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RFID AND GSM BASED CAMPUS SECURITY SYSTEM

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ABSTRACT

This paper represents the RFID and GSM technology. The main objective of the system is to uniquely identify and to make security for a person. This requires a unique product, which has the capability of distinguishing different person. This is possible by the new emerging technology RFID (Radio Frequency Identification). The main parts of an RFID system are RFID tag (with unique ID number) and RFID reader (for reading the RFID tag). In this system, RFID tag and RFID reader used are operating at 125 KHz. The microcontroller internal memory is used for storing the details.

KEYWORDS: RFID Tag, RFID Card Reader, GSM, DDRAM, EPC Tags.

INTRODUCTION

Most educational institutions' administrators are concerned about campus security. The conventional method allowing access to employee inside an educational campus is by showing photo I-cards to security guard is very time consuming and insecure, hence inefficient. Radio Frequency Identification (RFID) based security system is one of the solutions to address this problem. This system can be used to allow access for student 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 .security access easier, faster and secure as compared to conventional method. Students or workers only need to place their ID card on the reader and they will be allowed to enter the campus. And if any invalid card is shown then the buzzer is turned on.

WORKING OF THE SYSTEM

Initially the power is on and the microcontroller will start, it sends the request to LCD display ‘POWER IS ON’ that is initializing message. When the RFID tags, coming in the range of RFID reader then the tag generates its unique hex code that hex code is read the reader and sends message towards the microcontroller. Microcontroller checking that tag code. Whether the tag hex code is matching any code which has stored in the microcontroller, then the microcontroller sends the request to DC motor to start and at the same time microcontroller sends the message to LCD display ‘THIS IS VALID ENTRY’ and this employees whole detail in the LCD display, and the motor will start to open the door and close the motor to welcome the employee and through GSM sends the message whether this is same person who stored in previous storing data. If any other tag is coming in the range of RFID reader then it is a fake account, then reader can read that different code and sends message ‘ALLERT THIS IS INVALID ENTRY’ and motor will not start at the same time the buzzer will start and the guard is come there and check the person is theft or any other and remove from the campus.

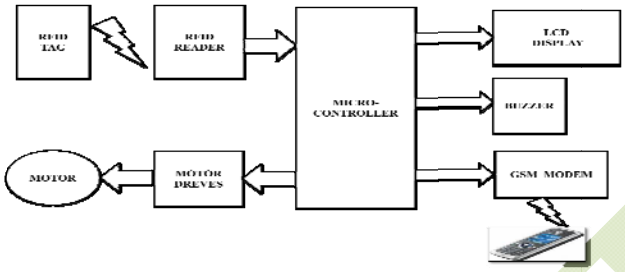

Fig. 1 System Block Diagram

RFID AND GSM TECHNOLOGY

Radio-frequency identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. The technology requires some extent of cooperation of an RFID reader and an RFID tag. An RFID tag is an object that can be applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader.

An RFID tag is comprised of a microchip containing identifying information and an antenna that transmits this data wirelessly to a reader. At its most basic, the chip will contain a serialized identifier, or license plate number, that uniquely identifies that item,

Fig. 2 RFID Tag

Similar to the way many bar codes are used today. A key difference, however is that RFID tags have a higher data capacity than their bar code counterparts. This increases the options for the type of information that can be encoded on the tag, including the manufacturer, batch or lot number, weight, ownership, destination and history (such as the temperature range to which an item has been exposed). In fact, an unlimited list of other types of information can be stored on RFID tags, depending on application needs. An RFID tag can be placed on individual items, cases or pallets for identification purposes, as well as on fixed assets such as trailers, containers, totes, etc.

Fig. 3 RFID Reader

Many types of RFID exist, but at the highest level, we can divide RFID devices into two classes: active and passive. Active tags require a power source they're either connected to a powered infrastructure or use energy stored in an integrated battery. In the latter case, a tag's lifetime is limited by the stored energy, balanced against the number of read operations the device must undergo. One example of an active tag is the transponder attached to an aircraft that identifies its national origin. Another example is a Low jack device attached to a car, which incorporates cellular technology and a GPS to locate the car if stolen. However, batteries make the cost, size, and life-time of active tags impractical for the retail trade. Passive RFID is of interest because the tags don't require batteries or maintenance. The tags also have an indefinite operational life and are small enough to fit into a practical adhesive label. A passive tag consists of three parts: an antenna, a semiconductor chip attached to the antenna, and some form of encapsulation. The tag reader is responsible for powering and communicating with a tag. The tag antenna captures energy and transfers the tag's ID (the tag's chip coordinates this process). The encapsulation maintains the tag's integrity and protects the antenna and chip from environmental conditions or reagents.
Encapsulation could be a small glass vial or a laminar plastic substrate with adhesive on one side to enable easy attachment to goods. Two fundamentally different RFID design approaches exist for transferring power from the reader to the tag: magnetic induction and electromagnetic (EM) wave capture. These two designs take advantage of the EM properties associated with an RF antenna—the near field and the far field. Both can transfer enough power to a remote tag to sustain its operation—typically between 10 W and 1 mW, depending on the tag type. (For comparison, the nominal power an Intel X Scale processor consumes is approximately 500 mW, and an Intel Pentium 4 consumes up to 50 W.) Through various modulation techniques, near- and far-field-based signals can also transmit and receive data.

Fig. 4 GSM Module

GSM (Global System for Mobile Communications) is world's most famous Mobile platform. Mobile phones with SIM cards use GSM technology to help you communicate with your family, friends and business associates.

Interfacing of GSM unit is done through a serial communication link with microcontroller 89E516RD. Whatever data is to be sent to GSM unit is done through this RS 232 link. Level translator translates TTL voltage level to RS-232 compatible level. It is realized with MAX 232.

GSM systems have following advantages over basic land line telephony systems:

1) Mobility
2) Easy availability

3) High up time
we use communication feature of Telephone landlines for internet, e-mail, data connectivity, remote monitoring, computer to computer communication, security systems.

In the same way we can use GSM technology and benefit from its advantages.

Uses GSM technology for following applications:

1. Access control devices: Access control devices can communicate with servers and security staff through SMS messaging. Complete log of transaction is available at the head-office Server instantly without any wiring involved and device can instantly alert security personnel on their mobile phone in case of any problem.

2. Transaction terminals: EDC (Electronic Data Capturing) machines can use SMS messaging to confirm transactions from central servers. The main benefit is that central server can be anywhere in the world.

3. Supply Chain Management: With a central server in your head office with GSM capability, you can receive instant transaction data from all your branch offices, warehouses and business associates with nil downtime and low cost.

SYSTEM DESIGN

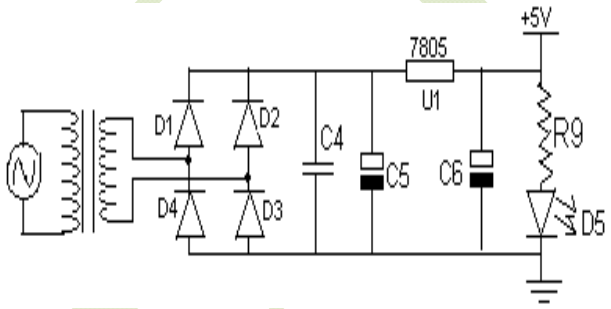

Fig. 5Power Supply Circuit

There are two types of transformer namely Step up and Step Down. We have used Step down transformer as we have to generate 5 VDC supply from the 230 V input AC supply Transformer selection we required 12V for relay. Min Input for 7805 is8 V. So at Input of 7805 we required 8 V with margin consider drop across diode 0.7V so 2 diode conducts drop is 1.4 V. So at secondary we required 10 V

Rectifier is used to rectify the negative half cycles of the output signal of the secondary of the transformer. So at the input of the rectifier we have AC signal with both positive and negative cycles and at the output of the rectifier we have signal with only positive cycles but as this signal is pulsating DC we have to use capacitor to filter out the AC contents of the output signal. There are mainly three types of rectifiers namely half wave, Full wave and Bridge rectifier. Out of these three we have used Bridge rectifier since it give more efficiency.
Filter capacitor is used to remove the AC signal from the output of rectifier. Voltage drop across IC and diode is 4.5V.So dc voltage must be 8V.

Voltage regulator is used after the filter capacitor so as to generate constant DC voltage supply of 5 volts. We have used IC 7805 as a voltage regulator it is a three pin IC which are namely input, ground and output. The regulator has a finger voltage of 3 volts. Hence voltage required at input of regulator is 8 volt.

RESULT

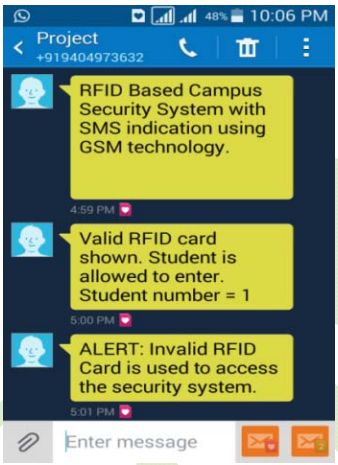

Fig. 6 Result Displayed On Cell Phone

CONCLUSION

So it can be conclude that by design the intelligent campus security tracking system based on RFID and GSM system which has full range of protection on campus, the security can be improved. The intelligent campus security tracking system is based on wireless communication services between nodes provided by RFID sensors and identifies the RFID tags within the region to prevent thefts and track the valuables, so as to protect the property of the campus.

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