IoT based Attendance Management System with Custom Dashboard

Lavina Chugh[1], Nikita Thakur[2], Vishal Tejwani[3]

[1] *Student Computer Science, Thadomal Shahani Engg College, Mumbai, Maharashtra, India*
[2] *Student Computer Science, Thadomal Shahani Engg College, Mumbai, Maharashtra, India*
[3] *Student Computer Science, Thadomal Shahani Engg College, Mumbai, Maharashtra, India*

Abstract - *Nowadays many organizations like education institutions, corporate houses and offices have adopted biometric attendance systems where attendance is recorded by putting your finger on a fingerprint sensor. These are then stored on the server to be used or analysed by the concerned authorities. Designing an efficient portable attendance manager device and a common portal for attendance takers and the attendees to cross check the attendance will significantly reduce the hassles of taking and maintaining physical attendance records.*

Key Words: **IOT, fingerprint sensor, attendance, ESP8266, dashboard**

1.INTRODUCTION

In this system, an IOT based Biometric attendance system is built which can store the attendance records in Google sheet taken through R305 fingerprint sensor module. This is a fingerprint sensor module with TTL UART interface for direct connections to microcontroller UART or to PC through MAX232 / USB-Serial adapter. The fingerprint data can be stored in the module and can be configured in 1:1 or 1: N mode for identifying the person. The biometric data along with the corresponding subject, teacher, taken through the OLED screen, is sent from NodeMCU to the google sheets. The records stored in the google sheets are retrieved on the website and one's specific records are displayed, once logged into their accounts. Manual work for information retrieval on attendance becomes less as the work becomes digitized by reducing the admin's work of integrating the details of all the departments of college or a company into a single database and also by auto generating of various types of attendance reports required for analysis. It also gives easy access to students as they can view their attendance and make up for the shortage of attendance accordingly. In the present situation the system can be accessed both in desktops and mobile devices. Any mobile device which has access to it's server on which the project has been deployed will work for that particular institute. Later on it can be modified to operate for many institutes.

2. LITERATURE REVIEW

Designing an efficient attendance management system for students to maintain the records with ease and accuracy is important thus improving the accuracy of attendance records and avoiding the entries of proxy attendance. In this paper, we will learn how to build an IoT based

Biometric Fingerprint Attendance System. We will collect the fingerprint data from the multiple users and send it over the internet to a website. The Enrolment of fingerprints is done on the Server and verification is done on the client with the transmission of fingerprint templates over the network.

The project has a database and records of attendance. By logging into the website, all the attendance records of each user including personal details as well as incoming & outgoing timing can be collected. The data can also be downloaded and exported to a google sheet.

The conventional authentication technologies like RFID tags and authentication cards have a lot of weaknesses in terms of security, the 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 implementations. Biometric Attendance systems are commonly used systems to mark the presence of a person 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, using the fingerprint sensor, the system becomes more secure for storing the user's data. We will also build a very interactive user interface which makes accessing and analysing this attendance information extremely easy and timely.

3. Hardware Assembly And Functionality

3.1. Components Selection

ESP8266:

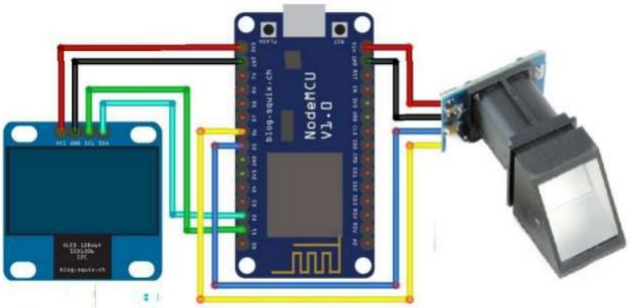


Fig -1 Circuit Diagram n OLED Display & Fingerprint Sensor is interfaced with NodeMCU ESP8266 12E Board

Given above is a circuit diagram that shows how an OLED Display & Fingerprint Sensor is interfaced with NodeMCU ESP8266 12E Board. The I2C pins of the OLED Display, i.e SDA & SCL are connected to NodeMCU D2 & D1 pins respectively.

Why esp8266?

It is a self contained microcontroller with Wifi built in thus avoiding the need of externally connected wifi modems and making circuits complicated.

Since it has Wifi, data can be sent over the internet rather than taking space locally.

It has powerful storage capacity and enough GPIOs to control both theS display and the fingerprint sensor.

R305 fingerprint sensor:

This is a fingerprint 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 fingerprint data in the module and can configure it in 1:1 or 1: N mode for identifying the person.

Why the R305 fingerprint sensor?

It's cheap, reliable, it has great community support and has open source documentation.

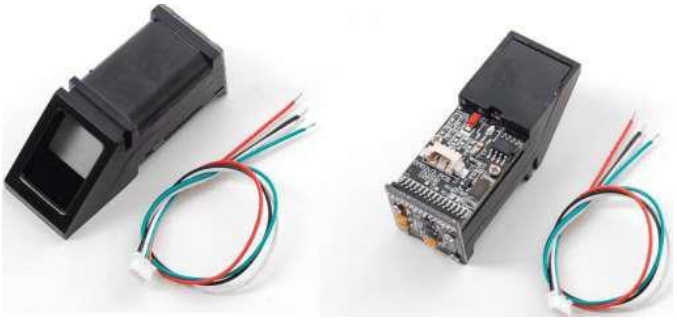


Fig -2 R305 Fingerprint Sensor

OLED display:

This blue OLED display is a 0.96 inch module. The display module can be interfaced with any microcontroller using SPI/IIC protocols with a resolution of 128x64. The package consists of a display board, display and 4 pin male header pre-soldered to board.

Why an OLED display and not LCD?

It is compact .

Offers better contrast in dim lighting.

It is durable and energy efficient.

Fig -3 OLED Display

Why use a battery instead of usb powered?

It helps make the device portable, moreover the user has freedom to use it anywhere and pass it among students.

4. SYSTEM SOFTWARE DESIGN

The software system consists of a portal, where the data is scraped from the cloud that stores information from the device. This system enables the user to view the stored data which helps to analyse, filter and deduce conclusions from it. Apart from merely viewing stored records, the

system also has secondary features that can be useful to the organisation we are using this system for. As of now, the system has been created for an educational institute, which includes features like separate login for students and teachers, and a unique dashboard for each user where one can access information exclusive to themselves. Apart from attendance, students can view latest notices posted by faculty through the 'teacher' portal, subject wise notes, assignment deadlines and upcoming internal tests.

4.1 Software Design Components

Login Pages

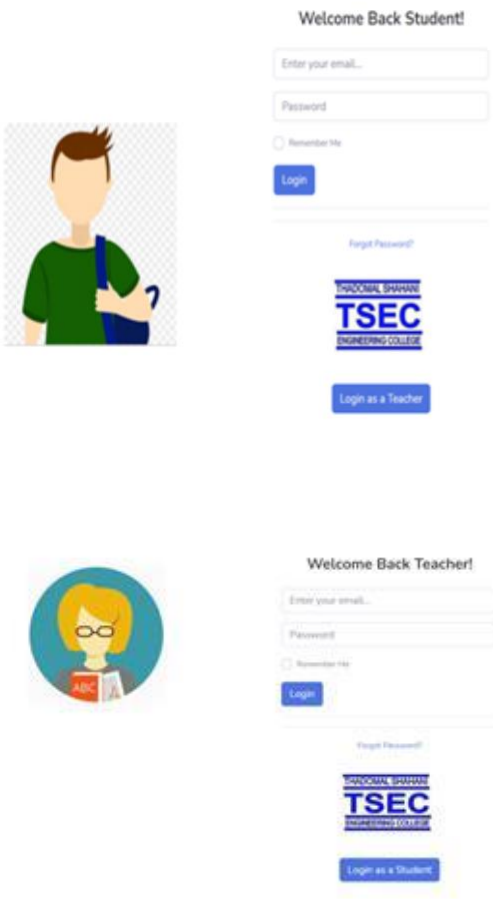


Fig -4 Student/Teacher Login Pages

Access to unique portals have been provided to each user by creating a separate login for students and faculty.

Student Dashboard

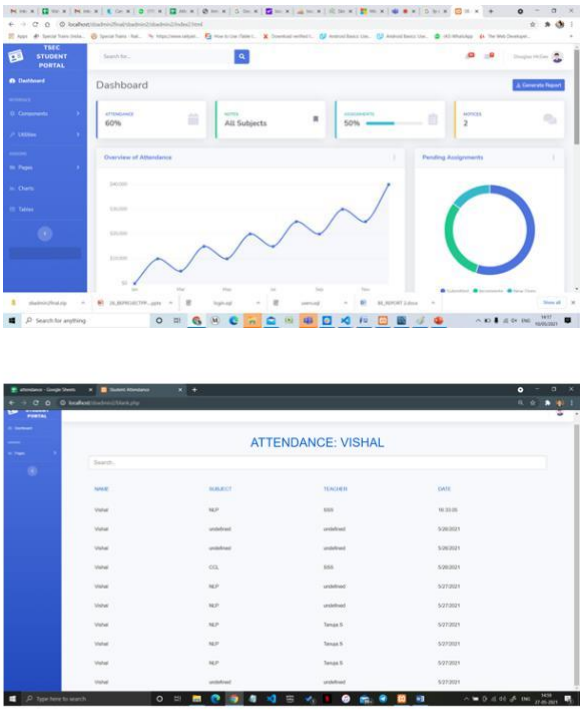


Fig -5 Student Dashboard

This dashboard contains attendance specific to the user based on login which can be filtered based on subject, teacher or date. The students can also view documents uploaded by faculty.

Teacher Dashboard

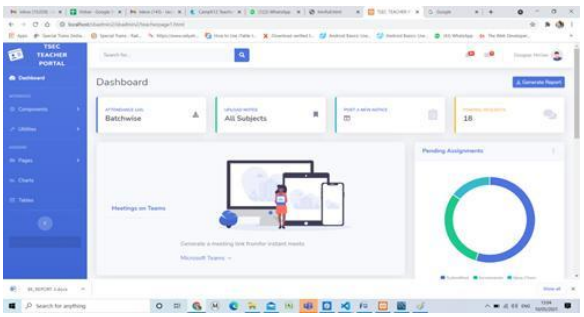


Fig -6 Teacher Dashboard

This dashboard enables teachers to view batch wise attendance for the classes they teach. The changes

made by the teacher in the notices and notes section can be viewed directly by the students in their respective portals. The teacher can also create a personal meeting link for a virtual lecture right from the dashboard.

5. APPLICATIONS

This biometric system has ample applications in multiple sectors other than student attendance. It can be used in:

- Banks to keep track of employee and employee data.
- Security systems to keep track of access and data.
- Healthcare sector.
- Commercial shipping and delivery.

6. CONCLUSIONS

We can manage students' records digitally without addition of centrally installed biometric stations which makes the process more convenient and eliminates proxy attendance. This device being compact brings portability to the old system. The portal is responsive and hence domain specific applications can be created using similar system design. This system can have a wide range of applications and makes the biometric process more efficient.

REFERENCES

[1] IoT Based Fingerprint Biometric Attendance System Using NodeMCU (Esp8266)
www.prateeks.in/2020/04/iot-based-fingerprint-bio metric.html

[2] Fingerprint Based On Biometric Attendance System using Arduino how2electronics.com/fingerprint-biometric-attendanc e-system-arduino/

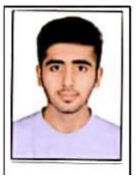
[3] How To Use Fingerprint Identification Modules
www.electroschematics.com/how-to-use-fingerprint-i dentification-modules/

[4] 0.96" OLED Display Module - SPI/I2C - 128x64 - 7 Pin (Blue)

BIOGRAPHIES

Lavina Chugh
Student Computer Science, Thadomal Shahani Engineering College,Mumbai,Maharashtra,India

Nikita Thakur
Student Computer Science, Thadomal Shahani Engineering College,Mumbai,Maharashtra,India



Vishal Tejwani
Student Computer Science, Thadomal Shahani Engineering College,Mumbai,Maharashtra,India