Smart Attendance System Using RFID In IOT

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Abstract— In recent years, there have been rise in the number of applications based on Radio Frequency Identification (RFID) systems and have been successfully functional to different areas as diverse as transportation, health-care, agriculture, and hospitality industry to name a few. IOT technology facilitates automatic wireless identification using electronic passive and active tags with suitable readers. In This paper, an effort is made to solve regular lecture attendance monitoring problem in developing countries using RFID technology. The application of RFID to student attendance monitoring as developed and deployed in this study is capable of eliminating time wasted during manual collection of attendance and an opportunity for the educational administrators to capture face-to-face classroom data for allocation of proper attendance scores and for further managerial decisions

Index Terms—   **RFID, Lecture, Attendance, IOT .**

I.   INTRODUCTION

IoT is a dynamic global network organization with self configuring capabilities based on standard and interoperable communication protocols In the IoT, physical and virtual "things" have identities, physical attributes, and virtual personalities and use intelligent interfaces The physical and virtual "things" are seamlessly integrated into the information network RFID is shaping up to be an important building block for the Internet of Things (IoT). RFID (Radio Frequency Identification) devices are wireless microchips used for tagging objects for automated identification RFID systems consist of a reading device called a reader, and one or many tags   the reader is a powerful device with ample memory and computational resources RFID can identify objects wirelessly without line-of-sight. . Attendance system will produces an automatic system which give better routine and efficiency than the traditional method of observing student. Furthermore, RFID technology can help to identify and to monitor items (products, people, student etc) wirelessly within a specified distance (a few centimeters to hundreds of meters). In this paper, we describe the proposed RFID system for recognizing and monitoring attendance. In this system, the RFID tags enable the school/college management people to supervise the student movement in and out of the campus. When RFID tags pass through the RFID reader in read range zone, then system will record the data from the RFID tags to the database systems.

Have caused students to be less motivated to come to the lecture rooms than ever before. Laziness on the part of students, nonchalance to school work, extra social activities that have no importance in aiding the objectives of the institution and a lot more, may prevent students from attending lectures. Sequel to these, lecturers and administrators in most developing countries have had to come up with ways to ensure a healthy participation from students, and make sure that the student-lecturer interactive relationship is kept intact. This in some cases have come in simple forms like roll calls, while in more interesting cases, can be formats like surprise quizzes, extra credit in class, etc. These strategies are however time consuming, stressful and laborious because the valuable lecture time that could otherwise been used for lectures is dedicated to student attendance taking [8] and sometimes not accurate.

II.   RELATED WORKS

Before the RFID IOT system smart-card and barcode are more popular for all purpose like supervision, attendance or for monitoring student, employees etc. In this we are going to implement the RFID system in our project for improvement of old attendance system and checking system for better result and security of the student. An RFID tag is an object that can be applied to or inserted into a product, person, or animal for the purpose of identification and tracking using radio waves. Some identifiers can be read from several centimeters or meters away and beyond the line of sight of the reader. A number of related works exist in works, application of RFID Technology to different areas and specifically to the area of academic attendance monitoring problem. In , authors designed and employed a model of a secured and portable embedded reader system to read the biometric data from the electronic passport. The authors attempted to solve problems of trustworthiness, security and confidentiality in E-passports by authenticating holder online .using Global System of Mobile Communications (GSM) network. The GSM network is the main edge between identification centre and the e passport reader. The communication data is protected between server and e-passport reader by using AES to translate data for protection while transferring through GSM network.

III.   PROCEDURE

The process of Attendance and SMS would be like as explained below:
- Student / Staff will fall in range of the readers installed with their respective Smart Cards.
- Receiving the data at the reader will be fire to the server where the complete raw data is processed

- SMS will send to each parent mobile (Message includes the time of card fall in range).
- SMS also sent to the parents of absent student as "alert".
- SMS can be sent to group of student ('n' number of group can be created)
- SMS on occasions.

This systems integrates the attendance system which gives the facility that they can view daily attendance report the which class has how much strength, etc.

Benefits of this system to Schools & Apprent**ices –**

Completely automates the attendance system.

 Saves time.

 Educates student about new technology.

Resists students from bunking classes through SMS Sending feature to Parent.

Improves academic skill of separate students as students are forced to attend class because they can't bunk

Classes anymore.

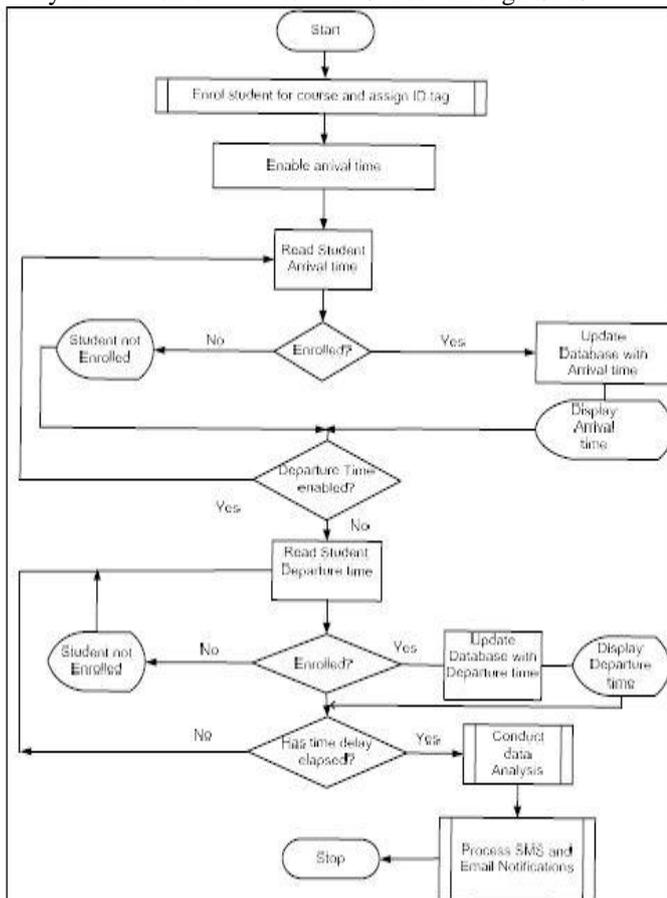Generates reports of any student in a click.

Installation is very easy and quick. .

Onetime expense on system, as Machine and Cards both are reusable.
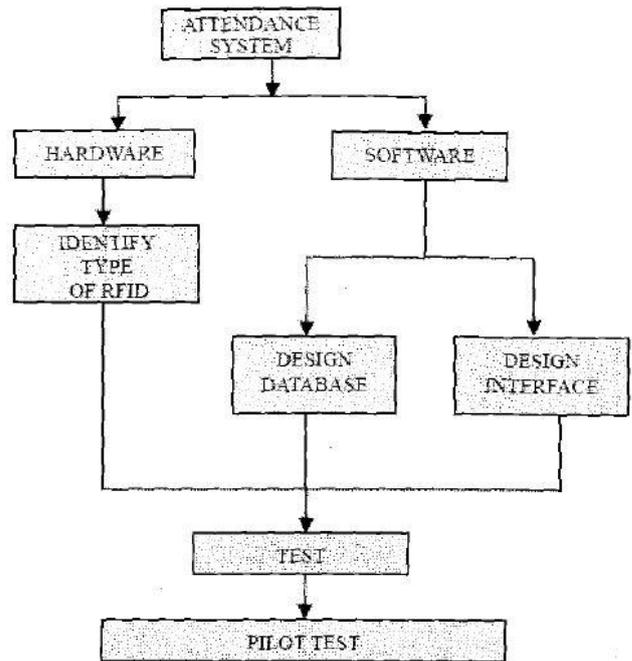
Very much cost effective.

Most important – Safety of Student.

Daily interaction of Parents with School through SMS.

Flowchart

System Module

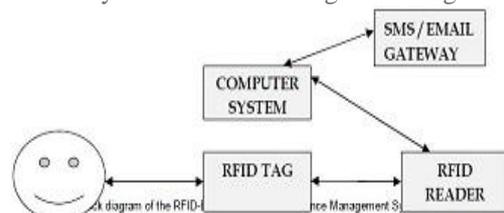## A) HARDWARE DESIGN CONSIDERATIONS

In RFID systems, an item is tagged with a tiny
Silicon chip plus an antenna collectively called a tag.
The tag can be mobile or static and be scanned
by stationary or mobile readers respectively, using
Radio waves.

8051 micro controller -
The micro controller is an integrated circuit or a chip with a processor and other support devices like program and data memory, I/O ports, serial communiqué interface etc. integrated together. Unlike microprocessor (ex: Intel 8085), a microcontroller does not require any external interfacing of maintenance devices. Intel 8051 is the most standard microcontroller ever produced in the world market.
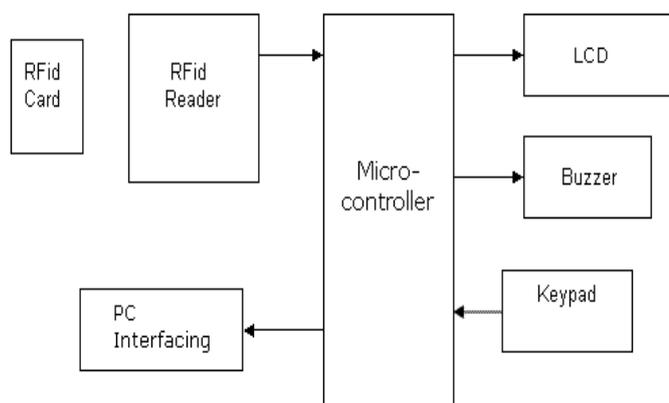
RFID tags-
RFID tags that contain their own power source are known as active tags. Those without a power source are known as passive tags. A passive tag is activated by the radio frequency   scan of the reader. The electrical current is small -- generally just enough for transmission of an identification number. Active tags have more

memory and can be read at greater ranges.

Software design consideration-

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Microsoft visual studio .NET is use for designing this system. My SQL is use as backend database for storing student attendance records.

IV. IMPLEMENTATION

It contains following blocks

1) **RFID Reader:** Full form of RFID is "Radio Frequency Identification". Wireless communication is used between RFID tags and RFID Reader. Reader does not require line of sight communication with tags. It means that Reader detects the RFID tag even if there is some object between Card and Reader. Thus it is a non-contact type of reader. The Radio frequency used in our reader is 125 kHz which is a Low Frequency (LF). RFID reader interfacing with Microcontroller is done using serial port. RFID reader will communicate with Microcontroller using serial communication. When RFID tag comes in the range of Reader module, then RFID reader detects RFID card. And at that time RFID reader sends out a series of alphanumeric unique codes on the serial port. So while adding the employees/student card number in the program memory. First we need to store this series of alphanumeric code into program memory and later on this unique series of codes will be compared with the incoming card number. RFID card reader module requires 9 volt power supply and output is given on DB9 connector port.

2) **RFID cards:** There are two main types of RFID cards, Passive and Active. In this project we have used Passive RFID tags. As given in introduction, we can use normal RFID cards which are of the size of credit card. These are rectangular in shape and white in color and can be attached with the ID-card. Or even we can use RFID tags which can be attached with keychain

3) **Microcontroller:** It is the main component of the project. It is the heart of the system. Microcontroller communicates with all input and output devices. Various functions of Microcontroller are as follows:

1. Displaying clock on LCD
2. Reading input from RFID reader
3. Comparing it with the data / RFID card number stored in

Microcontroller memory
4. Turning on buzzer if the cards does not match
5. Logging/Storing time into memory if cards match
6. Reading input from keypad and adjusting time according to the keypad entry given by user.
7. Sending data to computer.

4) **Keypad:** We have used 4by 1 keypad. It is a simple type of keypad. It gives low output to Microcontroller when key is pressed. It has 4 keys. Functions of these keys are Increment, Decrement, Enter and Escape. These are used in Time setting mode.

5) **Buzzer:** We have used 12 volt buzzer for demonstration purpose. Buzzer will be turned on for invalid card access.

6) **Liquid Crystal Display:** It is used to show current time and various messages. These messages are Invalid card, Valid card, attendance of student. We have used 16 by 2 alphanumeric display.

WORKING:

For operating this project first user has to insert the card numbers into the microcontroller memory. It can be done by company authority person or college administration person while issuing the card. Whenever a new student joins or new employee is recruited in an organization/company at that time, card will be issued. And same entry will be made in the microcontroller program memory. In the current project, these numbers are stored in the microcontroller's program memory. Which means while burning the program into memory, we need to add these card numbers into the program. Then this card will be issued to the respective person .Once the project is switched on, it will display time clock on LCD. We have provided "4 by 1" keypad for setting the time. User can press the setting key and use the increment / decrement and enter button to set the current time. Once the time is set then he/she can exit from the time setting mode / time set routine. Then the LCD will display current time set by user. Then this project operates in **normal mode**.

Whenever user comes near RFID reader module and shows RFID tag then microcontroller will store 2 information or 2 types of data will in the microcontroller memory. First is the card number and second is the time at which user has shown the card. Same situation happens for logout. For logging out also student will show the card. In this project single RFID card reader module will be used for in and out operation. While in actual implementation in industries or colleges, user can install 2 RFID reader modules. One will be placed at the outer side and second at the inner side of the door. When a student or employee has lost his/her card. Then in such situation he/she has to report this incident to the administration person. Then admin person can remove the card number from microcontroller memory. Also when any employee / student leave the office and they forget to return the card then at time also authority person will remove the card information from microcontroller memory. So in case of lost card or person left the company without returning the

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card and if these cards are shown to RFID reader then buzzer will be turned on. Lets take an example that any outside/unauthorized person get a RFID card. And these cards does not have entry in our system. Or if existing employee manages to get a RFID card, and if he/she shows card, then microcontroller will check and find that this card is not stored in the memory. It means card number is not found in microcontroller memory then buzzer is turned on.

V.   SYSTEM OPERATION, TESTING-

A careful observation of the trend of usage of RFID tags leads one to consider the possibility of its utilization for monitoring the attendance of students in educational institutions, **wi**th the aid of program driven computers. While every student given a specific RFID tag attends the lecture through entrance door, a serial number (related to each student's matriculation number) of tag is associated with the student database entry. So every time a student uses his/her card, the entries will be entered into the database with the time stamp. The use of webcam might be optionally necessary to take a snap of the person using the card. Webcam reduces proxy attendance attempts.

This is used to cross-verify in the event of an undesirable event or dispute. Consequently, the attendance data then can be used to create many types of reports like daily attendance details, monthly, weekly and real time feedback to parents. The attendance score calculation can be automated using the collected data. After setting up the student attendance RFID system from the mode of operation. The tag is activated when it passes through a radiofrequency (RF) field (125 kHz in this case), which is generated by the antenna embedded within the reader box. The program checks whether the tag is valid or not. If the tag is valid, it will continue to the database program and registers the student's attendance for the course. If the tag is invalid, the program gives a notification that the tag has not been registered to any student and requires the user to either supply a valid tag. In our proposed system, we improve the student attendance system. The Radio Frequency Identification (RFID) technology is one of an automation technology that is beneficial in improving current traditional way of monitoring. As every tag has its own unique ID, it is easy to differentiate every tag holder. In addition, a Graphical User Interface (GUI) provides more efficient way to review the monitor. Thus, the integration of RFID technology and the GUI in an monitoring system will produces an automatic

How to view attendance on computer?

We have provided PC interfacing to this project, so that attendance of employees can be seen on computer. To view the attendance first administrative person or the user operating this project has to press the Attendance key, then LCD display will display attendance of all students/employees. LCD will display card number 1, login time then card number 2, login time and so on… It will show attendance of those people who have logged in on that particular day. LCD display is helpful if PC interfacing is not available. Which means Computer is not near system. In PC interfacing, Data is sent to computer as soon as it is shown on LCD display. Various software are available to view data received on serial port. On computer we can use hyper terminal software or we can use terminal software to view the data received on computer. Later user can copy this data into another file or he/she can directly take the print out. PC interfacing will be useful when the data is very large or when employee number is very large. At that time attendance monitoring on LCD becomes very time consuming and is not easy. However, data for all employees can be viewed on computer at a faster rate and very easily.

a)   Advantages:

1) This system is fully automated and it does not require any human interaction except setting the initial time setting.

2) LCD and PC interface both are provided with RFID based attendance system. This gives benefit of viewing attendance on the spot on LCD or remotely from computer.

3) This system is accurate and can avoid proxy or false attendance.

b)   Future Development:

1) We can voice announcement system to this project. so whenever user logs in, we can announce message like, "Your attendance has been logged in" or "Your card is invalid".

2) We can send this data through internet to the user. So that user can access it remotely via internet.

3) We can implement GSM technology

VI. ACKNOWLEDGMENTS

VII. CONCLUSION

In this System, Smart Attendance System using RFID can replace the manual system that transformation of information can be delivered without a hitch. This system will ease is school/collage to monitor the student. The system can reduces manpower. Although there are different methods of tracking student but our system is very easy to handle and very convenient for college/university level. This system gives time saving, easy control and reliability

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VIII. REFERENCES

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