

HUMAN SURVEILLANCE AND ALERT SYSTEM USING RFID

Georgina Merlin M, Jeevitha S, Nandhini K
UG Scholar, Department of Information Technology,
Sri Krishna College of Engineering and Technology, Coimbatore, Tamil Nadu, India.
V.Saranya
Assistant Professor, Department of Information Technology,
Sri Krishna College of Engineering and Technology, Coimbatore, Tamil Nadu, India.

ABSTRACT:

Radio Frequency Identification (RFID) is a rapidly growing technology that has the potential to affect many different industries and applications. Here, radio waves are used to read a number from the RFID tag. Using radio means that the tag no longer has to be visible on the object to which it is attached; the tag can be hidden inside the item or box that is to be identified and still be read. As the item is passed by the reader it will be read automatically, thus saving in labour costs. By using RFID tags, it is easy to track the movement of students thus enhancing security and safety in a selected zone by the development of a system called “HUMAN SURVEILLANCE AND ALERT SYSTEM”. This project focuses on the use of passive RFID tags that communicates with the RFID system by means of a database application. The database system then informs the student’s presence or absence to parents by sending messages.

Keywords: RFID, Passive Tags, Reader, Unique Code.

I.INTRODUCTION

The success of RFID technology primarily centres on the advent of radio technology. The developments in radio technology were a prerequisite to harness the essence of RFID technology. RFID technology is rife in modern

industries that demand data integrity and high efficiency of the system. This technology is used for tracking vehicles and goods, courier services and luggage handling. Other applications include animal tracking, secure toll payments, inventory management systems, access control mechanisms, etc.

RFID (Radio Frequency Identification) can be defined as follows: Automatic identification technology which uses radio-frequency electromagnetic fields to identify objects carrying tags when they come close to a reader. Data (identification number for instance) included in the electronic chip of the RFID label can be collected by the reader.

RFID tags generally feature an electronic chip with an antenna in order to pass information onto the interrogator (also known as a base station or reader). The assembly is called an inlay and is then packaged to be able to withstand the conditions in which it will operate. This finished product is known as a tag, label or transponder. The information contained within an RFID tag’s electronic chip depends on its application. It may be a unique identifier (UII, Unique Item Identifier or EPC code, Electronic Product Code, etc.). Once this identifier has been written into the electronic circuit, it can no longer be modified, only read. (This principle is called WORM Write Once Read Multiple). Some electronic chips have another memory in which users can write, modify and erase their own data. These memories vary in size from a few bits to tens of kilobits.

The proposed system is a real time location system (RTL) which facilitates the parents to track their children from the time they leave home till the time they return home. The parents get all the notifications whether their child reached the school along with In-time of the child, or if their child is out of the school once the school is over with Out-time. It becomes difficult for the management to keep a watch on each and every student. This RFID technology makes it effortless for the organization to keep an eye on every single child and eliminates uncertainties. It becomes easy for the parents and the management to keep a track of the children and reduces manual efforts.

II. RELATED WORK

Rajan Patel et. al have proposed a system framework for student monitoring using RFID technology. RFID is a technology that allows for a tag affixed on identity card to communicate wirelessly with a reader, in order for the tag's identifier to be retrieved. It helps in managing the student's attendance and enhancing security [1]. It is a fully automated student monitoring system that provides more services to automate educational institution's processes. Moreover, this system does not require additional cost.

Herdawatie Abdul Kadiret. al have proposed a system for tracking students using active RFID. It is identified that RFID is an important technology in both industry and in human life. Here, easy tracking ensures safety and security of a student using RFID technology. It provides automated responding signals to identify physical objects without the need of line-of-sight communication [2]. From this paper, it is identified that to make the system immune from any attack, RFID can be combined with biometric technology.

Arulogun O. T., Olatunbosunet. al developed a RFID based Students Attendance Management System [3]. This paper deals with the elimination or reduction of the quality time wasted during manual collection of attendance. This emphasizes a simple, reliable and cost effective model for attendance management system. RFID detects the presence and absence

of student data that is to be transmitted wirelessly by a mobile device called the RFID tag, which is read by an RFID reader. This resulted in the creation of student database management system that is not prone to errors. It helped to deliver precise and accurate data about tagged items that will improve efficiency. It provides short message service to parents by using ID card chip as the passive tag and also it is a cost efficient method.

III. PROPOSED WORK

The proposed system aims to reduce the paper work and saves time in generating the accurate results of student's in-time and out-time. In RFID based students in-time and out-time system, students RFID is already registered and stored in the system and during their daily attendance, their ID is verified and in-time and out-time are noted. Therefore efficient reports can be generated by using this system. After registration of students, the attendance status is informed to their parents through SMS. The SMS is a one way communication from the system to their parents. By this registration system, it can save huge amount of manual work and time and so there is no need for human intervention. This emphasizes a simple, reliable and cost effective model for student management system.

IV. MERITS OF PROPOSED SYSTEM

User Friendly: The proposed system is user friendly because the retrieval and storing of data is fast and the data is maintained efficiently. Systemization can reduce the amount of duplication of data entry. Moreover the graphical user interface is provided in the proposed system, which allows the user to deal with the system very easily.

Less Paper Work: The proposed system requires less paper work. Work is very easy because there is no need of keeping the data in papers. It saves time in generating the accurate results of student's in-time and out-time. Thus report generation is easy. This system can save huge amount of time and human work.

Computer operator control: Computer operator control will be there, so there will be no chance of errors. Moreover storing and retrieval of information from the database is easy as there is no handwritten registers.

Easy Report Generation: Reports are easily generated Automated data entry tends to be faster than manual data entry. Reports can be easily generated in the proposed system so that the users can generate the report as per the requirement (monthly) or in the middle of the session. Report generation is not costly. User can give the notice to the students, so that he/she can attend the class regularly.

Term	Definition
RFID	Radio Frequency Identification
LCD	Front end
RS232	USB to Serial communication

Table 1.1 Definitions

Roles	Functions
RFID Tag	Carries the Unique code
RFID Reader	Senses the code and transmits to the front end
MAX232 IC	Interfacing the Reader and front end
Mobile	Retrieve processed information

Table 1.2. RFID Roles and Responsibilities

V. REQUIREMENTS

1. PERFORMANCE REQUIREMENTS

RESPONSE TIME: The average response time of the system is less than 1.0 second for every transactions.

WORKLOAD: The system can process hundreds of verifications per minute. The

database system is capable of storing and retrieving thousands of records every day.

SCALABILITY: The database system is scalable to store more details for future enhancements i.e. the system can be expanded to store Teacher and Staff details in addition to Student details.

USER INTERFACE: The user interface is very quick that there is hardly any time delay.

2. SECURITY REQUIREMENTS

LOGIN: The system is secure enough that only the admin can login to the system with a unique password.

ADMINISTRATOR PRIVILEGES: The admin has the exclusive right to register Student details in the database system. The admin can view, modify or delete records in tables.

VERIFICATION: The system verifies unique ID of each student and updates the same in the database thus unambiguous data are avoided.

ALERTS: The system sends alert messages to those numbers which are previously stored in the database.

VI. SYSTEM DESIGN

1. ARCHITECTURE

The proposed architecture for the project to implement RFID system in schools is depicted below:

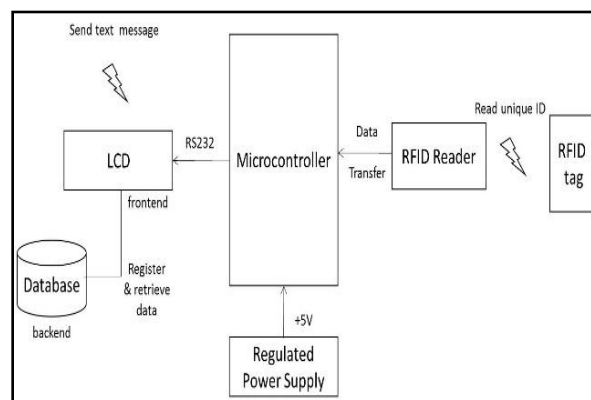


Fig.1.1 System Architecture

The proposed architecture describes that the data sensed by the RFID Reader, using the electromagnetic signals, which is then transferred to the database by means of the

process of registration. On traveling the student brings the Tag in proximity with the reader for the verification process. The communication between the RFID reader system and the front end is done with the help of MAX232 IC. The backend of the system is the database to store the registered details. The whole setup is regulated by power supply of 5V.

2. ALGORITHM

Input:

Login as Administrator
Student details in database
RFID unique 32-bit ID

Process:

```

Begin
If Registration
  Enter Student details
If submit
  Successfully Registered
End If

If view_details
  Display No_of_students_present;
  Display No_of_student_absent;
End If
Else If Verification
  RFID Reader reads RFID tag
  Data transfer between Reader and PC
    transmitted data
    Verified with database
  If data present
    Send IN_TIME,OUT_TIME to parent
  Else
    Send 'STUD_NAME is absent' to parent
  End If
End If
End
  
```

Output:

```

'<STUD_NAME> reached school at <IN_TIME>'
'<STUD_NAME> departed from van at <OUT_TIME>'
'<STUD_NAME> is absent on <DATE>'
  
```

VII. IMPLEMENTATION PROCEDURES

Implementation phase is the last phase regarding any system development, before any

system is implemented various tests are performed the system is reviewed thoroughly. The changeover selected is used to change the existing system to the new proposed system. In this phase, the system enters the operation and routine maintenance stage.

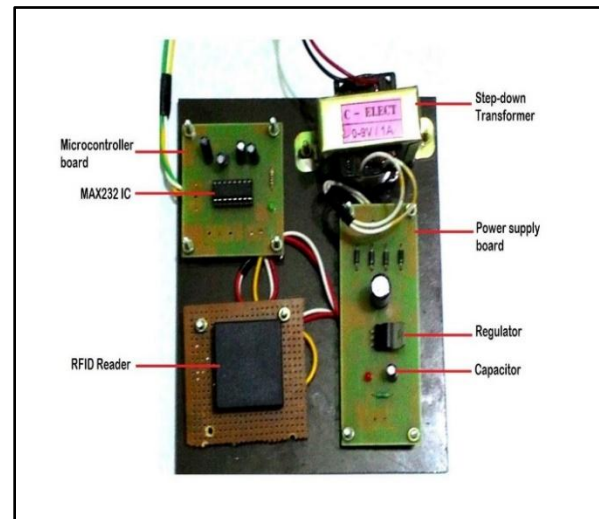


Fig.1.2 Hardware Configuration

MODULE DESCRIPTION

The tasks are described in the following three phases:

1. Registration
2. Verification
3. Send alert

1.REGISTRATION

The module explains about the login of the system and the registration process of the students.

1.1 Admin Login

The system administrator will be able to login the system by typing in the appropriate username and password. The entries are checked with the values given in the program as a part of verification.

1.2 Student Registration

The authenticated admin is now allowed to

register the students to the system by simply filling in the required details such as: Name, Reg No., Contact, Gender and Address. These details are updated in the database for every student registering with the system. The registration is actually done with the RFID unique code for improving security and easy processing.

2. VERIFICATION

The process of verification involves accounting in-time, out-time, late-hours.

2.1 Reading the Tag

The RFID Tag is in proximity with the RFID Reader and the unique code is read by the program coding. When the card value is read in the morning, it accounts the in-time of the student and when it is done in the evening, it accounts out-time of a particular student. The late-hours of a student can also be calculated by reading the code of the tag after a particular time, in the morning (say 10A.M).

2.2 Database Verification

The unique code is checked with the code already present in the database. This ensures the integrity of the student who enters the school premises. The admin or any other user can easily retrieve data at the front end, by simply clicking the buttons available.

3. SEND ALERT

3.1 Messaging

The parents are intimated about the students' status a textual message to their mobile phones. Using a jar file, which supports messaging is included in the program for easy delivery of message.

VIII. CONCLUSION & FUTURE WORK

The Human Surveillance and Alert System, found to be working accurately. The system promises to give away effective results, which ensures the safety of the students. The simple algorithm and setup makes it a beneficial

system for anyone to work. This also emphasizes the use RFID technology widely, as they are easy to carry anywhere. The system is found to be delightful, running under the single window system. Its performance is satisfactory. The RFID technology has various applications which operates at different frequency ranges. It resulted in effectiveness, flexibility, accuracy and user-friendliness

As the system is a desktop application, developed in Java; it is portable and can run in any environment. The hardware is simple and deployed for various other uses too. Documentations are done in such a way, that any other software developer can easily undergo this system, before undergoing for development for any changes that is to be single window system to the presentsystem. Hence, this system is eminent and efficient to use.

The programming techniques used in the design of the system provides a scope for further expansion and implementation of any changes which may occur in future. The same system can be used to implement an easy ticket issuing system in the buses. This helps the passengers to carry money safe, using their smart cards. It can result in effective usage of e-wallet, reduced man power and great deployment.

The system can also be expanded using Wireless Sensor Networks (WSN), where it can communicate with the parents about the location of their children, enabling an easy track of their movement.

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