

## STUDENTS MONITORING SYSTEM USING RFID- TYPE EMBEDDED

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### ABSTRACT:

Attendance Management system is required to assist the faculty members and for time consuming process. Generally paper based attendance system which may sometimes causes errors. For this purpose, the most convenient method to yield the attendance is automatic monitoring attendance system using RFID. In proposed system, each student is issued a RFID tag. This tag contains an integrated in built circuit that is used for storing, processing information through modulating and demodulating of the radio frequency signal that is being transmitted. The data is collected in RFID card is referred as the attendance of the person.

### KEYWORDS:

RFID, RFID tags, RFID receiver, Lecturer, Students, Attendance.

### INTRODUCTION:

Radio Frequency Identification (RFID) is a technology that uses radio waves to transfer data from an electronic tag, called RFID tag or label, attached to an object, through a reader for the purpose of identifying and tracking the object. Radio Frequency Identification

(RFID) is a matured technology that incorporates the use of electromagnetic or electrostatic coupling in the radio Frequency portion of electromagnetic spectrum to identify a person. RFID chip contains the radio transmitter that emits the coded identification number when queried by a reader device. Some RFID tags can read from several meters away and beyond line of sight of the reader. The RFID tag includes a small RF transmitted that transmits an encoded radio system to interrogate the tag, and receiver which receives the message and responds with its identification information. The RFID attendance system is an automatic embedded system used in taking attendance of registered persons in a particular organization. The RFID attendance system offers an organisation, the efficiency and convenience associated by the RFID technology at low cost. The ID card of the students is embedded with RFID tag which is read by a reader. This method is more effective to prevent the problem encountered when getting attendance manually. We register the new card entry with software at any time. The time is preset using keys for demonstration purpose. But we can set the constant time using software.

## RELATED WORK:

This section describes previous work done regarding attendance system. Attendance records are necessary to conclude and authenticate students as well as employees of organization. Therefore, many researchers have been done research in this area to improve and replace the traditional system of attendance by RFID technology. Mohd. Helmyetal [1] describes the integration of mobile device with software for recording examination attendance is sufficient. In a test, it was found that it reduces time, manpower, cost (printing and paper), and eases the examination procedures. The establishment of remote monitoring platform based on a GSM short message mode that can monitor and control the remote communication between the central monitoring station and remote monitoring stations. The remote monitoring station can send the short message because GSM network can interconnect and roam all over the country, and its network ability is very strong; the user will no need another network. In [3] proposed a system which utilizes the GSM short message service and microcontroller to achieve remote real-time data monitoring expressed low cost RFID Based Attendance System prototype, the system provides several advantages over conventional method of taking attendance in class. The prototype developed in this project is compact and light weight. Besides, it can run using power adapter or battery power.

## RFID CHARACTERISTICS:

Radio frequency waves are the waves whose frequency band lies in the range of 3 KHz to 300 GHz, thus it is a wireless technique of identifying objects. It uses electrostatic and electromagnetic coupling and a variety of modulation and encoding techniques between chip and the reader for transferring the data. Electrostatic refers to

the phenomena of static (without acceleration) electric charges. Modulation is defined as the technique of transferring the data to longer distance by introducing the carrier wave to the modulating wave. Encoding is defined as converting the data from one suitable form to another suitable form. Various encoding schemes are Polar form, Non-Polar form, NRZ encoding, Manchester encoding, etc. There are two components in RFID system and that are explained as below:

1. RFID Tag is an IC chip that has unique hexadecimal or electronic product code (EPC) contained in it. Here "UNIQUE" refers that each and every code word of the tag is independent of other code word. The tag acts as a key that is capable of opening a particular lock. So, it is also named as RFID key. The tag is classified into 2 categories: Active tags and Passive tags.

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 detectable to a longer range.

Passive tags are passive in nature i.e. they do not have any battery source built in them. They transmit low frequencies so they are detectable up to few meters of distance.



2. RFID reader is a system which transmits and receive the data to the tag or keys by the radio waves.



#### **SYSTEM OPERATION, TESTING AND DISCUSSION:**

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, with 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.

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 depicted.

The tag is activated when it passes through a radio frequency (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.

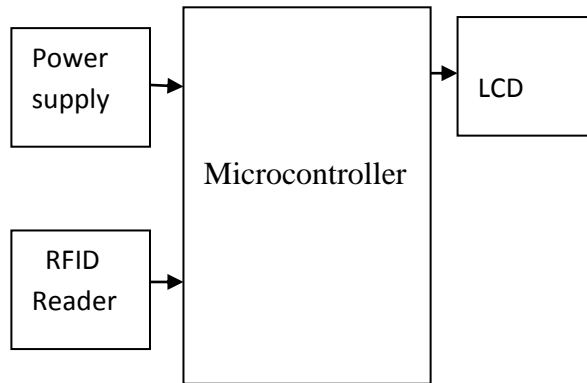
Due to the reason of cost and flexibility of implementation, this RFID attendance design application uses a passive tag and thus for every class, students would have to bring their tags close to the reader (about 10 cm from the reader). On doing this, the reader reads the tag and the application program records the student's arrival time and when leaving the class, students will also have to bring their tags close to the reader again.

The lecturer/instructor can call for information over any student by using queries provided by the application. More flexibility and unconscious interaction of students to the developed system can be achieved by using active tags. This will increase the overall cost of the system. At the end of the semester, the lecturer can grade students attendance scores in a particular course based on some specific metrics provided in the application. The selected metrics could be frequency of presence in class, duration of stay in class, punctuality, etc. The program gives the respected output.

#### **PROPOSED SYSTEM:**

Proposed system mainly consists of RFID tag and RFID reader and the overall process is controlled by the microcontroller. RFID reader is used to detects the tag. These tags have provided to students with particular ID. As soon as the student with valid RFID card comes near to the RFID detector, detector will sense the card and collect the necessary information present in the card. Microcontroller is used for controlling the events. Proposed block diagram of RFID attendance based system is shown in the

below figure. It has shown the main blocks that are used in this system.



Block diagram of the system.

System Parameters	Barcode	Biometry	Smart card	RFID
Data quantity	1-100		16-64 k	16-64 k
Data density	Low	High	Very High	Very High
Machine readability	Good	Expensive	Good	Good
Readability by people	Limited	Difficult	Impossible	Impossible
Influence of dirt/damp	Very high	-	Possible	No influence
Influence of (opt.) covering	Total failure	Possible	-	No influence
Influence of direction and position	Low	-	Unidirectional	No influence
Degradation/wear	Limited	-	Contacts	No influence
Purchase cost/reading electronics	Very low	Very high	Low	Medium
Operating costs	Low	None	Medium	None
Reading speed (including handling of data carrier)	Low ~4 s	Very low > 5-10 s	Low ~4 s	Very fast ~0.5s

Table 1: Comparison of different auto-id technologies

**CONCLUSION:**

The developed Web-Based Student Attendance System using Radio Frequency Identification technology will significantly improve the current manual process of student attendance recording and tracking system, especially in a university or school environment. The system promotes a semi-automated approach in capturing the student attendance, i.e. by having the students to flash their student cards to the RFID reader. In addition, a number of other advantages are gained by having an online web-based system, acting as a central repository of student attendance record.

Firstly all processes of managing the student attendance record are performed online, allowing administrators and lecturers to view or modify the users' data through any computer via the web browser, as long as they are connected to the Internet. This way, no specific software installation is required. The captured student attendance data are also processed and analyze automatically with less risk of data loss, compared to a manual filing approach. Specific to lecturers or teachers, they can easily monitor their students' attendance online and this could improve the quality of teaching since less time is needed to manage the student attendance record. The developed system can be improved and upgraded further, e.g. by extending the system with new features and modules or by improving the web interface layout with new display style. Better yet the system can be enhanced further to offer another significant enhancement where the system can be extended to monitor staff attendance record.

**RECOMMENDATIONS:**

Every good engineering design innovation has limitations. This passive RFID based lecture attendance monitoring system is not without limitation as a data collection technology with accurate and

timely data entry. Hence, the limitation of this design would be improved upon in future by considering the following salient recommendations: By incorporating a facial recognition application that would serve to further increase the biometric security of the system against impersonation by erring students. Usage of High Frequency (HF) active RFID tags against passive Low frequency (LF) RFID tags for better performance and flexibility of users Performance evaluation of combination of thumbprint, facial recognition and RFID technology to students' attendance monitoring problem.

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