for monitoring attendance of students/employees. Through this the institute/organization is all time ready with the record of attendance of all the students/employees anytime.

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