A Study on Tracking Attendance with RFID Technology

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ABSTRACT: Radio frequency identification (RFID) is a common wireless identification method used to assign unique identifiers to a wide variety of items, including people, vehicles, and merchandise. When compared to the previous method, this one has many more benefits, is safer, more secure, and simpler to implement, all while having fewer prerequisites. Both the RFID tag and the RFID reader work together to make this system very quickly. Student attendance has recently been recognized as one of the critical factors or concerns that indicate academic accomplishments and effectiveness provided to any institution, as opposed to old approaches that enforce time-consuming and inefficient requirements. Various automated identifying methods, like Radio Frequency Identification, have become increasingly popular (RFID). This study uses RFID technology to address the reoccurring issue of tracking student attendance in less-resourced classrooms. This study also shows that using RFID to track students' whereabouts in the classroom may save both students' and teachers' time, allowing for more accurate attendance tracking and better management choices.

KEYWORDS: Attendance, Barcodes, Identity Document (ID), Radio frequency identification (RFID).

1. INTRODUCTION

A real-time monitoring system that examines the system while the monitor itself is located at a distant or mobile location is referred to as a remote monitoring system. The traditional way of collecting attendance, which consists of shouting out names or having people sign their names on paper, takes a significant amount of time, is not particularly secure, and is thus inefficient. One of the potential answers to this issue is an attendance system that is based on radio frequency identification, sometimes known as RFID. Attendance may be taken using this approach for students in elementary school, high school, university, and college settings [1].

In addition to that, it may be used as a tool for recording the attendance of employees in various working environments. In comparison to the traditional way, this one makes taking attendance simpler, more expedient, and more secure thanks to its capacity to unambiguously identify each individual based on the RFID tag kind of identification card they use. It is sufficient for employees or students to just put their identification cards on the reader for their presence to be promptly recorded [2].

The evolution of student monitoring and management systems is only one example of how IT has contributed to the betterment of the educational sector and related fields. Therefore, it is a crucial topic for schools, colleges, and universities to keep tabs on and control student attendance. As a result of its potential to encourage students to show up on time, improve the efficacy of their

learning, raise their learning grades, and therefore raise and improve the quality of their education [3]. . Therefore, attendance systems are more likely to help with streamlining the bureaucracy and saving money than with improving instructional effectiveness. Recent advances in digital technology, such as Wireless Sensor Networks (WSNs), have the potential to transform the future of research and significantly impact people's daily lives. Face recognition, signatures, fingerprints, voices, irises, barcodes, Bluetooth, Near-Field Communication (NFC), RFID, and other biometrics methods are used to authenticate identities [4].

Regular class participation is a fundamental aspect of every successful classroom. The calling role has always fallen on the instructor. This not only wastes time but also limits your options when it comes to producing reports and analytics. Many technologies, such as a barcode-based attendance system, facial recognition, and fingerprint identification, have been developed by researchers to eradicate the time-consuming and error-prone human attendance procedure represented by paper sheet signatures. However, there are still certain obstacles and challenges with these systems [5].

2. DISCUSSION

The term "attendance" refers to the act of physically checking in with a venue or event to see how many people are there. An attendance management system is a program for checking off names and other data on a long list of people, such as students or workers. Radio Frequency Identification (RFID) technology is a useful tool for managing student attendance and bolstering classroom safety. These RFID-based initiatives are being developed to capture students' attendance as they enter and exit classrooms during the class time [6]. Similarly, Yuru et al. describe an RFID-based comprehensive student attendance system and its corresponding hardware node, as well as a thorough breakdown of how the system's accompanying applications came to be [3].

Furthermore, Kurniali et al. developed a web-based RFID reading system for tracking student attendance; the primary results of their suggested system centered on the drastic minimization or complete elimination of human labor. Although it did create some technical issues and slowed down system adoption, the system ultimately resulted in quicker procedures, fewer inventories, fewer attempts, and higher quality through direct cost savings [7]. Students' regular participation in class is crucial to the success of the educational system; when they are absent, they miss out on important information and may even fail to grasp concepts that have been introduced. One common reason for students to miss class is that they ditch it, making an accurate attendance management system all the more crucial [8].

RFID has expanded rapidly over the past few decades in response to the needs of contemporary industry, where precise data collection and system efficiency enhancements are paramount shown in Figure 1. The electronic equipment's foundational pieces are the RFID reader and also the Radio - frequency identification, of which many varieties have been produced to meet different application requirements [9]. Industrial, airline, and attendance management systems all make utilization of this technology; and also the Internet of Things will help make these applications even more efficient [10].
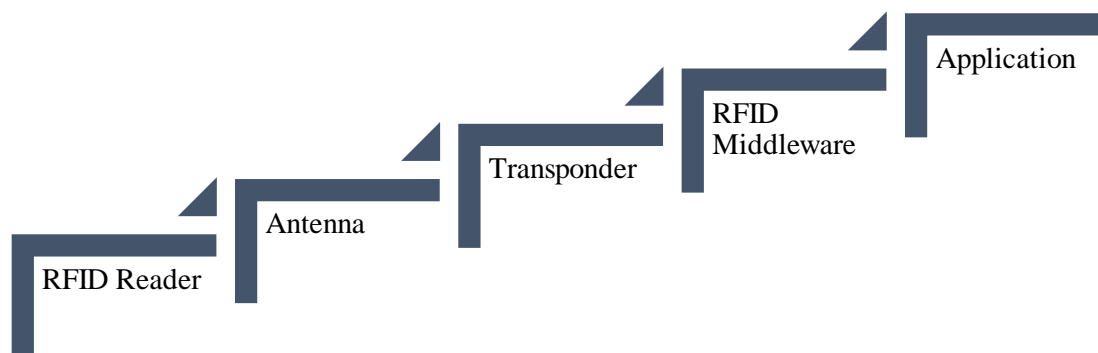
Figure 1: Displays the Structure of a Radio Frequency Identification (RFID) Network.

2.1.Technology for taking attendance:

2.1.1. Barcode:

Students in this technology have barcode technology printable on their student card numbers, which could be interpreted by a barcode reader when the barcodes are presented. This presence is quick enough and does not cost an arm and a leg, but this system has a flaw in that barcode technology could be conveniently recreated by printing them using a standard printer.

2.1.2. Magnetic Stripe:

The utilization of magnetic strips has the potential to make up for the shortcomings of barcodes. This is because, in this technology, a magnetic card is needed to be used as a form of identification for each student. However, the data redundancy of magnetic cards is not an easy task since it necessitates a permanent magnet card reader as well as a magnetic card writer. Due to the high cost of these devices, students do not have easy access to them [11].

2.1.3. Biometric:

The use of existence via biometrics is an ideal option since the Identification of each student may be a fingerprint, retinal scan, or facial recognition. This makes the use of biometrics an extremely convenient solution. Having said that, one must take into account the fact that the cost of this apparatus is rather high. The use of a Radio Frequency Identification (RFID) attendance management comes highly recommended. This is because the required equipment could be purchased for a reasonable price and also the attendance procedures could be completed in a short amount of time, which means that using this device to create a monitoring system existence could save both time and money [12].

2.2.RFID-based time and attendance tracking system:

A tag, which is affixed to the item to be recognized, and a reader, which reads the tag, are the two essential parts of an RFID system. A reader has an antenna as well as radio frequency modules that together produce very resonance frequency magnetic waves. RFID systems are made up of three parts: a screening antenna, a transceiver, and a transponder. An RFID reader or interrogation

is created whenever the reading antennas and transmitter are coupled. RFID readers are classified into two types: fixed scanners and mobile readers. RFID readers are network-connected devices that may be portable or fixed. It transmits impulses that actuate the tag through radio waves. When triggered, the tag transmits a wave back to the antenna, which converts it into data [13].
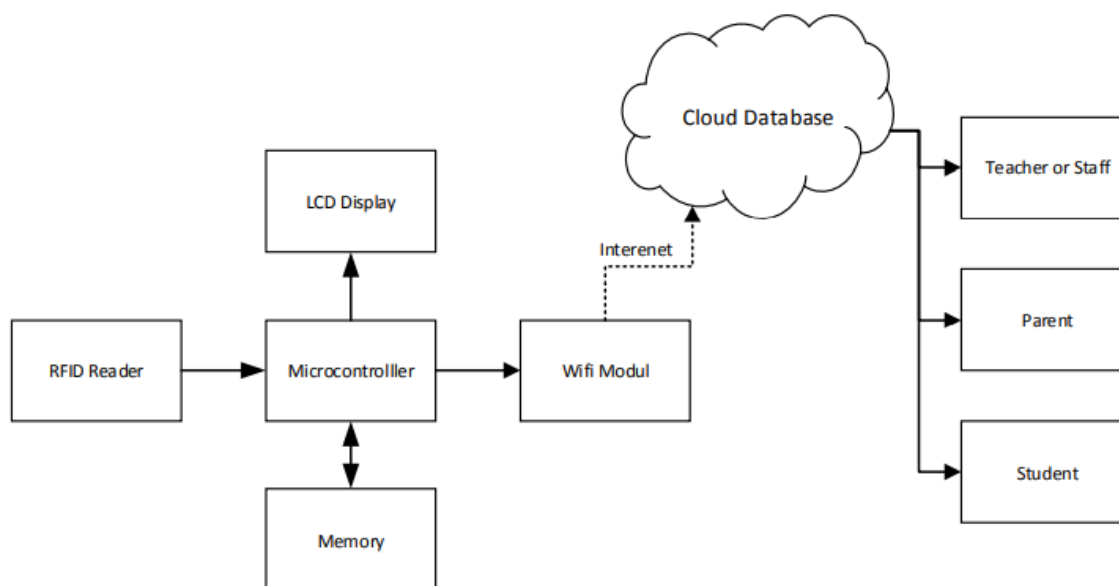

Figure 2: Displays the Schematic representation of the attendance tracking system [14]**.**

Figure 2, is a block diagram. Demonstrate the use of RFID technology to take attendance; each student is equipped with a Rfid system for use in this system. When a student places their tag close to the reader, the microcontroller compares the ID it receives with the student information stored in the memory; this information includes the names of the students and also the course for which they are required to register (IoT) [15]. Student ID data, time and date of attendees, courses, and attendance on which week are all stored in the cloud database after the RFID reader scans the tags and compares the results to the dataset. If the results are a good match, the existing data is saved to the cloud server; otherwise, the student is required to check the labels again. Two distinct types of users may access the attendance data stored in a cloud dataset: teachers and administrators, who see the attendance of students data collected by class, and parents and students, who see attendance records organized by subject and date.

3. CONCLUSION

As RFID technology advances, more complex applications will make use of RFID's capacity to collect, store, and transfer data to a distant sink source. RFID has as many uses as one may conceive. A unique magnetic signature is associated with a unique 10-digit ID number on each RFID tag. When the tag is within a scannable range of an RFID reader (typically less than an inch), the reader "reads" the number, emits a beeping noise, and stores the 10-digit number together with the current time and date. That's not a global positioning system. A student's whereabouts on campus are not recorded. Only the time the tag was willingly put within an inch of the reader is

recorded. There are benefits and drawbacks to using RFID technology instead of the more common "clicker" technology. It is common practice for teachers to demand the costly clickers while only really utilizing them for attendance purposes. To top it all off, the RFID attendance system delivers accurate and impartial attendance data, such as arrival and leave times. This has implications for studies examining the correlation between attendance and achievement.

REFERENCES:

[1] H. D. Rjeib, N. S. Ali, A. Al Farawn, B. Al-Sadawi, and H. Alsharqi, "Attendance and information system using RFID and web-based application for academic sector," *Int. J. Adv. Comput. Sci. Appl.*, 2018, doi: 10.14569/IJACSA.2018.090137.

[2] P. K. K. Pandey, "RFID Based Smart Attendance System," *Int. J. Res. Appl. Sci. Eng. Technol.*, 2018, doi: 10.22214/ijraset.2018.5080.

[3] Z. Yuru, C. Delong, and T. Liping, "The research and application of college student attendance system based on RFID technology," *Int. J. Control Autom.*, 2013.

[4] A. Brogi *et al.*, "Survey High-Performance Modelling and Simulation for Selected Results of the COST Action IC1406 cHiPSet," *Futur. Gener. Comput. Syst.*, 2018.

[5] H. Sharabaty, E. Zencir, and G. A. Hameed, "New anti-collision protocol for RFID-based student attendance system," 2018. doi: 10.1109/ISMSIT.2018.8567278.

[6] A. Qaiser and S. A. Khan, "Automation of time and attendance using RFID systems," 2006. doi: 10.1109/ICET.2006.335928.

[7] S. Kurniali and Mayliana, "The development of a web-based attendance system with RFID for higher education institution in Binus University," 2014. doi: 10.1051/epjconf/20146800038.

[8] M. F. Dicle and J. Levendis, "Using RFID Technology to Track Attendance," 2011. doi: 10.2139/ssrn.1926847.

[9] T. Sharma and S. L. Aarthy, "An automatic attendance monitoring system using RFID and IOT using Cloud," 2017. doi: 10.1109/GET.2016.7916851.

[10] A. Singh, S. Meshram, T. Gujar, and P. R. Wankhede, "Baggage tracing and handling system using RFID and IoT for airports," 2017. doi: 10.1109/CAST.2016.7915014.

[11] K. Mayes, "An introduction to smart cards," *Smart Cards, Tokens, Security and Applications: Second Edition*. 2017. doi: 10.1007/978-3-319-50500-8_1.

[12] M. K. Dehnavi, S. M. Sharafi, and N. Nematbakhsh, "Developing a e-learning model for tracking the continuous attendance of the students," *J. Theor. Appl. Inf. Technol.*, 2011.

[13] M. K. Dehnavi and N. P. Fard, "Presenting a multimodal biometric model for tracking the students in virtual classes," 2011. doi: 10.1016/j.sbspro.2011.04.318.

[14] J. Dedy Irawan, E. Adriantantri, and A. Farid, "RFID and IOT for Attendance Monitoring System," 2018. doi: 10.1051/matecconf/201816401020.

[15] S. P. Avinaash Ram and J. Albert Mayan, "Mobile attendance management and employee registration," *ARPN J. Eng. Appl. Sci.*, 2015.