# Web-Server based Student Attendance System using RFIDTechnology

Abdul Aziz Mohammed[#1], Jyothi Kameswari U[#2]
*1. Research Scholar, ECM Department, K L University, A.P., India*
*2. Assistant Professor, ECM Department, K L University, A.P., India*

***Abstract:-*Most educational institutions' administrators are concerned about student irregular attendance. Truancies can affect student overall academic performance. The conventional method of taking attendance by calling names or signing on paper is very time consuming and insecure, hence inefficient. Therefore, computer based student attendance management system is required to assist the faculty and the lecturer for this time-provide much convenient method to take attendance, but some prerequisites has to be done before start using the program. Although the use of RFID systems in educational institutions is not new, it is intended to show how the use of it came to solve daily problems in our university. The system has been built using the web-based applications such as ASP.NET and IIS server to cater the recording and reporting of the students' attendances The system can be easily accessed by the lecturers via the web and most importantly, the reports can be generated in real-time processing, thus, providing valuable information about the students'.**

***Keywords:*** **RFID, Students attendance, Web Server.**

## I. INTRODUCTION

Now-a-days, there are lots of colleges and Universities around the world and some of them consist of students up to thousands or more. To handle a large number of students may be a problem especially to get the attendance of the students. The manual process is that whenever a lecturer comes to class, he came with a register and manually take attendance by calling roll-numbers. This manual process has some flaws because in a case where students can cheat by saying attendance of their friends, the another problem is that the lecturer had to take care of the register and enter the attendance into the log (or) data-base, calculate the attendance percentage. This would be a big problem in the colleges and Universities.

The suitable solution for this problem is by designing a system that will record attendance automatically. In this project, RFID system is used to record the numbers of students attendance automatically. The ID cards of the students is embedded with RFID tag which is read by a reader. This RFID system is interfaced to a database through a computer or some electronic circuits. This method is more effective to prevent problem encountered when getting attendance manually. The components that the RFID technology consists are RFID Reader and RFID Tag.

## II. SYSTEM OVERVIEW

**T**he proposed system a generic application design to automate and enhance the manual work of recording and reporting in real-time, the Time and Attendance System in Educational institutes. A Log is maintained in the Database, which contains timely information of the Tag's Enter/ Exit. From the log maintained, total Stay- In time of the Student in the class is calculated, if the time is equal to required time (criterion fixed by the University Administration), he/ she is marked "Present" else marked "Absent" in the Database[1]. In addition to this attendance, 'Faculty Attendance' is also marked in the Database. The Unauthorized/ Unregistered entry of Student/ Faculty/ Administrator is also checked.

Student's Attendance weight-age is also calculated in order to confirm their eligibility to sit in exam. The whole data compiled after marking Attendance can be used to deduce different information i.e. depicting behaviours of Students etc from the Records and also reducing the burden of taking attendance , maintaining them and making a report on it by our lecturer's[1].

## III. SYSTEM DESIGN

The web-based student attendance system using Radio Frequency Identification (RFID) technology promotes semi-automated recording of student attendance, developed especially for the university. In drawing the system design, a number of web-based methods and works have been seen and referred.

Our proposed system consists of three main modules namely the RFID reader module, Controller module and Web server module. Those modules are integrated together in order to allow its full functionality. Each module carries its own functions and special features. The general process flow is illustrated in Figure 1, where all of these components are involved and operational.

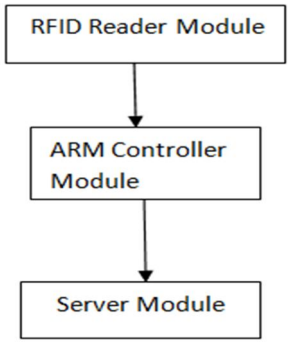


Fig. 1 Modules representation of the system.

### A. *RFID Reader and Tag*

*1) RFID Tag:* The tag, also known as the transponder (derived from the terms transmitter and responder),

holds the data that is transmitted to the reader when the tag is interrogated by the reader. The most common tags today consist of an Integrated Circuit with memory, essentially a microprocessor chip. Other tags are chipless and have no onboard Integrated circuit. Chipless tags are more effective in applications where simpler range of functions is all that is required; although they can help achieve more accuracy and better detection range, at potentially lower cost than their Integrated Circuit-based counterparts [2]. From here on out, we will use the term tag to mean Integrated Circuit-based tag. We will refer to chipless tags explicitly, when needed. RFID tags come in two general varieties which are passive and active tag [4]. Passive tags require no internal power source, thus being pure passive devices (they are only active when a reader is nearby to power them), whereas active tags require a power source, usually a small battery. When an RFID tag passes through the field of the scanning antenna, it detects the activation signal from the antenna. That "wakes up" the RFID chip, and it transmits the information on its microchip to be picked up by the scanning antenna.

2) *RFID Reader:* The RFID reader sends a pulse of radio energy to the tag and listens for the tag's response. The tag detects this energy and sends back a response that contains the tag's serial number and possibly other information as well. In simple RFID systems, the reader's pulse of energy functioned as an on-off switch; in more sophisticated systems, the reader's RF signal can contain commands to the tag, instructions to read or write memory that the tag contains, and even passwords [2]. RFID readers are usually on, continually transmitting radio energy and awaiting any tags that enter their field of operation. However, for some applications, this is unnecessary and could be undesirable in battery-powered devices that need to conserve energy. Thus, it is possible to configure an RFID reader so that it sends the radio pulse only in response to an external event. For example, most electronic toll collection systems have the reader constantly powered up so that every passing car will be recorded. On the other hand, RFID scanners used in veterinarian's offices are frequently equipped with triggers and power up the only when the trigger is pulled. Like the tag themselves, RFID readers come in many size. The largest readers might consist of a desktop personal computer with a special card through shielded cable [5].Such A reader would typically have a network connection as well so that it could report tags that it reads to other computers. The smallest readers are the size of a postage stamp and are designed to be embedded in mobile telephones.

B. *ARM Controller Module*

The Arm controller here i am using is the ARM-7(LPC 2148), in which i am using the two serial ports for to transfer the data from reader and Server (Implemented in a PC). Controller is used for a special purpose that is it receives the tags data from a reader and LCD displays are connected to it for to increment the counter values of the IR Sensor and for the Reader module correspondingly.

C. *Web Server Module*

1) *Web Server:* The web server here refers to either hardware (computer) or software (application) that helps to deliver content publicly accessible through the Internet. It provides the web site functionality by accepting requests from the user's browser and responds by sending back HTML documents (Web pages) and files [1]. To enable the system dynamic functionalities, the web server hosts the data collector component, a database and the graphical user interface (GUI) pages enabling online interaction with the system users.

2) *Database:* A database is defined as an organized collection of data and tailored to our system, our database is employed to mainly store the data captured by the RFID reader. Secondarily the database is also used to store data gathered from the online web-interface, such as class schedule and students personal information [7]. In offering more features to the users, our online system can manipulate the recorded student attendance record by querying the database for complex data retrieval. This includes automated operation, such as summarizing an individual student attendance by calculating the attendance percentage for a particular course.

D. *Graphical User Interface (GUI)*

The GUI component of the system is purposely developed for friendly interaction with the users. Both types of users, namely the students and academic staffs are given unique access to their individual member area, where the students can access their personal information, while the academic staffs can monitor their students information. The developed GUI is in the form of dynamic web pages, which are database driven [6]. This signifies that the information displayed on the web pages are constructed based on the data extracted from the database.

The web pages are categorized into four modules, namely the User List, Log, Timetable and Attendance. The pages are developed using the Hypertext Preprocessor (PHP) scripting language and compatible with all major web browsers [1].

## IV. SYSTEM IMPLEMENTATION

Based on the system design presented earlier, the system implementation was carried out. First of all we need to implement the IR sensor at the entrance, which will reduce some draw backs in the system and helps our system to be efficient [4]. The IR sensor is connected to the door and will sends the signal levels to the controller where we need to increment or decrement the counter value for the IR sensor. Which will be displayed on an LCD.

### A. *RFID System Device*

The system employs RFID terminals as the readers, which can be installed across all class rooms. Each reader is connected to a controller if we want to implement for the whole university we need to connect the GSM/GPRS module to the controller. Through this web-server, will be implemented and a web-application will be provided for accessing the data (or) for checking.

### B. *Controller*

The system uses a controller where the data from the reader is received by the controller and corresponding incrementation/decrementation of the IR sensor count value and RFID reader count value will be displayed on an LCD. Here LPC-2148 controller is used for this purpose. The corresponding programming will be written in embedded 'C'.
The data from the reader to controller will be communicated serially through serial port communication for that purpose MAX-232 and RS-232 are used.
The read data is passed to Server which is implemented in a PC from the controller by using MAX-232 and RS-232 serially.

### C. *Web Development*

The server is implemented in a PC. There are three stages for to implement this one. First one is to receive the data from the controller [3]. The second one is to store the data, taking attendance and updating it. The third one is to develop a web-application for to checking purpose or for editing which is given control only for a lecturer.

### D. *Windows Application*

The windows application is developed for to take the data from the controller while a person flashes their card at the reader. For this purpose we are using C# language and SQL server for the designing and data storage purpose.

### E. *Data Base Server*

The data for the attended students will be taken and stored based on the lecturer's presence only so whenever a lecturer came into the class when their card is flashed at the reader the student's attendance will be taken and stored in a server which is implemented by using SQL server and management studios.

### F. *Web-Application*

After all the above work done, if a lecturer or a student want to check the attendance, we need to develope a web application in a graphical user interface mode. Through this the details will b checked and the lecturer has the rights to modify the data also [5]. This will be implemented by using ASP.Net, C# and SQL server.

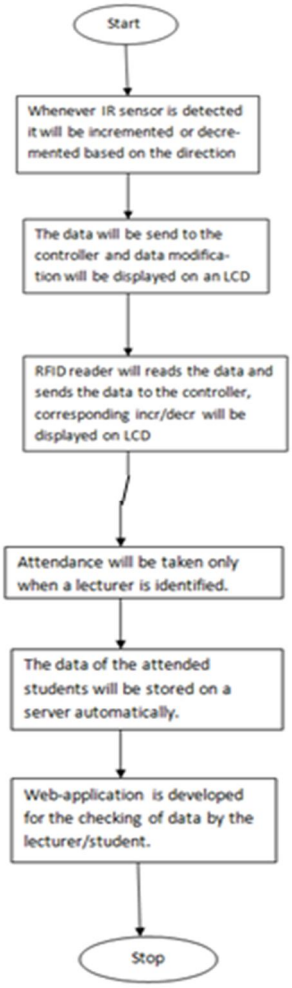


Fig. 2 Flow chart of the whole process.

## V. SYSTEM TESTING AND RESULT

To ensure the system correctness and completeness, system testing has been performed across the system environment that includes the client-side application, server-side application and the hardware.

### A. *Hardware and Software Integration*

RFID Reader was tested by having it to capture the ID and current timestamp for several RFID student cards in order to ensure the device is not malfunction and operates as desired. Firstly, a new student card is flashed to the RFID Reader to capture and recognize the card's unique ID. The

captured ID is then passed to the controller where RFID counter value is incremented and data is sent to the windows application for the storage purpose [8]. Once registered, the student card can then be used by flashing it to the RFID Reader to record the student attendance. For this purpose, the log data, which include the current timestamp, is also recorded.

The next step is that the windows application developed for to fetch the data from the controller. After the identification of a lecturer the data from the windows application is sent to the data base server which is acting as data collector and the attendance will be given to the corresponding students.

B. *System Testing Results*

In general, our aim to develop a prototype of a Web Server-Based Student Attendance System was successful. The user-login authentication process was successfully tested into the system. Once a user is successfully logged in, the user is given the access to the main page that displays a menu listing a set of features offered to the user. Figure 1 shows the home page of our web-server based attendance system. Figure 2 shows the Web Based Student Attendance System login interface. On this Users List page, all users' details are displayed. Student or lecturers registration will be shown their profile will be edited by the corresponding user. For to get the attendance of the specific date we choose to get attendance details of all the students.

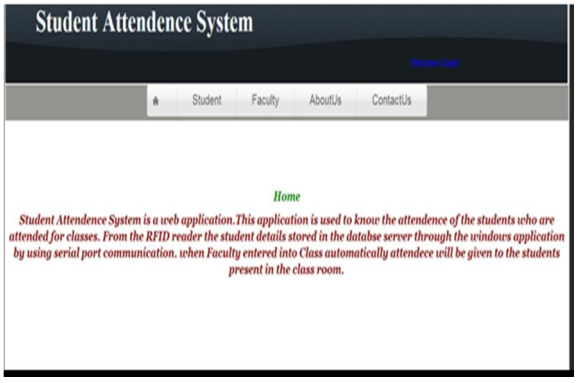


Fig. 3 Home page of the student attendance system.

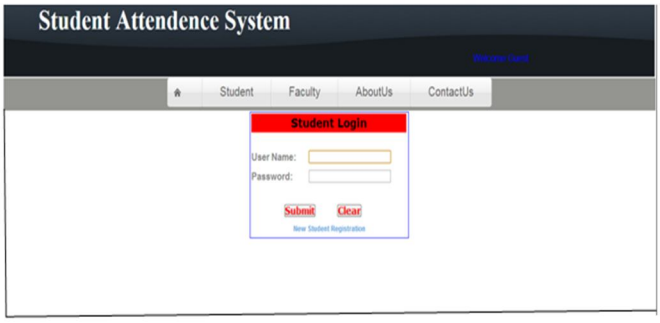


Fig. 4 Students login page.

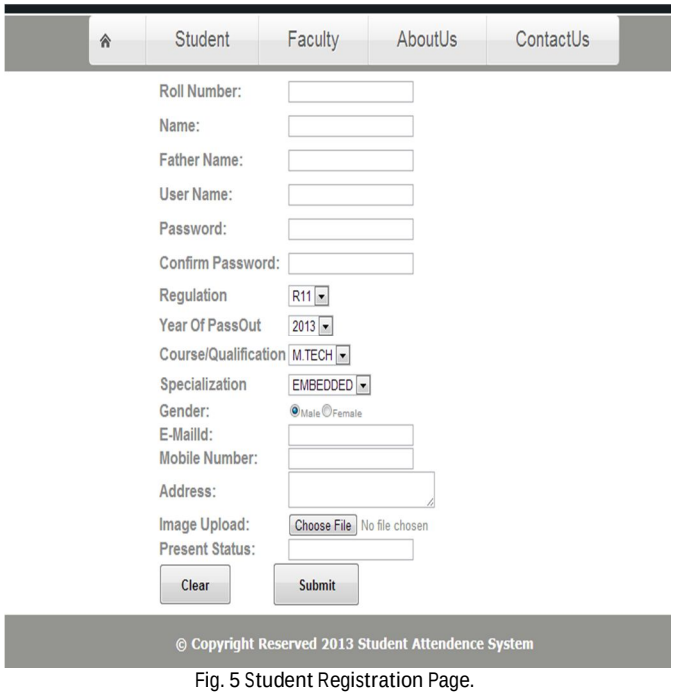


Fig. 5 Student Registration Page.

## V. CONCLUSION

The developed Web-Based Student Attendance System using Radio Frequency Identification technology will significantly improve the current manual process of student attendance recording and tracking system, especially in a university or school environment. The system promotes a semi-automated approach in capturing the student attendance, i.e. by having the students to flash their student cards to the RFID reader. In addition, a number of other advantages are gained by having an online web-based system, acting as a central repository of student attendance record. Firstly all processes of managing the student attendance record are performed online, allowing administrators and lecturers to view or modify the users' data through any computer via the web browser, as long as they are connected to the Internet. This way, no specific software installation is required. The captured student attendance data are also processed and analyze automatically with less risk of data loss, compared to a manual filing approach. Specific to lecturers or teachers, they can easily monitor their students' attendance online and this could improve the quality of teaching since less time is needed to manage the student attendance record. The developed system can be improved and upgraded further, e.g. by extending the system with new features and modules or by improving the web-interface layout with new display style. Better yet the system can be enhanced further to offer another significant enhancement where the system can be extended to monitor staff attendance record.

REFERENCES

[1]. Murizah Kassim, Hasbullah Mazlan, Norliza Zaini, Muhammad Khidhir Salleh. "*Web based student attendance system using RFID technology*" in 2012 IEEE Control and System Graduate Research Colloquium (ICSGRC 2012)

[2].Nurbek Saparkhojayev and Selim Guvercin. "*Attendance control system based on RFID technology*" in 2012 IEEE IJCSI International Journal of Computer Science Issues.

[3]. V.B.Gopala Krishna S. Chandra Sekhar N. Rajesh Babu K.Sreenivasa Ravi. "*The Design of Intelligent Campus Security & Attendance System Based on RFID, GSM and Zig-Bee*" in 2012 IOSR Journal of Engineering (IOSRJEN).

[4].Shardul Jain, Ankit Sabharwal and Satish Chandra. "*An improvised localization scheme using active RFID for accurate tracking in smart homes*" in 2010 International Conference on Computer Modelling and Simulation.

[5].Gatsheni, B.N., R.B. Kuriakose, and F. Aghdasi. "*Automating a student class attendance register using radio frequency identification*" in South Africa. in Mechatronics, ICM2007 4th IEEE International Conference on. 2007.

[6] Kassim, M. and S. Yahya. A case study: "*Reliability of smartcard applications and implementation in university environment*", Malaysia. In 2009 International Semiconductor Device Research Symposium, ISDRS '09. 2009. USA.

[7]. Zhu Yuan-jiao, Zhou Ke-qin,"*Design and Realizing of the Digital Campus Security System*", Software Engineering, 2009. WCSE '09. WRI World Congress on IEEE 2009.

[8]. Zhang Ye, "*Based on RFID technology jewelry and tracking management system Review*", E-Business Journal,2010(9) (in Chinese).

[9]. Sulaiman, N.A. and M. Kassim. "*Developing a customized software engineering testing for Shared Banking Services (SBS) System*". in 2011 IEEE International Conference on System Engineering and Technology, ICSET 2011. 2011. UiTM, Shah Alam, Malaysia.

[10]. Aljawarneh, S., et al. "*A Web Client Authentication System Using Smart Card for e-Systems*": Initial Testing and Evaluation. in Digital Society, 2010. ICDS '10. Fourth International Conference on. 2010.

[11]. Wahab, M.H.A., et al. "*Web-based laboratory equipment monitoring system using RFID*". in Intelligent and Advanced Systems (ICIAS), 2010 International Conference on. 2010.