

Biometric based Student monitoring system

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DECLARATION

We declare that this report has been composed solely by ourselves and that it has not been submitted, in whole or in part, in any previous application for a diploma. Except where states otherwise by reference or acknowledgment, the work presented is entirely our own.

Student's Name

Index Number

Signature

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ACKNOWLEDGEMENT

As final year students, we had to do a project implementation during our Specialize Instruction Program as a partial fulfillment of the requirements for the National Diploma in Engineering Sciences. This is the project report regarding to our project which is based on a biometric student management and monitoring system. We are pleased to write this report after completing the project successfully. So in this section we would like to acknowledge all the persons who have supported us in various ways to complete this project.

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ABSTRACT

Fingerprint attendance system aims to automate the attendance taking procedure using biometric technology (fingerprint). The automated attendance taking procedure is extremely efficient compared to the traditional name call out procedures. It saves the time consumed by the traditional method. However, the available commercial attendance systems are expensive and complex to design and develop. This project proposes a “Biometric based Student monitoring system” which is flexible, inexpensive, easy to use and capable to integrate with future development especially of an educational institute like IET.

To mark the attendance, the main input type is students' figure print. Otherwise it can be entered manually. An administrative login is provided for the lecturers, instructors and academic staff to enter or edit student details, exam results, coursework marks, practical timetables etc. also it is available to import and export those details in several file formats. A student login is provided for the students to check their attendance, exam results, marks, timetables etc. Both students and administrators can access our user friendly web application which is hosted online.

In brief, the proposed system is most efficient and widely uses solution that keeps the discipline of the students at highest level. In addition, we provide the facility of publishing above mentioned information which are commonly used in educational institutes like us.

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1.0 INTRODUCTION CHAPTER

1.1 Introduction

This is the project report draft to submit our project of “Biometric based Student monitoring system”. This project related to a web-based student monitoring system combining with real time fingerprint-based attendance system.

A Student management system by definition is a system where all or a number of process related to the students of an institution could be managed. In a traditional system where this is done using papers, file and binders there are a vast number of drawbacks including high time consumption and exorbitant and vexatious maintenance. Thus, the need to upgrade the Conventional Student management system with new technology is undeniable. On the other hand, student attendance is a paramount factor in any educational institute since it will affect the students from gaining knowledge and skills as well as their grades. Recording student attendance manually (using attendance sheets) during lecture periods has proven to be a strenuous challenge. Ergo upgrading both these systems from their less adequate and dated methods with newer competent and efficient systems is a necessity for any higher educational institute.

Here in this proposed Biometric based Student monitoring system we intend to provide an automated attendance recording system where attendance will be recorded subject wise and fingerprints will be used as the identifying factor, coupled with a web-based monitoring system. A number of additional features will also be added given the high flexible nature of the project including a student notification system, course work management system and an exam results management system.

Thus with this project we aspire not only to provide a more efficient student attendance recording system but also to mitigate a number of functions related to IET which will be discussed in detail below.

1.2 Problem statement

In our institute there is no any Student management system and Student attendance system up to now. So the Students, Lecturers & Staff members are facing to the lots of problems in day to day works.

- 1) Student attendance need to be record manually.

Since there is no any proper student attendance system, lecturers have to record student attendance manually using sign sheets. Not only this is a waste of precious and finite lecture time but also could be seen as reason for students to lose focus on the lesson.

- 2) Student can easily cheat the attendance

This probably is one of the more common problems faced by lecturers. In the existing method an attendance sheet is passed from student to student during the lecture time. There lies the problem, signatures for absent students can be forged with relative ease. Which will in return force the lecturer to count the number of students manually. On average taking a count of students in a lecture room with fifty to sixty students may very well take couple of minutes. Since there's always space for human error lecturer will have to take an additional count as well. At this point if the number of students didn't match with the number of signatures lecturers will most likely resend the attendance sheet and ask the students to remove the forged signatures. As we have experienced first-hand this is a very high time consuming debacle with no guaranteed method to eliminate forgeries.

- 3) No backup for the attendance records and it can be lost or damage easily

In Our institute, Attendance is the key for eligibility to the exam. So it's very important for the student. If the attendance sheet Lost or the Damage then there was no any proof for mark the student attendance. So, the lecturer will end up unable to enter the correct attendance records. Also, the lecturer had to keep these attendance sheet safely to the end of semester.

- 4) Hard to analyzing and tracking student performances using Attendance

Reviewing Student attendance record is an important factor for evaluating an individual student academic performance. But it is very hard when there was no proper attendance system. In our institute, the Lecturer has manually entered separate attendance sheets for each lecture. These data were scattered and it's hard to track student attendance. If lecturer needs to analyses or

track student attendance, he has to enter these scattered data into a table. It is very hard and waste the time.

5) No way for students to track their attendance

There's simply no method for students to keep track of their attendance after the lectures other than by memory. While it is undoubtfully important to attend each and every lecture there may be certain circumstances where students will have to weigh in their attendance percentage.

6) No Proper way to know course work/Assignment corrections

In our institute, many of student repeated their course works because of this problem. They don't know they had corrections. Therefore, student had to visit labs every time to check, that they had any corrections for their course works. This disturb the lab sessions, instructors, lab assistance and students also.

7) No convenient way to access exam results and course work marks

8) Poor communication between Department and Students

Department has to notice there all information (All results, exam time tables, lab schedules) in notice boards. Not Every Student refer the notice board. So some students will be miss them. This notice board method bothers staff members also. Because they had to get printout the notice and attached into the notice board. It waste time, papers. Even the notice is short they had to use the full paper and waste same time. Also some days the notice board full with notices. It's hard to point out what's the latest notice. So the communication between Department and students is poor.

As the students we were also face these problems every day. So our group desired to build “Biometric based Student monitoring system” for our institute.

1.3 Project Objectives

In designing this system, some project objectives had been specified. Among them we had two main objectives.

First main objectives is to improve the communication between department and the students and increase the efficiency and easy to the daily route of the Department. Second main objectives is to replace the current existing paper-based traditional attendance management system with new fingerprint-based student attendance management system that in use by most of the colleges/universities. The other objectives of this project had been identified and listed below.

- i. To provide a real time web-based student attendance system which can display each and every student's attendance details effectively.
- ii. To avoid the students cheating on attendance recording through the implementation of fingerprint attendance system.
- iii. To provide easier method in evaluate and analyses the student performance based on their attendance
- iv. To provide a convenient and efficient way to access pass exam results and course work marks
- v. To provide an effective method to share notices including lab schedules, course work corrections, lecture schedule changes.
- vi. To provide a notification system with automated Twitter messages and web push notifications which will be sent student phones helps to students to find their result, marks, corrections, special notices quickly.
- vii. To provide Full time available system. So, students can log in to the system 24hrs from any location.
- viii. To save the time. Students also can manage their time with their day to day works.
- ix. To Provide More reliable and effective system to our Institute.

As a start we hope to build this system for our Electrical department first and then it can be developed to Civil and Mechanical departments also

1.4 Literature Review

In recent years there's been a vast number of research papers done in biometric based student monitoring systems.

In [1], an embedded computer-based lecture attendance management system was proposed. The system provides an improvised electronic card and card reader serially interfaced to the digital computer system.

Authors in [2], used a wireless attendance management system that authenticates using the iris of the individual. The system uses an off-line iris recognition management system that can finish all the process including capturing the image of iris recognition, extracting minutiae, storing and matching.

Attendance Management has also been carried out using attendance software that uses passwords for authentication. The authors in [3] designed and implemented a system that authenticates the user based on passwords, this type of system allows for impersonation since the password can be shared or tampered with. Passwords could also be forgotten at times thereby preventing the user from accessing the system.

Other attendance solutions are RFID-based student attendance system and GSM-GPRS based student attendance system. These are all device-based solutions. While GSM-GPRS based systems use position of class for attendance marking which is not dynamic and if schedule or location of the class changes, wrong attendance might be marked. Problem with RFID [5] based systems is that students have to carry RFID cards and also the RFID detectors are needed to be installed [4].

The application of fingerprint-based presence technology has been done by [7] and [6]. On this research, on average, it only discusses the use of fingerprint machines compared to traditional presence mechanisms. Likewise, [8] applying Wireless technology to the Fingerprint Attendance Marking System that can present a framework using attendance management can be made automatically online. But the system does not have security measures to protect attendance data.

Next in the research [9], implementing a Zigbee based student attendance system using local area networking (LAN). In this system students can report their presence via biometrics and

attendance notifications are passed through the zigbee module, but the device can be damaged and attendance data will be exposed. Likewise, with research [10], designing and developing Arduino and Fingerprint-based portable class attendance systems.

A. LabVIEW

The system is designed using an 8051 microcontroller, R305 optical fingerprint sensor and LabVIEW as discussed in [11]. Microcontroller communicates with computer in which LabVIEW is installed. RS 232 is used for serial communication between microcontroller and PC. LabVIEW is a system design software from National Instruments which is used in the system for storing attendance records, maintaining it in a text file and displaying it to the user. Student ID is also displayed on the LCD screen after fingerprint matching.

Advantages:

1. User friendly (LabVIEW graphical interface)
2. High speed
3. Efficient and low-cost embedded platform
4. Low power consumption
5. Attendance report generation using LabVIEW

Disadvantages:

1. For small databases only
2. Limited Functionality
3. Two microcontrollers are used
4. Less security

B. GSM and ZigBee

The attendance system in [12] incorporates a low power consumption 2138 microcontroller, SIM 900 GSM module and a ZigBee series 2 OEM RF module. GSM (Global system for mobile communication) and ZigBee are the additional technologies used in this system.

GSM module is used to communicate the daily attendance report of students for every subject along with start time and end time of lecture to head of the department. Parents are also intimated about the attendance of their ward via SMS. ZigBee uses low power radios to transmit and receive the signals wirelessly. Attendance data is transferred from classroom module to centrally located PC via ZigBee. Data is then stored and analyzed in the centralized system. Attendance system using only GSM are implemented by [13] [14] and ZigBee based system is implemented by [15].

Advantages:

1. Easy to use.
2. Portable (Wireless)
3. Low power consumption
4. Additional functionality (due to GSM)

Disadvantages:

1. Less range of ZigBee (10-20 meters)
2. Low data rate of ZigBee.
3. High cost (both GSM and Zigbee)

C. RFID and Android

This attendance monitoring system uses RFID technology where student has to swipe RFID card along with his fingerprint to mark the attendance as done in [16]. An android application is developed through which system can be accessed from any remote location and record of any student can be checked. The system can also detect the location of students, faculties and other members anywhere inside the campus [16]. Online SMS service is used to inform the parents about student's attendance.

Advantages:

1. More secure (RFID+ Biometrics)
2. More functionality
3. System can be accessed remotely (via android application)
4. Attendance performance graph will be generated
5. RFID cards can serve as library card, mess card
6. RFID cards are difficult to tamper
7. Free bulk SMS service used instead of GSM (Lower cost)

Disadvantages:

1. Complex software design
2. Android application development difficult.
3. Very high cost
4. RFID cards can be misused

D. RFID, GSM and .Net

The system combines RFID and GSM technology with biometrics for attendance management. Students ID (identification) card is tagged with their RFID tag. RFID tag is matched with the database and attendance is finalized after fingerprint is verified using fingerprint sensor. GSM Modem is used for sending SMS to parents regarding student's attendance. RFID transponders are installed in classrooms, laboratories and staffrooms through which location of the student and staff can be traced. A website is designed through which teacher, students and guardians can view the location of a student in the campus and also the attendance record of the student. Vb.net is used for server application and asp.net for website [17]. System using NFC (Near Field Communication) is implemented by [18]. NFC based system has lower range than RFID based systems.

Advantages:

1. More Secure due to RFID and biometrics
2. Complete system is automated
3. Small size of RFID cards
4. Fast processing speed
5. No line of sight required for RFID
6. Many tags can be read simultaneously
7. .net framework simplifies debugging

Disadvantages:

1. Software design is difficult.
2. System should always be kept ON
3. Costly

E. Web Based Biometric attendance system

This proposed system, however, is a cost-effective simplified system that uses fingerprints for identification. The fingerprint is unique to each individual and cannot be shared. It allows students to register for lectures with ease and eliminate errors that are associated with attendance. Furthermore, web-based management framework offers vast advantages over any system with local storage.

Existing Fingerprint based Attendance systems are compared with the proposed system on the basis of speed of the system in recording and maintaining attendance, security of the system, power consumption of different units of the system, cost of implementation, portability and functionality in below

Parameter Technique	Speed	Security	Power Consumption	Cost	Portability	Functionality
LabVIEW	High	Moderate	Low	Low	No	Limited
GSM, ZigBee	Moderate	Moderate	Low	High	Yes	Wide
RFID, Android	High	High	Moderate	High	No	Wide
RFID, GSM, .Net	High	High	Moderate	High	No	Wide
Cloud based, ESP32	High	High	Moderate	Moderate	Yes	Wide

Table 01 – Comparison of other systems

Additionally, given the use of a web application, adjunct functions related to the institute such as results management, course work management and a proper student notification system can also be implemented from the same platform as we have proposed in this document

ESP32

The ESP32 which we have proposed as a solution is a cheap Wi-Fi module perfectly suited for DIY projects in the Internet of Things (IoT) and Home Automation fields. ESP32 has dual core 160MHz to 240MHz CPU. This module come with GPIOs that support a wide variety of protocols like SPI, I2C, UART, ADC, DAC, and PWM. The best part is that these boards come with wireless networking included, which makes them apart from other microcontrollers like the Arduino. It means that this module can easily control and monitor devices remotely via Wi-Fi or Bluetooth for a very low price. In our project we use Wi-Fi to communicate with the database. ESP32 work at 3.3V

Why we use ESP32 in this project

- Cheap & Faster WI-FI module
- It has 34 GPIO pins (ESP8266 has only 17 GPIOs)
- All GPIO pins can use as for interrupt pins. So pin selection for other modules is easy.

We use 2 push buttons for Interrupting. So no need to concern about pins

Fingerprint Module

Fingerprint sensor module used in biometrics for security in fingerprint detection as well as verification. These devices are mainly used in safes where there is a high-powered DSP chip used in the rendering of image, feature-finding, searching and calculation by connecting it to any microcontroller with the help of TTL serial, & send data packets to get photos, notice prints, search and hash. The enrolment of new fingers can be stored directly within the flash memory of on board.

Our Fingerprint sensor includes pins like VCC, TX, RX, GND and there were 2 No Connection pins. Operating voltage is 3.6 - 6.0VDC. In Our Project we supply 5VDC.

Why we use Fingerprint module in this project

- Using Fingerprint saves time to gain access as compared to other methods like RFID card or written attendance in register book.
- Fingerprint is unique for person. So can't cheat (other methods like RFID card or written attendance in register book can cheat easily)
- High accuracy
- Small Device

Web Application

As we have compared above the proposed web application will be able to provide some noticeable advantages over other systems

- 24 / 7 Accessibility

Given that the systems created by web applications are web-based, they can be accessed 24/7 provided that you have an internet connection. What's more, they are totally flexible, offering access from almost any device or browser.

When desktop based software need updating, every single device in which the application is installed will need individually updating. This task usually falls to staff and may be ignored if they are pushed for time, leaving the system vulnerable to security breaches.

Compare this with a web based application, where a security or functionality update can be rolled out to every version of the web application with zero downtime, giving users instant access to the updated version of the app.

- Higher Levels of Security

With desktop based software, a stolen or damaged computer can be a very costly and time consuming situation; leaving your data at risk and requiring you to contact your software provider and request for the software to be re-installed on a new device.

With a web based application (with data stored in the cloud), you have the peace of that should your computer equipment be damaged or stolen, it can very quickly be back to ‘business as usual’.

This is because web applications store information on remote service, so as long as you know your URL (web address), user name and password, you can log-in securely to any computer or mobile device connected to the internet and your business can be up and running again in no time.

Finally, in the event of loss of data through human or programme error, data can be quickly restored from the cloud.

- Easily Customizable and Scalable

One of the biggest problems with an off the shelf software solution is that it cannot grow or integrate with the institute, or not without expensive upgrades at least.

As a custom web application which will be made specifically for IET, this will be completely flexible and scalable to demands and growth.

2.0 PROJECT APPROACH

2.1 Introduction

Conventional attendance system followed in our institute, where the lecturer gives an attendance sheet for each student and marks the attendance, causes time wastage during lecture time. As explained under the project objective topic this becomes more severe especially when the number of students in a lecture is very large. Under this project approach chapter we have described our proposed solution, explaining the feature of it comparing with conventional attendance systems. Even the biometric attendance management systems are familiar in these days, those products are not perfect for educational institutes like us. So our goal is to overcome problems in traditional attendance marking system and to provide a perfect attendance management system regarding educational institutes like us. Additional features (such as publishing coursework details) are also mentioned under this proposed solution/study design chapter.

Methodology chapter shows the intended procedure of doing this project, in step by step. The graphical view of this process is shown in project management using a Gantt chart. A covenant time period had been given to us for finish the project. So we allocate a dedicated time period for each work in our methodology. It helps to achieve our tasks without exceeding the given time period. This project management sub chapter is not only shows our time management but it also shows our budget estimations.

Even we manage thing as mentioned above we have some difficulties to overcome while doing this project. Project limitation sub chapter shows those limitations with details.

2.2 Proposed Solution/Study Design

As we described in previous chapters we realized that the requirement of a well-established database management system to manage students and staff. So our solution would be a web application to manage student attendance, results and course works with an automated fingerprint module to recode attendance details in real time process. We provide the web application facilitates varying functions with the ability for students to trace their attendance

and course work progression. A notice board facility with notification capabilities are also included for our system through a user friendly web & app interfaces.

So here the contents of our solution...

- Take real time attendance of students with aid of figure print machine.
- By uploading above details into the web application, lecturers, instructors and students can check the attendance in anywhere at any time.
- Attended lectures are shown in a doughnut chart as a percentage of total lectures for each subject.
- Provide notice board facility to publish notices/announcement, exam results, lab schedules, course work marks and corrections.
- Students can attain them easily through their accounts.
- Notification capability for important announcement via the app.

Basically there are two segments in this biometric attendance management system as hardware development & software/web development.

➤ **Hardware Development**

Hardware development segment is related with the fingerprint machine as shown in bellow basic block diagram. An adafruit fingerprint sensor is used to make adding fingerprint detection and verification super simple. The output of sensor is the input for Arduino ESP 32 module which has in-built Wi-Fi capabilities. 4x4 matrix keypad with two push buttons (for the functions of delete & enter) is used to enter the subject code. And 20x4 character LCD display with I2C module are also connected with Arduino ESP 32 module. When a fingerprint is taken, the Arduino ESP 32 module should be upload it into web site via Wi-Fi. So there should be a router as shown & through the router, which data will be sent from Arduino ESP32 module to the web site. The hardware development is the costly part of our proposed solution.

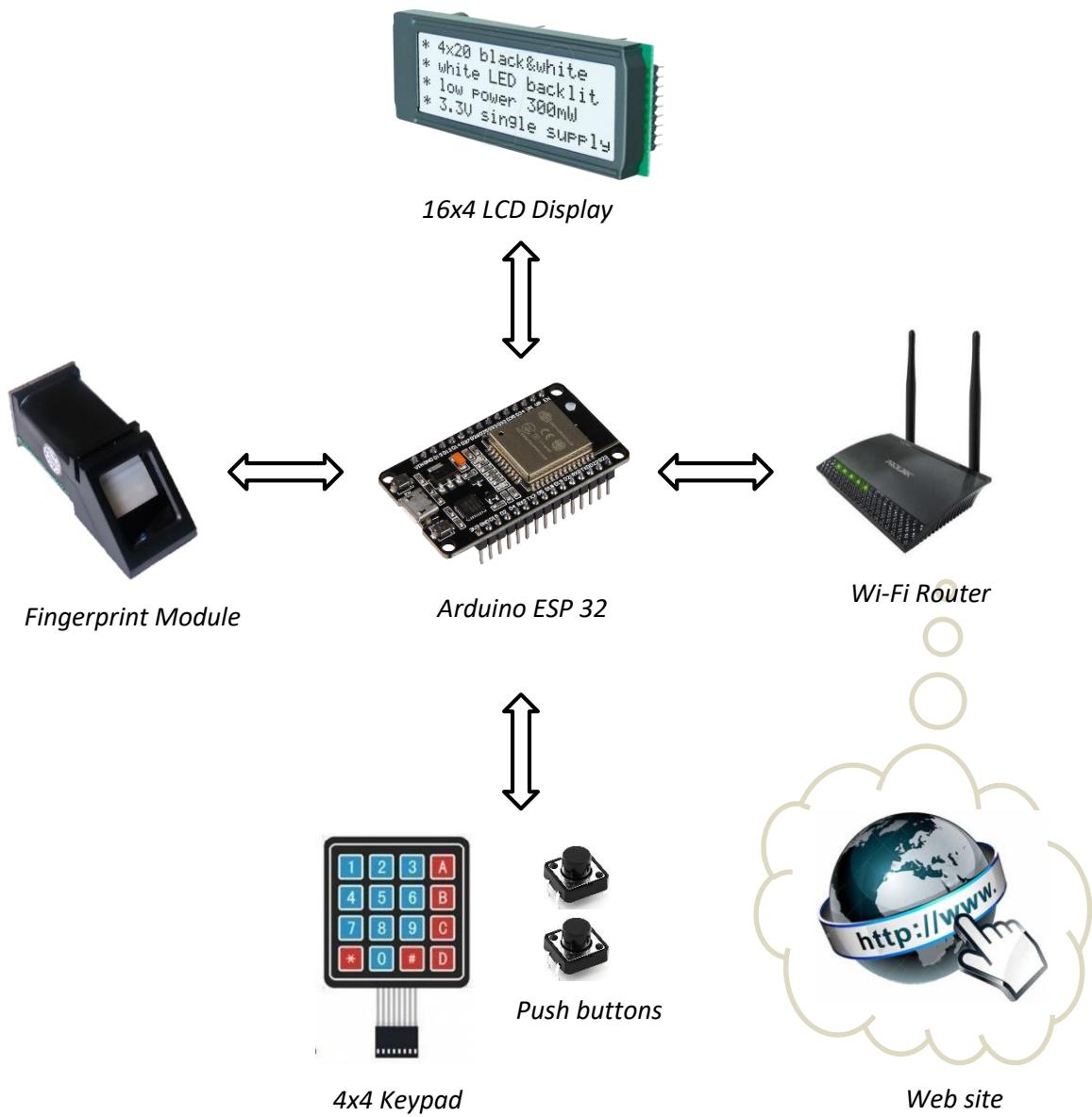


Figure 01 – Hardware arrangement

➤ Software & Web development

This is the most time consuming stage in our project that we have to achieve. The database is based on MySQL containing all the details of lectures, marks, attendance etc. and the website is developed by using CSS, PHP & JavaScript. We intend to give an administrative access/logging for lecturers and instructors to check, add or change information while giving permission for students only to check their attendance, marks and notices as a guest. Whether it is a lecturer or a student we always try to provide a user friendly but descriptive web interface for all users. In software development part, Arduino IDE is the programming environment for Arduino ESP 32 board.

The process of our proposed solution is a syncretism of hardware, software and web developments as described above. First of all a template of the fingerprint is stored to database with details (index, name etc.) of relevant student. This is a onetime enrolment process for each and every student. Following flowchart describes the chart for process of logging of attendance. It begins with putting fingerprint for a student to match his/her fingerprint template that was registered before, when the current fingerprint template matches the stored template that was registered before, the fingerprint device records a logging of attendance for a student by his index with date and time. The algorithm of chart in bellow diagram is used in the fingerprint device.

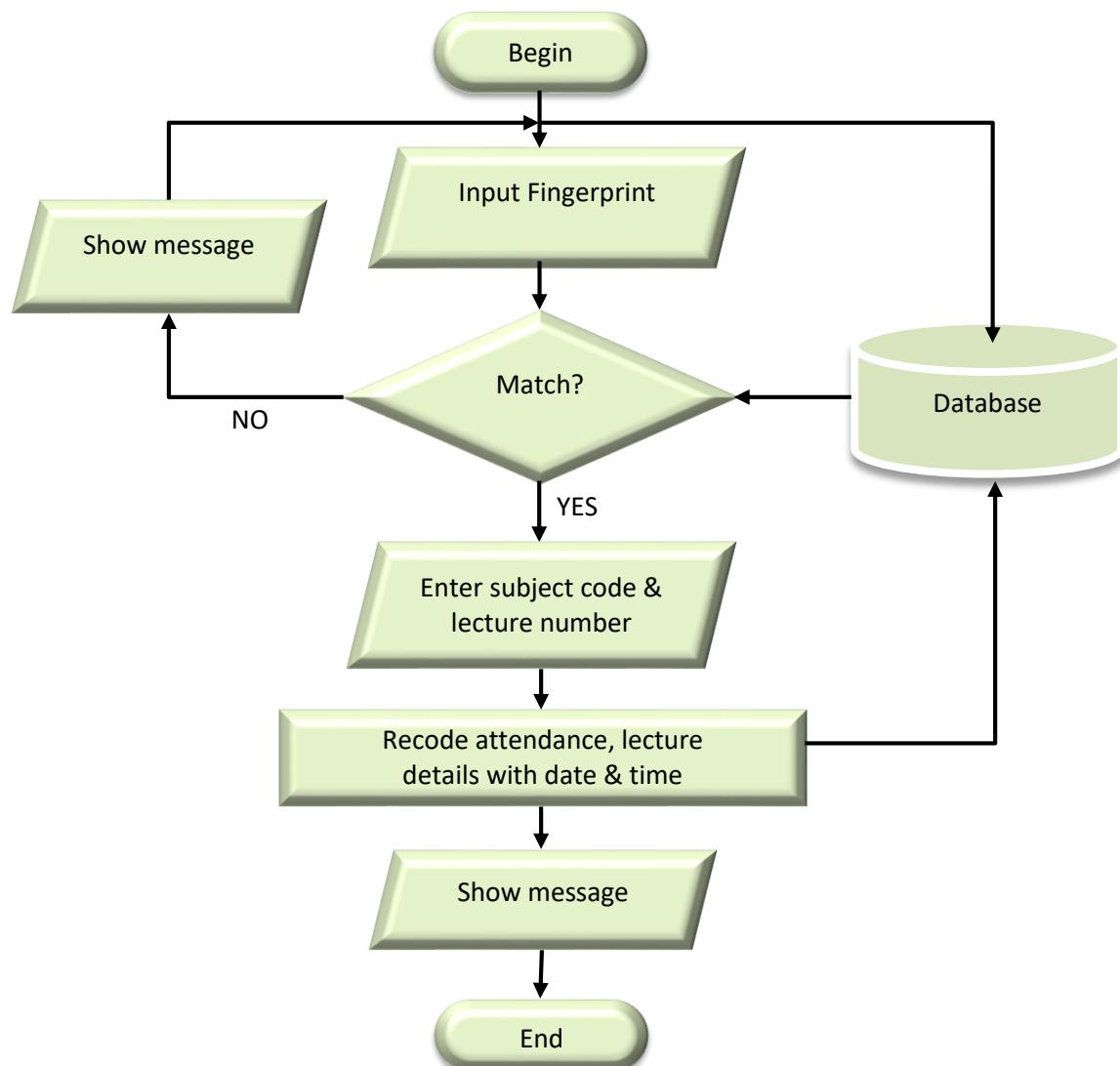


Figure 02 – Attendance marking flow chart

2.3 Methodology

1. Recognize the importance of advanced student attendance management system and what are the requirements what we can provide in this project over the traditional attendance management systems used in our institute.
2. Gather information related to the project by browsing internet, referring articles/books and asking experienced personnel etc.
3. Study about the required hardware equipment, software and other needed facilities to complete the task.
4. Prepare the Gantt chart, budget and other documents needed to implement the project while having an idea about the technical methodology of doing it.
5. Prepare project proposal and obtain the approval.
6. Purchas the needed hardware and software items.
7. Create web site & check the capability of logging and uploading data.
8. Prepare the fingerprint machine & then program it.
9. Drive several test to check if the expected output is given form the website when we put a fingerprint on biometric module.
10. If there are errors fix them or improve the prototype according to the requirements.
11. Improve web application to provide an attractive and descriptive interface.
12. Drive several test run again to identify there is no glitches or errors.
13. Completion of the project and finalize the project report.

14. Submission of the project report and presentation.

2.4 Project limitations

Limitations of this project can be divided into two parts as limitations in web application and limitations in fingerprint module. For both of these budget is a main limiting factor. Since the system is cloud based, requirement for a suitable hosting service rises. To explain it more for an online management system which can handle thousands of student records it must have a high storage capacity and a sufficient bandwidth limit. Furthermore, factors such as reliability and security needed to be weighed in. Since the attendance details are updated on live basis, cloud database need to be functioning at all the time with few to none down times. Choosing a hosting service within these limits is highly problematic. Thus compromises need to be made on aspects such as storage capacity which could in result limit future expansions and new features for the system. Same cost limitations rise in the hardware aspect of the project as well.

Technology wise since this project is web based its fully dependent on internet access and the internet access in Sri Lanka is something to be yet desired thus could prove limitations in accessing the system. Further there could be some minor limitations in compatibility of the web application with the vast variety of devices, operating systems and browsers available specially, when taking the time constrain into account as well. Another limitation in fingerprint module is its dependency on electricity to function. Without electricity data cannot be recorded or transmitted.

2.5 Project Management

2.5.1 Time Management

Individual columns represent weeks.

TASK	START DATE	END DATE	Duration (Days)	November 2020					December 2020					January 2021					February 2021				
				2	9	16	23	30	6	13	20	27	-	4	11	18	25	-	1	8	15	22	29
Phase 1 - Proposal																							
Recognize Importance	11/01/2020	11/05/2020	5																				
Gather information	11/06/2020	11/10/2020	5																				
Study required hardware and software	11/11/2020	11/14/2020	4																				
Prepare Budget and Gantt chart	11/15/2020	11/18/2020	4																				
Prepare project proposal	11/19/2020	11/29/2020	12																				
Phase 2 - Project																							
Purchase needed hardware and software	11/30/2020	12/04/2020	5																				
Create web application	11/30/2020	01/15/2021	46																				
prepare fingerprint machine	12/04/2020	01/15/2021	41																				
Test runs	01/15/2021	01/21/2021	7																				
Improve prototype	01/22/2021	10/02/2021	20																				
Improve web application	01/22/2021	10/02/2021	20																				
Completion of the project and finalize report	11/02/2021	20/02/2021	10																				
submission of project report and presentation	02/21/2021	02/28/2021	7																				

Figure 03 – Proposed Gantt chart

TASK	START DATE	END DATE	Duration (Days)	MONTH					November 2020					December 2020					January 2021					February 2021					March 2021				
				WEEK START DATE	1	2	3	4	5	6	7	8	9	-	10	11	12	13	-	1	8	15	22	-	1	8	15	22	29				
Phase 1 - Proposal																																	
Recognize Importance	11/01/2020	11/05/2020	5																														
Gather information	11/06/2020	11/10/2020	5																														
Study required hardware and software	11/11/2020	11/14/2020	4																														
Prepare Budget and Gantt chart	11/15/2020	11/18/2020	4																														
Prepare project proposal	11/19/2020	11/29/2020	12																														
Phase 2 - Project																																	
Purchase needed hardware and software	11/30/2020	12/04/2020	5																														
Create web application	11/30/2020	01/25/2021	46																														
prepare fingerprint machine	12/04/2020	01/25/2021	51																														
Test runs	01/25/2021	02/07/2021	7																														
Improve prototype	08/02/2021	08/03/2021	30																														
Improve web application	08/02/2021	08/03/2021	30																														
Completion of the project and finalize report	09/03/2021	29/03/2021	20																														
submission of project report and presentation	03/29/2021	04/05/2021	7																														

Figure 04 – Actual Gantt chart

2.5.2 Budget

Item	Cost (Rs.)
Fingerprint Optical Reader	5000
ESP32 Development Board	800
Membrane Switch Keypad 4×4	190
LCD Display Module 16×4	800
LCD 12C Adaptor	190
Push Buttons	80
LM2596 DC-DC Buck Converter Step-Down Power Module	150
Other materials to prepare demonstration	500
Domain	800
Hosting	1100
Total	<u>9610</u>

Table 02 - Budget

3.0 Project Implementation

3.1 Introduction

To implement the Project, we separate our Project in to two main Parts. They are Software part & Hardware Part. Hardware and software development were carried out in parallel. So, in this chapter when describing the progress of each design they are farther divided into semi groups as a and b to explain the hardware and software progress of each stage.

For our Hardware Part, first we searched for better language IDE Then we decided to work with Arduino IDE. We choose ESP32 DEVKIT V1 Board as our main Processing & communicating module in Hardware section. We use AS606 Fingerprint sensor for take attendance. 4*4 Membrane Switch keypad with two push buttons (for the functions of clear & enter) is used to enter the subject code. And 16x4 character LCD display with I2C module are also connected with Arduino ESP 32 module.

Final web application has a PHP backend and bootstrap, JavaScript front end. Project uses a MySQL database for storage. During first stage a local server was used and later a free hosting service was used (sip2020project.000webhostapp.com) and finally it was switched to a premium hosting service (sip2020project.online/beta3)

3.2 Design 1 / Test 1

3.2.1 STEP-01

a) Tested Fingerprint sensor module with LCD Display

As a 1st step we worked with Fingerprint sensor module because it is the most advance part in our module. Therefor we tested many Arduino programs with the help of internet and pdf books. Finally we studied how to connect the Fingerprint sensor module with Arduino and how to code to enrol a new finger, verify the finger & delete the scanned finger ID when we want. Also we connected & coded the LCD display to display the information's like "Put your finger", "scanning", "Valid Fingerprint", "Invalid Fingerprint", etc. That was very good progress we reached.

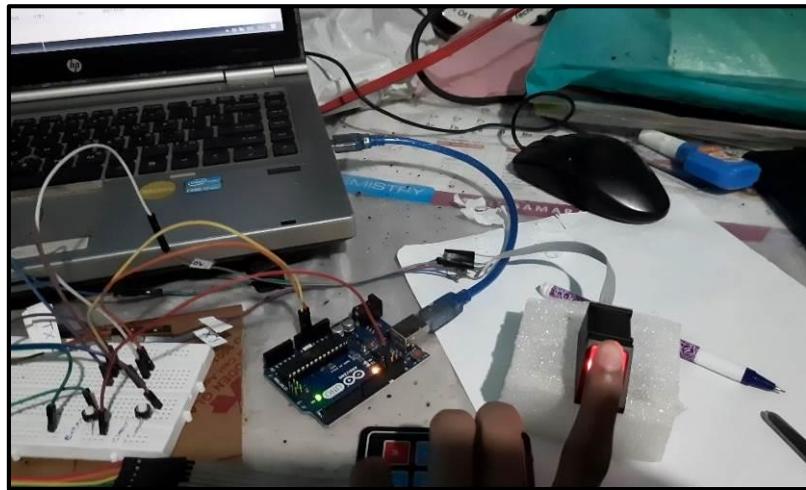


Figure 05 – Testing the Finger Print

b) Setup a local web server and designed the basic database

At this early stage of web application development as the initial step we setup a local web server using XAMPP and designed the first database. First designed database only had two tables. One record to student details and other to record attendance details.

Structure		SQL	Search	Query	Export	Import	Operations	Privileges	Routines	
Table	Action					Rows	Type	Collation	Size	Overhead
users	Browse Structure Search Insert Empty Drop					~1	InnoDB	latin1_swedish_ci	16 KiB	-
users_logs	Browse Structure Search Insert Empty Drop					~0	InnoDB	latin1_swedish_ci	16 KiB	-
2 tables	Sum					1	InnoDB	latin1_swedish_ci	32 KiB	0 B

Figure 06 – First database

3.2.2 STEP-02

a) Tested Keypad and two Push buttons working with ESP32 board

In this step we connected 4*4 Keypad to the ESP32 module also we connected two push buttons (for the functions of clear & enter) to the ESP32 module. Also we use LCD display to display the keypad input. Firstly we programed the ESP32 module to display the digit or symbol when the key was pressed in keypad. After that we programmed 1 Push button to clear the keypad input. Also we use another push button to enter (Uploading) the keypad value. In this step it only display as “Uploading” because uploading function not programed.



Figure 07 – Testing the Push Buttons



Figure 08 – Testing the Keypad

b) Started developing a basic web application to record attendance manually

A simple web application was developed in which admins can login to mark student attendance and students can view their attendance by entering their index number. This design relied heavily on JavaScript. Attendance details were recorded by generating a data array containing lecture code, date and all the attended students' index number which was stored as blob data type in database

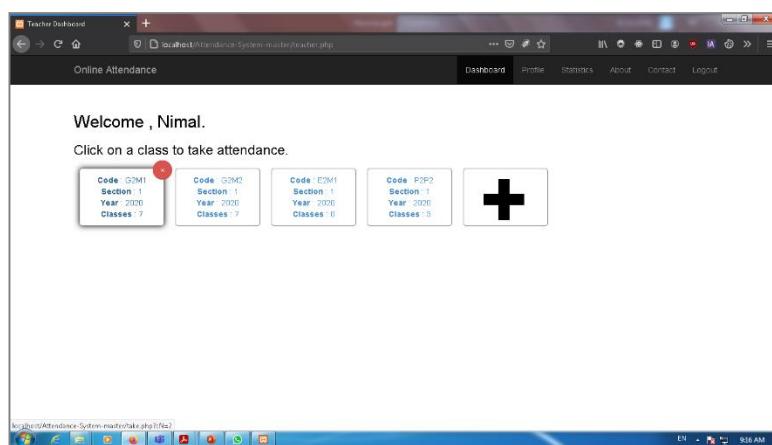


Figure 09 – Web application design 01

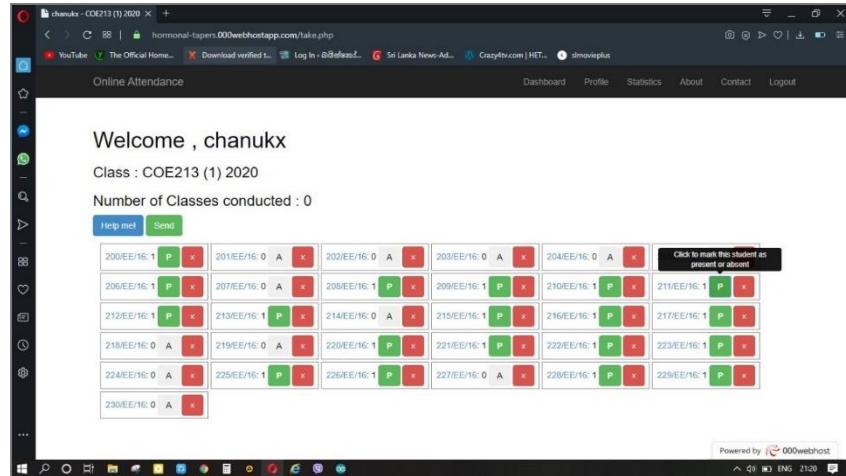


Figure 10 – Web application design 01 attendance marking

```

1 //Match student index, section ,year,code to get attendance
2 $(document).ready(function() {
3     if(gup('roll') && gup('code') && gup('year') && gup('section')) {
4         $("#getAttendance select[name=year]").val(gup('year'));
5         $("#getAttendance select[name=section]").val(gup('section'));
6         $("#getAttendance input[name=code]").val(gup('code'));
7         $("#getAttendance input[name=roll]").val(gup('roll').replace(/-/g,"/"));
8         getAttendance();
9     }
10    $('#getAttendance').submit(function() {
11        getAttendance();
12        return false;
13    });
14});
15 function getAttendance() {
16     var data = getFormElements('#getAttendance');
17     var check = 0;
18     jQuery.each(data,function(k,v) {
19         if(v == '') {
20             check++;
21         }
22     });
23     if(check) {
24         $('#output').html("<h2> Fill all details! </h2>");
25         return;
26     }
}

```

Figure 11 – Code of wed application design 01

Database was also changed to match the new system. In here two tables were used. Teacher table was used to store login details of admins and object table was used to store attendance details of classes

127.0.0.1 > attendance2															
Structure		SQL		Search		Query		Import		Operations		Privileges		Routines	
Table	Action									Rows	Type	Collation	Size	Overhead	
objects	Browse Structure Search Insert Empty Drop									~1	InnoDB	latin1_swedish_ci	16 KiB	-	
teacher	Browse Structure Search Insert Empty Drop									~2	InnoDB	latin1_swedish_ci	16 KiB	-	
2 tables	Sum									3	InnoDB	latin1_swedish_ci	32 KiB	0 B	

Figure 12 – Database 02

3.3 Design 2 / Test 2

3.3.1 STEP-01

- a) Web Application was switched to free hosting services instead of local server
(sip2020project.000webhostapp.com)

A free account was setup in 000webhosting service and application was uploaded to it.

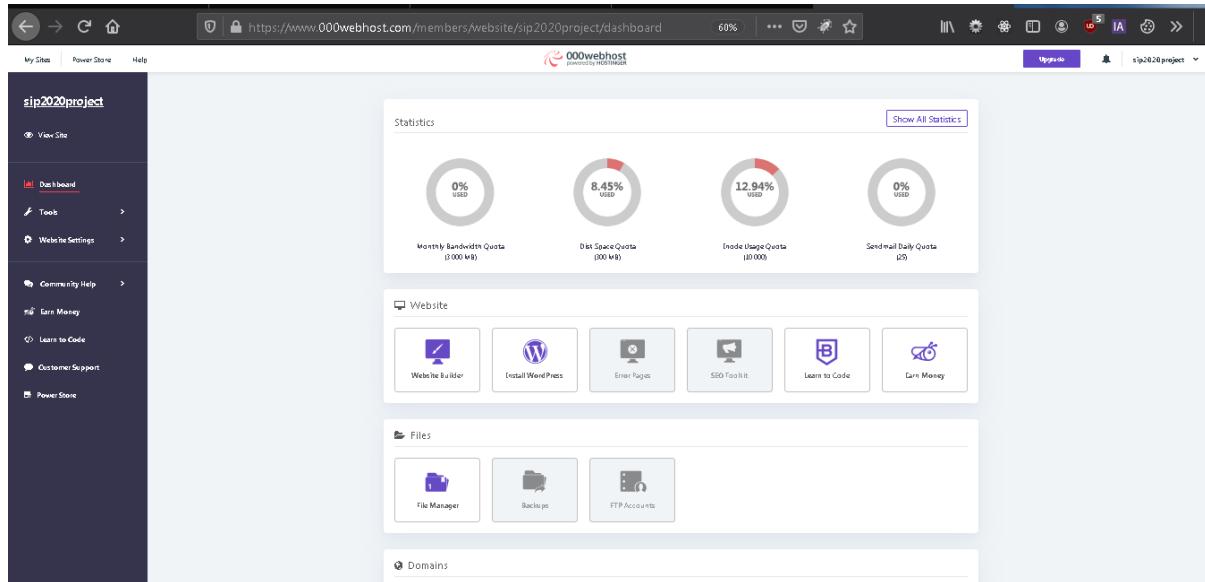


Figure 13 – Dashboard of 000 webhosting

Table based structure was adapted to the web application. Additionally, a temporary application was setup separately from the main application to communicate with the ESP32 module

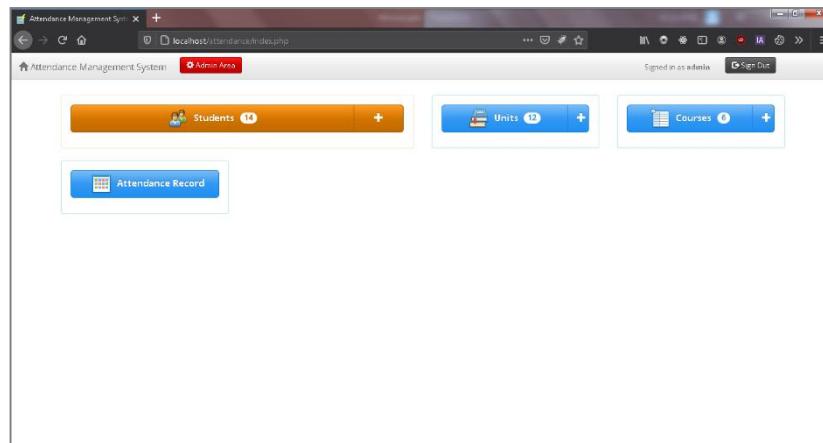


Figure 14 – Web application design 02

Student	Regno	Week	Date	Unit	Attended
Sandaruwan	EEL610592	1	03/29/2020	electrical installation	<input type="checkbox"/>
Doka	EEL610589	1	03/29/2020	electrical installation	<input checked="" type="checkbox"/>
arrow	EEL610584	1	03/29/2020	electrical installation	<input checked="" type="checkbox"/>
arrow	EEL610584	1	03/29/2020	Mathematics and computing	<input type="checkbox"/>
Doka	EEL610589	1	03/29/2020	Mathematics and computing	<input checked="" type="checkbox"/>
Sandaruwan	EEL610592	1	03/29/2020	Mathematics and computing	<input checked="" type="checkbox"/>
arrow	EEL610584	2	03/29/2020	Mathematics and computing	<input checked="" type="checkbox"/>
Doka	EEL610589	2	03/29/2020	Mathematics and computing	<input checked="" type="checkbox"/>
Sandaruwan	EEL610592	2	03/29/2020	Mathematics and computing	<input checked="" type="checkbox"/>
arrow	EEL610584	2	03/29/2020	electrical installation	<input checked="" type="checkbox"/>

Figure 15 – Attendance marking of web application design 02

- b) Connecting ESP32 module to the Temporary Web App & Operate the fingerprint with the instruction of the web application

In this step, our main target is to connect our ESP32 module to our website & operate the fingerprint sensor with the instructions of the website. First we need to connect to our Wi-Fi router. For that we need to provide network credentials.(SSID & Password) in the coding. After that we need to provide website address with the exact file location that we need to upload our fingerprint data in to the website database.

```
/* Set these to desired network credentials. */
const char *ssid = "Chanul234"; //ENTER WIFI SETTINGS
const char *password = "eel610584";
...
```

Figure 16 – Providing the Network credentials

```
String Website_link_getdata = "http://beta1.sip2020project.online/getdata.php"; // server domain
```

Figure 17 – Provide website address with the exact file location

After connecting to the website we programmed the ESP32 module to follow the website instructions such as add new finger, scan the finger & upload to the website, delete the finger ID.

ID	NAME	SERIAL NUMBER	FINGERPRINT ID	DATE	TIME IN	TIME OUT
5	chanuka	1	1	2020-12-29	23:27:50	23:29:04
4	chanuka	1	1	2020-12-29	21:51:49	23:29:04
3	chanuka	1	1	2020-12-29	21:32:57	23:29:04
2	chanuka	1	1	2020-12-29	21:31:44	23:29:04
1	chanuka	1	1	2020-12-29	21:28:47	23:29:04

Figure 18 – Temporary web application

3.3.2 STEP-02

a) Switched to a premium hosting service & developed a basic vue.js web application

Due to reasons mentioned under Results and Findings of Design 2 and Design 1 using a free hosting service wasn't effective. Therefor after much research a suitable premium hosting service was selected and Application was migrated to the new service (HostnGo.Lk)

At this stage major changes were made in the web application. A vue.js based functioning single page web application was developed with most of the functions of the final product. MVVM architecture was adopted with Vue. This was the first stage where a proper architecture was implemented for the web application

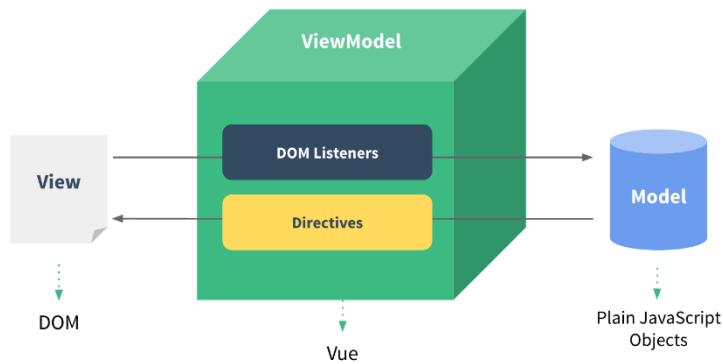


Figure 19 – Vue.js architecture

Additional tables were added to database for the new functions

Table	Action	Rows	Type	Collation	Size	Overhead
attendance	Browse Structure Search Insert Empty Drop	~3	InnoDB	latin1_swedish_ci	16 KiB	-
balamuko	Browse Structure Search Insert Empty Drop	~0	InnoDB	latin1_swedish_ci	16 KiB	-
cw_marks	Browse Structure Search Insert Empty Drop	~0	InnoDB	latin1_swedish_ci	16 KiB	-
exam_marks	Browse Structure Search Insert Empty Drop	~0	InnoDB	latin1_swedish_ci	16 KiB	-
practices	Browse Structure Search Insert Empty Drop	~0	InnoDB	latin1_swedish_ci	16 KiB	-
pw_users	Browse Structure Search Insert Empty Drop	~0	InnoDB	latin1_swedish_ci	16 KiB	-
students	Browse Structure Search Insert Empty Drop	~1	InnoDB	latin1_swedish_ci	16 KiB	-
stu_users	Browse Structure Search Insert Empty Drop	~1	InnoDB	latin1_swedish_ci	16 KiB	-
subjects	Browse Structure Search Insert Empty Drop	~4	InnoDB	latin1_swedish_ci	16 KiB	-
9 table(s)	Sum	~0	InnoDB	latin1_swedish_ci	144 KiB	0 B

Figure 20 – Database of design 02

b) Upload the Subject code & Lecture number to the separate web app setup for testing

In this step we Programed ESP32 module to upload the pressed key values to the website database. To do that we edit the TEST 1 Step 2 code. After typing the Subject code and Lecture number need to press the Enter Button. In this step we programmed the Enter Button function. Connecting to the website is as mention in STEP 1. After that we provide website address with

the exact file location that we need to upload our Lecture No. and Subject Code in to the website database.

```
const char* Website_link_espdata = "http://beta1.sip2020project.online/post-esp-data.php";
```

Figure 21 – Testing the Finger

3.3.3 STEP-03

a) Complete the fully functional Arduino code

In this Step we combined the previous Step 1 & Step 2 codes to make the fully functional code. This is the Final Code for the Hardware part. We successfully done this Step.

3.4 Design 3 / Test 3

3.4.1 STEP-01

a) Design a Circuit for Hardware components

In this Step we design a Circuit Diagram for the Hardware components using Eagle CAD Software.

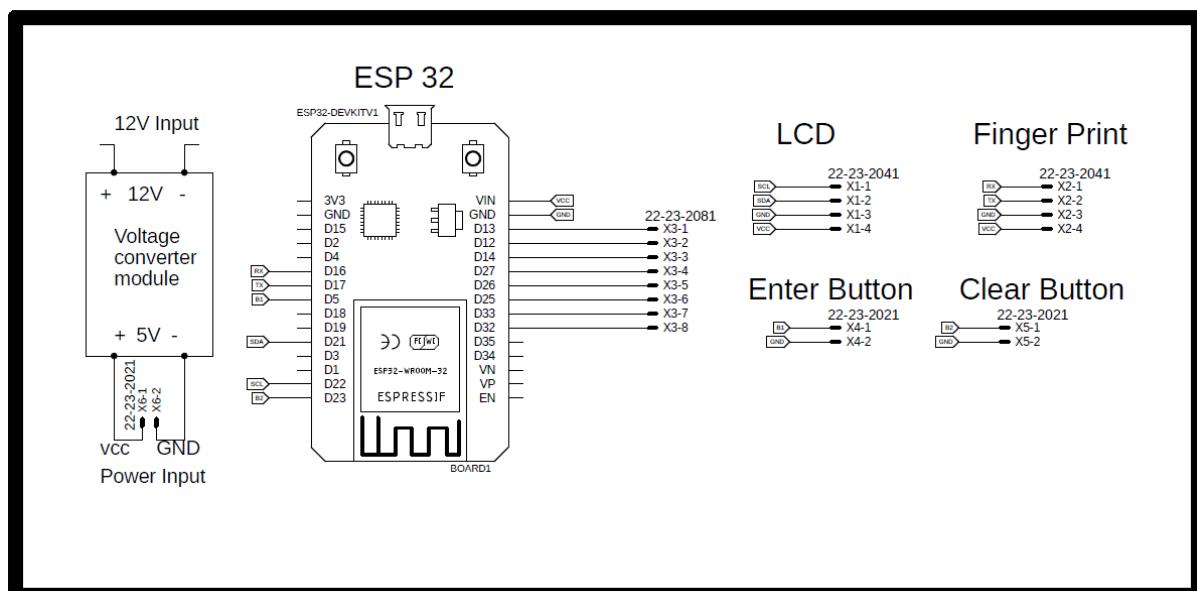


Figure 22 – Schematic diagram of circuit

b) Complete rehaul of web application and switched from Vue.js to pure PHP

Reasons for ditching Vue.js are discussed under Results and Findings of Design 2 software part. Instead of MVVM architecture used with the Vue we based the PHP application on MVC modal

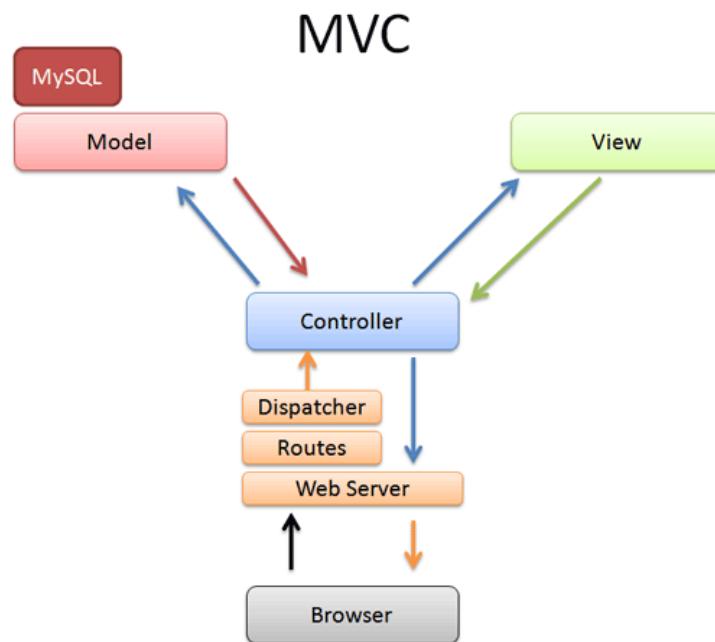


Figure 23 – MVC architecture

c) Notification system was set up for the web application

A noticeboard module was added to the web application and a push notification system was implemented which works from an RSS feed. The idea here was to create an RSS feed to the MySQL table of the notice board and connect the RSS feed to a push notification service via Zapier API. Notification service we used was One Signal. Additionally, we used Zapier to setup an Automated twitter account. So, by following the twitter account via SMS one could receive SMS notifications instead of Web Push Notifications. this was an ideal a continent way to setup SMS notification system without purchasing a SMS Gateway. However, this feature had to be removed because Twitter soon removed their SMS service.

```
1 <?php
2
3
4 // PDO connect *****
5 function connect() {
6     return new PDO('mysql:host=ns3017628;dbname=sipproj1_beta3', 'sipproj1_betauser', 'betauser123',
7         [array(PDO::ATTR_ERRMODE => PDO::ERRMODE_EXCEPTION, PDO::MYSQL_ATTR_INIT_COMMAND => "SET NAMES utf8"));
8 }
9
10 $pdo = connect();
11
12 // posts *****
13 $sql = "SELECT * FROM noticeboard ORDER BY id DESC";
14 $query = $pdo->prepare($sql);
15 $query->execute();
16 $rs_posts = $query->fetchAll();
17
18 // The XML structure
19 $data = '<xml version="1.0" encoding="UTF-8" >';
20 $data .= '<rss version="2.0">';
21 $data .= '<channel>';
22 $data .= '<title>SIP 2020 Project</title>';
23 $data .= '<link>http://www.sip20pProject.online</link>';
24 $data .= '<description>Testing Notifications</description>';
25 foreach ($rs_posts as $row) {
26     $data .= '<item>';
27     $data .= '<title>' . $row['notetitle'] . '</title>';
28     $data .= '<link>' . $row['noteurl'] . '</link>';
29     $data .= '<description>' . $row['notenote'] . '</description>';
30     $data .= '</item>';
31 }
32 $data .= '</channel>';
33 $data .= '</rss >';
34
35 header('Content-Type: application/xml');
36 echo $data;
37 ?>
```

Figure 24 – RSS feed coding

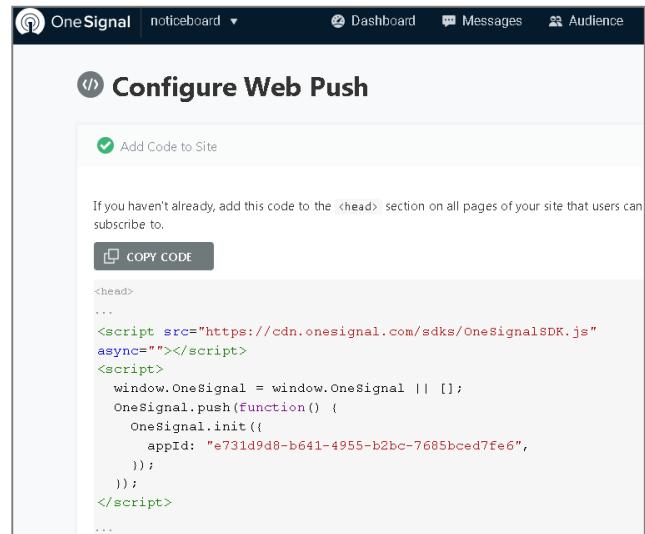


Figure 25 – One-Signal API

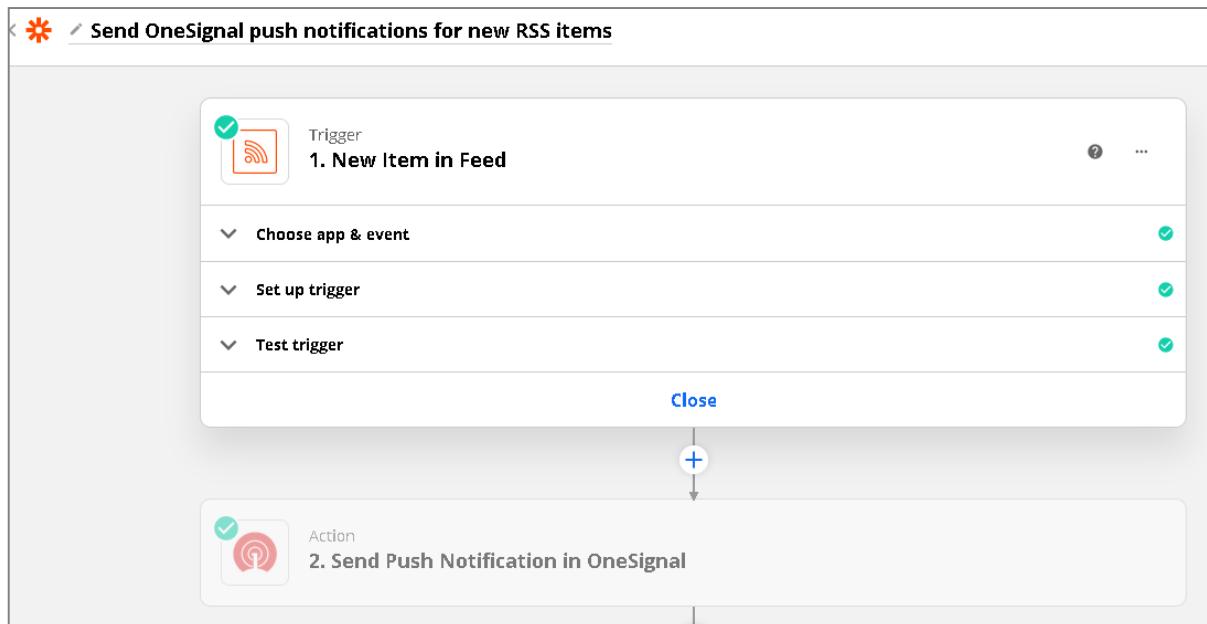


Figure 26 – ZAPIER setup

3.4.2 STEP-02

a) Solder the Circuit

We Solder the circuit according to the designed circuit diagram and tested the circuit. Input Voltage for the Circuit is 12V. We use LM2596 DC-DC Buck Converter Step-Down Power

Module to get 5V. Because LCD Display & Fingerprint Sensor module need 5V. Also we Power the ESP32 board using 5V.

Required Components for Solder the Circuit

- ESP32 DEVKIT V1 Board
- Male & Female Header Pins
- Dot Board
- Connecting Wires
- LM2596 DC-DC Buck Converter Step-Down Power Module
- Soldering Iron
- DC Base
- PCB Wire Connector

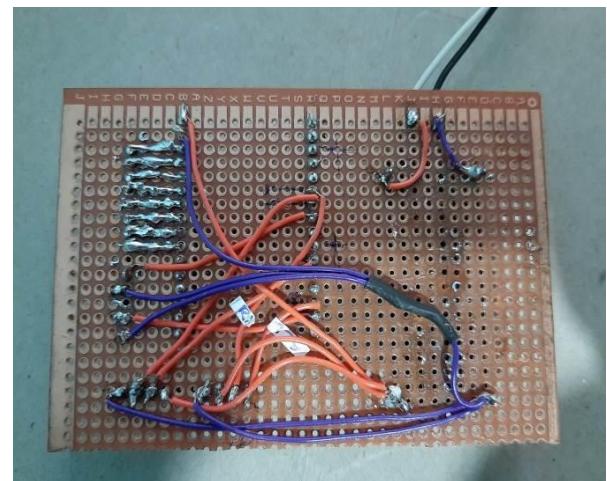
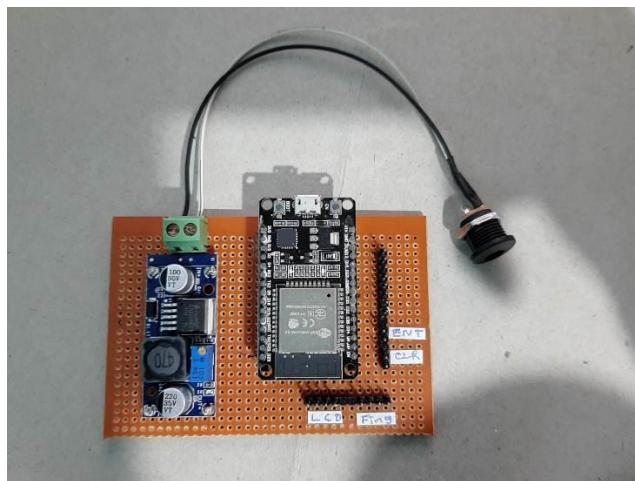
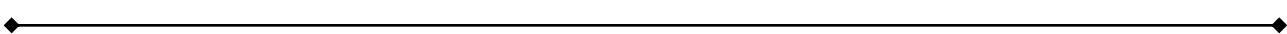


Figure 27 – Soldered Circuit



3.4.3 STEP-03

a) Design an enclosure for the Fingerprint machine



Figure 28 – Enclosure of fingerprint machine

b) Finalizing the web application

Structure	SQL	Search	Query	Export	Import	Operations	Privileges	Routines	Events		
Table	Action					Rows	Type	Collation	Size	Overhead	
app_logs	Browse	Structure	Search	Insert	Empty	Drop	~7	InnoDB	latin1_swedish_ci	16 KiB	-
attendancedb	Browse	Structure	Search	Insert	Empty	Drop	~6	InnoDB	latin1_swedish_ci	16 KiB	-
cwcorrection	Browse	Structure	Search	Insert	Empty	Drop	~1	InnoDB	latin1_swedish_ci	16 KiB	-
cwmarks	Browse	Structure	Search	Insert	Empty	Drop	~6	InnoDB	latin1_swedish_ci	16 KiB	-
cwprog	Browse	Structure	Search	Insert	Empty	Drop	~2	InnoDB	latin1_swedish_ci	16 KiB	-
examresultship	Browse	Structure	Search	Insert	Empty	Drop	~1	InnoDB	latin1_swedish_ci	16 KiB	-
examresultsgip	Browse	Structure	Search	Insert	Empty	Drop	~0	InnoDB	latin1_swedish_ci	16 KiB	-
examresultssip	Browse	Structure	Search	Insert	Empty	Drop	~0	InnoDB	latin1_swedish_ci	16 KiB	-
lecschedules	Browse	Structure	Search	Insert	Empty	Drop	~2	InnoDB	latin1_swedish_ci	16 KiB	-
noticeboard	Browse	Structure	Search	Insert	Empty	Drop	~2	InnoDB	latin1_swedish_ci	16 KiB	-
pracschedules	Browse	Structure	Search	Insert	Empty	Drop	~3	InnoDB	latin1_swedish_ci	16 KiB	-
practicesdb	Browse	Structure	Search	Insert	Empty	Drop	~18	InnoDB	latin1_swedish_ci	16 KiB	-
staffdb	Browse	Structure	Search	Insert	Empty	Drop	~1	InnoDB	latin1_swedish_ci	16 KiB	-
studentdb	Browse	Structure	Search	Insert	Empty	Drop	~5	InnoDB	latin1_swedish_ci	16 KiB	-
subjectsdb	Browse	Structure	Search	Insert	Empty	Drop	~20	InnoDB	latin1_swedish_ci	16 KiB	-
userinfo	Browse	Structure	Search	Insert	Empty	Drop	~8	InnoDB	latin1_swedish_ci	16 KiB	-
users	Browse	Structure	Search	Insert	Empty	Drop	~2	InnoDB	latin1_swedish_ci	16 KiB	-
users_logs	Browse	Structure	Search	Insert	Empty	Drop	~9	InnoDB	latin1_swedish_ci	16 KiB	-
18 tables	Sum					93	InnoDB	latin1_swedish_ci	288 KiB	0 B	

Figure 29 – Final database

Final database came up to a total of 18 tables each for a different function

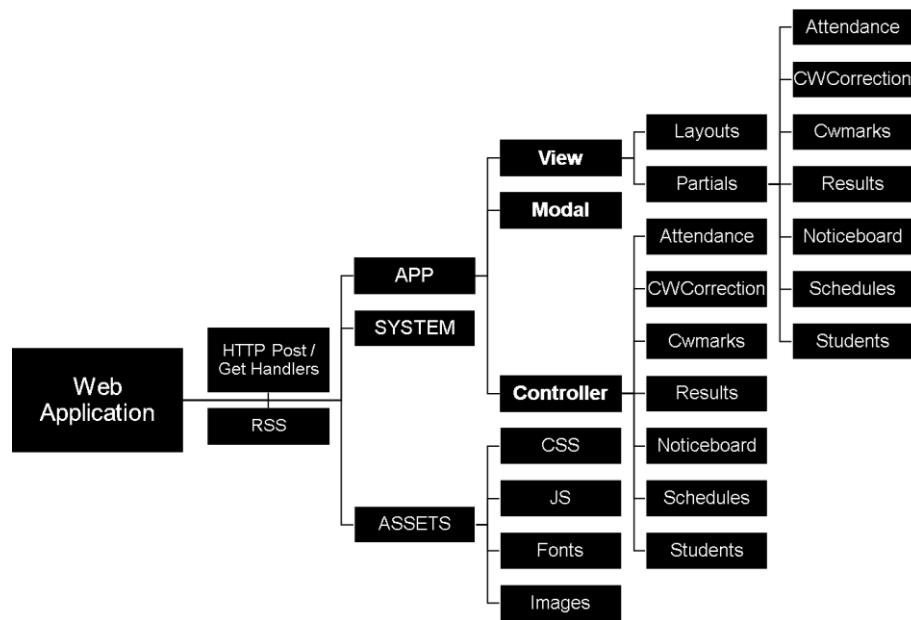


Figure 30 – File structure

List of assets and libraries used in Design 3 of web application

- Bootstrap framework – for responsive design
- Charts.js – to generate simple graphs
- Flatpickr – used to create the date time picker used in the project
- Bootstrap mini teal material theme – current theme of the project. Can be switched to other bootstrap themes as well
- Popper.js – used to make tooltips and popovers
- jQuery framework – for front end development and inline editing
- ion range slider – to create progress bars
- icons (material-icons.css, drip-icons.css, simple-line-icons.css)
- datatables.css – to make sortable tables
- Summernote library – WYSIWIG editing feature of the web app was developed using summernote
- Selectize.js – used to develop option lists and search options
- Animate.css – basic animations of bootstrap elements

- Dropzone.js - not fully implemented. Used to create drag and drop upload function
- PHPMailer – PHPMailer was added to the project to develop email functions. For password resetting and notifications. This feature is not complete at the time of report submission
- Font Awesome CSS toolkit

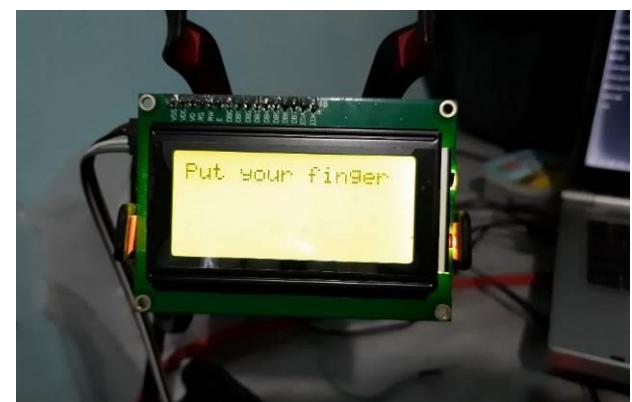
4.0 Results and Findings

4.1 Introduction

When a project is carried out a vast amount of knowledge and especially writable and un writable experiences are gathered within the people who has done it. This is the attempt to express those experiences, results and findings.

4.2 Results and findings of Design 1 / Test 1

As the 1st Step, we worked with the Fingerprint sensor module. In there we tested Arduino communication programming codes according to our module version. And also we were able to wired suitable connection of Fingerprint sensor module and ESP32 board. Finally, we created a proper process of coding. We created a programme to enrol a new finger, verify the finger & delete the scanned finger ID when we want. Also we were able to display the information's like "Put your finger", "scanning", "Valid Fingerprint", "Invalid Fingerprint" on the LCD Screen.



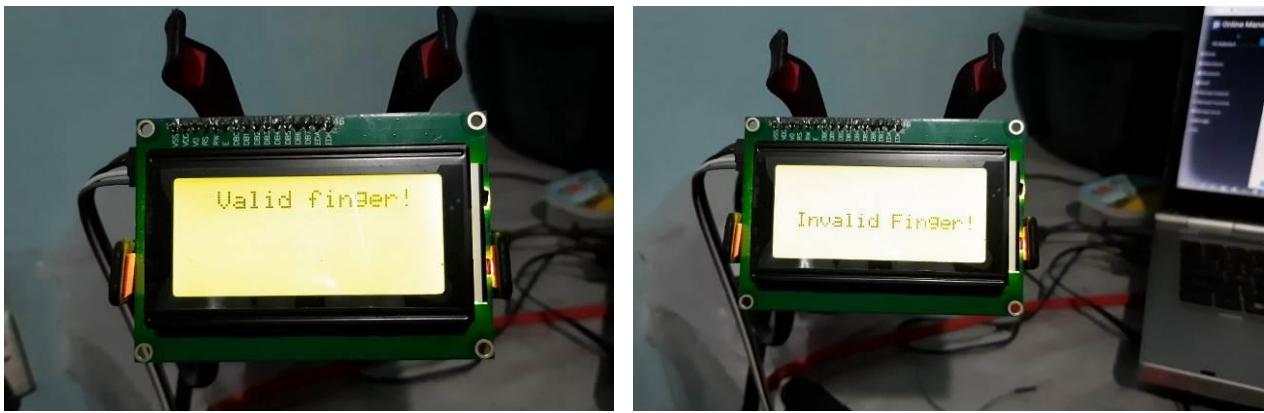


Figure 31 – Display result of design 01

Next step we worked with the 4*4 Keypad with two push Buttons. We programmed to display the digit or symbol when the key was pressed in keypad. Also we programmed 1 Push button to clear the keypad input. Also we use another push button to enter (Uploading) the keypad value. In this step it only display as “Uploading” because uploading function not programed.

Then we tested code .And it worked correctly.



Figure 32 – Test 02 of the Keypad

4.3 Results and findings of Design 2 / Test 2

In the First Step we programmed the ESP32 to connect to the website and upload the Fingerprint data to the database and also programmed the ESP32 to follow the instructions of website.

After uploading the code to the ESP32, Firstly ESP32 connecting to the Router and connecting to the website. And also detect the fingerprint sensor as we programmed. Also it follows the website instructions such as add new finger, scan the finger & upload to the website, delete the finger ID.



Figure 33 – Display result of test design 02

In the 2nd Step we tested the code to upload Keypad input into the website database and also we test the clear & enter push buttons. After uploading the code we observed that we can type the subject code & Lecture number. When we pressed the clear button, the numbers we typed were cleared and display “Retype”. When we pressed the Enter button, Subject code & Lecture no: will be upload to the website.



Figure 34 – Testing the function of push buttons

In the 3rd step we combined the previous step 1 and step 2 codes and create the fully functional code for our project.

When Power on the circuit, ESP32 module connecting to the Router. After that it connect to the website. When the website Request to add new Finger to the database, Fingerprint Scanner started to scan. After successfully scanned the finger then the Finger Id will be send to the Database. When we put a Registered Finger into the Fingerprint Scanner, Scanner Identified the Finger ID And send to the website at that time we need to enter the Lecture No: and Subject Code. After typing we need to Press Enter Button to upload it. When the website request to delete a finger print ID then the Fingerprint module will delete that image from its memory.

The screenshot shows a teal-colored web application interface titled "Student Attendance". At the top, there are three navigation links: "Fingerprints", "Attendance Record", and "Manage Students". Below the navigation bar, a heading says "HERE ARE THE USERS DAILY LOGS". There is a date input field with placeholder "min / dd / yyyy", a "Select Date" button, and an "Export to Excel" button. A table displays a single row of data:

ID	NAME	INDEX NUMBER	FINGERPRINT ID	DATE	TIME IN	SUB CODE	LEC NO
175	17stu1	0	1	2021-03-28	14:01:01	S1C3	07

Figure 35 – Result of uploading lecture number with subject code

Results and Findings of Web Application Development Design 2 / Test 2

Vue.js

At this stage a major change made to web application was switching to Vue.js framework. Vue.js is a relatively new progressive framework for JavaScript used to build web interfaces and one-page applications. Not just for web interfaces. Vue was selected primarily with the aim of laying a foundation for future native app development for the project.

The screenshot shows a dark-themed web application interface titled "vue". On the left, there is a sidebar with navigation links: "Home", "Attendancedb", "Noticeboard", "Stafffdb", "Studentdb", "Subjectfdb", "UserInfo", "Users", and "Users Logs". The main content area is titled "Attendancedb" and contains a table of attendance records. The table has columns: #, Id, Stuindex, Stuname, Subcode, Subname, Lecno, Leccdate, Passtime, and Yesorno. Each record includes a checkbox, a delete icon, and a edit icon. At the bottom of the table, there are pagination controls: "Records: 6 of 6", "Page: 1 of 1", "Limit: 20", and navigation arrows. The footer contains copyright information: "All Rights Reserved | © Vue - 2021" and links to "About Us", "Help And FAQ", "Contact Us", "Privacy Policy", and "Terms And Conditions".

Figure 36 – Vue.js web application

However, Vue came with many disadvantages and had to be ditched at Design 3.

Some of the reasons for ditching Vue framework from the project are,

- Reactivity Complexity

Vue.js consists of components that a user can interact with. Each component has its watcher that rerenders the data each time a user triggers the component. The reactivity system rerenders only those chunks of data that were triggered. The thing is that it's not that smart and often makes mistakes during data reading, so it requires data to be flattened.

- Flexibility Limitations

This was a main concern which had to be taken into account. With a single page application adding new components or making changes in existing components is a rather complicate and delicate. For the application we were developing for the IET ability to integrate new components with ease was a must. This was not satisfied by Vue

- Limited Resources

Since Vue is still a new framework there's only a very limited number of resources available online (as of 2020; time of Test 2). Be it plugins or help materials, finding content for Vue was rather difficult.

Free (000webhost) vs Premium (HostnGo.LK) Web Hosting

During the first stages of Test 2 we used 000webhost for hosting the application. The problem with 000webhost was that it came with extreme limitations and if those limitations were to be exceeded the website would get banned immediately as we soon experienced

While testing a php script to read the fingerprint module visitor limit of website exceeded. Traffic created was bot traffic however 000webhost counted this traffic as unique visitors and immediately suspended the website.

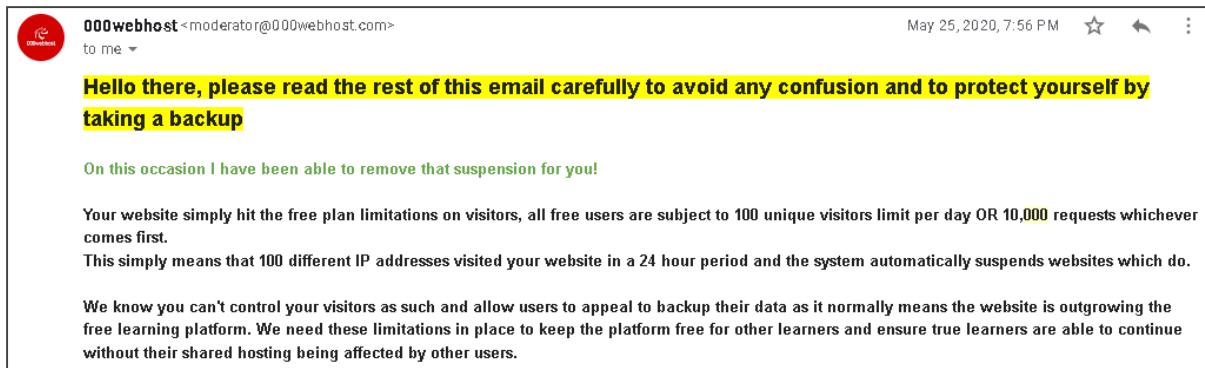


Figure 37 – Suspension of 000webhosting account

We had to appeal via email to get the website reinstated. However, they soon suspended the website for a second time, this time even without crossing any limits probably to push a sale of their premium service.

So, research was made into premium hosting services and a HostnGo account was purchased. It was a new company which started their business during the time of project development.

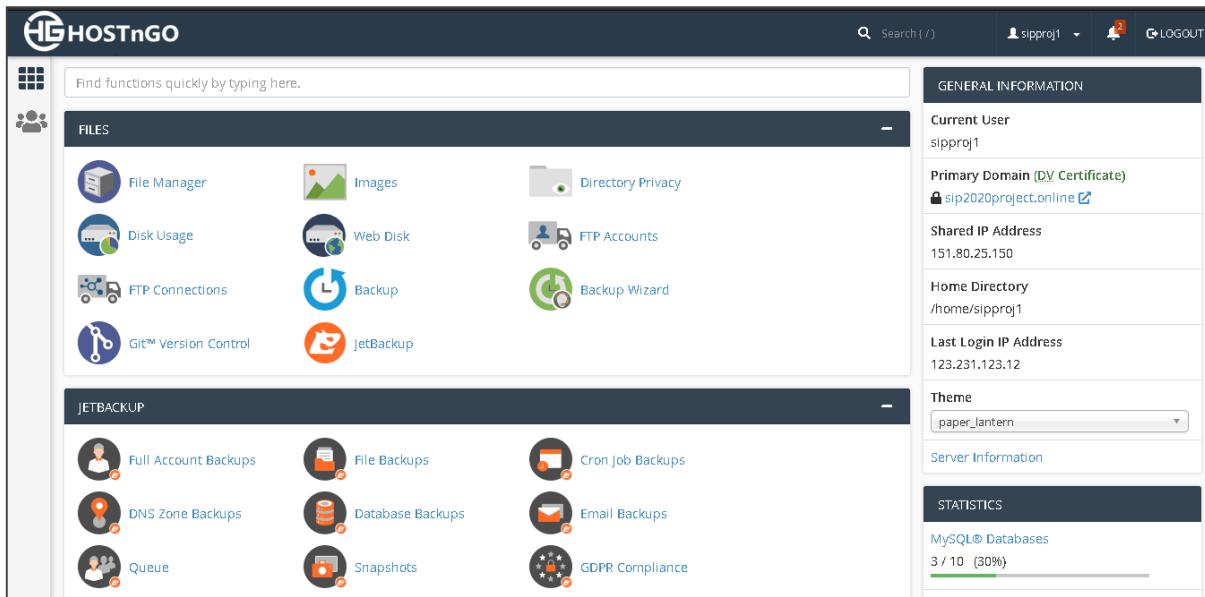


Figure 38 – HOSTnGo Cpanel

4.4 Results and findings of Design 3 / Test 3

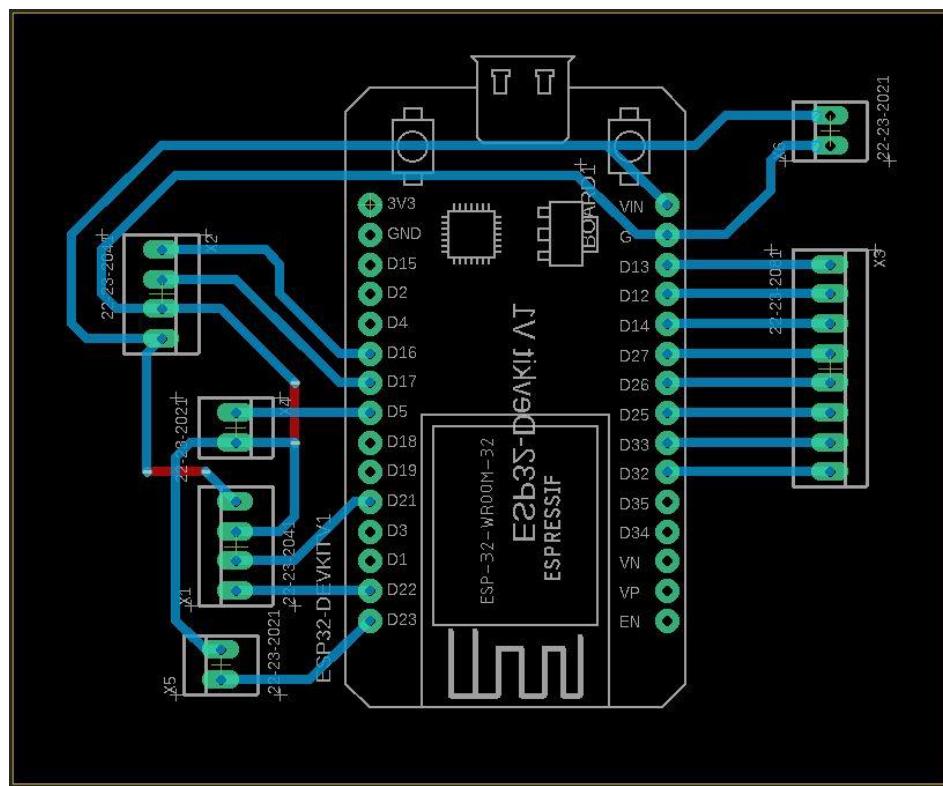


Figure 39 – PCB Layout

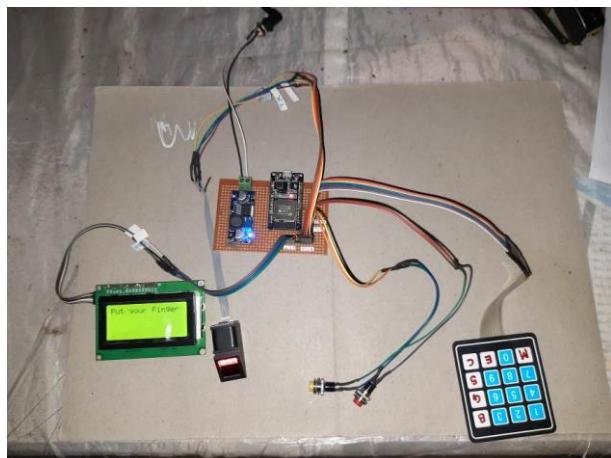


Figure 40 – Final circuit



Figure 41 – Final view of hardware

Results and findings of web application Test 3 / design 3

Notification system setup with web Push

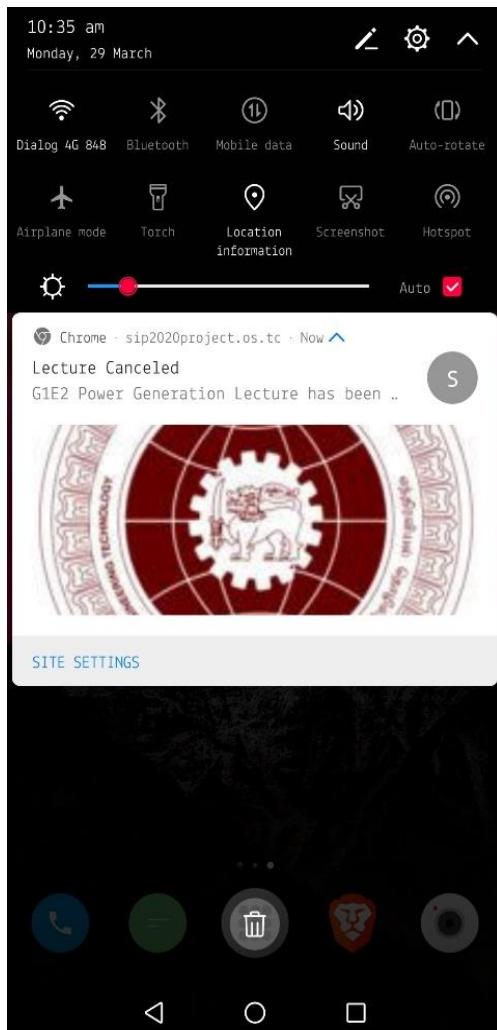


Figure 42 – Web push notification

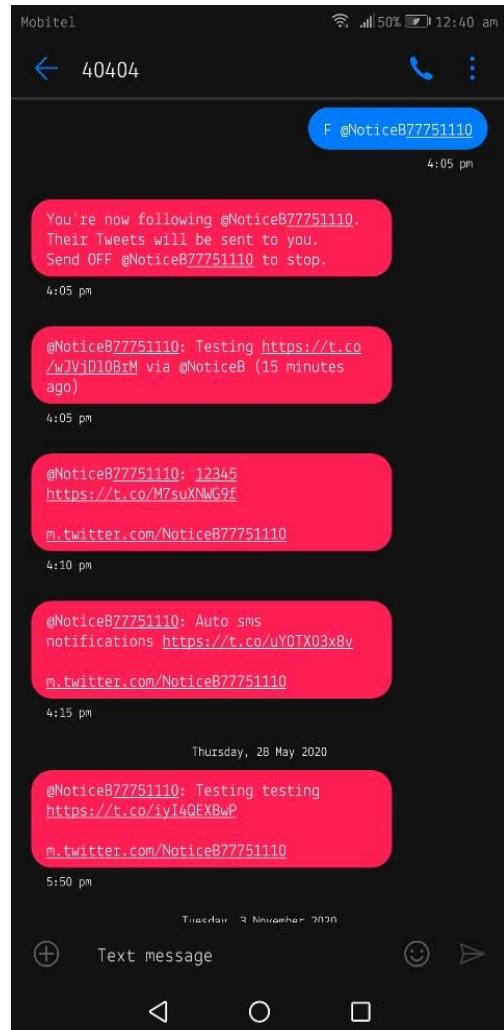


Figure 43 – SMS notification

SMS Notifications are no longer functioning since twitter has removed their SMS service.

Final Web Application

Login system was setup using PHP. Students have a limited access to the records and staff (instructors, lecturers) can access all the records. New user accounts can be setup by staff

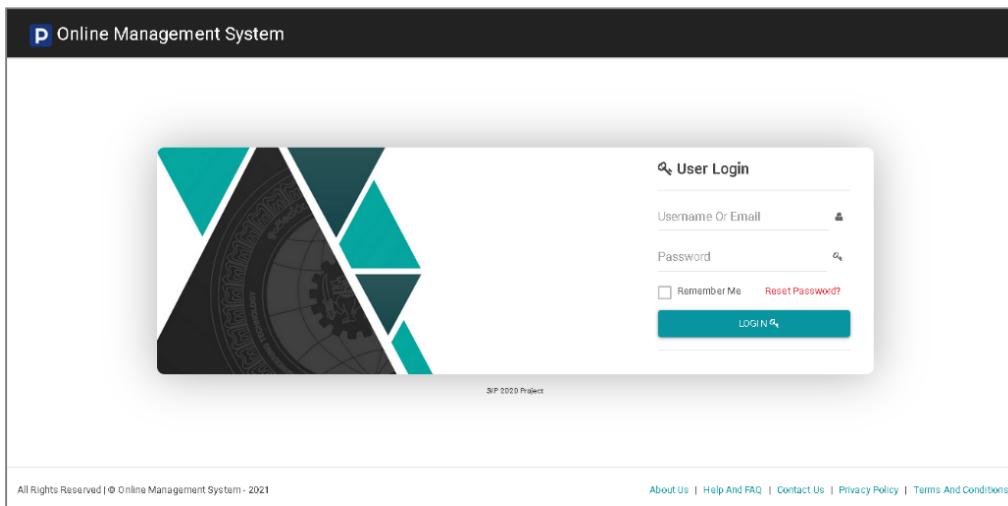


Figure 44 – Login interface

Admin dashboard have an overview of the system. Daily attendance and weekly attendance graphs are generated by charts.js

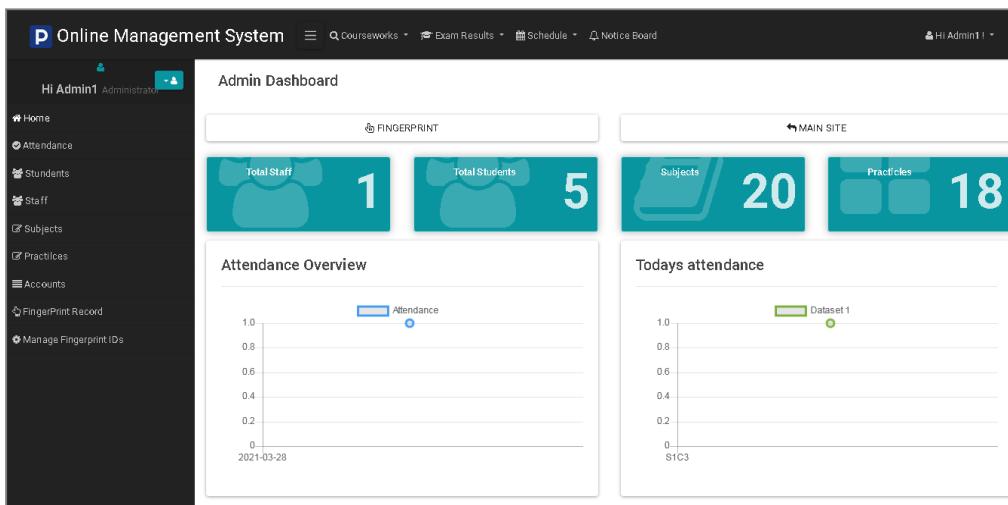


Figure 45 – Admin dashboard

Students have a separate dashboard. Which is updated with records of their own index number. Students get an overview of their lecture schedules, lab schedules and coursework correction submissions due for the week. Another module is a progress bar generated from the information in coursework marks entered for that student and total number of practices for a certain subject

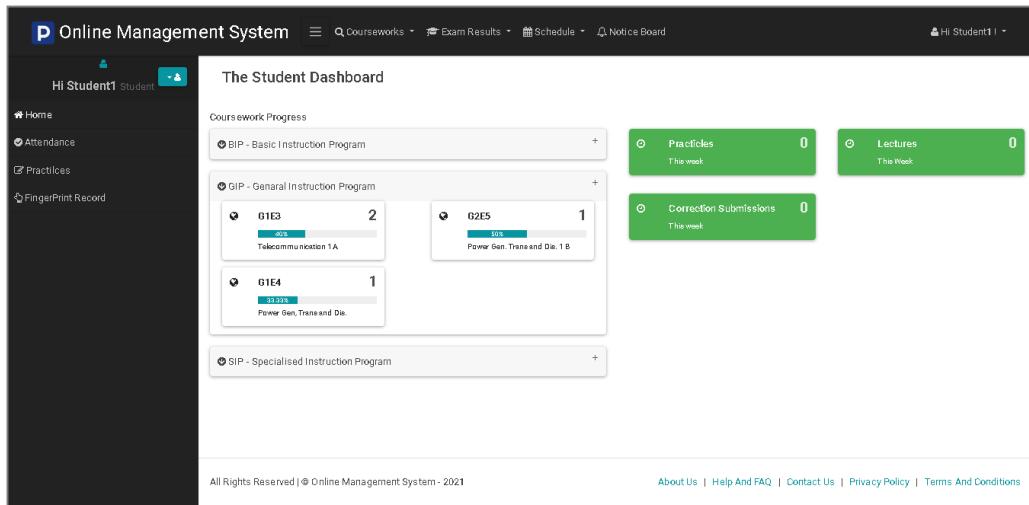


Figure 46 – Student dashboard

Course works for each subject can be updated by admins, so that new course works can be added or existing course works can be updated without making changes to core.

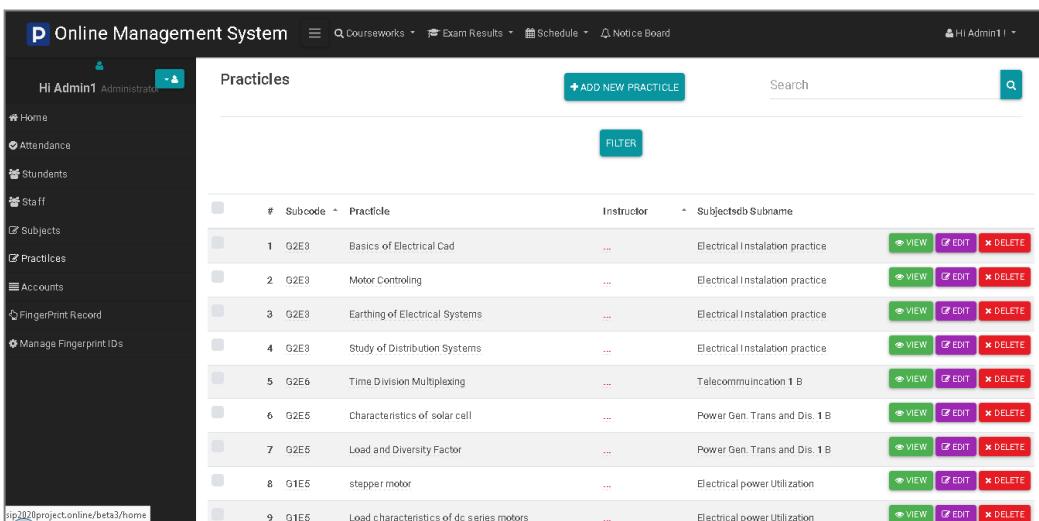


Figure 47 – Coursework overview

As per the instructions of Project supervisor data import export functions were added for certain modules. Importing data is a tedious process and only support .CSV and. json formats at the moment. They need to be correctly structured and should not contain any duplicates to successfully import.

Subject Code	Student	Date	Time	End Time	Lecturer	Subject
EP		2020-12-01	09:00:00	12:00:00	Mr. second one	Power Gen. Trans. and Dis. 1 B
EE		2020-11-30	09:00:00	12:00:00	Mr. asadda asdadasd	Electronics 1 A

Figure 48 – Data export

Index Number	Student Group	Practice	Marks	Subject Code	Instructor
EP/16/00002	Y	Load characteristics of dc series motors	7.2	G1E5	...
EE/16/00001	X	Import Data	5.8	G2E5	...
EE/16/00001	X	Select a file to import	5.6	G1E3	...
EE/16/00001	X	Browse... No file selected.	5.2	G1E3	...
EE/16/00001	X	Supported file types(csv , json)	6.2	G2E6	Instructor two
EE/16/00001	X	...	5.5	G1E4	instructor one

Figure 49 – Data import

Students can be added to the database by admins and at the same time accounts for students can also be setup. To dynamically generate student accounts information such as his practical group, department, batch and stream (power or electronics) is required.

#	Index Number	Name	Practical Group	Department	Batch	Category	VIEW	EDIT	DELETE
1	EE/16/00005	fifth student	E	Electrical	2016	EE			
2	EE/16/00004	fourth student	R	Electrical	2016	EE			
3	EE/16/00009	third student	E	Electrical	2016	EP			
4	EP/16/00002	student2	Y	Electrical	2016	EP			
5	EE/16/00001	saman	X	Electrical	2016	EE			

Figure 50 – Student database

Coursework marks and exam results can be either manually added or imported to the system. Manually entering has also made easier by joining tables so fields such as subject codes and practical names are filled automatically with minimum keystrokes

Index Number	Student Group	Practical	Marks	Subject Code	Instructor	VIEW	EDIT	DELETE
EP/16/00002	Y	Load characteristics of dc series motors	7.2	G1E5	...			
EE/16/00001	X	Load and Diversity Factor	5.8	G2E5	...			
EE/16/00001	X	Telephone Trainer	5.6	G1E3	...			
EE/16/00001	X	DPCM	5.2	G1E3	...			
EE/16/00001	X	Networking	6.2	G2E6	Instructor two			
EE/16/00001	X	AC Energy Meter	5.5	G1E4	Instructor one			

Figure 51 – Coursework marks

Online Management System

Hi Admin1 Administrator

Add New Cwmarks

Student Index*	EE/16/00001
Subject Code *	G1E4
Practicle Name *	AC Energy Meter
Marks *	Enter Marks

SUBMIT

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Figure 52 – Data input

Online Management System 2.0

Hi Admin1 Administrator

Exam resultsbip

#	Stuindex	Subcode	Stugrade	Studentdb Stuname	Studentdb Stubatch	Subjectsdb Subname
1	EE/16/00001	B11/B21	A	saman	2016	Mathematics and Computing

EXPORT

Records : 1 of 1

VIEW **EDIT** **DELETE**

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Figure 53 – Exam results

Attendance module for the time being is separated from the main student database and stores student name and student index separately. This is because there are further improvements need to be made in attendance module. Once completed it can be connected to the main student database.

#	Subject Code	Lec No	Date	Time	Fingerprint Id	Index Number	Student Name	
1	M1CE3	07	24th March, 2021	20:19:29	1	EE/17/00001	17stu1	
2	B8C7	14	1st March, 2021	15:27:30	6	EE/16/0012	yukhbn	
3	B4M8	07	1st March, 2021	15:21:56	1	EE/17/00001	17stu1	
4	B1E6	01	1st March, 2021	15:18:09	1	EE/17/00001	17stu1	
5	B1E12	06	28th February, 2021	00:24:03	3	EE/16/00007	doka	
6	S1E12	05	27th February, 2021	23:49:19	3	EE/16/00007	doka	
7	B2E6	05	27th February, 2021	23:42:20	1	EE/17/00001	17stu1	
8	S1E11	04	26th February, 2021	09:16:29	1	EE/17/00001	17stu1	
9	S1E11	03	24th February, 2021	23:37:25	2	EE/17/00002	17stu2	
10	S1E11	03	24th February, 2021	22:36:31	1	EE/17/00001	17stu1	
11	S1E11	02	24th February, 2021	22:36:57	2	EE/17/00002	17stu2	

Figure 54 – Attendance overview

Notice Board		
Push Notifications will be sent for any new content posted here		
	+ ADD NEW NOTICE	Search
Id: 6	Id: 2	Id: 1
Title: Test3	Title: Study Leave	Title: Exam Admissions
Content: Push notifications test3	Content: Study Leave from 15/01/2021 to 31/01/2021	Content: Obtain exam admissions on or before 1st of Feburary 2021
Posted Date: 20th February, 2021 02:20	Posted Date: 11th January, 2021 01:59	Posted Date: 11th January, 2021 01:50
From: Ad	From: asdada	From: from
To: Stu1	To: asdasdasd	To: to
Posted By:	Posted By: asd	Posted By: me
Records: 3 of 3		

Figure 55 – The notice board

Responsive design

Bootstrap was used to make the application responsive. Responsive means web application displays properly regardless of the screen size of the device used to access it. Making a responsive design manually is a tedious process which was simplified by using the bootstrap framework.

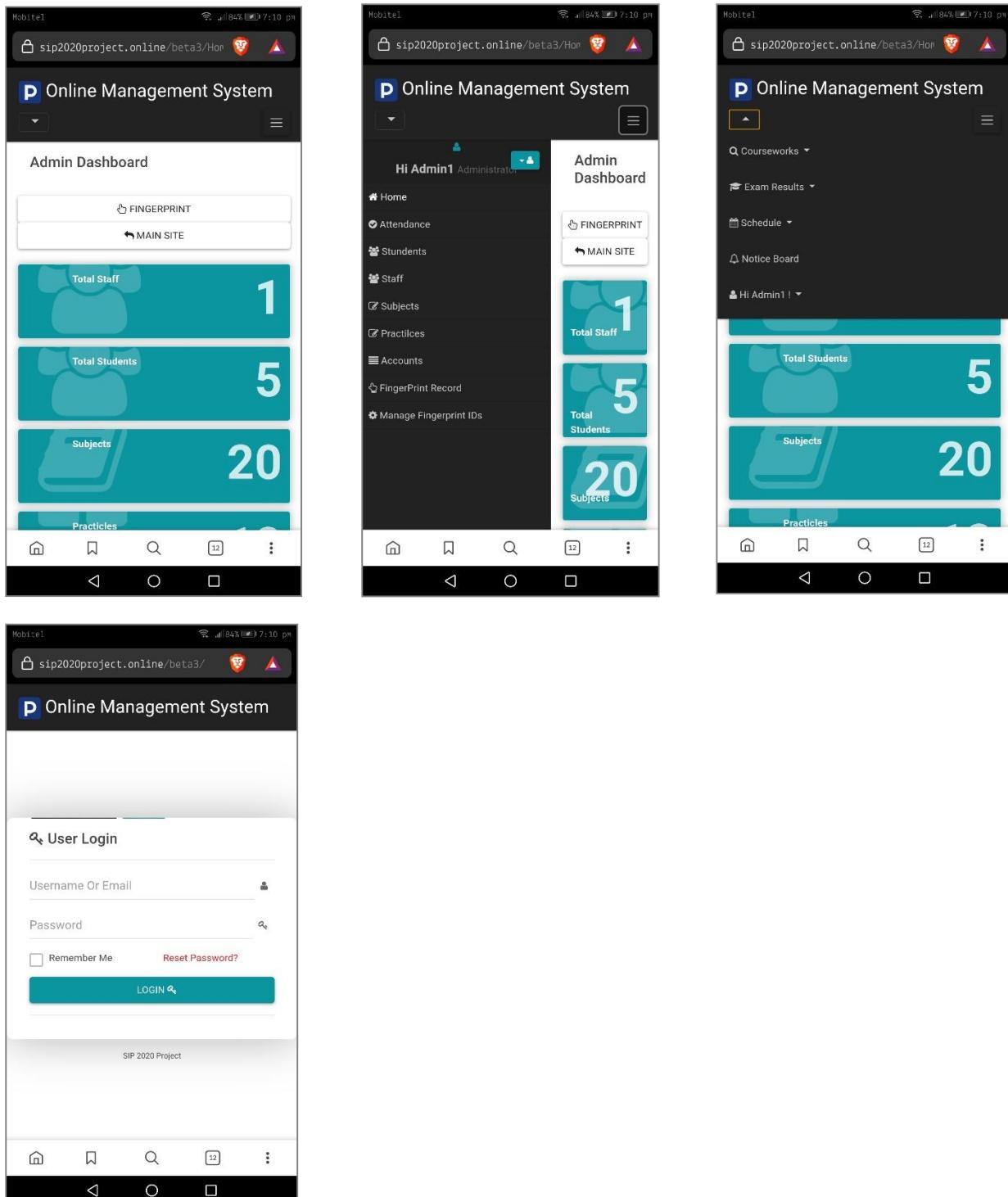


Figure 56 – Mobile display

Web Application GTmetrix test scores,

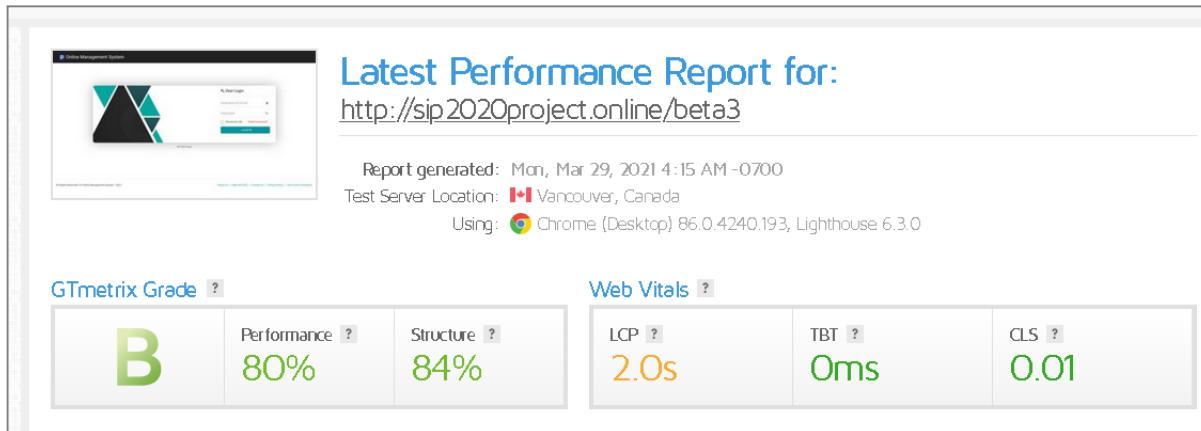


Figure 57 – Gtmetrix test score

Google Mobile-Friendly Test results,

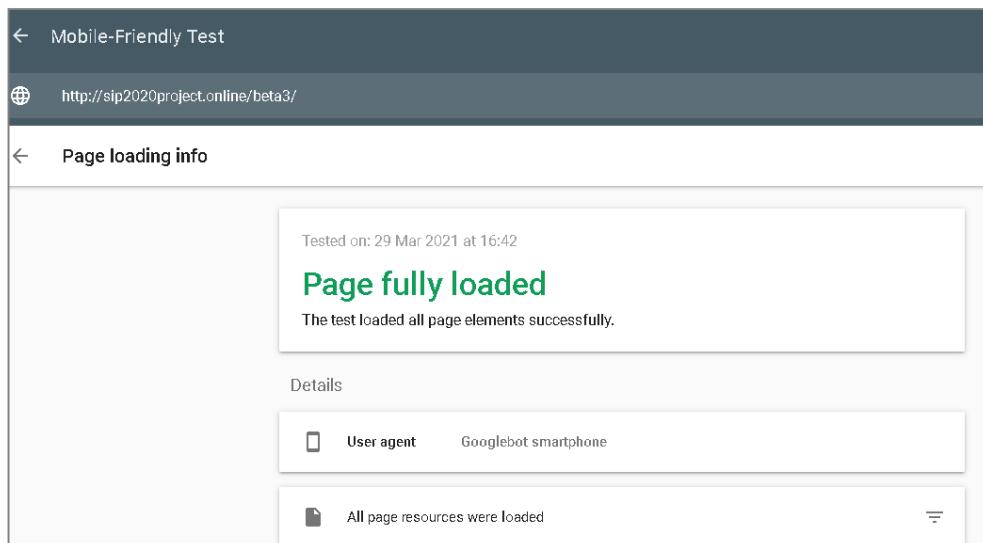


Figure 58 – Google Mobile-Friendly test result

Pentest vulnerability and security check,

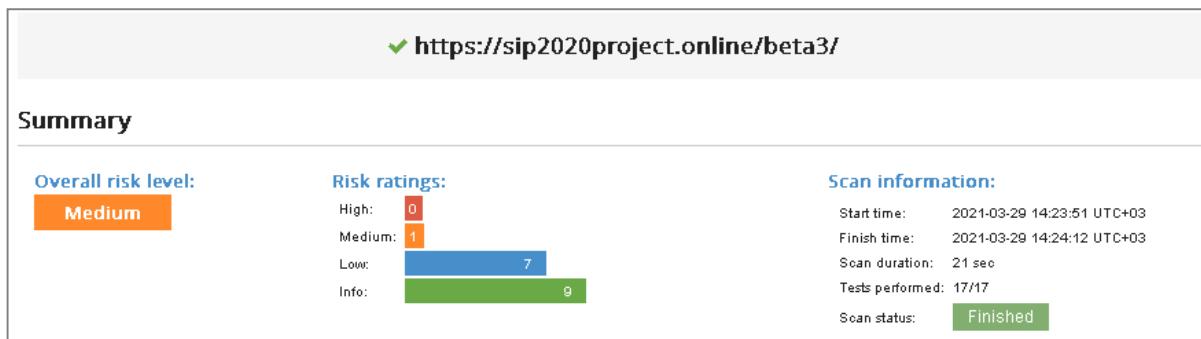


Figure 59 – Pentest vulnerability and security check

5.0 DISCUSSION AND CONCLUSION

5.1 Introduction

The intention of this project is to take attendance and manage the students with aid of a fingerprint module. Both students and administrators are free to access the web application but only administrators are allowed to add or edit students' details, marks, notifications etc. Our main purpose was to provide a well-managed student monitoring system to avoid students cheating on attendance recording. For the implementation of this project several kinds of applications were used as mentioned below.

5.2 Summary of findings

- Arduino Language & Familiar with Arduino IDE
- ESP32 DEVKIT V1
- AS606 Fingerprint sensor
- MySQL
- PHP
- JavaScript
- CSS
- Hosting

5.3 Discussion of findings

Arduino Language & Arduino IDE

During the initial stage of implementation of this project, studies were carried out about Arduino Language. Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board and a piece of software, or IDE (Integrated Development Environment) that runs on a computer, used to write and upload computer code to the physical board. Arduino code is written in C++ with an addition of special methods and functions. Whole Programming part in the Hardware section of our Project is based on Arduino Language.

ESP32 DEVKIT V1.

In Our Project we choose ESP32 DEVKIT V1 Board as our main Processing & communicating module in Hardware section. The ESP32 is the ESP8266 successor. The ESP32 is loaded with lots of new features. It combines Wi-Fi and Bluetooth wireless capabilities, and its dual core. It has more GPIO pins than ESP8266.

We connected several modules for this board in this project. They are fingerprint sensor, LCD display, Push buttons & Keypad. We use this module to communicate with the website. When we programmed the ESP32 module to Uploading data to the website, we faced a difficulty. We could not find a code to upload the data to the websites, then we checked a suitable code for uploading the data to website using ESP32 in the internet. Finally we found a code.

AS606 Fingerprint sensor

Fingerprint sensor module used in biometrics for security in fingerprint detection as well as verification. In this Project we studies about how AS606 Fingerprint sensor module worked with ESP32 module & Connection diagram of Fingerprint sensor module and coding for Fingerprint sensor module. We use this Module to mark the attendance of the Students. While we using this AS606 Fingerprint sensor, we were identified that the sensitivity of this Sensor is very Low.

MySQL

For the database development of this project MySQL was a clear-cut choice. MySQL is a popular open source database management system commonly used in web applications due to its speed, flexibility and reliability. MySQL employs SQL, or Structured Query Language, for accessing and processing data contained in databases.

As an open-source solution, we were able to use MySQL without incurring the cost of a commercial database platform. This fact makes MySQL attractive for individuals and organizations that are looking for an economical development path. MySQL is an example of free software that fulfills its promise and provides exceptional functionality. It is used for many personal as well as business projects which results in a constantly expanding population of developers with experience using MySQL to address their database needs.

Choice of MySQL paved many advantages other than financial benefit and ease of learning. MySQL also offered many features that are critically important to development of this platform

which is meant to function real-time. MySQL provided the reliability and high-availability that is required for this project in which application can be used at any hour.

During this project development MySQL showed to be extremely scalable, a characteristic that coincides with the needs of an Online Management System. As new features are implemented or depraved, resource use can be customized to minimize waste and maximize performance.

PHP

PHP was used as the backend language of this project. PHP programming language is most widely used for the website and web application development. It is a general purpose, a server-side scripting language which runs on a web server and which is designed for making dynamic pages and applications. As web development services option are secured, fast and reliable which offers lot more advantages to make it accessible to a lot of people. It is given a thought to what has made PHP programming language as one of the most commonly used languages and is also a good choice for web development. Using PHP as its language has many advantages like it supports Oracle, Sybase, etc. It is used for creating simple functions, methods, and syntax. It also supports database management system and another open source database.

JavaScript

JavaScript is a text-based programming language used both on the client-side and server-side that allows you to make web pages interactive. Where HTML and CSS are languages that give structure and style to web pages, JavaScript gives web pages interactive elements that engage a user.

jQuery Library

jQuery is a small, light-weight and fast JavaScript library. It is cross-platform and supports different types of browsers. It is also referred as write less do more? Because it takes a lot of common tasks that requires many lines of JavaScript code to accomplish, and binds them into methods that can be called with a single line of code whenever needed. While there are many JavaScript libraries available choice of jQuery for front end development of this project offered certain benefits including its simplicity, speed and lightweight

Vue.js

Vue.js is a lightweight frontend JavaScript framework. It can be used to develop modular UI components or entire Single Page Applications (SPAs). Advanced features such as routing, state management, build tooling, animations, and validations are offered via officially maintained libraries and packages.

During initial stages of this projects web application development thought was given to using Vue.js for backend purposes in order to develop the application as a single page application. This idea was scratched and pure PHP was used instead due to the fact with additional features being added to the project Vue.js did not offer the scalability required.

CSS

Cascading Style Sheets, fondly referred to as CSS, is a simple design language intended to simplify the process of making web pages presentable.

CSS handles the look and feel part of a web page. Using CSS, you can control the color of the text, the style of fonts, the spacing between paragraphs, how columns are sized and laid out, what background images or colors are used, layout designs, and variations in display for different devices and screen sizes as well as a variety of other effects.

CSS is easy to learn and understand but it provides powerful control over the presentation of an HTML or PHP document.

Bootstrap Framework

Bootstrap is the most popular, free and open-source framework for creating responsive layout in web pages, with much less efforts. It contains HTML, CSS and JS components for creating forms, buttons, navigation, dropdown, modals, layout and many other things, the list is very long indeed. You can create all these without much efforts, which otherwise would require a lot of CSS, HTML and JS code. For this project Bootstrap framework was heavily used and we were able to create a fully responsive web application which is scalable to all the display sizes.

Hosting

During the initial stages of the project a local apache server was setup using XAMPP for testing purposes. For testing the fingerprint module, a web server was required and we used a number of free hosting services including 000webhost and Freehosting.com. These free hosting services came with a number of problems such as very high limitations and constantly suspending our accounts. So, a premium hosting service had to be purchased. Service we bought was Hostngol.k. It's a relatively new Hosting service where a sri Lankan company act as intermediaries for Alibaba cloud and provide shared hosting at a fairly reasonable price range. Currently used Hosting plan is more than enough to deploy this project at a full scale.

One Signal / Zapier API

For setting up the notification system in this project a Zapier combined with one signal setup is used. Reason One signal API was used for Push notifications instead of Firebase which is a more widely used product, is that setting up one signal was comparatively simpler and it works well with Zapier. Zapier allows to integrate web applications and here it's the RSS feed of the project's application with One signal. Although with the free plans of both these services we experienced certain down times, slower speeds and failures, especially with Zapier.

5.4 Conclusion of the Project

An automated attendance system is something which we seem very much need to an educational institute like IET. Same with the online management system. Even much smaller institutes such as even schools nowadays have online platforms for students. This project was developed with the intention of providing solutions for both of those. It should also be noted the aim was not to provide a quick solution but rather to develop a highly capable commercial quality platform. Certain compromises had to be made to project since it was pressed against time. But the project can be developed further as we have discussed in below chapter.

5.5 Further improvements and developments

Improvement of the Capacity

Memory of the Fingerprint sensor can store a limited Number of Fingerprints. Therefore we proposed to use SD Card module to Store Fingerprints for further improvements and developments. Then we can use this monitoring system for wide area.

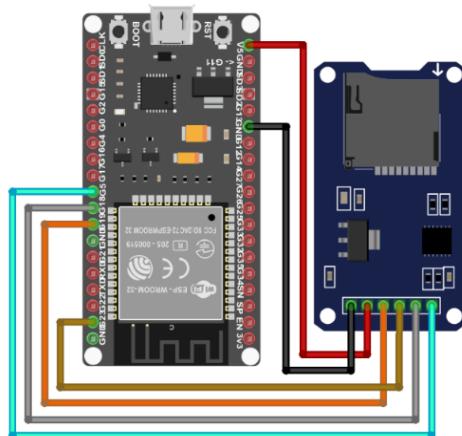


Figure 60 – Connecting SD card module

Rechargeable Battery

We propose to use a Rechargeable Battery as a backup power system for this Fingerprint Machine for further improvements and developments. Because this machine has no method for power the circuit when there was no electricity.

Backup attendance system

In Our Project we use only a fingerprint sensor for collect the attendance. But if the registered finger damage the student can't mark his attendance. (But Admin or lecturer can manually entered the attendance.) So we propose to use a backup attendance system Like RFID card System so we can avoid that difficulty.

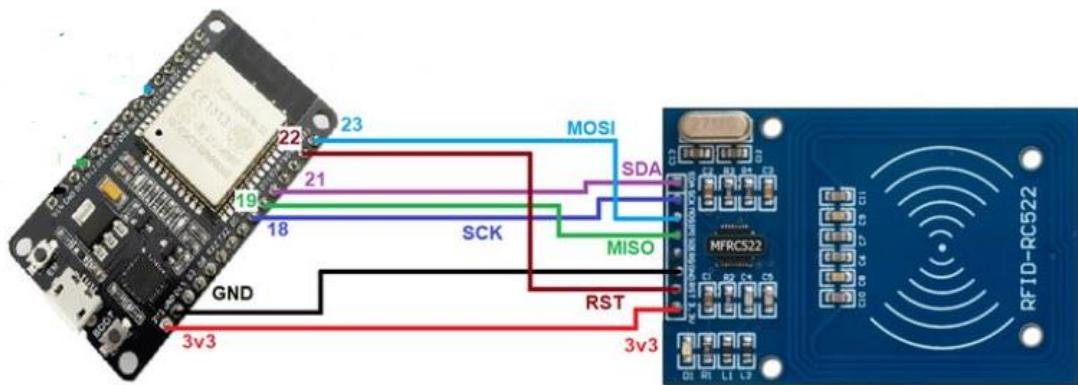


Figure 61 – Connecting RFID module

Native App or a Progressive web app

Android / iOS native mobile applications could be developed for the project in the future although the requirement is questionable since this web application was developed fully responsive and fully optimized for mobile devices. Arguably a better approach would be to develop a progressive web application given that progressive web applications are gaining a high popularity in recent years and are employed by companies such as twitter and amazon.

SMS Notifications

Implementing an SMS Notification system for this web application is fairly straight forward. A SMS Gateway service need to be purchased and SMS system can be setup with the existing RSS feed

Improvements to attendance system

Although this project features a functioning attendance recording system certain improvements can be made to the system which we were unable to do given the time frame. For an example lecture schedule times can be compared with attendance times and Late / On time stamp can be recorded with the attendance. Overall dashboard can also be improved hugely and the current employed dashboard is more of a temporary solution. A react.js dashboard can be developed with the existing PHP backend

A React.js dashboard design which can be developed for this project is shown below

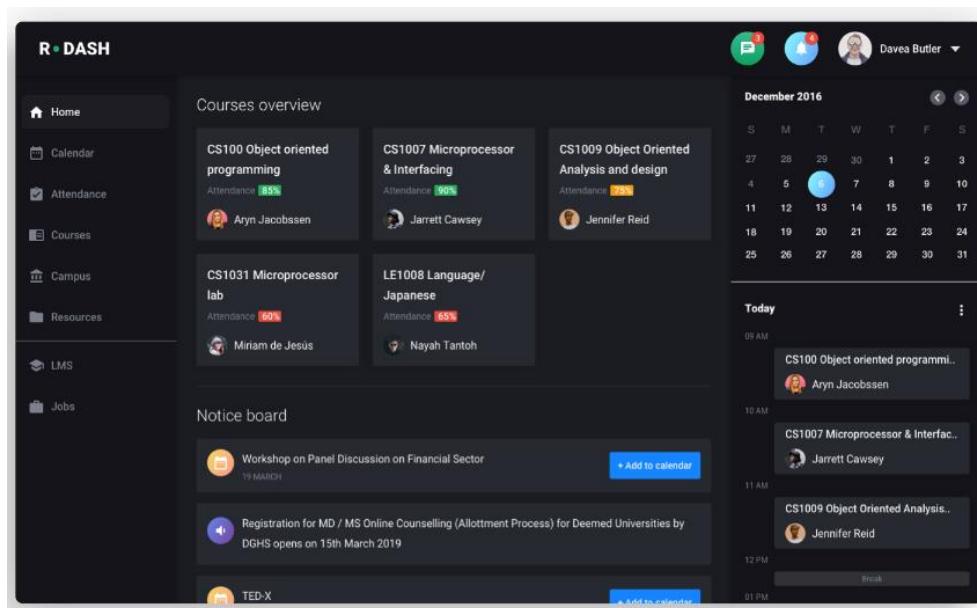


Figure 62 – React.js dashboard design

6.0 APPENDICES

6.1 Arduino Coding

The image displays three separate windows of the Arduino IDE, each showing a different section of the same code file. The code is a combination of C++ and Java-like syntax, likely for a project involving an LCD display, keypad, WiFi, and a fingerprint sensor.

```
Full_Working_Code_2021-02-21 §
1 //*****libraries*****
2 #include <SPI.h>
3 #include <Wire.h>
4 #include <LiquidCrystal_I2C.h>
5 #include <Keypad.h>
6 HardwareSerial Serial3(2);
7 #include <WiFi.h>
8 #include <HTTPClient.h>
9 #include <Adafruit_Fingerprint.h>
10 //*****
11 // Declaration for LCD display connected using software I2C
12 LiquidCrystal_I2C lcd(0x27, 16, 4 );
13 byte lcdColumns = 0; // Create a variable for Display Keypad input in LCD
14 byte lcdRows = 1; // Create a variable for Display Keypad input in LCD
15 //*****
16 Adafruit_Fingerprint finger = Adafruit_Fingerprint(&Serial3);
17 //*****
18 /* Set these to your desired credentials. */
19 const char *ssid = "Chanal234"; //ENTER WIFI SETTINGS
20 const char *password = "eel610584";
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 §
21 //*****
22 String postData ; // post array that will be send to the website
23 String Website_link_getdata = "http://beta1.sip2020project.online/getdata.php"; // server domain
24 const char* Website_link_espdata = "http://beta1.sip2020project.online/post-esp-data.php";
25 int FingerID = 0; // The Fingerprint ID from the scanner
26 uint8_t id;
27 String apiKeyValue = "tPmAT5Ab3j7F9";
28
29 //*****Keypad*****
30 const byte ROWS = 4;
31 const byte COLS = 4;
32 char hexaKeys[ROWS][COLS] = {
33     {'1', '2', '3', 'B'},
34     {'4', '5', '6', 'G'},
35     {'7', '8', '9', 'S'},
36     {'M', '0', 'E', 'C'} };
37 byte rowPins[ROWS] = {13,12,14,27}; //connect to the row pinouts of the keypad
38 byte colPins[COLS] = {26,25,33,32}; //connect to the column pinouts of the keypad
39 Keypad customKeypad = Keypad(makeKeymap(hexaKeys), rowPins, colPins, ROWS, COLS);
40 const int clear_button = 23; //Pin of Clear Push Button
41 const int Enter_button = 5; //Pin of Enter Push Button
42 boolean clear_button_val = 0;
43 boolean Enter_button_val = 0;
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 §
44
45 #define subjectcode_lenght 7 // Give enough room for four chars + NULL char
46 char data[subjectcode_lenght]; // 4 is the number of chars it can hold + the null char = 5
47 byte data_count = 0;
48
49 //*****
50
51 void setup() {
52
53   Serial.begin(115200);
54
55   //-----initiate LCD I2C display-----
56   lcd.init();
57   lcd.backlight(); // turn on LCD backlight
58   // lcd.clear();
59   pinMode(clear_button, INPUT_PULLUP); // clear_button mode INPUT_PULLUP
60   //-----
61
62   connectToWiFi();
63
64   //-----
65
66   // set the data rate for the sensor serial port
67   finger.begin(57600);
68   Serial.println("\n\nAdafruit finger detect test");
```

```
File Edit Sketch Tools Help
Upload
Full_Working_Code_2021-02-21 §
69
70 if (finger.verifyPassword()) {
71   Serial.println("Found fingerprint sensor!");
72   lcd.setCursor(5, 0);
73   lcd.print("Found");
74   lcd.setCursor(2, 1);
75   lcd.print("fingerprint");
76   lcd.setCursor(0, 2);
77   lcd.print("sensor!");
78   delay(1000);
79 } else {
80   Serial.println("Did not find fingerprint sensor :(");
81   lcd.setCursor(7, 0);
82   lcd.print("No");
83   lcd.setCursor(2, 1);
84   lcd.print("fingerprint");
85   lcd.setCursor(-1, 2);
86   lcd.print("sensor :(");
87   while (1) { delay(1); }
88 }
//-----
89
90 finger.getTemplateCount();
91 Serial.print("Sensor contains "); Serial.print(finger.templateCount); Serial.println(" templates");
92 Serial.println("Waiting for valid finger...")]
```

```
File Edit Sketch Tools Help
Upload
Full_Working_Code_2021-02-21 §
99 }
100 //*****
101 void loop() {
102
103 //check if there's a connection to WiFi or not
104 if(WiFi.status() != WL_CONNECTED){
105   connectToWiFi();
106 }
107 //-----
108 //If there no fingerprint has been scanned return -1 or -2 if there an error or 0 if there nothing, The ID start form 1 to 127
109 FingerID = getFingerprintID(); // Get the Fingerprint ID from the Scanner
110 delay(50); //don't need to run this at full speed.
111
112
113
114 //-----
115
116 DisplayFingerprintID();
117
118 //-----
119
120 ChecktoAddID();
121
```

```
File Edit Sketch Tools Help
Upload
Full_Working_Code_2021-02-21 §
129 } // End of Loop
130 //*****Display the fingerprint ID state on the LCD*****
131 void DisplayFingerprintID(){
132 //Fingerprint has been detected
133 if (FingerID > 0){
134   lcd.clear();
135   lcd.setCursor(2, 0);
136   lcd.print("Valid Finger!");
137
138   SendFingerprintID( FingerID ); // Send the Fingerprint ID to the website.
139
140 }
141 //No finger detected
142 else if (FingerID == 0){
143   lcd.clear();
144   lcd.setCursor(0, 0);
145   lcd.print("Put your Finger");
146
147 }
148 // Didn't find a match
149 else if (FingerID == -1){
150   lcd.clear();
151   lcd.setCursor(-3, 2);
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 §
152     lcd.setCursor(5, 2);
153     lcd.print("Invalid Finger!");
154 }
155 //-----
156 //Didn't find the scanner or there an error
157 else if (FingerID == -2){
158     lcd.clear();
159     lcd.setCursor(2, 1);
160     lcd.print("Try Again !!!");
161 }
162 }
163 //*****send the fingerprint ID to the website*****
164 void SendFingerprintID( int finger ){
165     HTTPClient http; //Declare object of class HTTPClient
166     //Post Data
167     postData = "FingerID=" + String(finger); // Add the Fingerprint ID to the Post array in order to send it
168     // Post methode
169
170     http.begin(Website_link_getdata); //initiate HTTP request, put your Website URL or Your Computer IP
171     http.addHeader("Content-Type", "application/x-www-form-urlencoded"); //Specify content-type header
172
173     int httpCode = http.POST(postData); //Send the request
174     String payload = http.getString(); //Get the response payload
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 §
175 |
176 Serial.println(httpCode); //Print HTTP return code
177 Serial.println(payload); //Print request response payload
178 Serial.println(postData); //Post Data
179 Serial.println(finger); //Print fingerprint ID
180
181 if (payload.substring(0, 5) == "login") {
182     String user_name = payload.substring(5);
183     Serial.println(user_name);
184
185     lcd.clear();
186     lcd.setCursor(5, 1);
187     lcd.print("Welcome");
188     lcd.setCursor(1, 2);
189     lcd.print(user_name);
190     delay (2000);
191     lcd.clear();
192     Serial.println("Stop here");
193     Enter_button_val = digitalRead(Enter_button);
194     Serial.println(Enter_button_val);
195     while (Enter_button_val != LOW) {
196         Subject_Code();
197     }
198 }
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 §
199 }
200 delay(1000);
201 postData = "";
202 http.end(); //Close connection
203
204 void clearKeypad() {
205     while (data_count != 0)
206     {
207         data[data_count--] = 0; //clear array for new data
208     }
209     lcd.clear();
210     lcdColumns = 0;
211     lcdRows = 1;
212 }
213
214 void Subject_Code(){
215
216     lcd.setCursor(0, 0);
217     lcd.print("Lec No + Subject");
218
219     clear_button_val = digitalRead(clear_button);
220     Enter_button_val = digitalRead(Enter_button);
221 }
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 $ 
221
222     char storedkeyvalue = customKeypad.getKey();
223
224     if (storedkeyvalue!= NO_KEY)
225     {
226         Serial.print(storedkeyvalue);
227         lcd.setCursor(lcdColumns, lcdRows);
228         lcd.print(storedkeyvalue);
229         data[data_count] = storedkeyvalue; // store char into data array
230         data_count++; // increment data array by 1 to store new char, also keep track of the number of chars entered
231         lcdColumns++;
232     }
233     if (clear_button_val == LOW) {
234         Serial.println("Clear Button Press");
235
236         clear_Keypad();
237     }
238
239     if (Enter_button_val == LOW )
240     {
241         Serial.println("Enter_button Press");
242         lcd.setCursor(-4, 3);
243         lcd.print("Uploading..");
244         Serial.print("Uploading..");
245         HTTPClient http;
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 $ 
246     HTTPClient http;
247     // Your Domain name with URL path or IP address with path
248     http.begin(Website_link_espdata);
249
250     // Specify content-type header
251     http.addHeader("Content-Type", "application/x-www-form-urlencoded");
252
253     // Data to send with HTTP POST
254     String httpRequestData = "api_key=" + apiKeyValue + "&value1=" + data[2] + data[3] + data[4] + data[5]+ data[6]
255     + "&value2=" + data[0] + data[1] + "";
256
257     // Send HTTP POST request
258     int httpResponseCode = http.POST(httpRequestData);
259
260     Serial.print("HTTP Response code: ");
261     Serial.println(httpResponseCode);
262
263     // Free resources
264     http.end();
265     clear_Keypad();
266
267     if (clear_button_val == LOW )
268     {
269         lcd.setCursor(4, 1);
270         lcd.print("Re-type!");
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 $ 
271     delay(2000);
272     clear_Keypad();
273 }
274
275 //*****Get the Fingerprint ID*****
276 int getFingerprintID() {
277     uint8_t p = finger.getImage();
278     switch (p) []
279     case FINGERPRINT_OK:
280         //Serial.println("Image taken");
281         break;
282     case FINGERPRINT_NOFINGER:
283         //Serial.println("No finger detected");
284         return 0;
285     case FINGERPRINT_PACKETRECEIVEERR:
286         //Serial.println("Communication error");
287         return -2;
288     case FINGERPRINT_IMAGEFAIL:
289         //Serial.println("Imaging error");
290         return -2;
291     default:
292         //Serial.println("Unknown error");
293         return -2;
294 }]
```

```

File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 §
294    }
295    // OK success!
296    p = finger.image2Tz();
297    switch (p) {
298    case FINGERPRINT_OK:
299      //Serial.println("image converted");
300      break;
301    case FINGERPRINT_IMAGEMESS:
302      //Serial.println("Image too messy");
303      return -1;
304    case FINGERPRINT_PACKETRECEIVEERR:
305      //Serial.println("Communication error");
306      return -2;
307    case FINGERPRINT_FEATUREFAIL:
308      //Serial.println("Could not find fingerprint features");
309      return -2;
310    case FINGERPRINT_INVALIDIMAGE:
311      //Serial.println("Could not find fingerprint features");
312      return -2;
313    default:
314      //Serial.println("Unknown error");
315      return -2;
316    }
317    // OK converted!
318    p = finger.fingerFastSearch();

// found a match!
//Serial.print("Found ID #"); Serial.print(finger.fingerID);
//Serial.print(" with confidence of "); Serial.println(finger.confidence);

return finger.fingerID;
}
//*****Check if there a Fingerprint ID to delete*****
void ChecktoDeleteID() {
|
HTTPClient http; //Declare object of class HTTPClient
//Post Data
postData = "DeleteID=check"; // Add the Fingerprint ID to the Post array in order to send it
// Post methode

http.begin(Website_link_getdata); //initiate HTTP request, put your Website URL or Your Computer IP
http.addHeader("Content-Type", "application/x-www-form-urlencoded"); //Specify content-type header

int httpcode = http.POST(postData); //Send the request
String payload = http.getString(); //get the response payload

if (payload.substring(0, 6) == "del-id") {
String del_id = payload.substring(6);
Serial.println(del_id);
deleteFingerprint( del_id.toInt() );
}

```

```

File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 §
347    deleteFingerprint( del_id.toInt() );
348  }
349
350  http.end(); //Close connection
351  }
352  //*****Delete Fingerprint ID*****
353  uint8_t deleteFingerprint( int id ) {
354    uint8_t p = -1;
355
356    p = finger.deleteModel(id);
357
358    if (p == FINGERPRINT_OK) {
359      Serial.println("Deleted!");
360
361      lcd.clear();
362      lcd.setCursor(4, 1);
363      lcd.print("Deleted!");
364
365    } else if (p == FINGERPRINT_PACKETRECEIVEERR) {
366      //Serial.println("Communication error");
367
368      lcd.clear();
369      lcd.setCursor(1, 1);
370      lcd.print("Communication");
371
372    } else if (p == FINGERPRINT_FEATUREFAIL) {
373      //Serial.println("Communication error");
374
375      lcd.clear();
376      lcd.setCursor(1, 1);
377      lcd.print("Communication");
378      lcd.setCursor(1, 2);
}

```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21.s
370 | lcd.clear();
371 | lcd.print("error!");
380 |
381 | return p;
382 | } else if (p == FINGERPRINT_BADLOCATION) {
383 | //Serial.println("Could not delete in that location");
384 | lcd.clear();
385 | lcd.setCursor(0, 1);
386 | lcd.print("Could not delete");
387 | lcd.setCursor(-4, 2);
388 | lcd.print("in that location");
389 |
390 | return p;
391 | } else if (p == FINGERPRINT_FLASHERR) {
392 | //Serial.println("Error writing to flash");
393 | lcd.clear();
394 | lcd.setCursor(0, 1);
395 | lcd.print("Error writing");
396 | lcd.setCursor(1, 2);
397 | lcd.print("flash!");
398 |
399 | return p;
400 | } else {
401 | //Serial.print("Unknown error: 0x"); Serial.println(p, HEX);
402 | lcd.clear();
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21.s
400 | lcd.clear();
401 | lcd.setCursor(1, 1);
402 | lcd.print("Unknown error:");
403 |
404 | return p;
405 | }
406 |
407 | }
408 |
409 //*****Check if there a Fingerprint ID to add*****
410 void ChecktoAddID() {
411 |
412 HttpClient http; //Declare object of class HttpClient
413 //Post Data
414 postData = "Get_Fingerid=get_id"; // Add the Fingerprint ID to the Post array in order to send it
415 // Post methode
416 |
417 http.begin(Website_link_getdata); //initiate HTTP request, put your Website URL or Your Computer IP
418 http.addHeader("Content-Type", "application/x-www-form-urlencoded"); //Specify content-type header
419 |
420 int httpCode = http.POST(postData); //Send the request
421 String payload = http.getString(); //Get the response payload
422 |
423 if (payload.substring(0, 6) == "add-id") {
424 String add_id = payload.substring(6);
425 Serial.println(add_id);
426 id = add_id.toInt();
427 }
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21.s
420 serial.println(add_id);
421 id = add_id.toInt();
422 getFingerprintEnroll();
423 }
424 http.end(); //Close connection
425 }
426 //*****Enroll a Fingerprint ID*****
427 uint8_t getFingerprintEnroll() {
428 |
429 int p = -1;
430 lcd.clear();
431 lcd.setCursor(4, 1);
432 lcd.print("Scanning");
433 lcd.setCursor(-1, 2);
434 lcd.print("Finger....");
435 |
436 while (p != FINGERPRINT_OK) {
437 p = finger.getImage();
438 switch (p) {
439 case FINGERPRINT_OK:
440 //Serial.println("Image taken");
441 lcd.clear();
442 lcd.setCursor(2, 1);
443 lcd.print("Valid Finger");
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 §
449
450 break;
451 case FINGERPRINT_NOFINGER:
452 //Serial.println(".");
453 lcd.clear();
454 lcd.setCursor(4, 1);
455 lcd.print("Scanning");
456 lcd.setCursor(-1, 2);
457 lcd.print("Finger....");
458
459 break;
460 case FINGERPRINT_PACKETRECEIVEERR:
461 lcd.clear();
462 lcd.setCursor(1, 1);
463 lcd.print("Invalid Finger");
464
465 break;
466 case FINGERPRINT_IMAGEFAIL:
467 Serial.println("Imaging error");
468 break;
469 default:
470 Serial.println("Unknown error");
471 break;
472 }
473 // OK success!
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 §
7.0 // No success.
474
475 p = finger.image2Tz(1);
476 switch (p) {
477 case FINGERPRINT_OK:
478 lcd.clear();
479 lcd.setCursor(2, 1);
480 lcd.print("Valid Finger");
481
482 break;
483 case FINGERPRINT_IMAGEMESS:
484 lcd.clear();
485 lcd.setCursor(1, 1);
486 lcd.print("Invalid Finger");
487
488 return p;
489 case FINGERPRINT_PACKETRECEIVEERR:
490 Serial.println("Communication error");
491 return p;
492 case FINGERPRINT_FEATUREFAIL:
493 Serial.println("Could not find fingerprint features");
494 return p;
495 case FINGERPRINT_INVALIDIMAGE:
496 Serial.println("Could not find fingerprint features");
497 return p;
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 §
7.0 // No success.
498 default:
499 Serial.println("Unknown error");
500 return p;
501 }
502 lcd.clear();
503 lcd.setCursor(5, 1);
504 lcd.print("Remove");
505 lcd.setCursor(1, 2);
506 lcd.print("Finger");
507
508 //Serial.println("Remove finger");
509 delay(2000);
510 p = 0;
511 while (p != FINGERPRINT_NOFINGER) {
512 p = finger.getImage();
513 }
514 Serial.print("ID "); Serial.println(id);
515 p = -1;
516 lcd.clear();
517 lcd.setCursor(3, 1);
518 lcd.print("Fingerprint");
519 lcd.setCursor(-1, 2);
520 lcd.print("scanning");
521 while (p != FINGERPRINT_OK) {
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21.s
520    lca.print("scanning");
521    while (p != FINGERPRINT_OK) {
522        p = finger.getImage();
523        switch (p) {
524            case FINGERPRINT_OK:
525                //Serial.println("Image taken");
526                lcd.clear();
527                lcd.setCursor(3, 1);
528                lcd.print("Fingerprint");
529                lcd.setCursor(-1, 2);
530                lcd.print("valid...");
531            break;
532            case FINGERPRINT_NOFINGER:
533                //Serial.println(".");
534                lcd.clear();
535                lcd.setCursor(3, 1);
536                lcd.print("Fingerprint");
537                lcd.setCursor(-1, 2);
538                lcd.print("scanning");
539            |
540        break;
541        case FINGERPRINT_PACKETRECEIVEERR:
542            Serial.println("Communication error");
543        break;
544        case FINGERPRINT_IMAGEFAIL:
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21.s
544        case FINGERPRINT_IMAGEFAIL:
545            Serial.println("Imaging error");
546        break;
547        default:
548            Serial.println("Unknown error");
549        break;
550    }
551 } // OK success!
552
553 p = finger.image2Tz(2);
554    switch (p) {
555        case FINGERPRINT_OK:
556            //Serial.println("Image converted");
557            lcd.clear();
558            lcd.setCursor(3, 1);
559            lcd.print("Fingerprint");
560            lcd.setCursor(-1, 2);
561            lcd.print("valid...");
562        break;
563        case FINGERPRINT_IMAGEMESS:
564            Serial.println("Image too messy");
565        return p;
566        case FINGERPRINT_PACKETRECEIVEERR:
567            Serial.println("Communication error");
568    }
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21.s
569    Serial.println("Communication error");
570    return p;
571    case FINGERPRINT_FEATUREFAIL:
572        Serial.println("Could not find fingerprint features");
573    return p;
574    case FINGERPRINT_INVALIDIMAGE:
575        Serial.println("Could not find fingerprint features");
576    return p;
577    default:
578        Serial.println("Unknown error");
579    return p;
580
581 // OK converted!
582 Serial.print("Creating model for #"); Serial.println(id);
583
584 p = finger.createModel();
585    if (p == FINGERPRINT_OK) {
586        //Serial.println("Prints matched!");
587        lcd.clear();
588        lcd.setCursor(3, 1);
589        lcd.print("Fingerprint");
590        lcd.setCursor(-1, 2);
591        lcd.print("valid...");
```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 $ 
593 } else if (p == FINGERPRINT_PACKETRECIEVEERR) {
594 Serial.println("Communication error");
595 return p;
596 } else if (p == FINGERPRINT_ENROLLMISMATCH) {
597 Serial.println("Fingerprints did not match");
598 return p;
599 } else {
600 Serial.println("Unknown error");
601 return p;
602 }
603
604 Serial.print("ID "); Serial.println(id);
605 p = finger.storeModel(id);
606 if (p == FINGERPRINT_OK) {
607 //Serial.println("Stored!");
608 lcd.clear();
609 lcd.setCursor(3, 1);
610 lcd.print("Fingerprint");
611 lcd.setCursor(-1, 2);
612 lcd.print("valid...");
613 confirmAdding();
614 } else if (p == FINGERPRINT_PACKETRECIEVEERR) {
615 Serial.println("Communication error");
616 return p;

```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 $ 
617 } else if (p == FINGERPRINT_BADLOCATION) {
618 Serial.println("Could not store in that location");
619 return p;
620 } else if (p == FINGERPRINT_FLASHERR) {
621 Serial.println("Error writing to flash");
622 return p;
623 } else {
624 Serial.println("Unknown error");
625 return p;
626 }
627 }
628 //*****Check if there a Fingerprint ID to add*****
629 void confirmAdding() {
630
631 HttpClient http; //Declare object of class HttpClient
632 //Post Data
633 postData = "confirm_id=" + String(id); // Add the Fingerprint ID to the Post array in order to send it
634 // Post methode
635
636 http.begin(Website_link_getdata); //initiate HTTP request, put your Website URL or Your Computer IP
637 http.addHeader("Content-Type", "application/x-www-form-urlencoded"); //Specify content-type header
638
639 int httpCode = http.POST(postData); //Send the request
640 String payload = http.getString(); //Get the response payload

```

```
File Edit Sketch Tools Help
Full_Working_Code_2021-02-21 $ 
642 lcd.clear();
643 lcd.setCursor(0, 1);
644 lcd.print("payload=");
645 lcd.setCursor(-1, 2);
646 lcd.print(payload);
647
648 delay(1000);
649 Serial.println(payload);
650
651 http.end(); //close connection
652 }
653 //*****connect to the WiFi*****
654 void connectToWiFi() {
655 WiFi.mode(WIFI_OFF); //Prevents reconnection issue (taking too long to connect)
656 delay(1000);
657 WiFi.mode(WIFI_STA);
658 Serial.print("Connecting to ");
659 Serial.println(ssid);
660 WiFi.begin(ssid, password);
661
662 lcd.clear();
663 lcd.setCursor(0, 1);
664 lcd.print("Connecting to");
665 lcd.setCursor(-1, 2);

```

```
666     lcd.print(ssid);
667
668 while (WiFi.status() != WL_CONNECTED) {
669     delay(500);
670     Serial.print(".");
671 }
672 Serial.println("");
673 Serial.println("Connected");
674
675 lcd.clear();
676 lcd.setCursor(3, 1);
677 lcd.print("Connected");
678
679 Serial.print("IP address: ");
680 Serial.println(WiFi.localIP()); //IP address assigned to your ESP
681
682 }
683 //=====
```

6.2 Web Application Coding

```
<?php
/**
 * Index Page Controller
 * @category Controller
 */
class IndexController extends BaseController{
    function __construct(){
        parent::__construct();
        $this->tablename = "userinfo";
    }
    /**
     * Index Action
     * @return null
     */
    function index(){
        if(user_login_status() == true){
            $this->redirect(HOME_PAGE);
        }
        else{
            $this->render_view("index/index.php");
        }
    }
    private function login_user($username , $password_text, $rememberme = false){
        $db = $this->GetModel();
        $username = filter_var($username, FILTER_SANITIZE_STRING);
        $db->where("username", $username)->orWhere("useremail", $username);
        $tablename = $this->tablename;
        $user = $db->getOne($tablename);
        if(!empty($user)){
            //Verify User Password Text With DB Password Hash Value.
            //Uses PHP password_verify() function with default options
            $password_hash = $user['userpass'];
            $this->modeldata['userpass'] = $password_hash; //update the modeldata with the
            password hash
            if(password_verify($password_text,$password_hash)){
                unset($user['userpass']); //Remove user password. No need to store it in
                the session
                set_session("user_data", $user); // Set active user data in a sessions
                //if Remeber Me, Set Cookie
                if($rememberme == true){
                    $sessionkey = time().random_str(20); // Generate a session key for the
                    user
                    //Update user session info in database with the session key
                    $db->where("id", $user['id']);
                    $res = $db->update($tablename, array("login_session_key" => hash_value($
                        sessionkey)));
                    if(!empty($res)){
                        set_cookie("login_session_key", $sessionkey); // save user
                        login_session_key in a Cookie
                    }
                }
                else{
                    clear_cookie("login_session_key");// Clear any previous set cookie
                }
                $redirect_url = get_session("login_redirect_url");// Redirect to user
                active page
                if(!empty($redirect_url)){
                    clear_session("login_redirect_url");
                    return $this->redirect($redirect_url);
                }
                else{
                    return $this->redirect(HOME_PAGE);
                }
            }
            else{
                //password is not correct
                return $this->login_fail("Username or password not correct");
            }
        }
        else{
            //user is not registered
            return $this->login_fail("Username or password not correct");
        }
    }
    /**
     * Index Action
     * @return null
     */
}
```

```
| <?php
$page_id = null;
$comp_model = new SharedController;
?>
<div class="py-5">
    <div class="container">
        <div class="row justify-content-around">
            <div class="col-md-10 login-card-holder comp-grid">
                <div class="">
                    <div class="container">
                        <div class="row ">
                            <div class="col-sm-8 svg comp-grid">
                                <?php $this :: display_page_errors(); ?>
                            <div class="p-3 animated fadeIn page-content">
                                <div>
                                    <h4><i class="fa fa-key"></i> User Login</h4>
                                    <hr />
                                    <?php
$this :: display_page_errors();
?>
                                    <form name="loginForm" action="<?php
print_link('index/login/?csrf_token=' . Csrf::$token); ?>" class="needs-validation form page-form" method="post">
                                        <div class="input-group form-group">
                                            <input placeholder="Username Or Email" name="username" required="required" class="form-control" type="text" />
                                            <div class="input-group-append">
                                                <span class="input-group-text"><i class="form-control-feedback fa fa-user"></i></span>
                                            </div>
                                        </div>
                                        <div class="input-group form-group">
                                            <input placeholder="Password" required="required" v-model="user.password" name="password" class="form-control" type="password" />
                                            <div class="input-group-append">
                                                <span class="input-group-text"><i class="form-control-feedback fa fa-key"></i></span>
                                            </div>
                                        </div>
                                        <div class="row clearfix mt-3 mb-3">
                                            <div class="col-6">
                                                <label class="">
                                                    <input value="true" type="checkbox" name="rememberme" />
                                                    Remember Me
                                                </label>
                                            </div>
                                            <div class="col-6">
                                                <a href="<?php print_link('passwordmanager') ?>" class="text-danger"> Reset Password?</a>
                                            </div>
                                        </div>
                                        <div class="form-group text-center">
                                            <button class="btn btn-primary btn-block btn-md" type="submit">
                                                <i class="load-indicator">
                                                    <clip-loader :loading="loading" color="#fff" size="20px"></clip-loader>
                                                </i>
                                                Login <i class="fa fa-key"></i>
                                            </button>
                                            <hr />
                                        </div>
                                    </form>
                                <div class="text-center">
                                    <small>Copyright © 2020. All Rights Reserved. Developed by <a href="https://www.techno-soft.com">TechnoSoft</a>.
                                    </small>
                                </div>
                            </div>
                        </div>
                    </div>
                </div>
            </div>
        </div>
    </div>
</div>
```



```

1  <?php
2  $page_id = null;
3  $comp_model = new SharedController;
4  $current_page = $this->set_current_page_link();
5  ?>
6  <div>
7      <div class="bg-light p-3 mb-3">
8          <div class="container">
9              <div class="row ">
10                 <div class="col-md-12 comp-grid">
11                     <h4>Admin Dashboard</h4>
12                 </div>
13                 <div class="col-md-12 comp-grid">
14                     </div>
15                 </div>
16             </div>
17         <div class="">
18             <div class="container">
19                 <div class="row ">
20                     <div class="col-md-6 col-sm-4 comp-grid">
21                         <a class="btn btn-secondary btn-md btn-block" href="<?php print_link("home")">">
22                             <i class="fa fa-hand-pointer-o "></i>
23                             Fingerprint
24                         </a>
25                     </div>
26                     <div class="col-md-6 col-sm-4 comp-grid">
27                         <a class="btn btn-light btn-md btn-block" href="<?php print_link("home")">">
28                             <i class="fa fa-reply "></i>
29                             Main site
30                         </a>
31                     </div>
32                 </div>
33             </div>
34         </div>
35     <div class="">
36         <div class="container">
37             <div class="page-header"><h4> </h4></div>
38             <div class="row ">
39                 <div class="col-md-3 col-sm-4 comp-grid">
40                     <div class=""><style>
41                         .topcard {
42                             overflow:hidden;
43                             box-shadow:0 0 10px rgba(0,0,0,0.3);
44                         }
45                         .topcard .value {
46                             font-size: 4rem;
47                         }
48                         .topcard i {
49                             position: relative;right: -50%;
50                             top: 20px;
51                             font-size: 8rem;
52                             line-height: 0;
53                             opacity: 0.2;
54                             color: white;
55                             z-index: 0;
56                         }
57                     </style>
58                 </div>
59             </div>
60             <?php $rec_count = $comp_model->getcount_totalstaff(); ?>
61             <a class="animated zoomIn record-count alert alert-primary topcard" href="<?php print_link("home")">">
62                 <div class="row">
63                     <div class="col-2">
64                         <i class="fa fa-users "></i>
65                     </div>
66                     <div class="col-10">
67                         <div class="flex-column justify-content align-center">
68                             <div class="title">Total Staff</div>
69                             <small class=""></small>
70                         </div>
71                     </div>
72                     <div class="value"><strong><?php echo $rec_count; ?></strong></div>
73                 </div>
74             </a>

```

```

75         </div>
76         <div class="col-md-3 col-sm-4 comp-grid">
77             <?php $rec_count = $comp_model->getcount_totalstudents(); ?>
78             <a class="animated zoomIn record-count alert alert-primary topcard" href="<
79                 ?php print_link("studentdb/") ?>">
80                 <div class="row">
81                     <div class="col-2">
82                         <i class="fa fa-users "></i>
83                     </div>
84                     <div class="col-10">
85                         <div class="flex-column justify-content align-center">
86                             <div class="title">Total Students</div>
87                             <small class=""></small>
88                         </div>
89                         <h4 class="value"><strong><?php echo $rec_count; ?></strong></h4>
90                     </div>
91                 </a>
92             </div>
93             <div class="col-md-3 col-sm-4 comp-grid">
94                 <?php $rec_count = $comp_model->getcount_subjects(); ?>
95                 <a class="animated zoomIn record-count alert alert-primary topcard" href="<
96                     ?php print_link("subjectsdb/") ?>">
97                     <div class="row">
98                         <div class="col-2">
99                             <i class="fa fa-book "></i>
100                         </div>
101                         <div class="col-10">
102                             <div class="flex-column justify-content align-center">
103                                 <div class="title">Subjects</div>
104                                 <small class=""></small>
105                             </div>
106                             <h4 class="value"><strong><?php echo $rec_count; ?></strong></h4>
107                         </div>
108                     </a>
109             </div>
110             <div class="col-md-3 col-sm-4 comp-grid">
111                 <?php $rec_count = $comp_model->getcount_practices(); ?>
112                 <a class="animated zoomIn record-count alert alert-primary topcard" href="<
113                     ?php print_link("practicesdb/") ?>">
114                     <div class="row">
115                         <div class="col-2">
116                             <i class="fa fa-th-large "></i>
117                         </div>
118                         <div class="col-10">
119                             <div class="flex-column justify-content align-center">
120                                 <div class="title">Practices</div>
121                                 <small class=""></small>
122                             </div>
123                             <h4 class="value"><strong><?php echo $rec_count; ?></strong></h4>
124                         </div>
125                     </a>
126                 </div>
127             </div>
128         </div>
129     <div class="">
130         <div class="container">
131             <div class="row ">
132                 <div class="col-md-12 comp-grid">
133                     <div class=""><div></div>
134                     </div>
135                 </div>
136                 <div class="col-md-6 col-sm-4 comp-grid">
137                     <div class="card card-body">
138                         <?php
139                             $chartdata = $comp_model->linechart_attendanceoverview();
140                         ?>
141                         <div>
142                             <h4>Attendance Overview</h4>
143                             <small class="text-muted"></small>
144                         </div>
145                         <hr />

```

```

146             <hr />
147             <canvas id="linechart_attendanceoverview"></canvas>
148             <script>
149                 $(function (){
150                     var chartData = {
151                         labels : <?php echo json_encode($chartdata['labels']); ?>,
152                         datasets : [
153                             {
154                             label: 'Attendance',
155                             fill:false,
156                             borderColor:'rgba(0 , 128 , 255, 0.7)',
157                             borderWidth:3,
158                             pointStyle:'circle',
159                             pointRadius:5,
160                             lineTension:0.1,
161                             type:'',
162                             steppedLine:false,
163                             data : <?php echo json_encode($chartdata['datasets'][0]); ?>,
164                         }
165                     ]
166                 }
167                 var ctx = document.getElementById('linechart_attendanceoverview');
168                 var chart = new Chart(ctx, {
169                     type:'line',
170                     data: chartData,
171                     options: {
172                         scaleStartValue: 0,
173                         responsive: true,
174                         scales: {
175                             xAxes: [
176                                 ticks:{display: true},
177                                 gridLines:{display: true},
178                                 scaleLabel: {
179                                     display: true,
180                                     labelString: ""
181                                 }
182                             ],
183                             yAxes: [
184                                 ticks: {
185                                     beginAtZero: true,
186                                     display: true
187                                 },
188                                 scaleLabel: {
189                                     display: true,
190                                     labelString: ""
191                                 }
192                             ],
193                         },
194                         ,
195                         ,
196                         });
197                     </script>
198                 </div>
199                 <div class=""></div>
200             </div>
201             <div class="col-md-6 col-sm-4 comp-grid">
202                 <div class=""><div></div>
203                 </div>
204                 <div class="card card-body">
205                     <?php
206                         $chartdata = $comp_model->linechart_todaysattendance();
207                     ?>
208                     <div>
209                         <h4>Todays attendance</h4>
210                         <small class="text-muted"></small>
211                     </div>
212                     <hr />
213                     <canvas id="linechart_todaysattendance"></canvas>
214                     <script>
215                         $(function (){
216                             var chartData = {
217                                 labels : <?php echo json_encode($chartdata['labels']); ?>,
218                                 datasets : [
219                                     {
220                                         label: 'Dataset 1',

```

```

229             data : <?php echo json_encode($chartdata['datasets'][0]); ?>,
230         }
231     ]
232   }
233   var ctx = document.getElementById('linechart_todaysattendance');
234   var chart = new Chart(ctx, {
235     type:'line',
236     data: chartData,
237     options: {
238       scaleStartValue: 0,
239       responsive: true,
240       scales: {
241         xAxes: [
242           ticks:{display: true},
243           gridLines:{display: true},
244           scaleLabel: {
245             display: true,
246             labelString: ""
247           }
248         ],
249         yAxes: [
250           ticks: {
251             beginAtZero: true,
252             display: true
253           },
254           scaleLabel: {
255             display: true,
256             labelString: ""
257           }
258         ],
259       },
260     }
261   },
262   );
263   </script>
264 </div>
265 </div>
266 </div>
267 </div>
268 </div>
269 </div>
270

```

```

1  <?php
2
3▼ /**
4  * Home Page Controller
5  * @category Controller
6 */
7▼ class HomeController extends SecureController{
8▼   /**
9    * Index Action
10   * @return View
11   */
12▼   function index(){
13     if(strtolower(USER_ROLE) == 'instructor'){
14       $this->render_view("home/instructor.php" , null , "main_layout.php");
15     }
16     elseif(strtolower(USER_ROLE) == 'student'){
17       $this->render_view("home/student.php" , null , "main_layout.php");
18     }
19     else{
20       $this->render_view("home/index.php" , null , "main_layout.php");
21     }
22   }
23 }
24

```

```

1  <?php
2  /**
3   * AttendanceDb Page Controller
4   * @category Controller
5   */
6  class AttendanceDbController extends SecureController{
7      function __construct(){
8          parent::__construct();
9          $this->tablename = "attendanceDb";
10     }
11    /**
12     * List page records
13     * @param $fieldname (filter record by a field)
14     * @param $fieldvalue (filter field value)
15     * @return BaseView
16    */
17    function index($fieldname = null , $fieldvalue = null){
18        $request = $this->request;
19        $db = $this->GetModel();
20        $tablename = $this->tablename;
21        $fields = array("attendanceDb.id",
22                        "attendanceDb.stuindex",
23                        "attendanceDb.subcode",
24                        "attendanceDb.subname",
25                        "attendanceDb.lecno",
26                        "attendanceDb.lecdate",
27                        "attendanceDb.passtime",
28                        "studentDb.stuname AS studentDb_stuname");
29        $pagination = $this->get_pagination(MAX_RECORD_COUNT); // get current pagination e.
30        //g array(page_number, page_limit)
31        //search table record
32        if(!empty($request->search)){
33            $text = trim($request->search);
34            $search_condition = "("
35                attendanceDb.id LIKE ? OR
36                attendanceDb.stuindex LIKE ? OR
37                attendanceDb.stuname LIKE ? OR
38                attendanceDb.subcode LIKE ? OR
39                attendanceDb.subname LIKE ? OR
40                attendanceDb.lecno LIKE ? OR
41                attendanceDb.lecdate LIKE ? OR
42                attendanceDb.passtime LIKE ? OR
43                attendanceDb.yesorno LIKE ? OR
44                studentDb.id LIKE ? OR
45                studentDb.stuindex LIKE ? OR
46                studentDb.stuname LIKE ? OR
47                studentDb.stugroup LIKE ? OR
48                studentDb.studpt LIKE ? OR
49                studentDb.stubatch LIKE ? OR
50                studentDb.stucat LIKE ?
51            ")";
52            $search_params = array(
53                "%$text%", "%$text%", "%$text%", "%$text%", "%$text%", "%$text%", "%$text%", "%$text%",
54                "%$text%", "%$text%", "%$text%", "%$text%", "%$text%", "%$text%", "%$text%", "%$text%", "%$text%"
55            );
56            //setting search conditions
57            $db->where($search_condition, $search_params);
58            //template to use when ajax search
59            $this->view->search_template = "attendanceDb/search.php";
60        }
61        $db->join("studentDb", "attendanceDb.stuindex = studentDb.stuindex", "INNER");
62        if(!empty($request->orderby)){
63            $orderby = $request->orderby;
64            $ordertype = (!empty($request->ordertype) ? $request->ordertype : ORDER_TYPE);
65            $db->orderBy($orderby, $ordertype);
66        }
67        else{
68            $db->orderBy("attendanceDb.id", ORDER_TYPE);
69        }
70        $allowed_roles = array ('administrator', 'user', 'instructor');
71        if(!in_array(strtolower(USER_ROLE), $allowed_roles)){
72            $db->where("attendanceDb.stuindex", get_active_user('stuindex') );
73        }
74        if($fieldname){
75            $db->where($fieldname , $fieldvalue); //filter by a single field name

```

```

74         }
75         $tc = $db->withTotalCount();
76         $records = $db->get($tablename, $pagination, $fields);
77         $records_count = count($records);
78         $total_records = intval($tc->totalCount);
79         $page_limit = $pagination[1];
80         $total_pages = ceil($total_records / $page_limit);
81     ▼ if( !empty($records)){
82         foreach($records as &$record){
83             $record['lecdate'] = human_date($record['lecdate']);
84         $record['passtime'] = human_time($record['passtime']);
85     }
86     }
87     $data = new stdClass;
88     $data->records = $records;
89     $data->record_count = $records_count;
90     $data->total_records = $total_records;
91     $data->total_page = $total_pages;
92     if($db->getLastError()){
93         $this->set_page_error();
94     }
95     $page_title = $this->view->page_title = "Attendancedb";
96     $this->view->report_filename = date('Y-m-d') . '-' . $page_title;
97     $this->view->report_title = $page_title;
98     $this->view->report_layout = "report_layout.php";
99     $this->view->report_paper_size = "A4";
100    $this->view->report_orientation = "portrait";
101    $this->render_view("attendancedb/list.php", $data); //render the full page
102 }
103 ▼ /**
104 * View record detail
105 * @param $rec_id (select record by table primary key)
106 * @param $value value (select record by value of field name(rec_id))
107 * @return BaseView
108 */
109 ▼ function view($rec_id = null, $value = null){
110     $request = $this->request;
111     $db = $this->GetModel();
112     $rec_id = $this->rec_id = urldecode($rec_id);
113     $tablename = $this->tablename;
114     $fields = array("attendancedb.id",
115         "attendancedb.stuindex",
116         "attendancedb.subcode",
117         "attendancedb.subname",
118         "attendancedb.lecno",
119         "attendancedb.lecdate",
120         "attendancedb.passtime",
121         "attendancedb.yesorno",
122         "studentdb.stuname AS studentdb_stuname");
123     $allowed_roles = array ('administrator', 'user', 'instructor');
124     if(!in_array(strtolower(USER_ROLE), $allowed_roles)){
125         $db->where("attendancedb.stuindex", get_active_user('stuindex'));
126     }
127     if($value){
128         $db->where($rec_id, urldecode($value)); //select record based on field name
129     }
130     else{
131         $db->where("attendancedb.id", $rec_id); //select record based on primary key
132     }
133     $db->join("studentdb", "attendancedb.stuindex = studentdb.stuindex", "INNER ");
134     $record = $db->getOne($tablename, $fields );
135     if($record){
136         $record['lecdate'] = human_date($record['lecdate']);
137         $record['passtime'] = human_time($record['passtime']);
138         $page_title = $this->view->page_title = "View Attendancedb";
139         $this->view->report_filename = date('Y-m-d') . '-' . $page_title;
140         $this->view->report_title = $page_title;
141         $this->view->report_layout = "report_layout.php";
142         $this->view->report_paper_size = "A4";
143         $this->view->report_orientation = "portrait";
144     }
145     else{
146         if($db->getLastError()){
147             $this->set_page_error();

```

```

148         }
149     else{
150         $this->set_page_error("No record found");
151     }
152 }
153 return $this->render_view("attendancedb/view.php", $record);
154 }
155 /**
156 * Insert new record to the database table
157 * @param $formdata array() from $_POST
158 * @return BaseView
159 */
160 function add($formdata = null){
161 if($formdata){
162     $db = $this->GetModel();
163     $tablename = $this->tablename;
164     $request = $this->request;
165     //fillable fields
166     $fields = $this->fields = array("stuindex","subcode","lecno","lecdate","passtime",
167     ", "yesono");
168     $postdata = $this->format_request_data($formdata);
169     $this->rules_array = array(
170         'stuindex' => 'required',
171         'subcode' => 'required',
172         'lecno' => 'required',
173     );
174     $this->sanitize_array = array(
175         'stuindex' => 'sanitize_string',
176         'subcode' => 'sanitize_string',
177         'lecno' => 'sanitize_string',
178         'lecdate' => 'sanitize_string',
179         'passtime' => 'sanitize_string',
180         'yesono' => 'sanitize_string',
181     );
182     $this->filter_vals = true; //set whether to remove empty fields
183     $modeldata = $this->modeldata = $this->validate_form($postdata);
184     if($this->validated()){
185         $rec_id = $this->rec_id = $db->insert($tablename, $modeldata);
186         if($rec_id){
187             $this->set_flash_msg("Record added successfully", "success");
188             return $this->redirect("attendancedb");
189         }
190         else{
191             $this->set_page_error();
192         }
193     }
194     $page_title = $this->view->page_title = "Add New Attendancedb";
195     $this->render_view("attendancedb/add.php");
196 }
197 /**
198 * Update table record with formdata
199 * @param $rec_id (select record by table primary key)
200 * @param $formdata array() from $_POST
201 * @return array
202 */
203 function edit($rec_id = null, $formdata = null){
204     $request = $this->request;
205     $db = $this->GetModel();
206     $this->rec_id = $rec_id;
207     $tablename = $this->tablename;
208     //editable fields
209     $fields = $this->fields = array("id","stuindex","subcode","lecno","lecdate",
210     "passtime","yesono");
211     if($formdata){
212         $postdata = $this->format_request_data($formdata);
213         $this->rules_array = array(
214             'stuindex' => 'required',
215             'subcode' => 'required',
216             'lecno' => 'required',
217         );
218         $this->sanitize_array = array(
219             'stuindex' => 'sanitize_string',
220             'subcode' => 'sanitize_string',
221             'lecno' => 'sanitize_string',
222         )

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```

221             'lecdate' => 'sanitize_string',
222             'passtime' => 'sanitize_string',
223             'yesono' => 'sanitize_string',
224         );
225         $modeldata = $this->modeldata = $this->validate_form($postdata);
226         if($this->validated()){
227             $allowed_roles = array ('administrator', 'user', 'instructor');
228             if(!in_array(strtolower(USER_ROLE), $allowed_roles)){
229                 $db->where("attendancedb.stuindex", get_active_user('stuindex') );
230             }
231             $db->where("attendancedb.id", $rec_id);
232             $bool = $db->update($tablename, $modeldata);
233             $numRows = $db->getRowCount(); //number of affected rows. 0 = no record
234             field updated
235             if($bool && $numRows){
236                 $this->set_flash_msg("Record updated successfully", "success");
237                 return $this->redirect("attendancedb");
238             }
239             else{
240                 if($db->getLastError()){
241                     $this->set_page_error();
242                 }
243                 elseif(!$numRows){
244                     //not an error, but no record was updated
245                     $page_error = "No record updated";
246                     $this->set_page_error($page_error);
247                     $this->set_flash_msg($page_error, "warning");
248                     return $this->redirect("attendancedb");
249                 }
250             }
251         }
252         $allowed_roles = array ('administrator', 'user', 'instructor');
253         if(!in_array(strtolower(USER_ROLE), $allowed_roles)){
254             $db->where("attendancedb.stuindex", get_active_user('stuindex') );
255         }
256         $db->where("attendancedb.id", $rec_id);
257         $data = $db->getOne($tablename, $fields);
258         $page_title = $this->view->page_title = "Edit Attendancedb";
259         if(!$data){
260             $this->set_page_error();
261         }
262         return $this->render_view("attendancedb/edit.php", $data);
263     }
264 /**
265 * Update single field
266 * @param $rec_id (select record by table primary key)
267 * @param $formdata array() from $_POST
268 * @return array
269 */
270 function editfield($rec_id = null, $formdata = null){
271     $db = $this->GetModel();
272     $this->rec_id = $rec_id;
273     $tablename = $this->tablename;
274     //editable fields
275     $fields = $this->fields = array("id","stuindex","subcode","lecno","lecdate",
276                                     "passtime","yesono");
277     $page_error = null;
278     if($formdata){
279         $postdata = array();
280         $fieldname = $formdata['name'];
281         $fieldvalue = $formdata['value'];
282         $postdata[$fieldname] = $fieldvalue;
283         $postdata = $this->format_request_data($postdata);
284         $this->rules_array = array(
285             'stuindex' => 'required',
286             'subcode' => 'required',
287             'lecno' => 'required',
288         );
289         $this->sanitize_array = array(
290             'stuindex' => 'sanitize_string',
291             'subcode' => 'sanitize_string',
292             'lecno' => 'sanitize_string',
293             'lecdate' => 'sanitize_string',
294             'passtime' => 'sanitize_string',
295             'yesono' => 'sanitize_string'.

```

```

295         );
296         $this->filter_rules = true; //filter validation rules by excluding fields not
297         in the formdata
298         $modeldata = $this->modeldata = $this->validate_form($postdata);
299         if($this->validated()){
300             $allowed_roles = array ('administrator', 'user', 'instructor');
301             if(!in_array(strtolower(USER_ROLE), $allowed_roles)){
302                 $db->where("attendancedb.stuindex", get_active_user('stuindex') );
303             }
304             $db->where("attendancedb.id", $rec_id);
305             $bool = $db->update($tablename, $modeldata);
306             $numRows = $db->getRowCount();
307             if($bool && $numRows){
308                 return render_json(
309                     array(
310                         'num_rows' =>$numRows,
311                         'rec_id' =>$rec_id,
312                     )
313                 );
314             }else{
315                 if($db->getLastError()){
316                     $page_error = $db->getLastError();
317                 }
318                 elseif(!$numRows){
319                     $page_error = "No record updated";
320                 }
321                 render_error($page_error);
322             }
323         }
324     }
325     render_error($this->view->page_error);
326 }
327 }
328 return null;
329 /**
330 * Delete record from the database
331 * Support multi delete by separating record id by comma.
332 * @return BaseView
333 */
334 function delete($rec_id = null){
335     Csrf::cross_check();
336     $request = $this->request;
337     $db = $this->GetModel();
338     $tablename = $this->tablename;
339     $this->rec_id = $rec_id;
340     //form multiple delete, split record id separated by comma into array
341     $arr_rec_id = array_map('trim', explode(",", $rec_id));
342     $db->where("attendancedb.id", $arr_rec_id, "in");
343     $allowed_roles = array ('administrator', 'instructor');
344     if(!in_array(strtolower(USER_ROLE), $allowed_roles)){
345         $db->where("attendancedb.stuindex", get_active_user('stuindex') );
346     }
347     $bool = $db->delete($tablename);
348     if($bool){
349         $this->set_flash_msg("Record deleted successfully", "success");
350     }
351     elseif($db->getLastError()){
352         $page_error = $db->getLastError();
353         $this->set_flash_msg($page_error, "danger");
354     }
355     return $this->redirect("attendancedb");
356 }
357 }
358 }
359

```

```
1 <?php
2 //check if current user role is allowed access to the pages
3 $can_add = ACL::is_allowed("attendancedb/add");
4 $can_edit = ACL::is_allowed("attendancedb/edit");
5 $can_view = ACL::is_allowed("attendancedb/view");
6 $can_delete = ACL::is_allowed("attendancedb/delete");
7 ?>
8 <?php
9 $comp_model = new SharedController;
10 $page_element_id = "view-page-" . random_str();
11 $current_page = $this->set_current_page_link();
12 $csrf_token = Csrf::$token;
13 //Page Data Information from Controller
14 $data = $this->view_data;
15 // $rec_id = $data['__tableprimarykey'];
16 $page_id = $this->route->page_id; //Page id from url
17 $view_title = $this->view_title;
18 $show_header = $this->show_header;
19 $show_edit_btn = $this->show_edit_btn;
20 $show_delete_btn = $this->show_delete_btn;
21 $show_export_btn = $this->show_export_btn;
22 ?>
23 ▼ <section class="page" id="<?php echo $page_element_id; ?>" data-page-type="view" data-
display-type="table" data-page-url="<?php print_link($current_page); ?>">
24     <?php
25     if( $show_header == true ){
26     ?>
27     <div class="bg-light p-3 mb-3">
28         <div class="container">
29             <div class="row ">
30                 <div class="col ">
31                     <h4 class="record-title">View Attendancedb</h4>
32                 </div>
33             </div>
34         </div>
35     </div>
36     <?php
37     }
38     ?>
39     <div class="">
40         <div class="container">
41             <div class="row ">
42                 <div class="col-md-12 comp-grid">
43                     <?php $this :: display_page_errors(); ?>
44                     <div class="card animated fadeIn page-content">
45                         <?php
46                         $counter = 0;
47                         if(!empty($data)){
48                             $rec_id = (!empty($data['id'])) ? urlencode($data['id']) : null;
49                             $counter++;
50                         }
51                         ?>
52                         <div id="page-report-body" class="">
53                             <table class="table table-hover table-borderless table-striped">
54                                 <!-- Table Body Start -->
55                                 <tbody class="page-data" id="page-data-<?php echo $-
page_element_id; ?>">
56                                     <tr class="td-id">
57                                         <th class="title"> Id: </th>
58                                         <td class="value"> <?php echo $data['id']; ?></td>
59                                     </tr>
60                                     <tr class="td-stuindex">
61                                         <th class="title"> Stuindex: </th>
62                                         <td class="value">
63                                             <span <?php if($can_edit){ ?> data-source='<?php
print_link('
api/json/attendancedb_stuindex_option_list'
); ?>' data-value="<?php echo $data['stuindex']; ?>
"
64                                             data-pk="<?php echo $data['id'] ?>" data-
url="<?php print_link("
attendancedb/editfield/" . urlencode($
data['id'])); ?>" data-name="stuindex" data-
title="Enter Stuindex" data-placement="left"
65                                         </span>
66                                     </tr>
67                                 </tbody>
68                             </table>
69                         </div>
70                     </div>
71                 </div>
72             </div>
73         </div>
74     </div>
75 
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69                               data-toggle="click"
70                               data-type="text"
71                               data-mode="popover"
72                               data-showbuttons="left"
73                               class="is-editable" <?php } ?>
74                               <?php echo $data['stuindex']; ?>
75                         </span>
76                     </td>
77                 </tr>
78▼             <tr class="td-subcode">
79                 <th class="title"> Subcode: </th>
80▼             <td class="value">
81▼                 <span <?php if($can_edit){ ?> data-source='<?php
82                     print_link('
83                         api/json/attendancedb_subcode_option_list');
84                     ?>''
85                     data-value="<?php echo $data['subcode']; ?>"
86
87                     data-pk="<?php echo $data['id'] ?>"'
88                     data-url="<?php print_link("'
89                         attendancedb/editfield/" . urlencode($
90                             data['id']));
91                     ?>"'
92                     data-name="subcode"
93                     data-title="Enter Subcode"
94                     data-placement="left"
95                     data-toggle="click"
96                     data-type="text"
97                     data-mode="popover"
98                     data-showbuttons="left"
99                     class="is-editable" <?php } ?>
100                    <?php echo $data['subcode']; ?>
101                </span>
102            </td>
103▼             <tr class="td-subname">
104                 <th class="title"> Subname: </th>
105                 <td class="value"> <?php echo $data['subname']; ?></td>
106             </tr>
107             <tr class="td-lecno">
108                 <th class="title"> Lecno: </th>
109                 <td class="value">
110                     <span <?php if($can_edit){ ?> data-source='<?php
111                         echo json_encode_quote(Menu :: $lecno); ?>'
112
113                         data-value="<?php echo $data['lecno']; ?>"'
114                         data-pk="<?php echo $data['id'] ?>"'
115                         data-url="<?php print_link("'
116                             attendancedb/editfield/" . urlencode($
117                                 data['id']));
118                         ?>"'
119                         data-name="lecno"
120                         data-title="Select a value ..."
121                         data-placement="left"
122                         data-toggle="click"
123                         data-type="select"
124                         data-mode="popover"
125                         data-showbuttons="left"
126                         class="is-editable" <?php } ?>
127                         <?php echo $data['lecno']; ?>
128
129                     </span>

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183
          data-placement="left"
          data-toggle="click"
          data-type="flatdatetimepicker"
          data-mode="popover"
          data-showbuttons="left"
          class="is-editable" <?php } ?>
          <?php echo $data['lecdate']; ?>
        </span>
      </td>
    </tr>
    <tr class="td-passtime">
      <th class="title"> Passtime: </th>
      <td class="value">
        <span <?php if($can_edit){ ?> data-value="<?php
          echo $data['passtime']; ?>"
          data-pk="<?php echo $data['id'] ?>"
          data-url="<?php print_link("
            attendancedb/editfield/" . urlencode($
              data['id'])); ?>"
          data-name="passtime"
          data-title="Enter Passtime"
          data-placement="left"
          data-toggle="click"
          data-type="time"
          data-mode="popover"
          data-showbuttons="left"
          class="is-editable" <?php } ?>
          <?php echo $data['passtime']; ?>
        </span>
      </td>
    </tr>
    <tr class="td-yesono">
      <th class="title"> Yesono: </th>
      <td class="value">
        <span <?php if($can_edit){ ?> data-source='<?php
          echo json_encode_quote(Menu :: $yesono); ?>
          ,
          data-value="<?php echo $data['yesono']; ?>"
          data-pk="<?php echo $data['id'] ?>"
          data-url="<?php print_link("
            attendancedb/editfield/" . urlencode($
              data['id'])); ?>"
          data-name="yesono"
          data-title="Enter Mark if Attended"
          data-placement="left"
          data-toggle="click"
          data-type="radiolist"
          data-mode="popover"
          data-showbuttons="left"
          class="is-editable" <?php } ?>
          <?php echo $data['yesono']; ?>
        </span>
      </td>
    </tr>
    <tr class="td-studentdb_stuname">
      <th class="title"> Studentdb Stuname: </th>
      <td class="value"> <?php echo $data['
        studentdb_stuname']; ?></td>
    </tr>
  </tbody>
  <!-- Table Body End -->
</table>
</div>

```

```

1  <?php
2  define("DEFAULT_TIMEZONE", ""); // set php date functions timezone
3  define("DEVELOPMENT_MODE", true); // set to false when in production
4
5  // return full path of application directory
6  define("ROOT", str_replace("\\", "/", dirname(__FILE__)) . "/");
7
8  // return the application directory name.
9  define("ROOT_DIR_NAME", basename(ROOT));
10
11 define("SITE_NAME", "Online Management System");
12
13
14 // Get Site Address Dynamically
15 $site_addr = (isset($_SERVER["HTTPS"]) && $_SERVER["HTTPS"] != "off" ? "https" : "http") .
16     "://" . $_SERVER["HTTP_HOST"] . dirname($_SERVER["SCRIPT_NAME"]);
17
18 //Must end with /
19 $site_addr = rtrim($site_addr, "\\") . "/";
20
21 // Can Be Set Manually Like "http://localhost/mysite/".
22 define("SITE_ADDR", $site_addr);
23
24 define("APP_ID", "46fe7f9a69e96e2285ad59368ee53509");
25
26 // Application Default Color (Mostly Used By Mobile)
27 define("META_THEME_COLOR", "#000000");
28
29 //Application resource access status
30 define("AUTHORIZED", 200);
31 define("UNAUTHORIZED", 401);
32 define("NOROLE", 404);
33 define("FORBIDDEN", 403);
34
35 // Application Files and Directories
36 define("IMG_DIR", "assets/images/");
37 define("FONTS_DIR", "assets/fonts/");
38 define("SITE_FAVICON", IMG_DIR . "favicon.png");
39 define("SITE_LOGO", IMG_DIR . "logo.png");
40
41 define("CSS_DIR", SITE_ADDR . "assets/css/");
42 define("JS_DIR", SITE_ADDR . "assets/js/");
43
44 define("APP_DIR", "app/");
45 define("SYSTEM_DIR", "system/");
46 define("HELPERS_DIR", "helpers/");
47 define("LIBS_DIR", "libs/");
48 define("LANGS_DIR", "languages/");
49 define("MODELS_DIR", APP_DIR . "models/");
50 define("CONTROLLERS_DIR", APP_DIR . "controllers/");
51 define("VIEWS_DIR", APP_DIR . "views/");
52 define("LAYOUTS_DIR", VIEWS_DIR . "layouts/");
53 define("PAGES_DIR", VIEWS_DIR . "partials/");
54 define("AUDIT_LOGS_DIR", "logs/");
55
56 // File Upload Directories
57 define("UPLOAD_DIR", "uploads/");
58 define("UPLOAD_FILE_DIR", UPLOAD_DIR . "files/");
59 define("UPLOAD_IMG_DIR", UPLOAD_DIR . "photos/");
60 define("MAX_UPLOAD_FILESIZE", trim(ini_get("upload_max_filesize"))));
61
62 // First page to see after user login
63 define("HOME_PAGE", "Home");
64 define("DEFAULT_PAGE", "index"); //Default Controller Class
65 define("DEFAULT_PAGE_ACTION", "index"); //Default Controller Action
66 define("DEFAULT_LAYOUT", LAYOUTS_DIR . "main_layout.php");
67 define("DEFAULT_LANGUAGE", "english"); //Default Language
68
69 // Page Meta Information
70 define("META_AUTHOR", "JGA");
71 define("META_DESCRIPTION", "");
72 define("META_KEYWORDS", "");
73 define("META_VIEWPORT", "width=device-width, initial-scale=1.0");
74 define("PAGE_CHARSET", "UTF-8");
75
76 // Email Configuration Default Settings

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```
85 // Database Configuration Settings
86 define("DB_HOST", "localhost");
87 define("DB_USERNAME", "root");
88 define("DB_PASSWORD", "password");
89 define("DB_NAME", "oms2");
90 define("DB_TYPE", "mysql");
91 define("DB_PORT", "");
92 define("DB_CHARSET", "utf8");
93
94
95 define("MAX_RECORD_COUNT", 20); //Default Max Records to Retrieve per Page
96 define("ORDER_TYPE", "DESC"); //Default Order Type
97
98 // Active User Profile Details
99 define('USER_ID',(isset($_SESSION[APP_ID.'user_data'])) ? $_SESSION[APP_ID.'user_data'][['id']] : null));
100 define('USER_NAME',(isset($_SESSION[APP_ID.'user_data'])) ? $_SESSION[APP_ID.'user_data'][['username']] : null));
101 define('USER_EMAIL',(isset($_SESSION[APP_ID.'user_data'])) ? $_SESSION[APP_ID.'user_data'][['useremail']] : null));
102 define('USER_ROLE',(isset($_SESSION[APP_ID.'user_data'])) ? $_SESSION[APP_ID.'user_data'][['userrole']] : null));
```

```

1  <?php
2      // Set url Variable From Router Class
3      $page_name = Router::$page_name;
4      $page_action = Router::$page_action;
5      $page_id = Router::$page_id;
6      $body_class = "$page_name-" . str_ireplace('list','index', $page_action);
7      $page_title = $this->get_page_title();
8  ?>
9  <!DOCTYPE html>
10 <html>
11     <head>
12         <title><?php echo $page_title; ?></title>
13         <meta http-equiv="content-type" content="text/html;charset=utf-8" />
14         <meta http-equiv="X-UA-Compatible" content="IE=edge,chrome=1" />
15         <link rel="shortcut icon" href=<?php print_link(SITE_FAVICON); ?>" />
16         <?php
17             Html :: page_meta('theme-color',META_THEME_COLOR);
18             Html :: page_meta('author',META_AUTHOR);
19             Html :: page_meta('keyword',META_KEYWORDS);
20             Html :: page_meta('description',META_DESCRIPTION);
21             Html :: page_meta('viewport',META_VIEWPORT);
22             Html :: page_css('font-awesome.min.css');
23             Html :: page_css('animate.css');
24             Html :: page_css('blueimp-gallery.css');
25         ?>
26             <?php
27             Html :: page_css('bootstrap-theme-material-mini-teal.css');
28             Html :: page_css('custom-style.css');
29         ?>
30         <?php
31             Html :: page_css('flatpickr.min.css');
32             Html :: page_css('bootstrap-editable.css');
33             Html :: page_css('selectize.css');
34             Html :: page_js('jquery-3.3.1.min.js');
35             Html::page_js('chartjs-2.3.0.js');
36         ?>
37     </head>
38     <?php
39         $page_id = "index";
40         if(user_login_status() == true){
41             $page_id = "main";
42         }
43     ?>
44     <body id=<?php echo $page_id ?>" class="with-login <?php echo $body_class ?>">
45         <div id="page-wrapper">
46             <!-- Show progress bar when ajax upload-->
47             <div class="progress ajax-progress-bar">
48                 <div class="progress-bar"></div>
49             </div>
50             <?php
51                 $this->render_view('appheader.php');
52             ?>
53             <div id="main-content">
54                 <!-- Page Main Content Start -->
55                 <div id="page-content">
56                     <?php $this->render_body();?>
57                 </div>
58                 <!-- Page Main Content [End] -->
59                 <!-- Page Footer Start -->
60                 <?php
61                     $this->render_view('appfooter.php');
62                 ?>
63                 <!-- Page Footer Ends -->
64                 <div class="flash-msg-container"><?php show_flash_msg(); ?></div>
65                 <!-- Modal page for displaying ajax page -->
66                 <div id="main-page-modal" class="modal fade" role="dialog">
67                     <div class="modal-dialog modal-lg">
68                         <div class="modal-content">
69                             <div class="modal-body p-0 reset-grids inline-page">
70                             </div>
71                             <div style="top: 5px; right:5px; z-index: 999;" class="position-
72                                 absolute">
73                                 <button type="button" class="btn btn-sm btn-danger" data-
74                                     dismiss="modal">&times;</button>
75                             </div>
76                         </div>
77                     </div>
78                 </div>
79             </div>
80         </div>
81     </body>
82 
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74             </div>
75         </div>
76     </div>
77     <!-- Modal page for displaying record delete prompt -->
78     <div class="modal fade" id="delete-record-modal-confirm" tabindex="-1" role="dialog" aria-labelledby="delete-record-modal-confirm" aria-hidden="true">
79         <div class="modal-dialog" role="document">
80             <div class="modal-content">
81                 <div class="modal-header">
82                     <h5 class="modal-title">Delete record</h5>
83                     <button type="button" class="close" data-dismiss="modal" aria-label="Close">
84                         <span aria-hidden="true">&times;</span>
85                     </button>
86                 </div>
87                 <div id="delete-record-modal-msg" class="modal-body"></div>
88                 <div class="modal-footer">
89                     <button type="button" class="btn btn-secondary" data-dismiss="modal">Cancel</button>
90                     <a href="" id="delete-record-modal-btn" class="btn btn-primary">Delete</a>
91                 </div>
92             </div>
93         </div>
94     <!-- Image Preview Component [Start] -->
95     <div id="blueimp-gallery" class="blueimp-gallery blueimp-gallery-controls">
96         <div class="slides"></div>
97         <h3 class="title"></h3>
98         <a class="prev"><</a>
99         <a class="next">></a>
100        <a class="close">x</a>
101        <a class="play-pause"></a>
102        <ol class="indicator"></ol>
103    </div>
104    <!-- Image Preview Component [End] -->
105    <template id="page-loading-indicator">
106        <div class="p-2 text-center m-2 text-muted m-auto">
107            <div class="ajax-loader"></div>
108            <h4 class="p-3 mt-2 font-weight-light">Loading...</h4>
109        </div>
110    </template>
111    <template id="page-saving-indicator">
112        <div class="p-2 text-center m-2 text-muted">
113            <div class="lds-dual-ring"></div>
114            <h4 class="p-3 mt-2 font-weight-light">Saving...</h4>
115        </div>
116    </template>
117    <template id="inline-loading-indicator">
118        <div class="p-2 text-center d-flex justify-content-center">
119            <span class="loader mr-3"></span>
120            <span class="font-weight-bold">Loading...</span>
121        </div>
122    </template>
123    </div>
124 </div>
125 <script>
126     var siteAddr = '<?php echo SITE_ADDR; ?>';
127     var defaultPageLimit = '<?php echo MAX_RECORD_COUNT; ?>';
128     var csrfToken = '<?php echo Csrf :: $token; ?>';
129 </script>
130 <?php
131     Html :: page_js('popper.js');
132     Html :: page_js('bootstrap-4.3.1.min.js');
133     ?>
134 <?php
135     Html :: page_js('flatpickr.min.js');
136     Html :: page_js('selectize.min.js');
137     Html :: page_js('bootstrap-editable.js');
138     Html :: page_js('plugins.js'); //bootstrapswitch, passwordStrength, twbs-pagination, blueimp-gallery,
139     Html :: page_js('plugins-init.js');
140     Html :: page_js('page-scripts.js');
141     ?>
142 </body>
143 </html>

```

```

1  <?php
2
3  /*
4  this script is used to receive subcode and lec number
5  */
6
7  $servername = "localhost";
8  $dbname = "siproj1_biomericattendace";
9  $username = "siproj1_betauser";
10 $password = "betauser123";
11
12
13
14 $api_key= $sensor = $location = $value1 = $value2 = $value3 = "";
15
16 if ($_SERVER["REQUEST_METHOD"] == "POST") {
17     $api_key = test_input($_POST["api_key"]);
18     if($api_key == $api_key_value) {
19
20         $value1 = test_input($_POST["value1"]);
21         $value2 = test_input($_POST["value2"]);
22
23
24         // Create connection
25         $conn = new mysqli($servername, $username, $password, $dbname);
26         // Check connection
27         if ($conn->connect_error) {
28             die("Connection failed: " . $conn->connect_error);
29         }
30
31         $sql = "UPDATE users_logs
32             SET value1 ='" . $value1 . "', value2 ='" . $value2 . "'"
33             order by id desc limit 1";
34
35
36
37         if ($conn->query($sql) === TRUE) {
38             echo "New record created successfully";
39         } else {
40             echo "Error: " . $sql . "<br>" . $conn->error;
41         }
42
43         $conn->close();
44     }
45     else {
46         echo "Wrong API Key provided.";
47     }
48
49 }
50 else {
51     echo "No data posted with HTTP POST.";
52 }
53
54
55 function test_input($data) {
56     $data = trim($data);
57     $data = stripslashes($data);
58     $data = htmlspecialchars($data);
59     return $data;
60 }
61

```

```

1  <?php
2 //Connect to database
3 require 'connectDB.php';
4
5 if (isset($_POST['FingerID'])) {
6
7     $fingerID = $_POST['FingerID'];
8
9     $sql = "SELECT * FROM users WHERE fingerprint_id=?";
10    $result = mysqli_stmt_init($conn);
11    if (!mysqli_stmt_prepare($result, $sql)) {
12        echo "SQL_Error_Select_card";
13        exit();
14    }
15    else{
16        mysqli_stmt_bind_param($result, "s", $fingerID);
17        mysqli_stmt_execute($result);
18        $resultl = mysqli_stmt_get_result($result);
19        if ($row = mysqli_fetch_assoc($resultl)){
20            //*****
21            //An existed fingerprint has been detected for Login or Logout
22            if (!empty($row['username'])){
23                $Uname = $row['username'];
24                $Number = $row['serialnumber'];
25                $sql = "SELECT * FROM users_logs WHERE fingerprint_id=? AND checkindate=CURDATE() AND timeout=''";
26                $result = mysqli_stmt_init($conn);
27                if (!mysqli_stmt_prepare($result, $sql)) {
28                    echo "SQL_Error_Select_logs";
29                    exit();
30                }
31                else{
32                    mysqli_stmt_bind_param($result, "i", $fingerID);
33                    mysqli_stmt_execute($result);
34                    $resultl = mysqli_stmt_get_result($result);
35                    //*****
36                    //Login
37                    if (!$row = mysqli_fetch_assoc($resultl)){
38
39                        $sql = "INSERT INTO users_logs (username, serialnumber,
40                                fingerprint_id, checkindate, timein, timeout) VALUES (?, ?, ?, CURDATE(), CURTIME(), ?)";
41
42                        $result = mysqli_stmt_init($conn);
43                        if (!mysqli_stmt_prepare($result, $sql)) {
44                            echo "SQL_Error_Select_login1";
45                            exit();
46                        }
47                        else{
48                            $timeout = "";
49                            mysqli_stmt_bind_param($result, "sdis", $Uname, $Number, $fingerID, $timeout);
50                            mysqli_stmt_execute($result);
51
52                            echo "login".$Uname;
53                            exit();
54                        }
55                    }
56                    //Logout
57                    else{
58                        $sql="UPDATE users_logs SET timeout=CURTIME() WHERE fingerprint_id=? AND checkindate=CURDATE()";
59                        $result = mysqli_stmt_init($conn);
60                        if (!mysqli_stmt_prepare($result, $sql)) {
61                            echo "SQL_Error_insert_logout1";
62                            exit();
63                        }
64                        else{
65                            mysqli_stmt_bind_param($result, "i", $fingerID);
66                            mysqli_stmt_execute($result);
67
68                            echo "logout".$Uname;
69                            exit();
70                        }
71
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```

```
74 //*****
75 //An available Fingerprint has been detected
76 else{
77     $sql = "SELECT fingerprint_select FROM users WHERE fingerprint_select=1";
78     $result = mysqli_stmt_init($conn);
79     if (!mysqli_stmt_prepare($result, $sql)) {
80         echo "SQL_Error_Select";
81         exit();
82     }
83     else{
84         mysqli_stmt_execute($result);
85         $result1 = mysqli_stmt_get_result($result);
86
87         if ($row = mysqli_fetch_assoc($result1)) {
88             $sql="UPDATE users SET fingerprint_select=0";
89             $result = mysqli_stmt_init($conn);
90             if (!mysqli_stmt_prepare($result, $sql)) {
91                 echo "SQL_Error_insert";
92                 exit();
93             }
94             else{
95                 mysqli_stmt_execute($result);
96
97                 $sql="UPDATE users SET fingerprint_select=1 WHERE fingerprint_id
98                     =?";
99                 $result = mysqli_stmt_init($conn);
100                if (!mysqli_stmt_prepare($result, $sql)) {
101                    echo "SQL_Error_insert_An_available_card";
102                    exit();
103                }
104                else{
105                    mysqli_stmt_bind_param($result, "i", $fingerID);
106                    mysqli_stmt_execute($result);
107
108                    echo "available";
109                    exit();
110                }
111            }
112        else{
113            $sql="UPDATE users SET fingerprint_select=1 WHERE fingerprint_id=?";
114            $result = mysqli_stmt_init($conn);
115            if (!mysqli_stmt_prepare($result, $sql)) {
116                echo "SQL_Error_insert_An_available_card";
117                exit();
118            }
119            else{
120                mysqli_stmt_bind_param($result, "i", $finger_sel, $fingerID);
121                mysqli_stmt_execute($result);
122
123                echo "available";
124                exit();
125            }
126        }
127    }
128 }
129 }
130 //*****
131 //New Fingerprint has been added
132 else{
133     $Uname = "";
134     $Number = "";
135     $gender= "";
136
137     $sql = "SELECT fingerprint_select FROM users WHERE fingerprint_select=1";
138     $result = mysqli_stmt_init($conn);
139     if (!mysqli_stmt_prepare($result, $sql)) {
140         echo "SQL_Error_Select";
141         exit();
142     }
143     else{
144         mysqli_stmt_execute($result);
145         $result1 = mysqli_stmt_get_result($result);
146         if ($row = mysqli_fetch_assoc($result1)) {
147             $sql="UPDATE users SET fingerprint_select =0";
148             $result = mysqli_stmt_init($conn);
```

```

148             $result = mysqli_stmt_init($conn);
149             if (!mysqli_stmt_prepare($result, $sql)) {
150                 echo "SQL_Error_Insert";
151                 exit();
152             }
153             else{
154                 mysqli_stmt_execute($result);
155
156                 $sql = "INSERT INTO users (username , serialnumber, gender, fingerpri
157                 $result = mysqli_stmt_init($conn);
158                 if (!mysqli_stmt_prepare($result, $sql)) {
159                     echo "SQL_Error_Select_Add";
160                     exit();
161                 }
162                 else{
163                     mysqli_stmt_bind_param($result, "sdsi", $Uname, $Number, $gender,
164                     mysqli_stmt_execute($result);
165
166                     echo "succesful1";
167                     exit();
168                 }
169             }
170         }
171     else{
172         $sql = "INSERT INTO users (username , serialnumber, gender, fingerprint_i
173         $result = mysqli_stmt_init($conn);
174         if (!mysqli_stmt_prepare($result, $sql)) {
175             echo "SQL_Error_Select_Add";
176             exit();
177         }
178         else{
179             mysqli_stmt_bind_param($result, "sdsi", $Uname, $Number, $gender, $fi
180             mysqli_stmt_execute($result);
181
182             echo "succesful2";
183             exit();
184         }
185     }
186 }
187 }
188 }
189 }
190 if (isset($_POST['Get_Fingerid'])) {
191
192     if ($_POST['Get_Fingerid'] == "get_id") {
193         $sql= "SELECT fingerprint_id FROM users WHERE add_fingerid=1 AND username=''";
194         $result = mysqli_stmt_init($conn);
195         if (!mysqli_stmt_prepare($result, $sql)) {
196             echo "SQL_Error_Select";
197             exit();
198         }
199         else{
200             mysqli_stmt_execute($result);
201             $resultl = mysqli_stmt_get_result($result);
202             if ($row = mysqli_fetch_assoc($resultl)) {
203                 echo "add-id".$row['fingerprint_id'];
204                 exit();
205             }
206             else{
207                 echo "Nothing";
208                 exit();
209             }
210         }
211     }
212     else{
213         exit();
214     }
215 }
216 if (!empty($_POST['confirm_id'])) {
217
218     $fingerid = $_POST['confirm_id'];
219
220     $sql="UPDATE users SET fingerprint_select=0 WHERE fingerprint_select=1";
221     $result = mysqli_stmt_init($conn);
222     if (!mysqli_stmt_prepare($result, $sql)) {

```

```

222     if (!mysqli_stmt_prepare($result, $sql)) {
223         echo "SQL_Error_Select";
224         exit();
225     }
226     else{
227         mysqli_stmt_execute($result);
228
229         $sql="UPDATE users SET add_fingerid=0, fingerprint_select=1 WHERE fingerprint_id=?";
230         $result = mysqli_stmt_init($conn);
231         if (!mysqli_stmt_prepare($result, $sql)) {
232             echo "SQL_Error_Select";
233             exit();
234         }
235         else{
236             mysqli_stmt_bind_param($result, "s", $fingerid);
237             mysqli_stmt_execute($result);
238             echo "Fingerprint has been added!";
239             exit();
240         }
241     }
242 }
243 if (isset($_POST['DeleteID'])) {
244
245     if ($_POST['DeleteID'] == "check") {
246         $sql = "SELECT fingerprint_id FROM users WHERE del_fingerid=1";
247         $result = mysqli_stmt_init($conn);
248         if (!mysqli_stmt_prepare($result, $sql)) {
249             echo "SQL_Error_Select";
250             exit();
251         }
252         else{
253             mysqli_stmt_execute($result);
254             $result1 = mysqli_stmt_get_result($result);
255             if ($row = mysqli_fetch_assoc($result1)) {
256
257                 echo "del-id".$row['fingerprint_id'];
258
259                 $sql = "DELETE FROM users WHERE del_fingerid=1";
260                 $result = mysqli_stmt_init($conn);
261                 if (!mysqli_stmt_prepare($result, $sql)) {
262                     echo "SQL_Error_delete";
263                     exit();
264                 }
265                 else{
266                     mysqli_stmt_execute($result);
267                     exit();
268                 }
269             }
270             else{
271                 echo "nothing";
272                 exit();
273             }
274         }
275     }
276     else{
277         exit();
278     }
279 }
?>

```

```

1  <div id="topbar" class="navbar navbar-expand-md fixed-top navbar-dark bg-dark">
2      <div class="container-fluid">
3          <a class="navbar-brand" href="<?php print_link(HOME_PAGE) ?>">
4               <?php echo
5                  SITE_NAME ?>
6          </a>
7          <?php
8              if(user_login_status() == true ){
9                  ?>
10                 <button type="button" class="navbar-toggler dropdown-toggle" data-toggle=""
11                     collapse" data-target=".navbar-responsive-collapse">
12                     </button>
13                     <button type="button" id="sidebarCollapse" class="btn btn-dark">
14                         <span class="navbar-toggler-icon"></span>
15                     </button>
16                     <div class="navbar-collapse collapse navbar-responsive-collapse">
17                         <?php Html :: render_menu(Menu :: $navbartopleft , "navbar-nav mr-auto" ); ?
18                         >
19                         <ul class="navbar-nav ml-auto">
20                             <li class="nav-item dropdown">
21                                 <a class="nav-link dropdown-toggle" href="#" data-toggle="dropdown">
22                                     <span class="avatar-icon"><i class="fa fa-user"></i></span>
23                                     <span>Hi <?php echo ucwords(USER_NAME); ?> !</span>
24                                 </a>
25                                 <ul class="dropdown-menu">
26                                     <a class="dropdown-item" href="<?php print_link('account') ?>"><i
27                                         class="fa fa-user"></i> My Account</a>
28                                     <a class="dropdown-item" href="<?php print_link('
29                                         index/logout?csrf_token=' . Csrf::$token) ?>"><i class="fa fa-
30                                         sign-out"></i> Logout</a>
31                                 </ul>
32                             </li>
33                         </ul>
34                         <?php
35                         if(user_login_status() == true ){
36                             ?>
37                         <nav id="sidebar" class="navbar-dark bg-dark">
38                             <ul class="nav navbar-nav w-100 flex-column align-self-start">
39                                 <li class="menu-profile text-center nav-item">
40                                     <a class="avatar" href="<?php print_link('account') ?>">
41                                         <span class="avatar-icon"><i class="fa fa-user"></i></span>
42                                     </a>
43                                     <h5 class="user-name">Hi
44                                         <?php echo ucwords(USER_NAME); ?>
45                                         <small class="text-muted"><?php echo ACL::$user_role; ?> </small>
46                                     </h5>
47                                     <div class="dropdown menu-dropdown">
48                                         <button class="btn btn-primary dropdown-toggle btn-sm" type="button" id=""
49                                         dropdownMenuButton" data-toggle="dropdown" aria-haspopup="true" aria-
50                                         expanded="false">
51                                             <i class="fa fa-user"></i>
52                                         </button>
53                                         <ul class="dropdown-menu">
54                                             <a class="dropdown-item" href="<?php print_link('account') ?>"><i
55                                                 class="fa fa-user"></i> My Account</a>
56                                             <a class="dropdown-item" href="<?php print_link('
57                                                 index/logout?csrf_token=' . Csrf::$token) ?>"><i class="fa fa-
58                                                 sign-out"></i> Logout</a>
59                                         </ul>
60                                     </div>
61                                 </li>
62                             <?php Html :: render_menu(Menu :: $navbarsideleft , "nav navbar-nav w-100 flex-
63                                 column align-self-start" , "accordion"); ?>
64                         </nav>
65                         <?php
66                         }
67                         ?>

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148                     </div>
149                     </div>
150                 </div>
151             <div class="card mb-3">
152                 <div class="card-header accordion-header" data-toggle="collapse"
153                     data-target="#Accordion-1-Page3" role="tab">
154                         <i class="fa fa-arrow-circle-down "></i> SIP - Specialised
155                         Instruction Program <span class="expand text-muted">+</span>
156                     </div>
157                     <div id="Accordion-1-Page3" class="collapse " data-parent="#Comp
158                         -1-Accordion-Group">
159                         </div>
160                     </div>
161             <div class="col-md-3 col-sm-4 comp-grid">
162                 <?php $rec_count = $comp_model->getcount_practices_2(); ?>
163                 <a class="animated zoomIn record-count card bg-success text-white" href
164                     ="<?php print_link("pracschedules/") ?>">
165                     <div class="row">
166                         <div class="col-2">
167                             <i class="fa fa-clock-o "></i>
168                         </div>
169                         <div class="col-10">
170                             <div class="flex-column justify-content align-center">
171                                 <div class="title">Practices</div>
172                                 <small class="">This week</small>
173                             </div>
174                             <h4 class="value"><strong><?php echo $rec_count; ?></strong></h4>
175                         </div>
176                     </a>
177                     <?php $rec_count = $comp_model->getcount_correctionsubmissions(); ?>
178                     <a class="animated zoomIn record-count card bg-success text-white mt-4"
179                         href="<?php print_link("cwcorrection/") ?>">
180                         <div class="row">
181                             <div class="col-2">
182                                 <i class="fa fa-clock-o "></i>
183                             </div>
184                             <div class="col-10">
185                                 <div class="flex-column justify-content align-center">
186                                     <div class="title">Correction Submissions</div>
187                                     <small class="">This week</small>
188                                 </div>
189                                 <h4 class="value"><strong><?php echo $rec_count; ?></strong></h4>
190                             </div>
191                         </a>
192                     </div>
193                     <div class="col-md-3 col-sm-4 comp-grid">
194                         <?php $rec_count = $comp_model->getcount_lectures(); ?>
195                         <a class="animated zoomIn record-count card bg-success text-white" href
196                             ="<?php print_link("lecschedules/") ?>">
197                             <div class="row">
198                                 <div class="col-2">
199                                     <i class="fa fa-clock-o "></i>
200                                 </div>
201                                 <div class="col-10">
202                                     <div class="flex-column justify-content align-center">
203                                         <div class="title">Lectures</div>
204                                         <small class="">This Week</small>
205                                     </div>
206                                     <h4 class="value"><strong><?php echo $rec_count; ?></strong></h4>
207                                 </div>
208                         </a>
209                     </div>
210                 </div>
211             </div>
212         </div>
213     </div>

```

7.0 References

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