PERIODIC MONITORING OF CLASSROOM ATTENDANCE

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Abstract

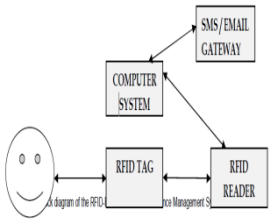
Today most of the institution faculties take attendance by calling names or passing the attendance sheet. Both the way have drawbacks, because every five or ten minutes will be wasted for both the professors and the students. For the large classroom it is very difficult to verify one by one. So we are going to implement the automatic periodic attendance. If a student enter into the class, the RFID reader reads the data from the RFID tag and compare with the predefined data .If it matches, mark as presence then the attendance count will be incremented by one on the LCD display and later the LCD displays the absentees roll number and notification send to their parents like your child is absent. If a student comes late to class, he will be mark as absence for the first period then automatically presence for the next period. From this, the student come their classroom in punctuality and maintains their attendance properly.

Keywords: RFID, Students attendance, tracking, tags, LCD display

1.INTRODUCTION

Now-a-days most of the institution professors take attendance by calling out names and register number or signing on the paper. Both the ways are time consuming process and insecurity also. Some students may tell her friend also present even though she is absent. Because it is very difficult to verify the student for the long classroom environment. RFID based periodic monitoring system gives solution to this problem. RFID tag were provided to all the students. RFID active tag is used. RFID reader reads the data from the RFID tag, If RFID active tag means the reader finds the tag around 10meter distance. RFID reader has micro controller, RF generator, RF receiver. RF generator generates the radio frequency waves emit the waves around the distance. If any RFID tag is around that area, RFID reader identifies the RFID tag and reads the data from the RFID tag. RF receiver receives the data from the RFID tag. The copper wire is inside the RFID tag, radio waves transmit data from the tag to the RFID reader. This paper presents a design of a periodic monitoring attendance system and sends messages to their parents like your child is absent. If a student comes late to class, this system automatically mark absence to that student and mark presence for the next period. From this every student maintain their strict attendance and punctuality. This system can be used in to take attendance for students in schools, colleges, universities and also workers in working places. The existing system is there is no periodic monitoring of attendance, it display only who are not present in their classes. In RFID based attendance system. It automatically takes attendance and send notification to their parents to know whether there is present or absent.

In Management system for student attendance, If the student enter the class it displays the present name and later it will display who are not present to their classes. If any student enter the classroom the RFID reader reads the data from the RFID tag and send it to the Rasperry pi3 it compare the data with the pre-defined data. If it matched with the predefined data, then Raspberry pi increments the attendance of the person by one . If it not matches, then shows invalid card in the LCD display.



This is the block diagram for RFID based attendance system.

The RFID tag has transponder, rectifier, controller and the memory. A transpondercould also be a wireless communications, monitoring, or control device that picks up and automatically responds to an incoming signal. The term may be acontraction of the words transmitter andresponder. Transponders can be either passive or active. Then give it to the rectifier, it generates power and give it to the controller.

2. COMPARISON OF EARLIER SYSTEM

The RFID based attendance management system with face recognitionwhich was used in schools, colleges and universities. If any student enters into the class, the RFID reader reads the data from the RFID tag. The RFID tag transmits the data through the radio waves to the RFID reader. This tag contains electronically stored information. This energy activates the chip and then transmits the signal back to the RFID reader. RFID tag have a storage chip, it stores the information like serial number, location, photo. There is no periodic monitoring of attendance, it display only present students and later it will display those who are not present in the class. If a students had their friend identity card, then mark their friend also present. So it is a high cumbrous way to taking attendance. The RFID based attendance system paper is, it automatically take attendance and send notification to their parents like your child is absent or your child is present at this time.

A. Barcode Attendance System

The scanner tag framework could be a typical type of time and gathering activity framework through that the intensity of estimating and following workers' time could be expanded to an incredible degree. With the mechanization through standardized tag innovation, the blunders recently made in the manual finance or attendances are disposed of. Accordingly, the framework gives significant levels of precision and unwavering quality in following of representative participation. What's more, the expenses related with the establishment of the framework are not all that much comparative with the expense of finance or participation mistakes. The execution of the standardized tag framework is simple. Each representative is given an identification/card in which there is a scanner tag. So as to look into or out of the organization, the identification/card is swapped on the time clock, and the information is caught by the clock. This information from the clock can be downloaded by the supervisor or the chairman and afterward utilized for refreshing and keeping up time and participation records. The All inclusive Item Code (UPC) is an exceptional 12-digit number appointed to retail stock that distinguishes an item and the seller. The General Item Code (UPC) on an item regularly seems neighboring its scanner tag; the machine-clear portrayal of the All inclusive Item Code (UPC) The UPC for a specific item is consistently the equivalent. The initial six digits is the merchant exceptional ID number. All the items that the merchant sells will have a similar initial six digits in their UPCs. The following five digits distinguish the item. The last digit is known as the check digit. This is utilized to confirm that the UPC for that particular item is right. Each time that UPC is perused, normally by a scanner perusing the standardized identification, a computation is finished. Furthermore, if the check digit is diverse analyzed from the one that is determined, at that point the PC realizes that there is a major issue with the UPC. Fig. shows pictorial graphof a barcode with its universal product code (UPC).

B. Biometric Attendance System

Biometric participation framework catches the extraordinary natural or physical highlights, for example, unique finger impression, voice, iris design. Biometric participation framework utilize the unique finger impression of the representative to confirm who is really sign in and log out of work every day. This framework filters the finger of the representative, arranges are resolved and afterward the framework contrasted and predefined information, in the event that it think about imprint as nearness in

any case missing. Our biometric time and participation framework improves security among the laborers as well as shields the workplace alongside ensuring an organization's important information. Additionally, our participation the executives framework renders made sure about access control and approval by following and keeping up the passages and ways out of each worker.

Fig:Pictorial diagram of Barcode

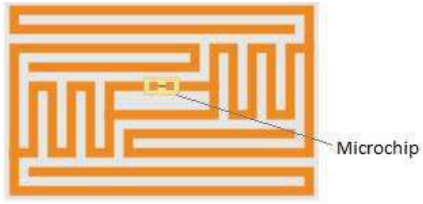


Fig: RFID tag

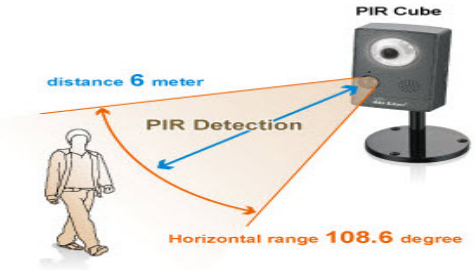
The limitation of the biometric attendance system is mentioned below

- As you can see the expense of biometric innovation equipment and programming is costly in itself and expenses for preparing, plan, upkeep, and security will likewise be brought about.
- The cost of biometric gadgets is similarly higher than other conventional security gadgets. The expenses of biometric programming, gadgets, software engineers, server and other relative gear joined is a lot of cash.
- Some biometric gadgets take more than the acknowledged time and a long line of laborers structure holding on to be taken a crack at enormous organizations. In these cases, individuals get hard time while checking the biometric gadget consistently. It is hard for an individual when he/she needs to experience a biometric check framework before going into school,office.

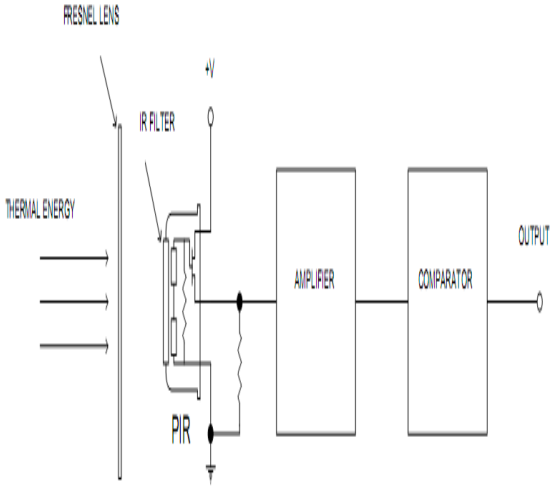
3. PROPOSED SYSTEM

A lot of time and focus has been placed in order to design a stable and reliable database so that a good performance can be guaranteed. Prior to implementing a database design the problem was considered and a solution to the system needs was applied and tested while creating an ERDscheme. The appropriate database schema is depicted below. It shows what will be necessary for the system in order to record all attendances of each student.

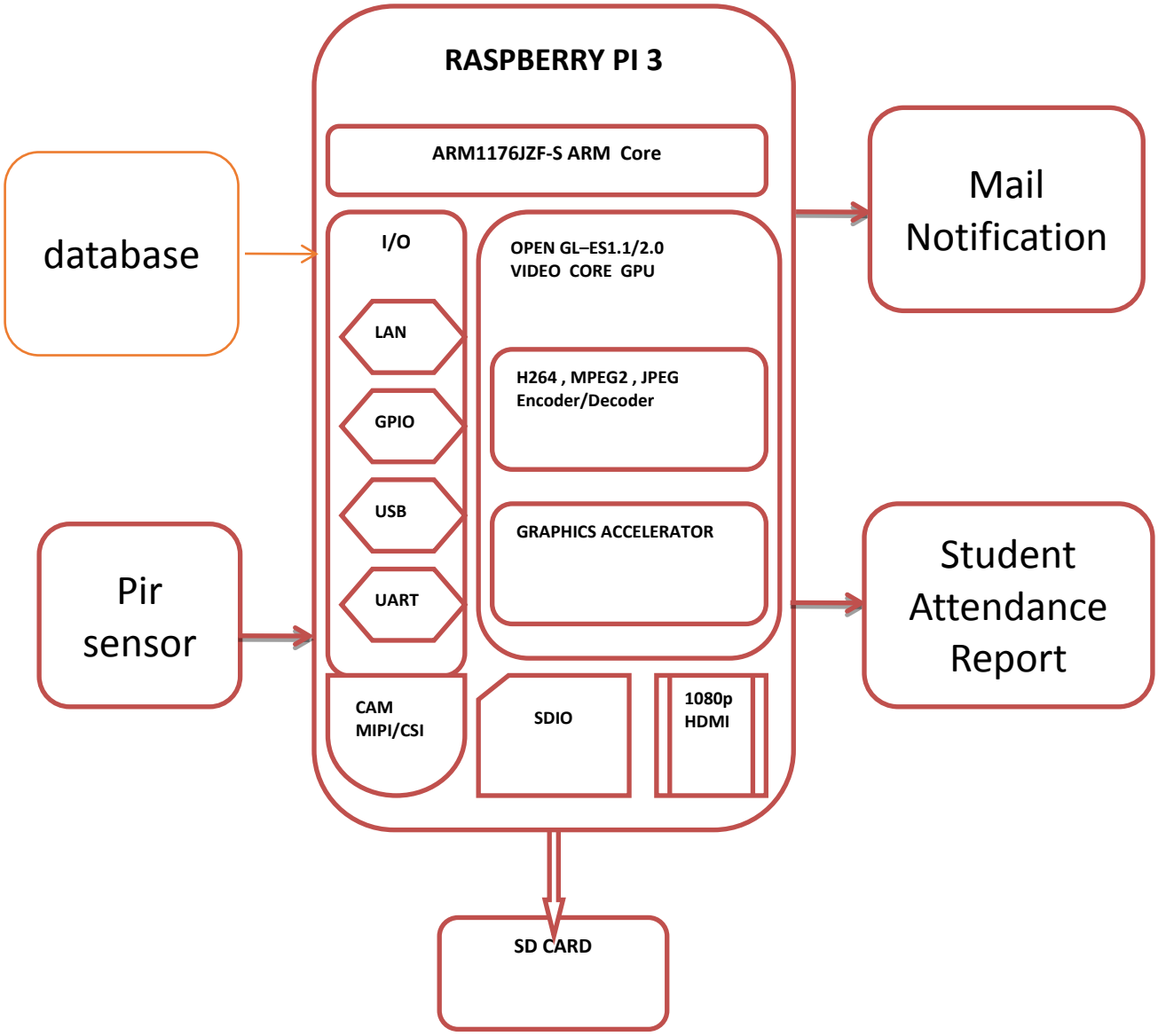
PIR sensor:



PIR sensor detects the human being moving around within approximately 10 meter from the sensor. Actual detection range is between 5m to 12m. It is made by pyro electric sensor which can detect the level of infrared radiation. PIR sensor has 3 pin connections at the side or bottom. One pin will be ground another will be signal and last will be power. Power is up to 5Volt. Sometimes bigger module doesn't have direct output and instead just operate a relay. When motion is detected output will be high.



HARDWARE ARCHITECTURE



1) Rasperry pi 3:

The Raspberry Pi is the computer with credit card size single board.It is the perfect tool for aspiring computer scientists because it is affordable and difficult to break.It has developed in the UK by the Raspberry Pi foundation in 2009, with the intention of promoting the study of basic computer science in schools and to develop interest among kids and adults.It uses a different processor. Broadcom chip used in Raspberry pi 3 and the Raspberry pi 2.The architecture of the BCM2837 is identical to the BCM2836. The only significant difference is the replacement of the ARMv7 quad core cluster with a quad-core ARM cortex A53 cluster But you can install several versions of the Linux operating system that look like Windows. If you want to, you can use the Raspberry Pi 3 to surf the internet, since it can able to connect with wireless fidelity

UART:

UART is the universal asynchronous receiver transmitter. The RFID reader reads the data from the RFID tag, the data is received by Raspberry pi3 through UART. Then Raspberry pi3 validates the

tag and shows the result on the LCD screen.

GPIO:

GPIO is the general purpose input output. It gives the way the Raspberry pi3 can control and monitor outside the raspberry pi3.

SDIO:

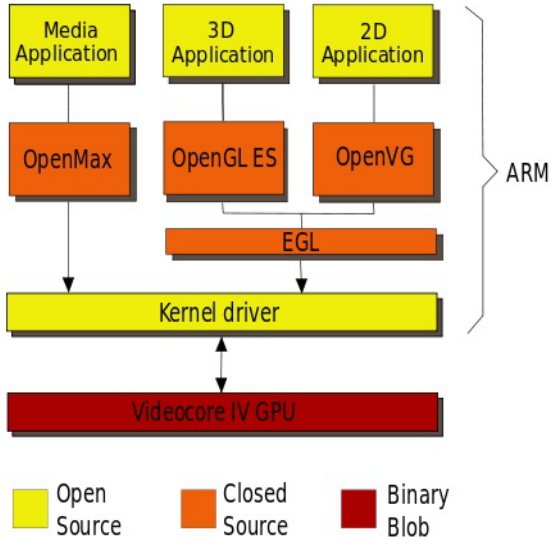
SDIO is the secure digital input output. It interchanges the data from the SD card to the Raspberry pi and Raspberry pi to SD card

HDMI:

HDMI is the high definition multimedia interface. It is a standard for connecting high definition video voice. It supports the connection between the device and a projector.

Graphical Accelerator:

Graphical accelerator is the micro electronic component to which a computer program can refresh the images to display monitor speed up the display of message. It boost the performance of the computer system. Graphical cards are usually connected via PCI bus. But the raspberry pi3 has no bus. So the graphical accelerator is in-built of the Raspberry pi3.



The above figure shows Raspberry pi 3 software architecture

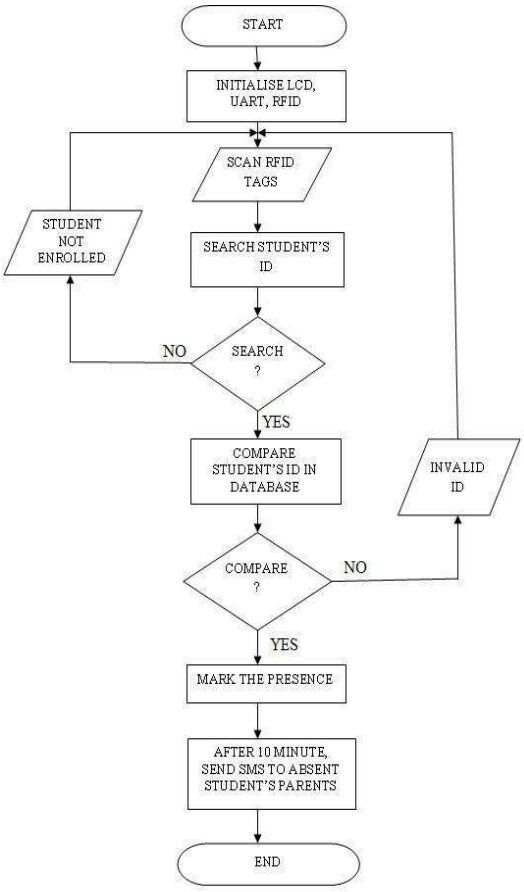
After successful log in, the lecturer will have the list of all students in a tabular mode, each accompanied by a flag indicating if the student is present or not. Initially all the flags are set to false (or visually "red") and when lecturer gives the system the signal that the class has started (shown in figure 4), it will start automatically reading the tags in the classroom and the students present in the class will have the flag changed to true (or visually "green") real- time so that the lecturer will have the picture of who is present in theclass. All read tags will be recorded in our database, and also the database will be updated each time the students' status will be changed. The moment a student gets out of the class, where the Reader cannot read him/her anymore, the flag will automatically change to false indicating that student is not present in the class (for example during thebreak).Finally at the end of the class, all the data will be stored in the database which holds the attendance history. Lecturer as well as the administrator of the system will have the opportunity to access the "attendance history" page where they can see attendance statistics for each student and send via email student's attendance history for that particularcourse. Additionally the system will alert the lecturer for students who are near the limit of their maximum absence allowance so that he/she can be notified in advance.

Start Class End Class

STUDENT	ABSENT
SHKELQIM	Present
JETON	Present
KRENARE	Present
IVA	Present
IVO	Present
MITKO	Present
DRAGAN	Present
DIMITRIS	Present
GIANNIS	Present
THEONAS	Absent

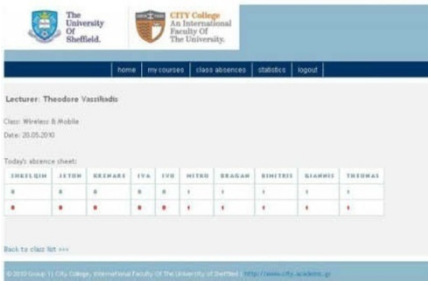
Once the students will enter the classroom the lecturer can press the 'start attendances' button and leave the application check the students' tags automatically (see figure 5) where lecturer can view the attendance in a real-time application interface.

SOFTWARE ARCHITECTURE:



Step 1-Initialise RFID Reader
Step 2-Initialise LCD
Step 3-Initialise UART
Step 4-Scan RFID tags
Step 5-Send scanned of RFID data to Raspberry pi3
Step6-Using Raspberry pi3 performs the filtering operation to remove unwanted field and extract student's id.
Step 7-Search student tags id in permanent database with scanned with RFID reader student's tags.
Step7.1-Search student's id, if found go to step 8 else go to step 4.
Step8-Compare detected students tag, identity card , date and time with class time table and if match found then go to step 9 else go to step 4.
Step9- Check person type and mark the presence
Step10- Repeat step 4 to step 9 for all students in database.
Step 11- Student enters after start time of the class. Mark as absent otherwise mark as present.

At the end of class the system will provide a detailed attendance history description for each student (shown in the figure 6). Every line in the table presents the attendance status of the students in each class. After the whole module finishes, the absence will be summed up and displayed in the lastrow. To make it more readable, the results on the last row representing the total of absences will be shown in red color. All this data can be sent by the administrator (when necessary) in form of a report via e-mail to each student as confirmation for their attendance and of course as a grouped list to administration and professor later on.



Reading tag Process

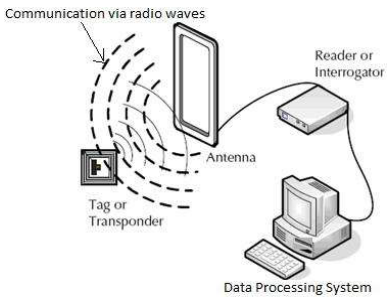
4.TESTING THE PROTOTYPE

Testing in a simulated environment

Before starting with live testing in a real environment, the system was tested in simulated world environment. While testing in this environment we have encountered several issues which were quite challenging tomeet.We also depict a virtual environment where we have presented the antennas, reader and tags which were embedded to all students. The students are tagged with virtual RFID tags , each of them with its own unique IDnumber.

Testing in a lab environment and performance measurements

During the measurements conducted previously in the classroom or lab environment, the outcome suggested usage of one RFID reader in order to cover the whole classroom. In



To overcome the limitation using passive RFID reader, tag. It can be able to read only up to 10cm. so each and every student need to wait for reading of tag then only present count will increase. In order to avoid time consumption for reading students id we have been introduced active RFID. one meter away from the class entrance door overlooking the balcony, both of them will be mounted in a the same line where the first antenna will be in the left side and the other one in the right side in a way that they can cover the whole classroom. Instead of covering also the front of students that will be sitting down in the first chairs we will position the external antenna slantwise whereas the integrated antenna will be positioned straight forward so we can cover also the last students that will be sitting down in the last chairs.

When carrying out the measurements, the above mentioned positioning proved to be successfully since they cover the whole class members inside the classroom without interfering with other students that could be outside the classroom, no matter if they were in balcony or in corridor. Although, there is an issue regarding what kind of tags are being used, if there will be used durable tags or label tags cause durable tags can be reached no matter if the tags are in our pocket, bags or standing on the top of study table whereas the label tags we are obliged to put them on the top of our table while sitting down cause if the students are standing up, it may interfere the reader while reading students tags. The problem regarding what kind of tags we are going to use is related to price.

5. CONCLUSIONS AND FUTURE WORK

Nowadays it is becoming harder and harder to keep the good mood of the students classes attendance, since the motivation of every generation decreases distinctly. Instead of losing first 10 or more minutes at the beginning of each class for taking the attendance manually we have design a good application system using RFID technology that take care for student attendance in no time atall.

Many Lecturers for motivating the students' attendance, they give extra credit for attending the classes, they limit the hours of absence etc. So, counting students' absence, teachers lose couple of minutes of their classes to fill in the attendance sheet manually by calling the students for signing the documents and the worst just come after classes where there should be spent extra time for inserting the attendance data in a computer to generate the statistics.

To overcome all this trouble with time consuming, this paper has presented a good solution web application Periodic monitoring of classroom attendance. From this we maintain the punctuality and strict attendance will be maintained.

In the next future there can be also other improvements to the system where the system can send announcement via Bluetooth so the student will know immediately that her/his attendance has been recorded successfully. The same issue can be implemented using SMS-s to the students but the last one could be a problem of cost and also each student should provide their phone number so we can save in our student table details.

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