

## **AUTOMATED ATTENDANCE MONITORING SYSTEM USING RFID TECHNOLOGY**

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*Abstract— The paper gives an idea about a portable attendance system which will be designed and implemented using Raspberry Pi for the management of attendance mainly in educational institutes. The main purpose is to develop a safe and secure web based attendance monitoring system using Radio Frequency Identification (RFID) Technology based on multitier architecture, for both computers and smartphones. This system can maintain attendance records and can also detect the current location of the students anywhere within the domain of institution campus. This gives an idea of the student's consistency in attendance throughout the semester. An automated SMS service is facilitated in the system, which sends SMS automatically to the parents in order to notify that their ward has successfully reached the college.*

*Keywords—Radio Frequency Identification Technology, Raspberry Pi, Automated system, Information system.*

### **I. INTRODUCTION**

A micro-chip in a label used to transmit data when the label is exposed to radio waves. RFID Technology was invented and used from early 1940's but commercial operation begun from 1960's. Radio Frequency and Identification is a technology that uses radio-frequency waves to transfer data between a reader and a movable item to identify, categorize and to track. RFID is speed, reliable and does not require physical sight or contact between reader and the tagged item. Attendance of students has become an important evaluation aspect in the current educational system in both colleges and schools. The traditional attendance monitoring system has several disadvantages. For example, passing the daily attendance sheet to a huge number of students in a class is very problematic and it hampers the attention of the students in the class[1]. While analyzing the attendance, the teacher has to work-out a lot of calculations, which is pretty gruesome and time consuming.

As an alternative to the traditional system, we propose a system which records the attendance of students without any human interventions, Biometrics. The registered users need to flash their RFID tag embedded identity card in front of the RFID reader to confirm their originality. It consists of terminal units and central unit. Each terminal unit consists of Raspberry Pi, screen GUI, RFID, transponder card with each user(student) and GSM board. The Central unit consists of Arduino, GSM board and a computer. Each unit has a special program to achieve its purpose. The terminal unit is responsible of making a connection with the transponder card to bring its id's and make a comparison with the names and RN listed in the database of SQL server to get the names of the absent students and send their serial nos. by using GSM message [3]. The CoAP is a specialized internet application protocol for constrained devices, as defined in RFC7252 is used here to communicate with RFID reader and server. This system is a low cost and is given a one unit per course teacher authentication. Reading out the names of each student, each hour will destroy the precious time. This system will reduce the manual effort of teacher and the presence of student in class is course wise.

## II. RADIO FREQUENCY IDENTIFICATION (RFID)TEHCNOLLOGY

A wireless technology of communication of electromagnetic waves between the RFID reader and the RFID tag in order to automatically collect the stored information, uniquely identify and trace the RFID tag is known as Radio Frequency Identification Technology. There are three types of RFID tags- active, passive and semi-passive. The main difference between these tags is that active and semi-passive tags require an internal battery to work but the passive tags do not. Passive tags acquire the required power from the RFID reader. In the proposed system we have used passive RFID tags only. Each and every RFID tag has unique ID stored in it. Different frequencies of RFID readers available are shown in the table 2.1. In our prototype we have used a high frequency RFID reader with frequency range from 3 MHz to 30 MHz, as shown in the figure 2.1.

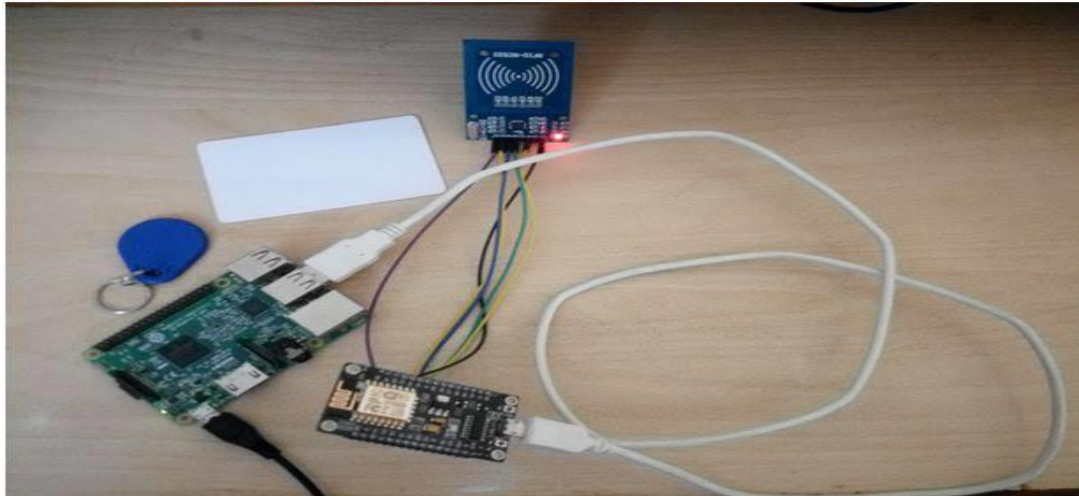


Figure 2.1 RFID reader and tags

In order to communicate, it is not necessary to have a line of sight. The RFID readers can easily read the RFID tags from a significant distance. The readers are capable of reading multiple tags at a time. As the RFID tags are enclosed in hard casing, it is difficult to tamper them. If a card holder loses his card, he can easily track it online and trace it back to its location.

	RANGE	FREQUENCY USED
Low Frequency	3KHz-300KHz	125KHz
High Frequency	3MHz-30MHz	13.56MHz
Very High Frequency	30MHz-300MHz	Not used in RFID
Ultra High Frequency	300MHz-1GHz	866MHz 915MHz

Table 2.1 Different types of available RFID readers

### **III. COMPONENTS OF OUTERNET**

The Outernet project have its own needs to work adequately. The main areas of the components include:

- Raspberry Pi 3 Model B
- WIFI-Module

#### *A. Raspberry pi 3 Model B*

The Raspberry Pi is a low cost and credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is capable of little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python, which has on-board Wi-Fi / Bluetooth support and an 64bit improved Processor, Raspberry Pi v3.

#### *B. WIFI-Module*

The Raspberry Pi can be used as a wireless access point, running in a standalone network. This can be done using the inbuilt wireless features of the Raspberry Pi 3 or Raspberry Pi Zero W, or by using a suitable USB wireless dongle that supports access points[2]. One common use of the Raspberry Pi as an access point is to provide wireless connections to a wired Ethernet connection, so that anyone logged into the access point can access the internet, providing of course that the wired Ethernet on the Pi can connect to the internet via some sort of router.

### **IV. PROPOSED SYSTEM**

The offline server is used to track the attendance of the college students. The system works by reading the RFID tag from the students and logs the same with timestamp to a local server. All the communications are planned to carry out using WLAN. By implementing, the real time attendance of the students can be tracked. By creating a broadcast, that is, one to many system, it can provide geography coverage. The main motive of the outernet, is to provide free access to the media archive, through outernet inside the college campus and rural areas without having internet access. This system is designed based on the IoT technology which has a tremendous development in many fields, which helpful in rural areas. Outernet will provide ample of information. Broadcast information at free of cost [2].

**V. SYSTEM ARCHITECTURE**

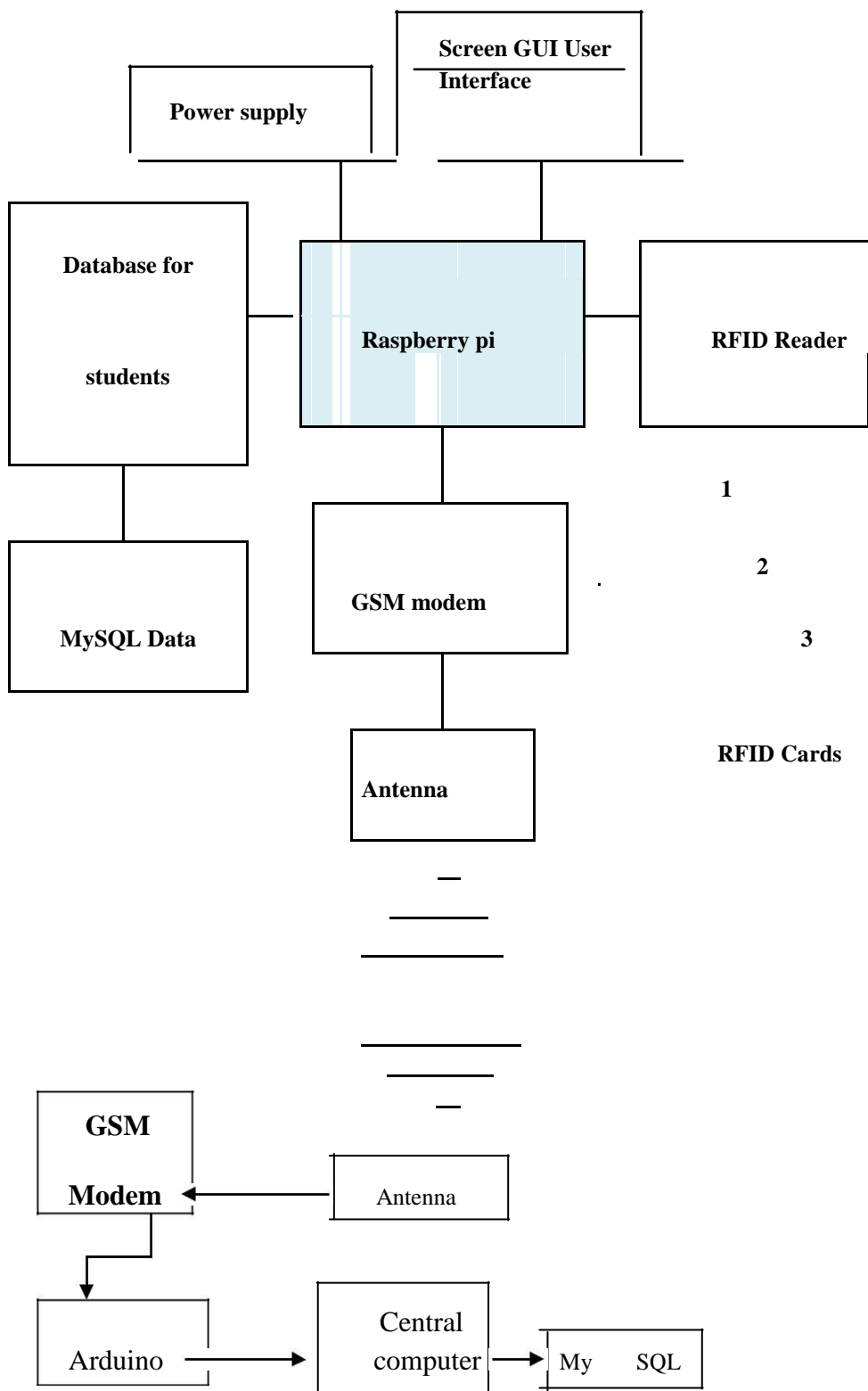


Figure 5.1 System block diagram.

## VI. CONCLUSION

This is one of the precise system can be used as proper fully automated attendance system in educational institutes. Fingerprint scanner used in this system returns exact Id of matched fingerprint and raspberry pi which is core of this system write that Id in MySQL database with respective position. And as this system requires teacher's authentication to start the taking attendance of student's. Moodle server is very useful for getting a log of all candidates for generation of different reports. As this system needs teacher's authentication that restricts the students to bunk the class. This is a fully automated system with low cost and works very precisely with very less human intervention. As it's a movable device, so it reduces a time of teacher and made whole system portable, less time consuming and easy to use. Recording the attendance of the students, teachers and other institutional staff is a very hectic job in a college environment. In the proposed work a system is developed where a traditional local offline database attached with Raspberry Pi module which performs operation through web services. A student can be tracked easily if he/she is present in institutional campus.

## VII. REFERENCES

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