

Attendance System Based on Radio Frequency Identification

¹Dr. Meena Chavan, ²Aayushi Gosain, ³Rishika Sushil, ⁴Yashodhara Samadhiya

^{1,2,3,4}Department of Electronics, Bharati Vidyapeeth (Deemed to be) University, College of Engineering, Pune, India

Abstract - Most educational institutions' administrators are concerned about student irregular attendance. Truancy can affect a student's overall academic performance. The conventional method of taking attendance by calling names or signing on paper is very time consuming and insecure, hence inefficient. Radio Frequency Identification (RFID) based attendance system is one of the solutions to address this problem. This system can be used to take attendance for students in school, college, and university. It also can be used to take attendance for workers in working places. Its ability to uniquely identify each person based on their RFID tag type of ID card makes the process of taking the attendance easier, faster and secure as compared to conventional methods. Students or workers only need to place their ID card on the reader and their attendance will be taken immediately. With the real time clock capability of the system, attendance taken will be more accurate since the time for the attendance taken will be recorded. The system can be connected to the computer through RS232 or Universal Serial Bus (USB) port and store the attendance taken inside the database.

Keywords: Attendance, Radio Frequency Identification System, Easier and Faster, Real Time, Accurate.

I. INTRODUCTION

Nowadays there is high development in technology. All the information is present on the internet so if anyone wants any information then it will be easily available on the internet. Because of this reason students are attracted towards various things and they try to ignore study and they waste much more time. When students enter campus they try to avoid the lectures. Students are not ready to attend lectures and they are bunking lectures and parents assure that their son/daughter will present to lecture. But it does not happen in reality. So to avoid these things this system can be implemented. This system will track the students in the campus and also manage attendance of students. If a student tries to bunk the lecture and his/her attendance is below 70% then an alert message will be sent to the parents. System uses RFID technology to track the student. Radio frequency identification (RFID) is a technology that transmits data using radio waves from an RFID tag attached to an object by the reader for tracking and

identifying objects. RFID systems contain two main components: the reader and the tags. The tag is normally attached to the objects to be monitored and carries information in a microchip. The reader on the other hand detects tags that are within its frequency range and writes to or read from the tags.

1.1 RFID Tag

The RFID tag is primarily a kind of a memory device that can transmit its contents when being scanned by the reader. The memory consists of binary digits called the bits, and the transmission and receiving of data has a communication channel. The tag can be an electronic circuit with its own power supply (an active device) or a very low power integrated circuit (passive device) which taps energy from the scanner to transmit its content. In a tag, the transmission power is very low and is measured in millionths of watt i.e. microwatts. Tag can be passive, semi-passive or active. It can also be categorized based on memory type and based on the transmission channel. Passive RFID tags have no internal energy source; energy supplied to the antenna by the incoming radio frequency waves induces enough energy for the CMOS integrated circuit in the tag to get activated and transmit a response. The semi passive tag is similar to passive tag, but has an addition of a small power source (battery). This battery constantly powers the integrated circuit of the tag and the need for an aerial to tap energy from the incoming signal is removed. Active tags have their own internal energy source which supplies energy for the integrated circuit producing the outgoing signal. They are more sophisticated and reliable due to their ability to conduct a session with the reader. As a result of their onboard energy source, they can transmit at a higher power level than passive tags, allowing them to be more effective in RF challenged environments such as water, metal or at longer distances. They can transmit signals over a greater distance and their random access memory (RAM) gives them the ability to store up to 32,000 bytes of data. A battery can live up to 10 years and have practical ranges of hundreds of meters. Types of tags that were used in the RFID system are ISO card, clamshell card and also soft label. Tag used in this project is a passive tag and the model of RFID reader is RFID IDR-232N.

1.2 RFID Reader

The RFID reader sends a pulse of radio waves to the tags and listens for its response. The tag detects this pulse and sends back a response; the tag ID number and possibly other information as well. The RFID reader can be classified based on the design and technology used (read or read-write) or based on the fixation of the device. The read only RFID reader only reads data from tags, usually a microcontroller based unit with a wound output coil, peak detector hardware, comparators and firmware which are designed to transmit energy to tags and read information back from them by detecting their backscattering modulation, different types for different protocols and standards existing. The read/write reader reads data from/to tags. While in a stationary reader, the device is attached in a fixed way.

II. METHODS AND MATERIAL

2.1 Literature Survey

A number of related works exist in literature, application of RFID Technology to different areas and specifically to the area of academic attendance monitoring problem. Author in reviewed the current research application of RFID to different areas with emphasis on application for supply chain management and developed a taxonomic framework to classify literature which enables swift and easy content analysis to help identify areas for future research. Authors reviewed the use of RFID in an integrated circuit (IC) packaging house to resolve inventory transaction issues. His study suggests that RFID contributes significant improvements to the water receiving process and the inventory transaction process that reduce labour cost and man-made errors. In, an automated attendance management system was implemented both in electronic and mobile platforms using stationary matrix AR 400 RFID reader with four circular polarized antennas and Symbol MC9000-G handheld RFID reader respectively. In the electronic platform, the attendance management system depicts a simple client (antennae placed at classroom entrance) /server (privileged student database) system. Students can visually see their names as they entered class on the screen and they are assured that their presence has been entered in the instructor’s database. However, one important drawback about this system is the RFID tag read rates degrade tremendously as it comes closer to electronic devices. Authors also reviewed and proposed a biometric system using fingerprint identification for attendance automation of employees in an organization. Consequently, authors proposed a student wolf pack club tracking system to simplify and speed up the process of student wolf pack club ticket distribution for athletic events. Our proposition emphasizes a simple, reliable and cost effective model for face

to face classrooms’ attendance management that uses existing student ID card chips as the passive tag with additional short message services to parents as weekly summary.

2.2 System Architecture

The development of Student Tracking and Attendance Monitoring systems Using RFID is divided into two main parts; the hardware and software. The hardware part consists of the RFID reader, tags and the host computer. The software part is the host system application designed using C#. .net incorporated with Microsoft access database. Administrator or lecturer can login into the system and check necessary information in the application, which keeps a log of the ID, time and date of every student that enters the lecture room for lecture. It also can register new students using the tag ID of each tag. In connecting the RFID reader to the PC, UART is incorporated through the RS-232 (Serial Port) cable. The complete system is placed at the entrance door of the lecture room. A RFID tag is given to each student in the department (which is embedded into their ID cards) and this is scanned at the entrance of the lecture room by the reader. The RFID contains a unique code that is scanned by the reader. On every scan by the student, the name, matriculation number of the student, the course to be taken and the date are displayed on the user interface if the tag number matches that which is stored in the database.

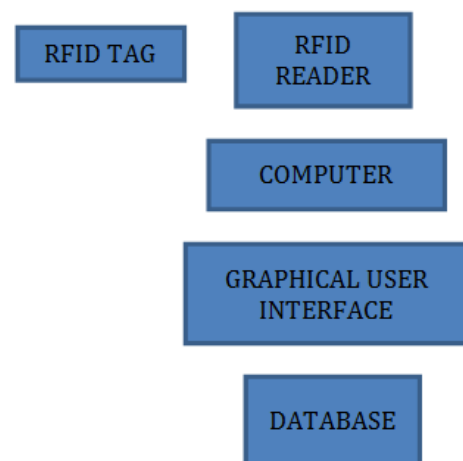


Figure 1: Overview of Student Tracking and Attendance Monitoring System Using RFID

III. RESULTS AND DISCUSSION

The RFID system was successfully integrated with a graphic user interface on the host system. The system consists of login form, admin form, database form, main menu form, class record form, and admin registration form and database record form interface using USB UART serial communication with the RFID reader. The system performs two main

functions which are class attendance system and students' evaluation for eligibility to sit for examination.

3.1 Graphical User Interface

The graphical user interface is created with visual basic 2010 and it consists of the database system used to store all the student details, date and time. There are seven tables built in Microsoft Access database to store the RFID based automatic attendance system's information. There are eight frames designed in vb.net/C# which are frame login, class record, admin, database, student evaluation, admin registration, student record and course record.

3.2 Login Window Form

The login window is built with tightened security which allows only authenticated people to access this system. The administrator needs to create his username and password to log in this system. Therefore, the administrator needs to key in the correct username and password to access this system and can quit this system by clicking the exit button to turn off the system. The administrator can make a selection either to login to the admin page or attendance page.

3.3 Main Window Form

When the administrator logs in to the software, he can register students, edit, and update or delete student's information at any time. From this form, he can register new Lecturers and edit, update or delete their respective information. He also has rights to set the time of each lecture and breaks in the college. With this form, he can mark attendance of each student also. At any time the administrator can close the application by selecting the Exit option from the Application Menu on the Main Form.

3.4 Add/Edit/Delete Student

The login window is built with tightened security which allows only authenticated people to access this system. The administrator needs to create his username and password to log in this system. Therefore, the administrator needs to key in the correct username and password to access this system and can quit this system by clicking the exit button to turn off the system. The administrator can make a selection either to login to the admin page or attendance page.

3.5 Add/Edit/Delete Lecturers

Clicking Faculties button, faculty details form is opened, where new faculty / lecturer can be registered with their respective RFID card tags. Here, the user of the application can search, edit, update or delete a lecturer / faculty, if required.

3.6 Edit Lecture Time Table

Clicking this button, Lecture Time Table form is opened where the user can change the time schedule of the college.

3.7 Mark Attendance

This form is most important in our project. Here, RFID cards are used to mark attendance of a student. When the administrator opens this form, the student is asked to show his RFID card to the RFID reader module. Here, the RFID reader module reads the RFID card of the student, searches in the database for its existence by using a sorting algorithm and when it finds the card registered, his entry and exit time is marked into the database. Depending upon the time of the attendance, his attendance for the respective lecture is marked.

IV. RESULT



Figure 2: Default Screen

When 12 characters are transferred to controller, the controller matches the characters with the saved characters. If the characters are matched then controller sends '1' to green LED and time & date at time of entrance is fetched and stored.



Figure 3: Valid Entry

If characters do not match with the saved characters, the controller sends '1' to red LED and displays tag number along with a string "ERROR".



Figure 4: Invalid Entry

V. CONCLUSION

Today the attendance in colleges and classes are done manually. The proposed system i.e student tracking and attendance management system using RFID technology will improve the process of manual attendance, especially in an organization or school environment. So we have come up with a system which would mark the attendance of the student as well as track them in and around campus. This system gives an automated approach to maintain the student attendance. In the proposed system it is necessary to issue RFID tags to each and every student in the college. The students have to swap their RFID cards to the RFID reader. By using this system we

will track the particular student and check whether he/she is bunking his/her lectures. The purpose of developing this system is to track the student using an RFID tag which will be provided to the student. The system can also generate a detention list of the students, Because of this system the task of manual attendance filling is made easy and time required to do this is also reduced. It is very useful for the teacher as they can easily monitor their student's attendance and manage the attendance of them. Because of this system the frequency of students bunking the lectures is reduced and Parents also assure their son/daughter. So this system is very useful for colleges and schools.

REFERENCES

- [1] www.rfid.org
- [2] <https://www.electronicshub.org/rfid-based-attendance-system/>
- [3] <https://www.projectsof8051.com/rfid-based-attendance-management-system/>
- [4] https://en.wikipedia.org/wiki/Radio-frequency_identification
- [5] <https://internetofthingsagenda.techtarget.com/definition/RFID-radio-frequency-identification>
- [6] https://www.researchgate.net/publication/348163330_STUDENT_ATTENDANCE_USING_RFID_SYSTEM

Citation of this Article:

Dr. Meena Chavan, Aayushi Gosain, Rishika Sushil, Yashodhara Samadhiya, "Attendance System Based on Radio Frequency Identification" Published in *International Research Journal of Innovations in Engineering and Technology - IRJIET*, Volume 5, Issue 7, pp 52-55, July 2021. Article DOI <https://doi.org/10.47001/IRJIET/2021.507009>
