

Design and Implementation of Smart Attendance System using Raspberry pi

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ABSTRACT

Numerous employees are announcing late on obligation and in this way, Attendance Management is a repetitive errand and a troublesome activity for a man to keep up its record. It is additionally imperative that on the off chance that we compute the loss of work because recently revealing it will be a colossal sum if various employees are more. Accordingly Attendance Monitoring System (AMS) encourages us to control work costs, limit consistence hazard, and enhance workforce profitability. It is likewise lessens the regulatory time related with attendance special cases and worker request. It is conceivable to keep up the record of extra minutes of representative and record of occasions moreover. In perspective of this, Attendance Management System is proposed utilizing Radio Frequency Identification (RFID) tag and finger print peruser. The framework takes attendance electronically with the assistance of the RFID and finger print gadget, and the recorded attendance is put away in a database. The algorithm and projects are creating utilizing python for the Raspberry Pi 2 Model B. Status of attendance can be seen on Graphical User Interface (GUI).GSM/GPRS module is actualized to send the back rubs to the parent's mobile occasionally.

Keywords : RFID Tag and Reader, Raspberry pi 2 Model B, Fingerprint Module, GSM.

I. INTRODUCTION

The Raspberry Pi is a progression of credit card-sized single-board PCs created in the United Kingdom by the Raspberry Pi Foundation with the plan to advance the educating of essential PCs. It likewise plays top notch video. This gadget does exclude an implicit hard circle or strong state drive, yet utilizes a SD card for booting and long haul stockpiling. The model depicted in this paper has the arrangement of tolerating contributions from a keen card peruser (EM-18 RFID peruser) or finger print module (R305). Data from RFID peruser and finger print module (R305) are serially transmitted to Raspberry Pi Model. On distinguishing proof of specific understudy, his attendance record is

refreshed in the database and he/she is told on the screen. Likewise a GSM module is utilized here to send the attendance points of interest as a message to the parent's telephone. The writing review identified with Attendance Management System (AMS) is as under. The attendance administration framework is intended for understudy yet it can likewise be actualized for representative.

II. RELATED WORK

Authors Tabassam Nawaz, SaimPervaiz, ArashKorrani, Azhar-Ud-Dinin(2009), suggested Fingerprint sensor was utilized to check the attendance, on distinguishing proof student's finger

record was refreshed in the database and it was advised through LCD screen. Pallavi Verma & Namit Gupta in October 2013 suggested that, a Fingerprint securing module was utilized for catching the finger print, GSM modem was utilized to send the attendance of the understudies to their folks as SMS. Karthik Vignesh E, Shanmuganathan S, A. Sumithra, S. Kishore and P. Karthikeyan in 2013 proposed that, a fingerprint obtaining module was utilized for catching the finger print, The nearness of every understudy will be refreshed in a database of Raspberry pi and the information will be passed to the server utilizing Wi-Fi and GSM modem send the attendance of the understudies to their folks as SMS. Chirag M. Shah, Vamil B. Sangoi and Raj M. Visharia An in October 2014 recommended that, RFID peruser or a biometric sensor was utilized to acknowledge the information, get to was conceded to the client and the logs were remotely transmitted to the PC utilizing a Wi-Fi module.

Ravishankar Yadav, Sumita Nainanin, February 2014, proposed the framework to screen student's attendance by utilizing RFID module, Notification will be sent to parents as SMS utilizing GSM modem. Moth Moth Myint Thein, Chaw Myat Nwe and Hla Myo Tun in JULY 2015 recommended, RFID & Finger Print Reader was utilized to records of the attendance and it was put away in a database.

III. SYSTEM DESIGN

The block diagram of proposed Microcontroller based Attendance Management System (AMS) is showed in Figure 1. The student's bio-information (Name, date, time, RFID card id no. also, finger id no.) are enlisted initially in the database of raspberry pi. At the point when an understudy goes into the class, this RFID peruser peruses his/her student's id no. what's more, his/her finger must be push on the finger print module.

Name, date, time of perusing is appeared on the PC screen. Whenever RFID and finger print peruser peruses RFID card id no. also, finger print id and on the off chance that it matches with the rundown of ids accessible in the database then the person's id, GSM module is utilized here to send the attendance points of interest as a message to the parent's cell phone. The AMS comprises of Raspberry Pi2, Model B, EM-18 RFID Reader, Fingerprint Module R305, GSM SIM-900, and Display System. The subtle elements of every module are clarified in the ensuing segments.

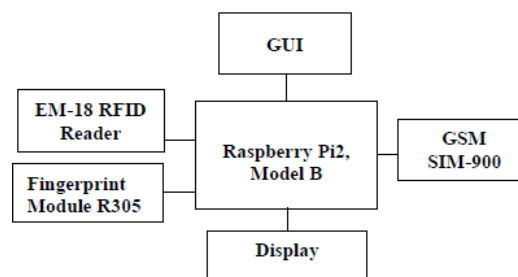


Figure 1. Attendance Management System

A. Raspberry Pi2, Model B

Technical Specifications:

- ✓ Broadcom BCM2836 Arm7 Quad Core Processor powered Single Board Computer running at 900MHz
- ✓ 1GB RAM
- ✓ 40pin extended GPIO
- ✓ 4 x USB 2 ports
- ✓ 4 pole Stereo output and Composite video port
- ✓ Full size High-Definition Multimedia Interface (HDMI)
- ✓ Camera Serial Interface (CSI) camera port for connecting the Raspberry Pi camera
- ✓ Display Serial Interface (DSI) display port for connecting the Raspberry Pi touch screen display
- ✓ Micro Secure Digital (SD) port for loading your operating system and storing data. It facilitates the increase of available memory via the insertion of a Micro SD card.
- ✓ Micro USB power source.

Raspberry Pi hardware has evolved through several versions that feature variations in memory capacity and peripheral-device support.

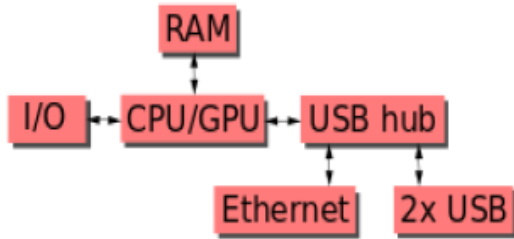


Figure 2. Block diagram of Raspberry Pi2, Model B

This block diagram Raspberry Pi2, Model B depicts the Ethernet and USB center point segments. The Ethernet connector is associated with an extra USB port as appeared in Figure 2. Raspberry Pi 2 display B was discharged in February 2015. The Raspberry Pi 2

Figure 3.

[http://www.cnxsoftware.com/wpcontent/transfers/2015/02/Raspberry_Pi_2_Model_B.jpg] conveys 6 times the handling limit of past models. The Raspberry Pi is a Linux based working framework condition with python as the fundamental programming dialect



Figure 3. Raspberry Pi 2, Model B

B. EM-18 RFID Reader Modules This is a low frequency (125 KHz) RFID peruser with serial yield with a scope of 8-12cm as appeared in Figure 4. It is a minimal unit with worked in reception apparatus and can be straightforwardly associated with the PC utilizing RS232 protocol.



Figure 4. EM-18 RFID Reader Modules

RFID Reader is a checking gadget that uses the receiving wire to understand the labels that are in its region. It transmits signals at specific frequencies. RFID perusers are more often than not ON, persistently transmitting radio vitality and anticipating any labels that enter their field of activity. EM 18 RFID peruser is the gadget fit for perusing and recovering data put away inside the RFID labels Specifications of RFID Module Operating Voltage: 5v Current: <50mA Read remove: 10cm Operating frequency: 125 kHz

C. RFID Tags RFID Tag is an IC chip that has special hexadecimal or electronic item code (EPC) contained in it. The arrangement is a numeric serial, which is put away in the RFID memory. The microchip is accessible inside RFID label which is appeared in underneath Figure 5. The microchip incorporates minute hardware and an installed silicon chip. Each tag can store a most extreme of 2KB of data in the microchips. The label memory can be perpetual or rewritable, which can be re-customized electronically by the per user numerous circumstances.

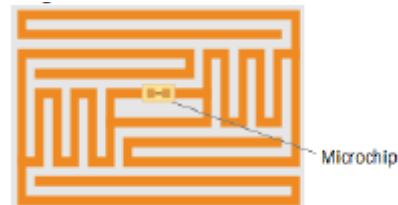


Figure 5. RFID tag

Features of different types of RFID Tags are shown in the following table1. The directional flow of the AMS is described in flow chart Figure 6.

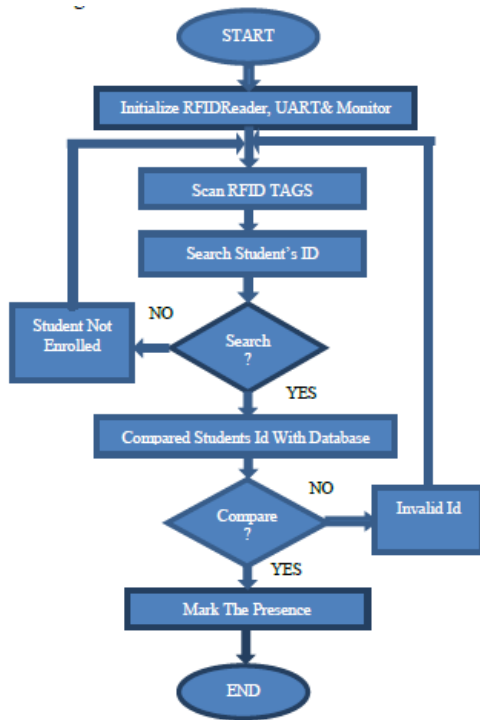


Figure 6. Directional flow of the system

The proposed framework has been clarified with the assistance of following advances.

- Step 1 Initialize RFID Reader
- Step 2 Initialize Monitor (PC screen)
- Step 3 Initialize UART (UniversalAsynchronous Receiver/Transmitter)
- Step 4 Scan RFID labels
- Step 5 Send examined of RFID information to Raspberry pi demonstrate
- Step 6 Using Raspberry pi modelperform the separating task to expel undesirable field andextract student's id
- Step 7 Search understudy labels id in lasting database with checked RFID student's labels.
- Step 7.1 Search student's id, if found go to step 8 else go to step 4.
- Step 8 Compare recognized student's tag, id"s, date and time with class time table and if coordinate discovered at that point go to step 9 else go to step 4.
- Step 9 Check individual write and stamp the nearness.
- Step 10 Repeat step 4 to step 9 for all column of RFID information.

D. Finger print Module R305 The finger print module as appeared in Figure 7 is utilized to filter the finger and after that it changes over it to picture and afterward a character record. There are 256 capacity memory spaces in the module. The information that is put away in the module is then given to the controller to be perused and perceived/coordinated in the database.



Figure 7. R305 module

A finger print sensor gadget alongside a screen is put at the passage of every classroom. The finger print sensor is utilized to catch the fingerprints of understudies while screen advises the understudy that his/her attendance has been stamped. The Flow outline of the framework is as appeared in Figure 8.

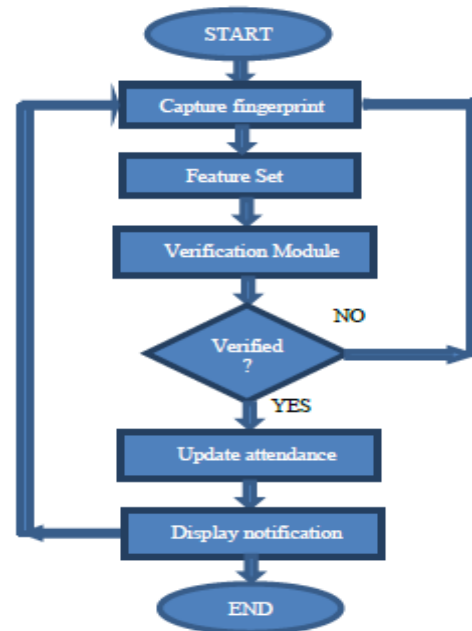


Figure 8. Flow chart of the system.

The proposed framework has been clarified with the assistance of following advances.

- Step 1: Capture the student'sfinger print test and make a list of capabilities. An arrangement of special

highlights made to coordinate finger print is called include set.

- Step 2: Retrieve the put away formats from the archive (database).
- Step 3: Perform a one-to-n examination between the finger print highlight set and the finger print formats put away in database, settle on a choice of match or non-coordinate.
- Step 4: If coordinate is discovered recover student's data (Registration number, Department, Subjects) from the database.
- Step 5: Obtain the planned address from the database and check attendance if understudy is inside the predefined time i.e. inside 30 minutes of the lecture's beginning time. On the off chance that confirmation isn't done or there is some mistake in enlistment of finger print, framework backpedals to its underlying state without denoting the attendance as appeared in Figure 8.

E. GSM Module SIM-900A GSM Module SIM-900A is as appeared in Figure 9. It has a variable baud rate with go from 9600 to 115200. Baud rate can be configurable utilizing AT charges. It works on 12V directed power supply. It has a SIM card space to embed SIM and an accepting receiving wire to get arrange signals. GSM Modem-RS232 is worked with Dual Band GSM motor SIM900A, deals with frequencies 900/1800 MHz.

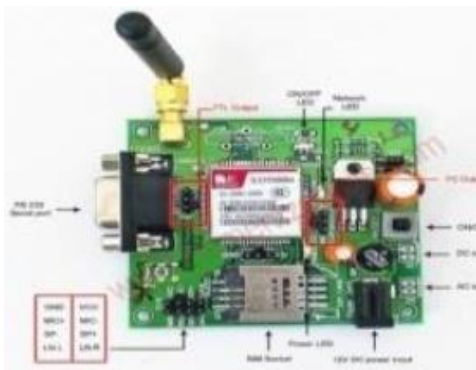


Figure 9. GSM module.

For AT summons:

- Use capital letters for AT charges.
- Send CR (Carriage return) and LF (Line feed) after the AT charge.

- Place the serial correspondence jumpers in the correct position.
- Use an outer power supply and place the power jumpers in the correct position.

IV. EXPERIMENTAL RESULT

The Microcontroller base attendance framework is configuration created and tried utilizing EM-18 RFID and R305 Finger Print Module. The GUI plan and the outcome are appeared in Figure 10 to 14.



Figure 10. Microcontroller base attendance system Model

The following dialog box in Figure 11. shows, the admin/teacher mode for entering in this system. Admin/Teacher needs to create own username and password to log in this system.

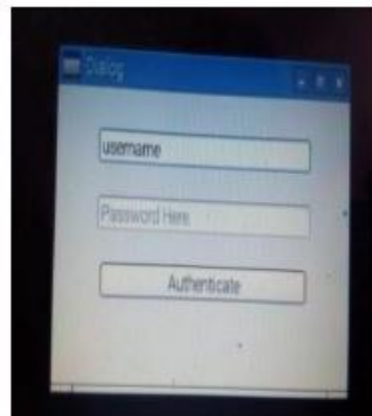


Figure 11. Login Screen for admin and teacher

Admin may enlist to each understudy with RFID card ID and finger ID. At this position, the client needs to squeeze finger on finger print module. These enlisted ID number spare in database appeared in Figure 12

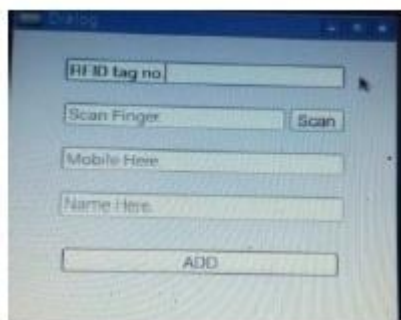


Figure 12. Student Card & Finger ID database

For attendance, understudy RFID card ID right off the bat read from RFID peruser. As indicated by their RFID card ID that has put away in database, framework will demonstrate understudy points of interest. At that point understudy must press his/her finger on finger print peruser. In the event that these RFID card ID and finger ID are substantial, understudy will get move require that day as appeared in Figure 13.

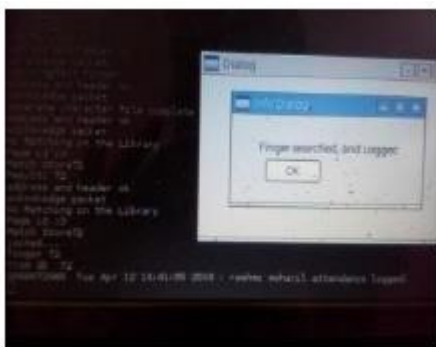


Figure 13. Student Roll Call

This framework takes the attendance of the understudy and sends this attendance to their parent's mobile through GSM. Figure 14. demonstrates the SMS got by the parents.

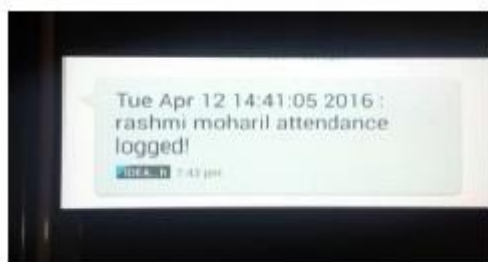


Figure 14. SMS received in parents mobile

V. CONCLUSION

The current traditional attendance system of taking attendance by calling names or marking on paper is exceptionally tedious and unreliable, consequently wasteful. Consequently, microcontroller based attendance observing framework is proposed. The framework is tried for a class of 50 understudies and it is watched that the exactness is 98%. The framework can be reached out to more number of understudies and more number of classes gave its database is produced. The framework to keep up the attendance as well as it can advise the status of attendance to worry by messages. The AMS is additionally equipped for to keep up the records of loss of work because recently detailing. The AMS controls work costs, limit consistence hazard, and enhance workforce efficiency. It can be closed from the above discourse that a dependable, secure, quick and an effective framework has been proposed by supplanting a manual and inconsistent framework busing Raspberry Pi Model with Radio Frequency Identification (RFID) or a fingerprint. GSM module is utilized here to send the attendance points of interest as a message to the person's telephone. The advantage of this framework is that it will spare time and diminish the measure of work of the organization. In future the work can be reached out with the Web camera that can naturally figure and keep up the attendance for understudies in a foundation utilizing a picture handling

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