

RADIO FREQUENCY IDENTIFICATION (RFID) BASED ATTENDANCE SYSTEM WITH AUTOMATIC DOOR UNIT

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ABSTRACT

In recent years, there are rise within the variety of applications based on Radio Frequency Identification (RFID) systems and are successfully applied to different areas such as transportation, health-care, agriculture, and cordial reception business to name some. RFID technology facilitates automatic wireless identification using electronic passive and active tags with appropriate readers. In this paper, an endeavor is created to resolve recurrent lecture attendance monitoring drawback in developing countries using RFID technology.

The application of RFID to student attendance monitoring as developed and deployed during this study is capable of eliminating time wasted throughout manual assortment of attendance and a chance for the academic administrators to capture face-to-face classroom statistics for allocation of acceptable attendance scores and for further managerial decisions.

Keywords: RFID, Lecture, Attendance, Passive tag, Reader

I.INTRODUCTION

Radio-frequency identification (RFID) is a technology that uses radio waves to transfer information from electronic tag, known as RFID tag or label, hooked up to an object through a reader with the aim 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 the electromagnetic spectrum to unambiguously identify an object, animal, or person. RFID chips contain a radio transmitter that emits a coded identification number when queried by a reader device. Some RFID tags can be read from several meters away and beyond the line of sight of the reader. The application of bulk reading enables an almost-parallel reading of tags. This small kind is incorporated in consumer product, and even implanted in pets, for identification.

The tag's info is stored electronically. The RFID tag includes a small RF transmitter that transmits an encoded radio signal to interrogate the card and receiver that receives the message and responds with its identification info. Some RFID tags don't use battery. Instead, the tag uses the radio energy transmitted by the reader as its energy source. The RFID system design includes a method of discriminating several tags/cards that



may be within the range of the RFID reader. RFID is employed in several applications. A tag is glued to any object and used to track and manage inventory, assets, people, etc. for instance, it is glued to cars, computer equipment, books, mobile phones, etc. The health care trade has used RFID to cut back tally, looking for things and auditing items. Several financial institutions use RFID to trace key assets and automatize compliance. Also with recent advances in social media RFID is being employed to tie the physical world with the virtual world. RFID in Social Media 1st came to light in 2010 with Facebook's annual conference.

RFID may be a superior and more efficient way of identifying objects than manual system or use of Universal Product Code systems that are in use since the 1970s. RFID tags (those while not a battery) can be scanned if passed enough proximity to associate RFID reader. It's not necessary to "show" the tag to the reader device, like a Universal Product Code. In other words, it doesn't need line of sight to "see" associate RFID tag, the tag can be read inside a case, carton, box or different instrumentality, and in contrast to barcodes RFID tags can be read hundreds at a time. Bar codes will solely be scanned one at a time. Radio frequency identification (RFID) is a matured technology that comes with the employment of electromagnetic or static coupling in the frequency portion of the spectrum to unambiguously determine associated object, animal, or person. They're classified beneath the automatic identification (Auto-ID) technologies. RFID tags don't seem to be an "improved bar code" as the proponents of the technology would love you to believe. An RFID system consists of 3 parts that include: an antenna, a transceiver and a transponder (the tag). The antenna and therefore the transceiver are often incorporated into one reader. The antenna uses radio frequency waves to transmit a signal that activates the transponder. Once activated, the tag transmits data back to the antenna. The RFID can scan the tag using radio frequency, which means that the RFID scanner can be read from a distance, all over your garments, wallet, bags etc. An RFID tag consists of unique ID for every tag. The RFID technology has been in existence since the early 1920s. This technology has been employed in libraries, museums, race timing, toll collection and contactless payment, tracking of persons and animals etc. The RFID attendance system is an automatic embedded system employed in taking attendance of registered persons in a particular organization. The RFID attendance system offers an organization, the efficiency and convenience associated with RFID technology at a low cost. This technique is quick as well as easy. Every employee uses an RFID card and therefore the reader records the info once the worker enters or exits. RFID devices and software should be supported by a sophisticated software architecture that permits the collection and distribution of location primarily based info in close to real time. A whole image of the RFID attendance system combines the RFID Tags and readers with access to world standardized database, ensuring real time access to up-to-date info on the card. The card contains a unique identification number known as an electronic product code (EPC). Nowadays, there are a lot of corporations around the world and a few of them consist of workers up to ten thousand or more. To handle an oversized range of staff may be a problem especially to get the attendance of the staff.

This manual method has some flaws because in a case where a worker bribes the time officer or is familiar with him, the time officer might tamper with the attendance records. The manual method means whenever an employee involves work, he goes to sign at the time officer's table. This manual method has some flaws because in a case where a worker bribes the time officer or is familiar with him, the time officer might tamper with the attendance records. This would be an enormous downside within the company and might have an effect on the productivity and management of the corporate. The suitable answer for this downside is by planning a system that may record group action mechanically. During this project, RFID system is employed to record the numbers of employees' attendance mechanically. The ID cards of the workers are embedded with RFID tag which is read by a reader. This RFID system is interfaced to a database through a computer. This technique is simpler to stop downside encountered once obtaining attendance manually.

Below is that the diagram of associate RFID attendance system.

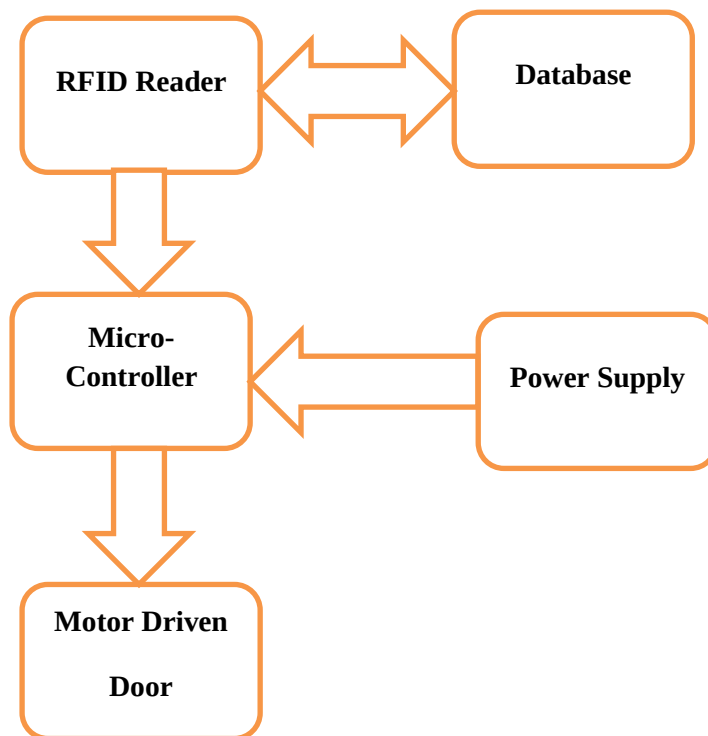


Fig. Block diagram of an RFID attendance system with door unit

The RFID attendance system offers the organization, the efficiency and convenience associated with RFID technology at a low cost. Each employee uses an RFID card and the reader records the data when the employee enters or exits.

II. OPERATIONS

RFID devices and software are supported by a sophisticated software architecture that enables the collection and distribution of location based information in near real time. A complete picture of the RFID attendance system combines the RFID Tags and readers with access to global standardized database, ensuring real time access to up-to-date information on the card. The card contains a unique identification number called an electronic product code (EPC). The RFID tag can be read from a distance and the embedded electronic information for each card can be over written repeatedly. This increases technologies like surveillance cameras to be activated in conjunction with an employee being in their vicinity. The RFID attendance system is faster, and does not require line of sight. The RFID system has higher data storage. In the RFID systems, the transponders are also easy to conceal or incorporate in other items. For example in 2009, researchers successfully glued RFID micro transponder to live ants in order to study their behavior [1]. Furthermore, multiple RFID cards can be read all at the same time. Information about the employees' access and attendance can be stored on the database.

III. FREQUENCY BAND

Frequency refers to the size of the radio waves used to communicate between the RFID system's components. It can be assumed that higher frequency resulting faster data transfer rate and longer reading distance. However as frequency increases, the sensitivity to environmental factor also increases. RFID system currently operates at Low Frequency, High Frequency and Ultra High Frequency. Generally a lower frequency means a lower read range and slower data read rate, but increased capabilities for reading near or on metal or liquid surfaces. The frequency chart is shown in table:

Frequency Band	Description	Operating range	Applications	Benefits	Drawbacks
125KHz To 134KHz	Low frequency	Less than 0.5m to 1.5ft	Access control, animal tracking point of sale application, product authentication, vehicle immobilizer etc	Works well around water and metal products	Short read range and slower read rate
13.56M Hz	High Frequency	Less than 1m to 3ft	Smartcards library books, airline baggage etc	Low cost of tag	High read rate when compared to low frequency

860MHz	Ultra high	3m	Parking lot access, Electronic	EPC standard	Does Not
To	Frequency	to	s toll collection	built around	work Well
930MHz	(UHF)	9ft	Etc	this frequency	with High
					water Or
					metal content
2.4GHz	Microwave	1m	Airline baggage,	Most	Fastest Read
		to	electronic toll collection	expensive	rate
		3ft			

The Radio Frequency Identification (RFID) Application Areas :

In 2010 three key factors drove a significant increase in RFID usage. They include; decreased cost of equipment and tags, increased performance to a reliability of 99.9% and a stable international standard around UHF passive tag. The areas of significant use are financial services for Information Technology asset tracking and healthcare with more than 60% of the top medical device companies using passive UHF RFID in 2010. RFID is becoming increasingly prevalent as the price of the technology decreases. Therefore, the current uses include:

1. Electronic Vehicle Registration.
2. Payment by mobile phones.
3. Transportation payment at toll barriers.
4. Public transit (bus, rail, subways).
5. Asset management and retail sale.
6. Schools and universities.
7. Human implants.

IV.CONCLUSION

In conclusion, the objective to build an RFID based attendance system with a door unit was successfully achieved. In terms of performance and efficiency, this project has provided a convenient method of attendance marking compared to the traditional method of attendance system. By using databases, the data is more organized. This system is also a user friendly system as data manipulation and retrieval can be done via the interface, making it a universal attendance system. Thus, it can be implemented in either an academic institution or in organizations.

However, some further improvements can be made on this RFID in order to increase its reliability and effectiveness. By incorporated an indicator or an LCD screen in the system to indicate when an unregistered



card is scanned. An IP camera can be integrated into this system to enable the monitor to view the person who makes the transaction to avoid a problem of a person scanning in for another person. *A reminder alert also can be developed to effectively track any ID that has been absent for an unacceptable times in a row. *Finally, this attendance system can be improved by adding a feature where the attendance system indicates when an employee or a student is late for work or classes as the case maybe.

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