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RFID BASED AUTHENTICATION SCHEME USING GSM TECHNOLOGY

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Abstract:

RFID is wireless identification technique which is very popular in these days. It is used for identifying the object by using radio frequency. Now a days it is also used in library management, bank locker security, mall's and show rooms etc. This technique is faster, safe and secure and easy to use with lower overheads in contrast with other conventional techniques like biometrics and bar code etc. RFID has two components one is RFID tag and other one is RFID reader. RFID reader is able to read and fetch data which is saved in the RFID tags. This paper proposes a system for an automatic attendance system for everyone with parent notification via GSM.

Keywords: RFID (Radio Frequency Identification), RFID tags, RFID reader, Micro-controller and GSM.

1. Introduction

RFID use radio frequency to recognise and trace the tag pasted in the instance. In the sense of wireless, it is the method of interaction that use electromagnetic and electrostatic coupling in radio frequency bit of the segment (image etc.) to interact in the middle of tag and reader via designing and encoding plan. RFID is a combination of radio frequency and microchip to create a system that can be used to identify the object. RFID system has a small chip called tag that contain to transmit/transfer some little identifying information to reader and RFID reader that turn to interface with a computer.

In RFID based attendance system with notification to parent using GSM, passive type of reader is used whose maximum range of detecting the object is 10 cm. and it's operate 125 KHz frequency and 12 voltage electric source. This structure having capability of recognising (separately) and taking presence of everyone. The user of this system only needs to enter/place where RFID tag upon the reader to take presence. They don't require passing via the name list or finding and signing in the register. This system takes less time. Presence will be recorded by the tag, and scanned id will be comparing in the id store in memory blocks. Else it will display an failure report.

In some recent years RFID is most used automatic identification technology. There is vast study and work scope in that technology and people are working to get extreme benefit of it. RFID has been successfully applied into different areas diverse as agriculture, hospitality industry, health care and transportation etc. RFID also bring some problems regarding security and protection of individuals who work with tag's every day. RFID use uniquely identify tag object. RFID system has been generally utilise as a part of numerous application regions for example bank locker security system, inventory control, product tracking, automatic toll collection management system, parking lot access control system, library management system, etc.

The aim of this paper is to monitor student's attendance by using RFID. And notification will be sent to parent as well as authority in case of absence of student in the class.
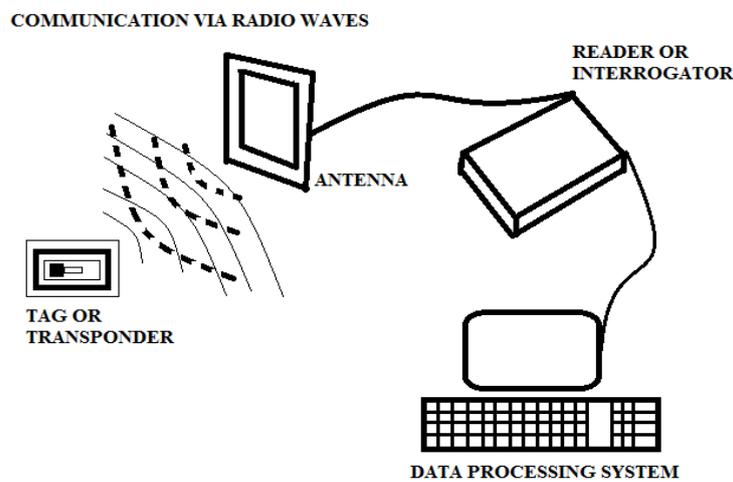

Fig: 1

2. RFID System Components

2.1. Radio Frequency Identification

RFID means radio frequency identification. That means, identifying an object using radio frequency transmission. It utilizes to gather data naturally by radio frequency transmission information correspondence with a device like mobile instance and an RFID reader to recognise and trace. In the RFID system there are tags and reader. A reader is a gadget which has minimum of one and more antenna it identifies radio waves and gets signals which is send via tag. To retrieve the data which is saved upon a RFID tag, a reader needed that data to process. RFID is utilising to peruse and compose data on a tag and pass this data to a framework which stores and handles this data.

Generally, RFID consist of 2 parts interrogator and transponders. They are also known as RFID reader and tag respectively.

2.2. RFID Reader

It is a scanning gadget which uses antenna to identify the tag. It sends signals at certain frequency. Reader is usually permanently on and continuously send radio frequency and waiting for response from any tag that enter some data for processing. EM 18 is a device which is able of read and fetches data which is saved in the RFID tag. We have two types of RFID reader one is active reader and other is passive reader.

Active RFID reader

It can identify only an active tag and it can cover some meters of distance to the device.

Passive RFID reader

Passive reader can identify only few centimetres away from the device. It operates 125 KILO HERTZ and 12 volt electric source. The powerful range of this reader is nearly 10 centimetres away the antenna. The reader used in RFID system is cheap for reading passive tags.

2.3. RFID tags

It is an integrated circuit chip and it has hexadecimal code or it has EPC (Electronic Product Code)pasted in it. Unique means tag independent code no code is similar in any of the tags. All the codes are different is each and every tags. The tag work as a key that is capable to unlock the particular reader (lock). That's why it also has another name called RFID key. The sequence of the rid tag is a numeric series which is stored in RFID memory.

One microchip is available inside the RFID tag which is shown below in a figure. The microchip includes a small circuit which is bind with a chip which is made by silicon. Each and every tag can store 2 kb of data in microchip. We can erase the tag memory or it could be permanent. The tag can be re-designed through the RFID reader couple of time. All the tags are composed particularly for an application.
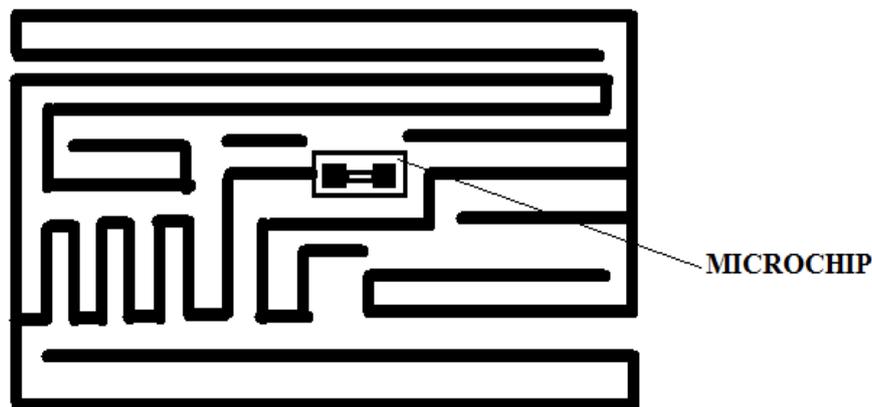

Fig:2

Here three kinds of RFID tags, active, semi active, passive tags. Active tags are active in nature that is they do not require any external resource/ source for power. They have their own inbuilt battery which is use for active the tag permanently. It can release high frequency so that it can detect or found in longer range. And passive tags are passive in nature, they do not have inbuilt battery for power resource. They take power from an electromagnetic resource generated by the reader. Passive tags do not have any active transmitter so that reader can detect passive tags.

Feature	Passive	Active	Semi-Passive
Range of reading	small(0-10 cm)	big(0-100m)	big(0-100m)
Battery	No	Yes	Yes
Life Validity	0-20 Years	Within 5 -10 Years	0-10 Years
Data base	128 B read/ write	128 Kb read/ write	128 Kb read/ write
Cost	Cheap	Very Expensive	Expensive
Application	Attendance Management System	Screen the state of crisp produce	Estimation of temperature occasionally

They transmit low frequencies so they can be identified up to few meters of separation. Tags are accessible in different shapes and sizes. A Semi-Passive tagstands, which have elements of altogether Active and Passive tags. Semi-Passive Tags have their own energy source that powers the microchip just. They have no transmitter and as with Passive tags they depend on changing the RF field from the Handset to transmit their information. The distinctive sorts of RFIDtags are appeared in table 1. Tags operate on less frequency (30-300 Kilohertz), large frequency (3-30Megaheartz), very large frequency (300MHZ-3Gigaartz) and microwave (2.4-5 GHZ).

3. System Design

For implementation the RFID based attendance System with notification with GSM, the hardware and software designs are discussed below.

3.1. Hardware design

The system is for automatic attendance of both student and professors etc. the basic idea is while entering the class room or anywhere else (where the device is enabled) students, professor and employee etc. have to give their attendance using RFID cards. This data will forward to the system after processing it will go through the microcontroller where it will be stored. If anybody absent then the notification will be sent to the authority. The

figure beneath is showing the architecture of this framework. In this system there is a label/tag that is fixed upon the identity card to help in wireless communication with reader, which returns back the label's identity. The information of student is loaded in RFID tag/label and is read by the RFID reader. After that the Microcontroller gets the data from RFIDreader, transforms it and forwards it to both computer and the GSM module.
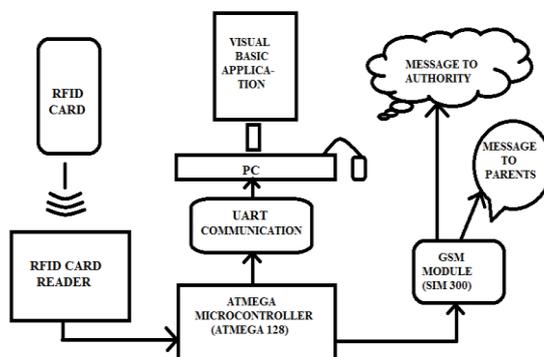

Fig: 3

GSM (Global System for Mobile correspondences) is utilized to transfer SMS to understudy's guardians regarding their nonappearance in classes .GSM SIM 300 is an open, propelled cell advancement used for broadcasting portable voice and data organization. GSM works in the 900MHz and 1.8GHz groups. GSM underpins information exchange velocities of up to 9.6 kbps, permitting the transmission of fundamental information administrations, for example, SMS.

The equipment of the framework is appeared in diagram. This framework comprises of RFID Reader, GSM SIM 300 module, microcontroller with LCD. Functioning of the framework is examined beneath. At the point when understudies filter the RFID labels to RFID reader, information will be sent to the microcontroller through Max232 and it will be showed on LCD. Microcontroller forwards the information to database in the Computer to coordinating understudy subtle elements and data is put away in the database. Subsequent to coordinating, Computer forwards details to controller furthermore, it will be showed on LCD "present" 10 minutes later, for understudies who are missing, Computer forwards message to microcontroller. Microcontroller sends the message to guardians through GSM

3.2.Software design

The system will follow some steps.

Step 1: Initialise the RFID reader

Step 2: Initialise the LCD monitor

Step 3: Initialise the universal asynchronous receiver/transmitter

Step 4: Scan RFID tags

Step 5: Send scan data (tags data) to microcontroller

Step 6: With the help of microcontroller attempt the shifting actions to evacuate undesirable data column and fetch id.

**Step 7:** Search id tags in database with the help of scanned RFID tags.

Step 8: Compare the id tags, if found then jump to step 8 otherwise jumps to *step 4.*

Step 9: Compare detect tags id, date and time including timetable and if the mapped is discovered then jumps to step 9 otherwise jumps to step 4.

Step 10: Repeat step no. 4 to step 9 for all row of data which is available in database.

Step 11: After some min check for present and if student is absent then send sms to parent and authority.

Direction flow diagram shows how the system works.
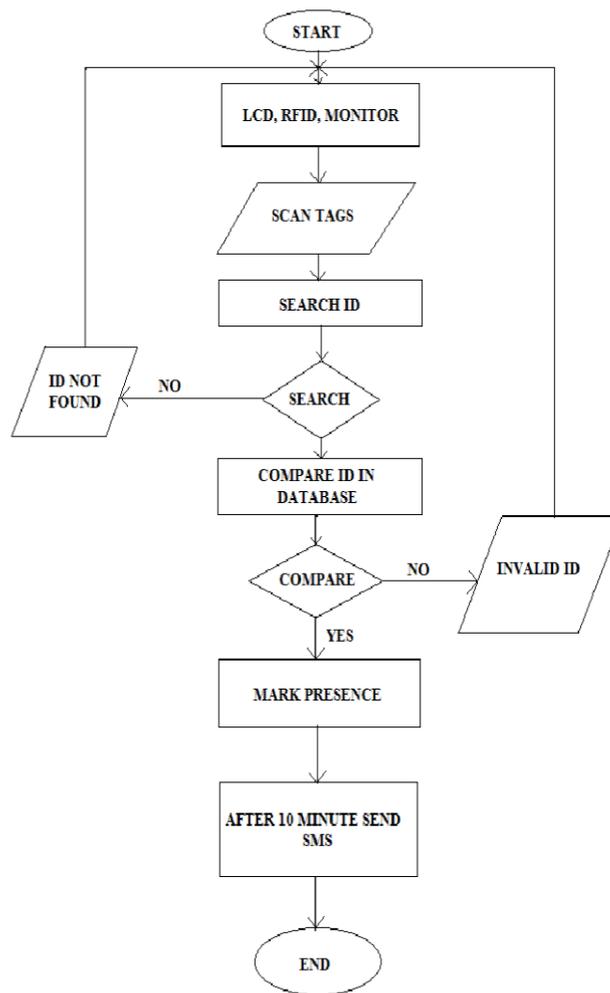
DIORECTIONAL FLOW OF SYATEM

Fig: 4

4. Conclusion

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 nonattendance. In this framework utilizing the AVR controller, guarantees quick operation, cost viability and low power utilization.

4. References

1. R.Ramani, S.Valarmathy, S. Selvaraju and P.Niranjan, ―BankLocker Security System based on RFID and GSM Technology‖– (0975– 8887)International Journal of Computer Applications) Volume57– No.18, November 2012.

2. Zatin Singhal and Rajneesh Kumar Gujral―Anytime AnywhereRemote Monitoring of Attendance System based on RFID using GSM Network‖ International Journal of Computer Applications (0975 –8887) Volume 39– No.3, February 2012.

3. Sumita Nainan, Romin Parekh and Tanvi Shah, ―RFID TechnologyBased Attendance Management System‖ IJCSI International Journal ofComputer Science Issues, Vol. 10, Issue 1, No 1, January 2013.

4. Zhang Yuru, Chen Delong and Tan Liping, ―The Research andApplication of College Student Attendance System based on RFIDTechnology‖ International Journal of Control and Automation Vol.6, No. 2, April, 2013.

5. L.M. Ni, Y. Liu, Y.C. Lau, and A.P. Patil, "LANDMARC: indoor locationsensing using active RFID", Proceedings of the First IEEE Conference onPervasive Computing and Communications (PerCom'03), IEEE ComputerSociety, March 23-26, 2003, pp. 407-415.

6. Aysha Qaiser and Shoab A Khan, ―Automation of Time andAttendance using RFID Systems‖ 2nd International Conference onEmerging Technologies, Peshawar, Pakistan, November 2006.

7. T.S. Lim, S.C. Sim and M.M. Mansor, ―RFID Based AttendanceSystem‖ 2009 IEEE Symposium on Industrial Electronics andApplications (ISIEA 2009), Kuala Lumpur, Malaysia, October 4-6,2009.

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