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SMART MOBILITY ATTENDANCE SYSTEM

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Abstract : The conventional way of collecting attendance is being followed for several decades and it is becoming a challenge if it need to collect from diverse of students either in an event or elective course system. In educational system attendance plays a major role for students growth in academics. Poor attendance leads students in detention list, so a proper and reliable system is necessary for attendance management. This paper deals with a smart attendance system which has to be authenticate by the faculty who took the class at the end of the session by using fingerprint technology. A portable device has been proposed with a fingerprint sensor to recognize students attendance. The collected attendance of the students will be sent to a personal website where faculty can monitor students attendance reports at anytime at anywhere. This system will eliminate proxy completely, improve accuracy of attendance and saves faculty's time during the lecture.

Keywords – Attendance System, Biometric, Authentication, Accuracy

I. INTRODUCTION

All educational institutes use attendance systems to record students attendance. An attendance system provides many benefits to institutes. The traditional way of collecting attendance is done through registers which leads to huge paperwork for faculty. And also it leads to proxy and errors. So as to avoid these proximities, a system is developed based on unique identification of each individual. Therefore biometrics suits well for differentiating each and every one even twin also in a quick manner.

fig-0:-manual attendance

Conventional attendance collecting system is to be replaced with mobility-based Biometrics attendance system which avoids proxy and auto-updating of status of student presence in the server immediately after the class work in line with the Timetable with customized options. Technology had to play its role in this field just as well as it is done in other fields. The time and work of teachers lightened through this attendance monitoring system by making attendance marking procedure effortless. Every human being has unique biometric pattern. This unique biometric pattern helps to identify a person in an accurate way.

The concept of IOT [7] is applied to the proposed system. A portable device is designed such a way that it has a capability of recognizing students fingerprints through fingerprint module R307 and then sends students respective ID's to the web server. For this system internet is compulsory. When the system is powered ON, it searches for Wi-Fi networks and connected to the suitable network. Once the Wi-Fi connection is made system displays place finger for attendance, once student places his/her finger fingerprint module recognize that student fingerprint ID and send that ID to the web server. After every student places their FINGERS at last faculty authenticate it by placing his finger. When faculty authenticates it the system asks the faculty to select the number of periods. All this data is sent to web server where the server records everything and calculate attendance percentage of every student. And it maintains all the attendance reports in real time. This attendance reports and all can be checked on the website by logging into it at anytime. This makes easy to faculty to maintain the students attendance. Students also get to know their attendance percentage at real time.

II. Problem Identification

Manual attendance taking consumes more time and there is always a chance of human error and proxy. And it is becoming a challenge if it needs to collect from diverse of students either in an event or elective course system. Mostly entries of attendance from faculty are required to maintain attendance data. Un-posting of attendance, incorrect entry of times, keyboard and printing errors may affect students attendance and this leads students in detention list. Some institutions uses wall mounted RFID swipe card systems, theses RFID based systems complex, costly and absent students cards can be swiped by other students. And some other institutions Biometric systems which are wall mounted based. It is difficult to students to go out and place fingers in that system for every period in that day and it consumes lot of time. To overcome the above problems we proposed a smart mobility attendance system..

III. Literature Review

In paper[1] authors proposed an IOT based attendance system ,they implemented a portable device that device is capable of sending recorded attendance data to server using Wi-Fi connectivity . They used NODEMCU ESP8266-12E Wi-Fi module chip to connect to the internet and to upload to server. In paper [3]the authors proposed a novel fingerprint reconstruction algorithm to reconstruct the phase image, the phase image that is reconstructed is then converted into the grayscale image. This algorithm is used to automate the whole process of taking attendance. In paper[4] the authors have developed a biometric attendance system and they included SMS alert to parents in it. In paper[5] the authors proposed an attendance system that is based on using a QR code. The QR code can be read quickly by a cell phone. It stores information such as the lecture number, date, name of the professor, etc, which is used in this proposed system.

IV. Proposed Method

The block diagram of proposed method is shown in figure-1. The fingerprint module R307[8], push button switches and 4x3 keypad are the input devices and 16by2 LCD is output device in this proposed method.Finger print module shown in figure is used tostoe the fingerprint patters in the formof template ID's and also used to scan the fingers that are placed. Four Push Button switches are used to enroll fingerprints ,delete fingerprints,and to incrementand decrement fingerprint IDs. 4x3 keypad is used to enter number of periods after faculty authuentication.The flowchart for the overall process is shown in figure-2.Initially students and faculty enroll their fingerprints through fingerprint module using pushbutton switches.Inorder to delete any fingerprint we use delete fingerprint push button and select respective fingerprint ID using incement and decrement push buttons. After faculty and student successfully enrolls their fingers with respect to their fingerprint IDs we create database in web server. When we powered ON the Raspeberry pi ,initially it searches for Wi-Fi network once it connected to Wi-Fi program automatically starts running and it shown place finger for attendance in LCD. If anyone places finger, finger print sensor scans and searches for IDS that are stored in it previously.If anyfingerprint matches then it shows authorized roll or else it displays no match foundin LCD.It again comes back to place finger unless faculty place his finger.Once faculty places his finger it waits for input from keypad.

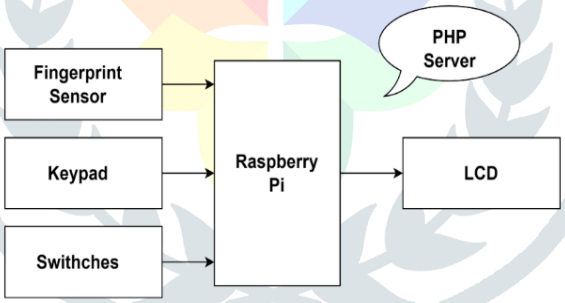

fig-1:- block diagram of proposed method

In keypad faculty enters number of periods that he take attendance. Once it is done the data will be sent to web server where everything will updated and stored in real time. This attendance data can be monitored by faculties by logging into website. The students who places their finger from that class will get present those who are not placed finger at that time will get absent. This is a portable device which can easily circulate in classroom. This device can also be used for event registrations where students who want to register for particular event that is going to be conducted in that institution. This can be easily achived by entering event registration ID number by the faculty at the end after students places their fingers. This event registration will be availbale in web server seperately.

4.1Flowchart

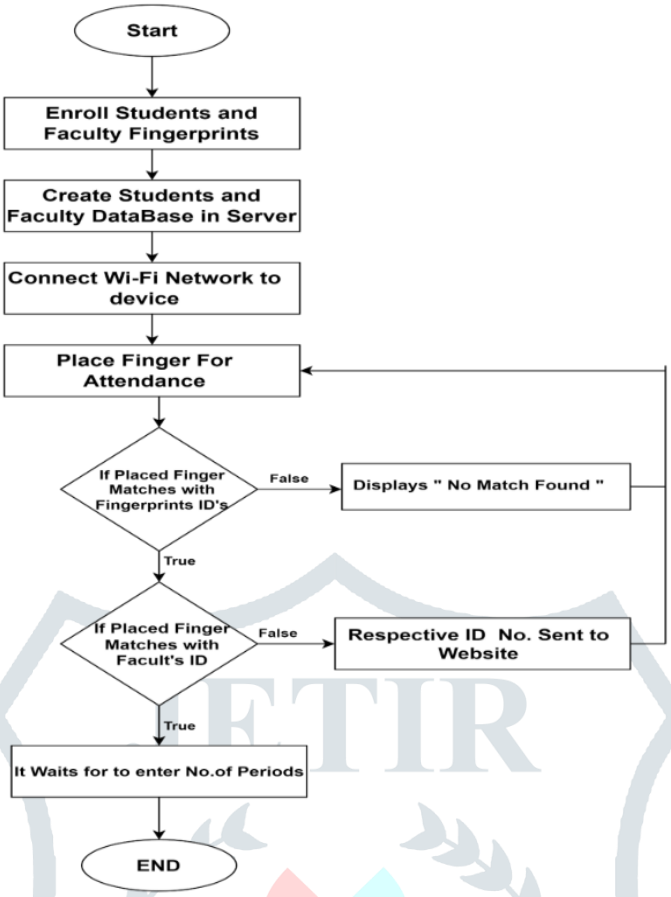

fig-2:- flowchart of proposed system

V. HARDWARE AND SOFTWARE REQUIREMENTS

For the implemention of this biometric attendance device , we used Raspeberry Pi 3 model B, R-307 Fingerprint Module, 4x3 keypad, 4 Push Button Switches.

5.1 Hardware Requirements

5.1.1 Raspberry Pi

Raspberry Pi is a mini computer. It is mainly used by the people who are involved in making projects. It has a separate website which works same as Google. We can see videos, search for anything, we can even implement our own code as it provides many platforms to do. If we want we can install required platforms too just by writing some commands. If we want we can install it in our own pc or can be monitored from some other websites like VNC Viewer, etc. It has many advantages as compared to others.

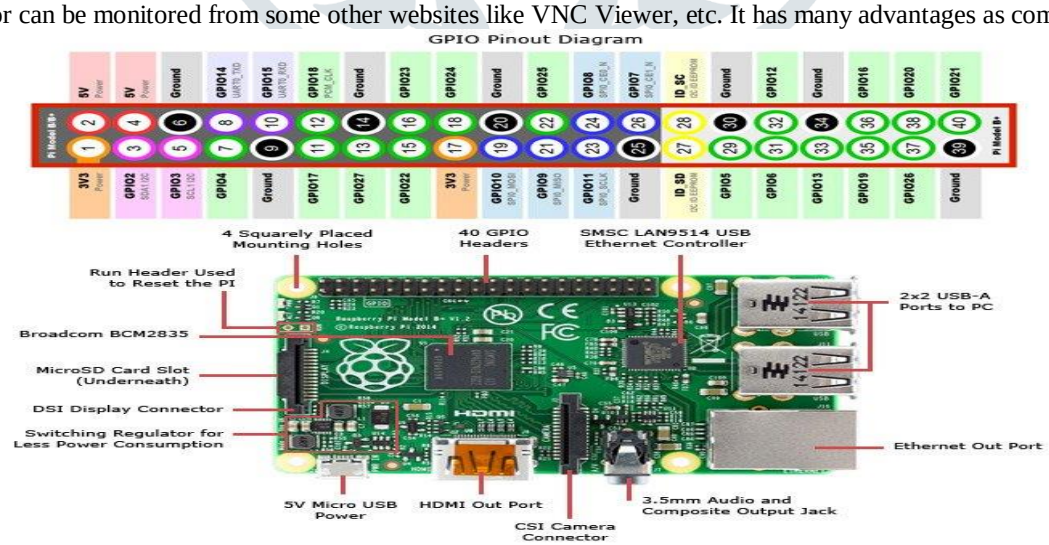

fig-3:- raspberry pi

5.1.2 Fingerprint Module

fig-4:- fingerprint sensor

The fingerprint module is used for different purposes like fingerprint enrolling, deleting, comparing and it also stores the data. It can work with different devices such as Pc, external devices, etc. It can enhance[9] the product into fingerprint authentication power. We can do many things through fingerprint sensor like it can enroll new fingerprints, can delete fingerprints, can create new templates, and can even compare the fingerprints. These all can be done only with this module no need of external memory or devices. It enhances our product into fingerprint authentication power.

5.1.3 Keypad

Most commonly used one is Matrix Keypad. It consists of set of push buttons or switches which are arranged in matrix format of rows and columns.

fig-5:- membrane keypad

A Membrane keypad is made of a thin, flexible membrane material. It has adhesive backing which helps us to attach it anywhere. When we push a button one of the row line shorts to one of the column lines, which helps in flow of current in respective row and column and hence sends the number which is pressed. It is an effortless thing which makes the process easier.

5.1.4 Push Button switches

fig-6:- push button

A Push Button is a type of switch which consists of a simple electric mechanism or air switch mechanism to turn something on or off. It connects the circuit together when pressed and disconnects when released. Same as a simple switch it allows current when pressed as a joint is formed and no current is passed when released. It can be used where a simple switch needs to us.

5.1.5 LCD

A LCD(Liquid crystal diode) is a module that is used to display alpha-numerics and characters. Mostly used LCD is 16x2 which displays 16 characters can be shown per line and 2 such lines exist. Each character is shown in 5x7 pixels in the LCD.

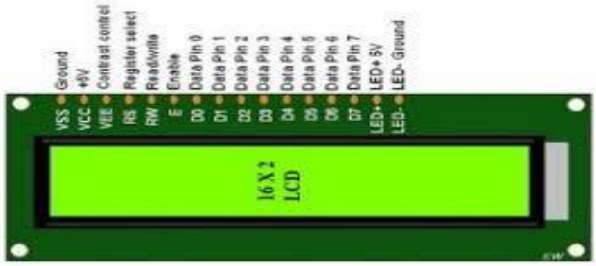

fig-7:- lcd display 16x2

5.2 SOFTWARE REQUIREMENTS

5.2.1 Noobs Installation

NOOBS has plenty of operating systems – the mostly used one is Raspbian .Using Noobs we can easily install Raspbian on our SD card. This SD card will be inserted in raspberry pi

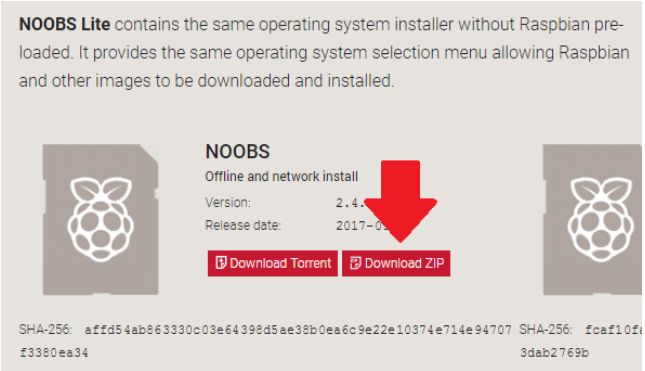

fig-8:- downloading noobs zip files

5.2.2 Advanced IP Scanner

It is a fast and free software for network scanning. It allow us to quickly detect all network computers and obtain access to them. Download IP scanner from the web and allow to install.

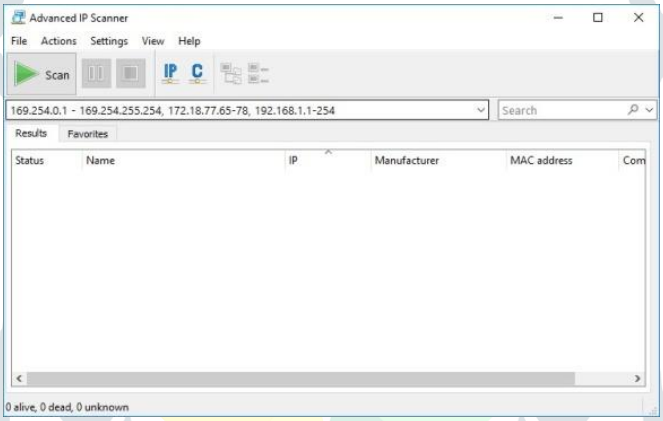

fig-9:- interface of advanced ip scanner

Here we can scan the IP addresses of computer networks shown in figure-9 and can be used to monitor them using apps. It is used to find the IP which will help to monitor our device in VNC viwer and some other apps too. Its just we need the respective device details as we need to enter the credetionals correctly. Then we can simply access the device and can monitor it easily.

5.2.3 VNC Viewer

Raspberry pi can be monitor in two ways one is by installing Raspberry in our PC and other one is from some other applications like VNC viewer. Download VNC viewer and install it. Obtain required IP address using IP scanner and paste it in the VNC and enter security credentials. Then you can obtain access to monitor the Raspberry pi shown in figure-10. It is a simple app that acts same as a PC. We can watch videos, use Internet and can run programs too. It has default platforms to perform coding.

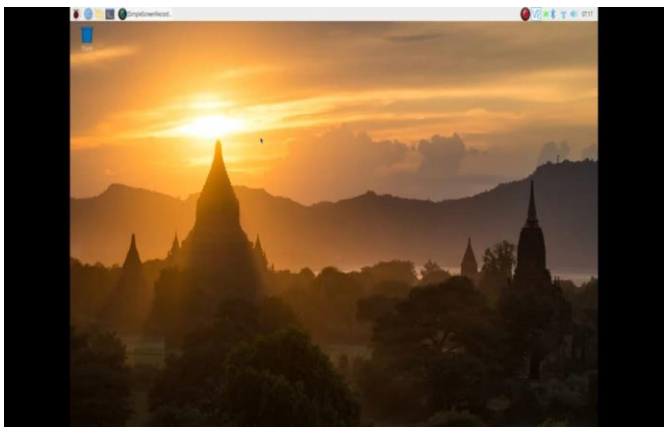

fig-10:- interfacing of VNC viewer

VI. IMPLEMENTATION DETAILS

The figure shown in 11 is the setup of the proposed device. In that raspberry pi is the main unit, keypad, push button switches, finger print module are the input devices and LCD is the output device.

fig-11:- implementation of proposed device

6.1 Circuit Diagram

The figure shown in 12 is the actual pin connections between Raspberry pi and all input and output devices such as finger print module, LCD, keypad and push button switches**.**

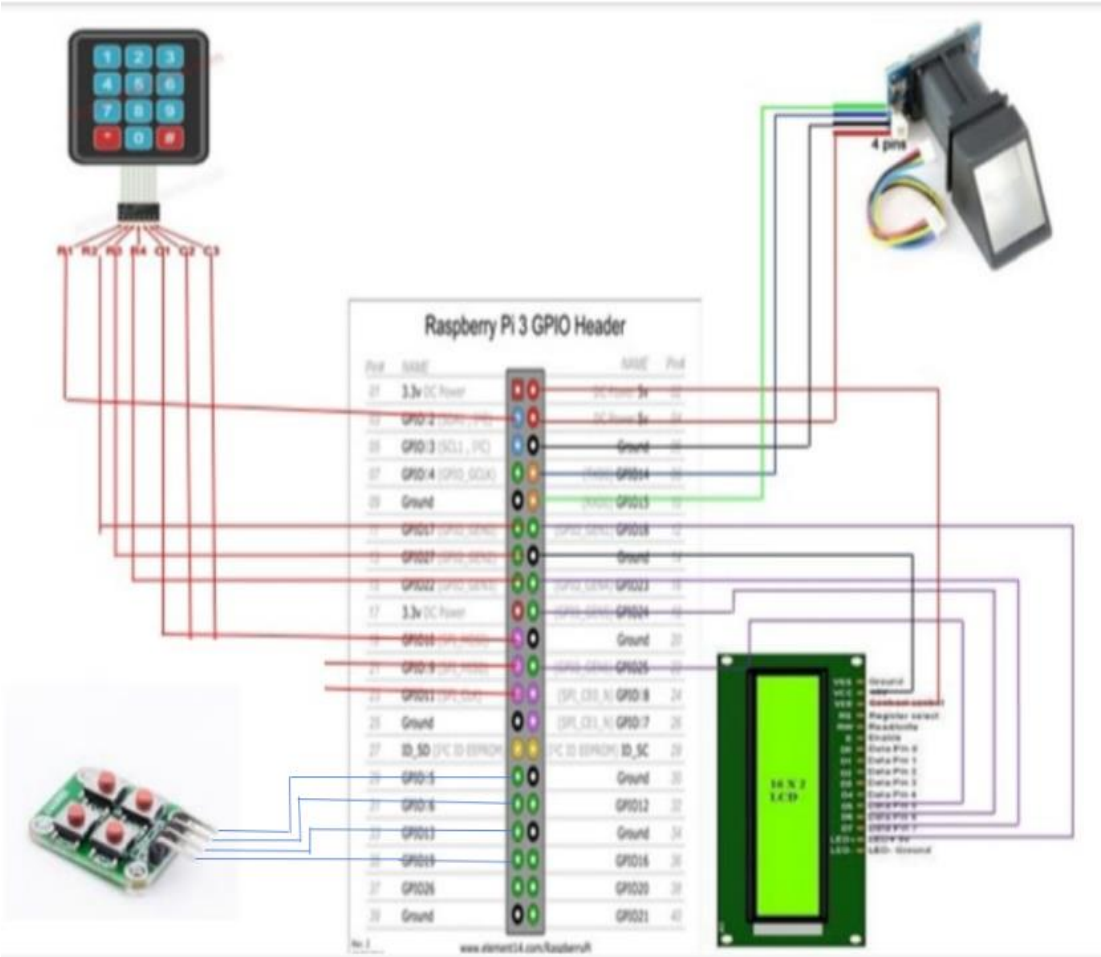

fig-12:- pin connection between raspberry pi & devices

VII. RESULTS AND DISCUSSION

Enrolled 3 faculty and 7 students fingerprints at first. And created facultyand student database shown in figure-16 in web server with their respective IDs. And created subjects too. Subjects,students and faculty that created can be seen in view option in website shown in figure-17. And taken 10 classes with 3 different facultiesthe overall attendance percentange of students for that 10 classes is shown in figure-14. We wantedly placed only some students out of 7 students in order to check the accuracy of the presenties and absenties. We can also monitor day wise reports that are shown in figure-15. And also event registration of students has been done the results shown in figure-13. We compared attendance data manually and the data that is stored in website . we got 99% accuracy for the implemented system

Attendance Mangement

Create Views Settings Reports

Events Data

Copy Excel CSV PDF Search:

Sl.No	Date & Time	Student Name	Class (Section)	Subject	Teacher
1	30 May, 2022 08:04 AM	Tharun	A	College Celebrations	Balaji
2	30 May, 2022 08:04 AM	Sreeram	A	College Celebrations	Balaji
3	30 May, 2022 08:04 AM	Saleema	A	College Celebrations	Balaji
4	30 May, 2022 08:04 AM	Madhurima	A	College Celebrations	Balaji
5	30 May, 2022 08:04 AM	Hari	A	College Celebrations	Balaji
6	30 May, 2022 08:04 AM	Sahithya	A	College Celebrations	Balaji
7	29 May, 2022 05:57 AM	Tharun	A	College Celebrations	Ravi Shekar
8	29 May, 2022 05:57 AM	Madhurima	A	College Celebrations	Ravi Shekar

Showing 1 to 8 of 8 entries Previous 1 Next

fig-13:- event report

Attendance Mangement

Create Views Settings Reports

Class Wise Report 30-05-2022 30-05-2022 Submit

Copy Excel CSV PDF Search:

Sl.No	Class	Total Classes	Present Classes	Absent Classes	Percentage
1	Tharun	10	10	0	100 %
2	Madhurima	10	9	1	90 %
3	Harsha	10	7	3	70 %
4	Sahithya	10	6	4	60 %
5	Saleema	10	8	2	80 %
6	Sreeram	10	4	6	40 %
7	Hari	10	5	5	50 %

Showing 1 to 7 of 7 entries Previous 1 Next

fig-14:- class wise reports

Attendance Mangement

Create Views Settings Reports

Reports Date/Month Wise 30-05-2022 30-05-2022 Submit

Copy Excel CSV PDF Search:

Sl.No	Date & Time	Student Name	Class (Section)	Subject	Teacher	Present/Absent
1	30 May, 2022 07:52 AM	Tharun	A	Telugu	Ravi Shekar	P
2	30 May, 2022 07:52 AM	Madhurima	A	Telugu	Ravi Shekar	P
3	30 May, 2022 07:52 AM	Harsha	A	Telugu	Ravi Shekar	P
4	30 May, 2022 07:52 AM	Sahithya	A	Telugu	Ravi Shekar	P
5	30 May, 2022 07:52 AM	Saleema	A	Telugu	Ravi Shekar	P
6	30 May, 2022 07:52 AM	Sreeram	A	Telugu	Ravi Shekar	A
7	30 May, 2022 07:52 AM	Hari	A	Telugu	Ravi Shekar	A
8	30 May, 2022 07:54 AM	Hari	A	English	Balaji	P

fig-15:- day wise report

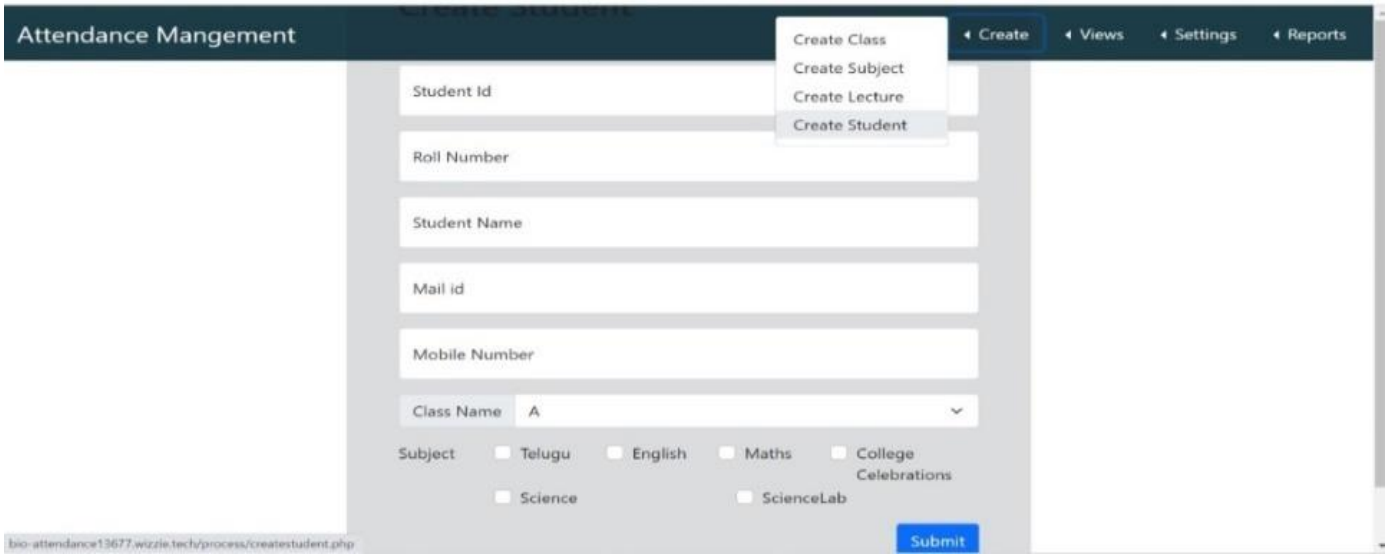

Fig-16:- creation of class/student/lecture/subject

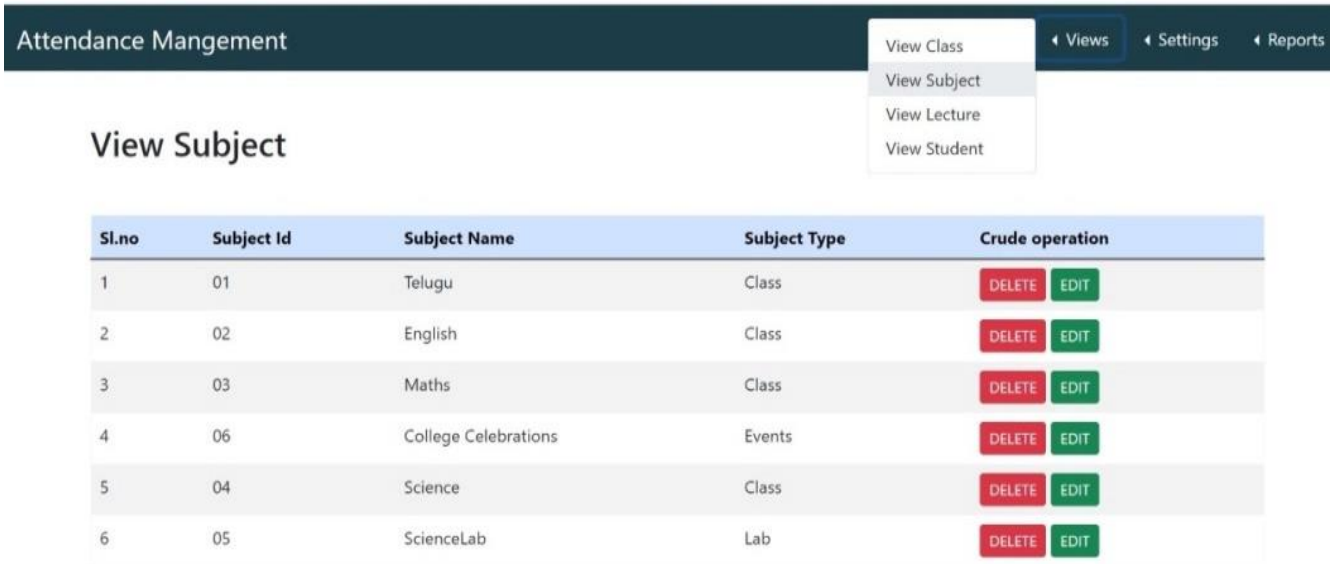

Fig-17:- view of lecture/student/class/subject

VIII. CONCLUSION

The proposed biometric attendance system will increase the reliability and accuracy. The problems that have been faced in manual attendance , in RFID swipe based systems and wall mounted biometric attendance system will be overcome with this proposed system. The proposed device is handheld and so compact to carry anywhere easily. This project satisfies all the requirements like collecting attendance using Biometrics with predefined structure followed by timetable or customized by authority. The results that have been shown in web server after 10 classes with 7 students are exact to the results that are taken from manual attendance which shows us the accuracy of the system is 99% for now.

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