SMART CLASS USING WIRLESS TECHNIQUE.

Sumitted by
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Abstract:

To Design the smart monitoring system based on wireless network. So in this project using Radio Frequency Identification (RFID) is one of the automatic identification technologies that is mainly used in nowadays. There is a wide research in RF technology and development in this area trying is to take maximum advantage of this technology, and in coming future many new applications and research areas will continue to appear. This interest in RFID also brings about some concerns, mainly the security and privacy that helping , those who work with or use tags in their everyday life.

RFID has, for some time, been used to access control in many different areas, from asset tracking to limiting access to restricted areas. In this paper we propose an architecture and a prototype of a system that uses distributed RFID and also uses IR TX/RX sensor, to identify the obstacle between IR transmitter and IR receiver that triggered the cctv camera that are using in this project. we demonstrate how to automate an entire students' attendance and their strength registration system by using RFID in an educational institution environment. 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.

1. Introduction:

RFID stands for Radio Frequency Identification, which is a wireless communication technology that is used to uniquely identify tagged object s or people. RFID systems have been widely used in many application areas, such as: inventory control, product tracking through manufacturing andAssembly, parking lot access and control, container/pallet tracking, ID badges and access control, equipment/personnel tracking in any industry, etc.

This paper is organized as follows: Section 1 describes the basic ideas around the concepts of students' attendance and strength in classrooms and the whole attendance registration process of the institution. Section 2 presents the system architecture so as to contextualize and present the system architecture proposed for an automatic attendance registration and to increase the strength of the student in classroom. Section 3 explains the implementation and describes the privacy concerns regarding this proposal, which is a delicate constraint for the success of this solution. Section 5 shows the results that were made in order to validate the success of the prototype. Finally, section 6 concludes the paper and presents the issues for further work.

2.Existing system architecture :

In existing system, RFID systems use radio waves to transmit Information from an integrated circuit tag through a wireless communication to a controller by using RFID reader. These systems consist of three components: the tag (transponder), the reader

(interrogator) and the host computer (microcontroller). The reader communicates with the tags in its wireless range and collects information about the objects to which tags are attached. Compared to other automatic identification technologies, like optical barcode systems, RFID has several advantages, such as: tag data can be read automatically without line of sight, through some materials, simultaneously tag reading and from a range of several meters. The working principle is based on back scattering method.

The major that, held back the adoption of RFID can be spited into technology, standard, patent, cost, infrastructure, return on investment (ROI), and barcode to RFID migration challenges. One of the important topics related to RFID technology is privacy and security. Currently, there are several protocols for RFID technologies to achieve certain security and privacy levels.The goals that RFID systems should reach regarding security and privacy are: maintaining data security, preventing counterfeiting, preventing illegitimate access, preventing unwanted recognition and tracking, and coping with the service. In most of the access control applications, there is a reader linked directly to a microcontroller /computer and the communication of data from the reader to the computer is made through RS-232 or Wiegand or USB.

This architecture is simple and economical, but there is no proper monitoring of the student and the class strength. It is only able to monitor the attendance of the student. The existing system help the teacher from manual attendance and it is very easy to monitor each and every student. because all the data is stored in the server of the institution. we want to monitor the student in the institution by implementing the wirless technique. the architecture becomes more complex and reaches higher costs.

Motivation:

At the Bharath University the attendance of all students present in a given class is recorded. To carry out this registration, each teacher has an attendance register that must be filled in for every class held. At the beginning of each lesson the teacher is required to fill in the attendance sheet, with all the information concerning the lesson. After that, the attendance sheet handed out so that all students sign the sheet. When all students have signed, the teacher collects the sheet and checks the attendance of each student into an excel file. The purpose of the file is to verify whether the student has already exceeded the maximum number of absences allowed for each subject. At the end of this whole procedure, the teacher hands in the attendance sheet to the school office, so that this information can be inserted into the computer system.

If the lectural is not available in the classroom, students used to go outside or some time students bunk their classes. Because of this the strength of the class is decreases and students are suffer from low attendance percentage that causes semester back or year back to the student. This procedure, besides being troublesome for teachers, also affects students as time is expended on signing, verifying and submitting the attendance sheet manually as well as it help the students to avoid such type of problem and make them punctual.

As motivating factor we expect to find a reader that works over Ethernet transmitting its RFID information in a distributed environment and also powered by Power over Ethernet (PoE). All the readers have to operate in a distributed architecture over Ethernet because there are many classrooms to control and there must be one reader for every classroom. Each reader in each classroom will uniquely identify the physical location of the classroom so the server will know which

class the student is trying to attend. With the current Power over Ethernet standard (IEEE 802.3af), the RFID readers can also be powered by the Ethernet connection. This technology reduces the number of wires discarding the need for frequent charging or replacing batteries in readers.

3. Proposed System architecture:

The aim of this section is to describe the system overview and explain the proposed architecture. The main objective is to automate the whole system of students' attendance registration using RFID and help them to avoid problem such as low attendance and make them punctual. Because of this the strength of the class is increased. The proposal comprises converting the existing student debit cards for student cards tagged with an RFID tag. In addition, by installing one RFID reader , sensor and cctv camera per classroom and having them all connected to the Institute's Local Area Network (LAN). but in this demo project using Zigbee as a communication unit. Finally, a computer system will be responsible for recording the attendance and strength of students in class and protecting them from serious problem.
Once a student enters a classroom he will place his card near the reader if he intends to register his presence in a particular class. The reader should emit a sound when the card is successfully read. After a successful reading, the RFID reader establishes a communication with the RFID server in order to send the student card identification. If the students enters in classroom without placing their card to the reader. The sensor can identify them and activate the cctv camera. This information is directly transferred to the server.
  The proposed architecture is shown in Figure (1) and can be divided in two grouped parts. The first group consists of

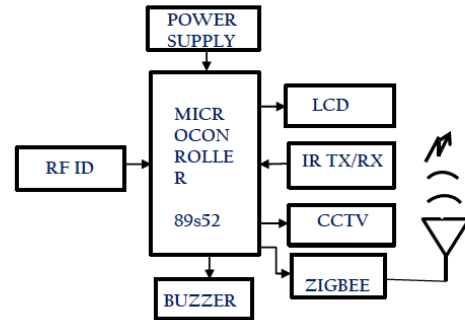transmitting section and second group consist of receiving section.

Fig. 01.a Transmitting section

In transmitting section consist of RFID reader, microcontroller (89S52) , sensor IR TX/RX, buzzer, LCD, cctv, zigbee to transfer the data from transmitting to receiving module. while the receiving section consist of zigbee, microcontroller (89S52), buzzer, LCD, TV and TV tuner.
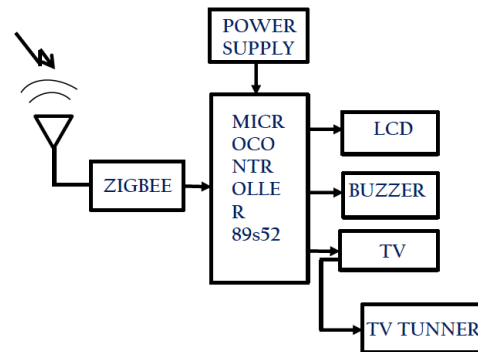

Fig.01.b receiving section
PROPOSED SYSMTEN BLOCK DIAGRAM

In transmitting section consist of RFID reader, microcontroller (89S52) , sensor IR TX/RX, buzzer, LCD, cctv, zigbee to transfer the data from transmitting to receiving module. while the receiving

section consist of zigbee, microcontroller (89S52), buzzer, LCD, TV and TV tuner.

For both section 5volts is required as a power supply. LCD is used to display the data of the student. RFID is a basic part of the project that identifies the student identity. Each student having their ID card that containing the data base of the student. sensor module used to detect the student, who does not interface their to the RFID reader. In such case the sensor trigger the Cctv module, that leads to identify the student.

Implementation:

The next step was to find a RFID reader which met all requirements and the minimum requirements were: Standard TCP/IP communication, close reading range, fast identification time, PoE and an affordable price since there are more than 100 classrooms. Initially, the intention was to use one or more UHF readers distributed in the classroom, so students did not have to take out their cards and place them near the reader. However, not only would this process be much more expensive, but it could also violate privacy issues, because whenever a student entered a classroom the system would always know where he was. The implemented solution is far from being a tracking application, i.e., the system only knows that a particular student has presented his card near a reader at particular day and hour. In earlier the automatic attendance is done but this system can also help to increase the strength of the class,it also never knows were exactly is a particular student. Because of these considerations has been chosen for a LF (125 kHz) RFID
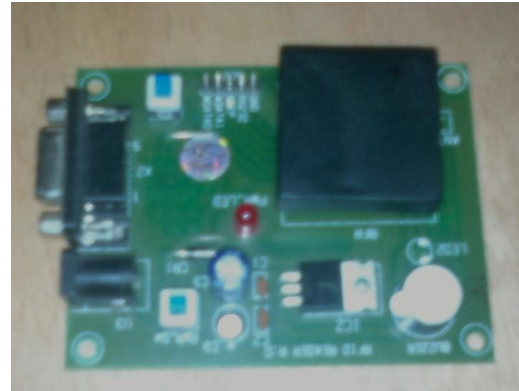
reader, with a range of 10-15cm.shown in fig 04.a

Fig 04.a RFID reader

The "LF 125 KHz Antenna" module is designed to power the tag and to allow communication between the tag and the reader module. The "RFID Reader" module reads the data from the tag and sends it to the "Processing unit" module called microcontroller. The "FLASH Memory" module aims to serve as a backup of attendance records in case of a network problem or a queue if the server cannot respond to all requests. The "Power supply" module aims to power the integrated circuit of this reader that required 12v Dc. RS232 is the protocol that is used to interface the microcontroller.

Privacy issues regarding RFID systems are one of the most worldwide concerns, and in the development of this proposal it, too, was one of the aspects that we were concerned about. The student's tagged card only contains one decimal number that is assigned every year when a student's identification card is renewed. Because it is a unique number it could raise privacy concerns, but the tag inside the

student's card only works at very close range, like the readers. If the students' carry UHF tags and the institution has UHF readers then it could raise privacy issues, because we could easily see where students are. In our case, if the student signs the attendance register or uses his RFID card to demonstrate his intention of attending a class, it will not raise privacy problems.

The data of the student is sent through zigbee, The standard takes full advantage of the IEEE 802.15.4 physical radio specification and operates in unlicensed bands worldwide at the following frequencies: 2.400–2.484 GHz. The power levels (down from 5v to 3.3v) to power the zigbee module, The communication lines (TX, RX, DIN and DOUT) to the appropriate voltages. The Rx and Tx pins of ZIGBEE are connected to Tx and Rx of 8051 microcontroller respectively. Wireless communication range is 10 − 100 meters in general. In receiving section the data will display through LCD. A liquid crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals (LCs). It has the advantage of low power consumption (1 mA typical) with powerful
command set and user-produced characters which is compatible with TTL and CMOS compatible. The LCD standard requires 3 control lines and 8 I/O lines for the data bus.

8 data pins D7:D0
Bi-directional data/command pins. Alphanumeric characters are sent in ASCII format.
### RS: Register Select
RS=0-> Command Registeris selected
RS=1-> Data Registeris selected
R/W: Read or Write
0->Write, 1->Read

E: Enable (Latch data)
Used to latch the data present on the data pins. A high-to-low edge is needed to latch the data. The 8 data lines are connected to PORT 1 of 8051 microcontroller. The three control lines(RS,RW and EN) are connected to PORT 3.5,3.6 and 3.7 respectively.
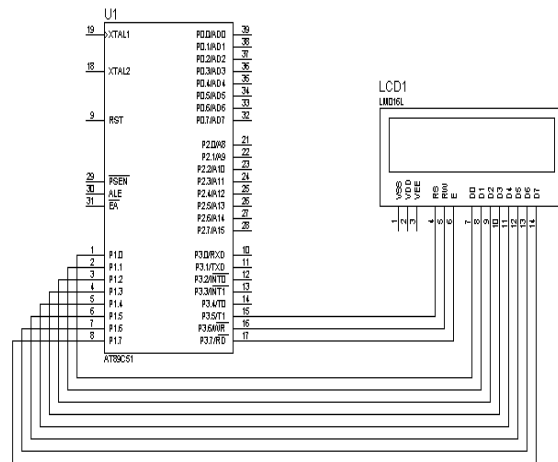
Cctv module is mainly in sleeping mode, it will trigger by the sensor when any student enters the classroom without placing their tag to the reader or goes out from the class. The RFID of the faculty coded in different to the student. While placing the tag of any faculty the whole module goes to sleep mode and vice versa.

5. Results:

To verify the accurate functioning of the prototype, we have set up a test scenario. The scenario was composed by two classrooms with a RFID reader installed in each one, all connected to the receiver module through zigbee. Buzzer, cctv, sensor, tag , LCD and student data base as well as class data base First step, to interface the card or tag of student to the RFID reader. It read the code inside the tag by the back

scattering method. RFID convey the message to the microcontroller. In the transmitting section there is LCD screen, on which the number student present in the class is displayed. while without interfacing any one enter or going out from the class. The sensor (pair of IR transmitter and IR receiver) can detect the obstacal (student) between IR transmission and reception and activate the cctv camera module. It send the picture to the reception module and image will displayed on TV.

6. Conclusions and future work:

This demonstrates how a generic architecture can be used in order to create an intra-connected network of RFID readers within an educational institution. We can say that it is as generic as possible, due to the this project. With the full development of this project, it is possible to create solid foundation that can be easily put into service in another institution of education, thus automating the process of recording and reporting students' attendance and also maintain the strength.

Although the field of automatic identification is extremely broad, out of the large number of readers analyzed, not one was found to meet only the minimum requirements. Thus, a good proposal for RFID reader manufacturers is the development of a reader that can transmit data acquired over zigbee in a distributed environment at a very attractive price. This new reader, instead of having more processing power, its own database to register accesses, allowing or denying accesses to a particular area and having a

display and keyboard for manual insertions, should only focus on reading the data contained on an access card and sending it back to a specific IP/network mask/gateway.

For future work we are lacking the implementation and validation to the whole architecture with one communication part for every classroom in a building and the use of the server of the institution directly as data source. In the future it is also necessary to implement all kinds of advanced methods in different area of institution and as providing services so the institution's applications may automate its processes.

7. References:

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