RFID Student ID Cards

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Abstract: Title: Use of RFID technology in students ID cards

The tags (or students ID card) contain electronically stored information. These tags are powered by and read at short ranges (few meters) via magnetic fields (electromagnetic induction), and then act as a passive transponder to emit microwaves or UHF radio waves (i.e., electromagnetic radiation at high frequencies). Others use a local power source such as a battery, and may operate at hundreds of meters. Unlike a bar code, the tag does not necessarily need to be within line of sight of the reader, and may be embedded in the tracked object. These tags can be used to gain access for transport, attendance, hostel, etc. The biggest advantage of RFID is that it is contactless and safe technology which is very much required in today's times.

There a growing concern to the management officials of any education institute to implement a secured efficient and accurate tracking mechanism for their student's .These tags will allow them to have a single card that will hold all the information of a particular student and ease their work.

Keywords: - RFID (Radio frequency identification); RFID Reader; RFID Tags; ARM7 controller; GSM and Student Attendance system.

1.   INTRODUCTION :

Today in most institution professors take attendance by calling out names or passing a sheet of paper. Both way have respective drawbacks. For this reason college needs to create a system to monitor students attendance and report it to their parents automatically and it also gives report about their test marks through SMS process. This project is to simplify attendance recorder system by using RFID. Radio frequency identification (RFID) refers to the use of radio frequency wave to identify and track the tag apply into an object or a living thing. It is a wireless means of communication that use electromagnetic and electrostatic coupling in radio frequency portion of the spectrum to communicate between reader and tag through a variety of modulation and encoding scheme. Radio Frequency Identification (RFID) is the combination of radio frequency and microchip technologies to create a smart system that can be used to identify, secure ,monitor and do object inventory. At their simplest, RFID systems use tiny chips called tags that contain and transmit some piece of identifying information to an RFID reader, a device that in turn can interface with computers. In the system of RFID Based Student Attendance System with Notification to Parents Using GSM, the passive type RFID reader is used whose maximum range of detection is around 10cm. It operates at frequency of 125 kHz and 12V power supply. and take attendance of the students. The users only need to place their RFID tag on the RFID reader to take attendance. They do not need to go through the long catalogue to look for their name. Hence, it is a very time efficient system. Attendance will be taken if the encoded tagged ID scanned, matches the tagged ID stored in the memory. Otherwise, an error message will be displayed.

In recent years, RFID is one of the automatic identification technologies. There is a wide research and development in this area trying to take maximum advantage of this technology, and in coming years many new applications and research areas will continue to appear. RFID system has been successfully applied to different areas as diverse as transportation, health-care, agriculture, and hospitality industry to name a few. RFID is also brings about some concerns, mainly the security and privacy of those who work with or use tags in their everyday life which is proposed in.RFID is used to uniquely identify tagged objects or people. RFID systems have been widely used in many application areas such as inventory control, product tracking through manufacturing and assembly, parking lot access and control, Automatic Toll Collection System (ATCS), Bank Locker Security System, Library Management system (LMS), Attendance Management System etc. as discussed. The aim of this paper is to monitor student's attendance by using RFID for administration. Notification will be sent to parents as well as school's/college authority in case of absence of students and faculty in the class and it also gives report about their test marks through SMS process. The rest of the paper is discussed as follows: section II describes in literature review, section III describes brief RFID technology, section IV discusses the system design and finally conclusion is discussed in section
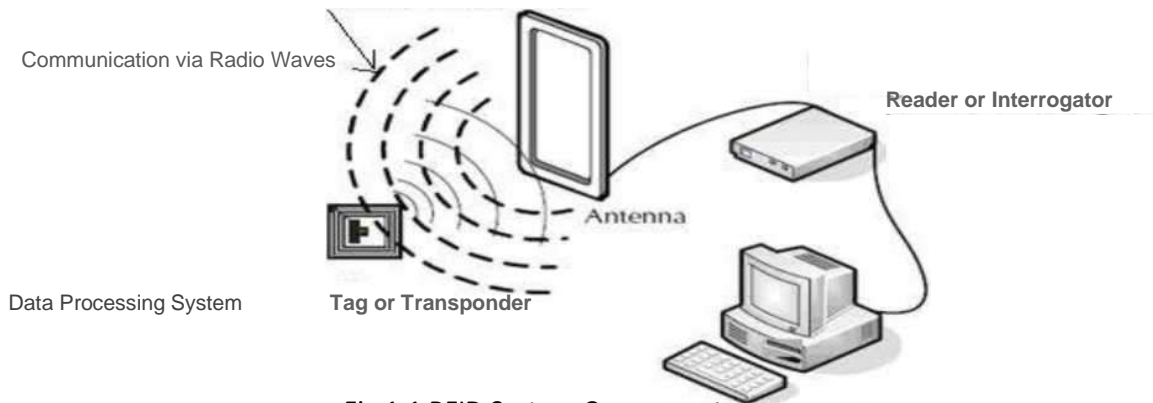
Fig 1.1 RFID System Components

1.1 Literature Survey :

The use of Radio-frequency identification (RFID) technology in automated electronic environment and for tracking objects has been widely researched upon by researchers and deployed by various organizations as part of their automation systems.Zhang Yuru, Chen Delong and Tan Liping ,April, 2013,suggested,The Research and Application of College Student Attendance System based on RFID Technology. Combined with the actual situation of college students class attendance system, the design of student attendance system nodes based on RFID has be proposed. In this paper, the hardware node of system and the develop processes of related application have been detailed presentation. The designed system not only can improve the work efficiency, but also can save human and material resources. SumitaNainan, Romin Parekh and Tanvi Shah, January 2013,suggested that ―RFID Technology Based Attendance Management System. The proposed framework can give another, precise, and less bulky method for taking understudy participation in school and switch the worldview of understudy's address participation checking in classroom. An ease and cheap RFID Based Authentication System model have effectively created. The model of the framework can give a few advantages over the customary strategy for taking participation. This framework will help in programmed capacity of participation and guardians will be informed in instance of non attendance. In this framework utilizing the AVR controller, guarantees quick operation, cost viability and low power utilization. AnkitaAgrawal and AshishBansal, ―Online Attendance Management System Using RFID with Object Counter says that, The Student Attendance System using Radio Frequency Identification technology with object counter will significantly improve the current manual process of student attendance recording and tracking system, especially in a university environment. The system promotes a fully-automated approach in capturing the student attendance and monitoring the student in the university campus. The attendance taken is secure and accurate. The system is user-friendly with easily accessible switches and communication ports. Attendance can be stored and retrieved.

1.2 RFID (Radio Frequency Identification)

RFID stands for Radio Frequency Identification. RFID is a means of identifying a person or object using Radio Frequency Transmission.RFID is used to collect information automatically by radio frequency data communication between a mobile object and an RFID reader to identify and track them. They are most commonly referred to as reader and tag respectively .The RFID system is shown in fig.1. There are Tags and Reader in the system. A typical reader is a device that has one or more antennas that emit radio waves and receive signals back from the tag. To retrieve the data stored on an RFID tag, a reader is needed. RFID is used to read or write information on a tag and passing that information to a system for storage and processing. Generally, RFID system consists of 2 parts Interrogator and Transponders. Interrogator and Transponder are also known as RFID Reader and RFID Tag respectively.

1.2.1   RFID Reader :

RFID Reader is a scanning device that uses the antenna to realise the tags that are in its contiguity. It transmits signals at certain frequencies. RFID readers are usually ON, continuously transmitting radio energy and awaiting any tags that enter their field of operation. EM 18 RFID Reader is shown in fig. 2. RFID Reader RC522 is the device capable of reading and recalling information stored inside the RFID tags. There are two types of RFID readers, the active and the passive RFID readers.

Fig 1.2.1 RFID Reader RC522

Active RFID reader can detect an active RFID tag at few meters to line of Sight while passive RFID reader can only detect passive RFID tag at a few centimeters away from the reader. It operates at frequency of 125 kHz and 12V power supply. The effective detection range of the reader is around 10 cm from the antenna. The RFID reader used in the system is a low cost reader for reading passive RFID tags.

1.2.2   RFID Tags :

 RFID Tag is an IC chip that has unique hexadecimal or electronic product code (EPC) contained in it. Here —UNIQUE‖ refers to each and every code word of the tag and is independent of other code word. The tag acts as a Key that is capable of opening a particular locks [10]. So, it is also named as RFID key. The sequence is a numeric serial, which is stored in the RFID memory. The microchip is available inside RFID tag which is shown in below fig. 3. The microchips contain minute circuitry and an embedded silicon chip. Each tag can store a maximum of 2KB of information in the microchips. The tag memory can be permanent or re-writable, which can be reprogrammed electronically by the reader multiple times. Tags are designed specific to an application and the environment it is proposed in. There are three types of RFID tags which are active, passive, and semi-passive. Active tags are active in nature i.e. they do not require any external source, they have their own in-built battery. It can transmit high frequencies so it can be detected at a longer range. Passive tags are passive in nature i.e. they don't have any battery source built in them. They draw their power from the electromagnetic field generated by the RFID reader. They have no active transmitter and rely on altering the RF field from the transceiver in a way that the reader can detect.
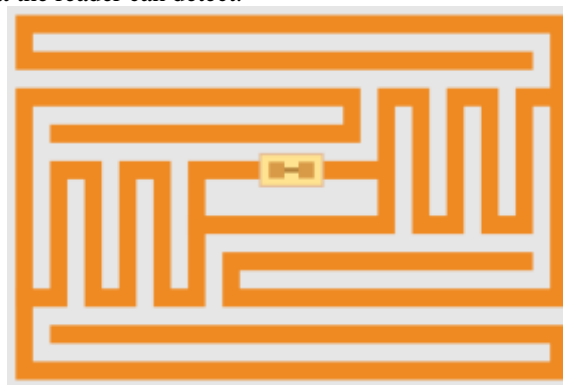

Fig 1.2.2 RFID tags

They transmit low frequencies so that can be detected up to few meters of distance. Tags are available in various shapes and sizes which are shown in fig. 1.2.2. A Semi-Passive tag exists, which has the features of both Active and Passive tags. Semi-Passive Tags have their own power source that powers the microchip only. They have no transmitter and as with Passive tags they rely on altering the RF field from the Transceiver to transmit their data. The different types of RFID Tags are shown in table 1.2.

Issues	Active RFID tags	Passive RFID tags	Semi-passive RFID tags
Tag power source	Internal to tag	Energy transferred from the reader	Internal power source
Availability of tag power	Continuous	Only when found in the field of the reader	Use their battery to power chip only, require a reader to interrogate them first
Required signal strength from reader to tag	Low	High	Not available
Available signal strength from tag to reader	High	Low	Not applicable
Communication range	Long range(Can be 30 m or more)	Short range(Typically under 3 m)	Long range (This research will find out how much this range is?)
Multi-tag collection	Scanning of thousand of tags from a single reader	Scanning of a hundred of tags within 3 meters from	Not available

TABLE 1.2 Features of types of RFID Tags

2. METHODS AND MATERIALS

2.1 Hardware Requirement :
• Arduino Uno Board
• RFID MFRC522 Module
• SD card module
• RTC module
• LCD display (20 x 4) with i2c lcd module
• Jumper Wires
• Soldering Iron
• Solder Wire, Lead Free

2.2 Software Requirement :
• Arduino IDE(Integrated Development Environment)

3. RESULTS & DISCUSSION :

3.1 The aim of this project is:
• To design and integrate RFID trackers in the id cards of students
• To use GIS/GPS technology for location information.
• To use soft computing techniques for automated data updating
• To access various facilities with single card
• Use of technology

3.2 Expected Outcome :
• Safety of the students
• Easy management of data for institution
• Single ID card for any venue/facilities access inside the university.
• It also used in gate pass.

4. CONCLUSION :

We want to create a single card than can allow students to access all the available facilities of the institute with it. To digitalise as much as possible. To track and maintain data in more efficient way. To provide a single platform to manage in store data. This project will help any institute to manage their data and this can be made better by adding some new

options and components like you can add the GSM and send SMS to the parent of the student whenever he his card is scanned for the attendance and you may add many other things.

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