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Radio Frequency Identification and Telegram for Student Attendance

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Abstract. The research aims at building a system that can record data attendance and Telegram notification utilizes Radio Frequency Identification (RFID) and Telegram. The research method used the experimental method to check the success time to retrieve the data. The results show that with 60 cards, the system can retrieve data in 3 minutes, 33 seconds, or 213 seconds without stopping. The system can see student attendance recaps stored in the database and notify when students come to school via Telegram to the parents of the respective students and class teachers. Reading the cards is also quite beneficial, so it prevents queues in attendance and makes it easier for officers to recap attendance.

Keywords: *RFID, telegram, student attendance*

1. Introduction

Attendance is a reporting activity and attendance data collection in an institution [1]. The implementation of teaching and learning activities for the school education environment of the middle class in Indonesia still uses the conventional system. Attendance is an attendance record, part of reporting activities of an institution that contains attendance data arranged in such a way as to be quickly sought if at any time [2]. Student attendance usually calls the name of the student and taking notes using paper. The importance of managing attendance students in schools and colleges can discipline students to be on time [3]. Attendance for those still wearing student signatures and entering names can take a long time to recapitulate attendance [4]. Managing attendance manually can be tiring and tedious due to many classes [5].

The results of research conducted by Hasanein D. Rjeib et al. discussed programmable RFID technology such as the Arduino and this system's web-based application. Eventually, the system can track attendance and support information for student assessment scores [6]. Similar to the research conducted by Al-Mansor, MJ explained that this system using Arduino and 125 kHz RFID tags. This system aims to create a secure system and can provide student attendance

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information [7]. Furthermore, the research conducted by Dalwadi, D., who uses RFID and GSM systems, aims to develop RFID attendance that is power efficient [8]. According to research conducted by Mishra Y., Marwah said that this system aims to create a secure system that can detect authorized and unauthorized people. When attached, it will read the RFID card and display employee information and a welcome message with an audio greeting by retrieving their name that registered on the SD card using the speaker [9].

This system aims to maintain attendance records of students and teachers/staff by directly sending messages to parents of students, detect the location and staff members anywhere within the campus [10]. The drawback of previous research conducted by Dalwadi, D is that students can create proxies or give signs to other students accidentally or intentionally. Our system includes student attendance by swiping the card RFID [8]. Meanwhile, research conducted by Azura, A has explained a system of RFID-based attendance with Arduino Uno. This system's disadvantage is that it requires additional electronic components to limit the time for taking attendance, and this system is not equipped with attendance recording [11]. Different from previous research, this research aims to build a system that can record attendance data and Telegram notifications. The method used was the experimental method.

2. Method

This research was conducted using experimental methods. Experimental is a method for designing, testing, and analyzing the resulting responses, the parts either of the system or as a whole [12]. This research tried a successful time for data collection, using 60 trial cards. Thus, it is known how fast the application takes to retrieve data and what benefits this application system provides in making it easier to recapitulate attendance and utilization of Telegram to increase information to parents and guardians.

3. Results and Discussion

The results of data retrieval using Radio Frequency Identification (RFID) shows that with 60 cards, the system can retrieve data in 3 minutes, 33 seconds, or 213 seconds without stopping if it is calculated on average 3.5 seconds or less per student. The system can see the attendance recap of that student stored in the database. It can notify when students come to school via Telegram to each of the students' parents and class teachers. The success of reading cards is also very good to prevent queues in attendance and can make it easier for officers to recap attendance.

Based on research conducted by Poltak Sihombing et al. with the title The Student Attendance Controlling by Using RFID to Increase the Time Optimization and Accurate of Data said that the consumption of manual entry time and technology RFID. This research has tested a sample of 50 students, the capacity of general classrooms in our department. Time consumption comparison: the application of RFID technology has accelerated the recording attendance process. The traditional method of recording attendance involves consuming particular manual entries processing time. Average, Based on experimentation, the total time is taken to record attendance for a class of 50 students using the manual entry method took about 200 seconds (3.3 minutes). It implies that about 4 seconds per student are required to record their attendance. Using RFID, there is no requirement for visual confirmation. It reduces the time to 2 seconds per student for a class of 10 students. Besides, because all students can walk to the scanner simultaneously, the scanning process is reduced to 0.8 seconds per student (40 seconds for 50 students) [13]. In line with the research results, namely, time recording is less than 3.5 seconds. The research by Joseph Dedy Irawan, J. et al. (2018) with the title RFID

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and IOT for Attendance Monitoring System shows the comparison of attendance records manually and using RFID. The figure represents that using the manual method takes twice as much time to 40 seconds. Meanwhile, RFID, the attendance of 11 students only needs 20 seconds [14], which means that 1 student takes 1.8 seconds. This research has a faster result than the research conducted at the time of recording. The results of data retrieval using RFID shown in Figure 1.

RFID ATTEDANCE IN STUDENTS

No.	NIM	Name	Class	Homeroom teacher	Date	Time	One time	Come late
1	10919004	Desma	X MI1	Irfan.S.pd	13-01-2021	14:31:07	0	1 come late
2	10919017	Reni	X MI1	Irfan.S.pd	13-01-2021	14:31:10	0	1 come late
3	10919040	Kiki	X IS1	Iyan S,pd	13-01-2021	14:31:12	0	1 come late
4	10919015	Putri	X MI1	Irfan.S.pd	13-01-2021	14:31:15	0	1 come late
5	10919032	Rila	X IS1	Iyan S,pd	13-01-2021	14:31:17	0	1 come late
6	10919020	Yusup	X MI1	Irfan.S.pd	13-01-2021	14:31:20	0	1 come late
7	10919010	Qijar	X MI1	Irfan.S.pd	13-01-2021	14:31:22	0	1 come late
8	10919050	Imas	X RPL1	Tono S,pd	13-01-2021	14:31:25	0	1 come late
9	10919044	Prianto	X RPL1	Tono S,pd	13-01-2021	14:31:27	0	1 come late
10	10919056	Miftah	X RPL1	Tono S,pd	13-01-2021	14:31:30	0	1 come late

Figure 1. The Results of Data Retrieval Using RFID

Telegram application is used for monitoring student attendance by parents, homeroom teachers, and attendance notification on students. The integration process with the database was successfully carried out with the Telegram As service connecting the device with the database. ID tag data from the reader's reading on the device successfully sent to the database and successfully received a reply response in the form of identity from the user. The ID tag is shown on Telegram messages. The process was successfully done in less time than 2.5 seconds, as long as the device is connected to the internet network. If offline Telegram is not will get a notification, as well as other components that are also used on the system can be used as desired.

In research conducted by Chaniago, MB., & Junaidi, A describes that it is required to set up Telegram messengers in student attendance to ensure that students have attended, it is hoped that the Telegram messenger can overcome attendance problems students. This application was tested at the PGII Integrated Superior Vocational School Bandung with very good results satisfactory [15]. It can be concluded that this journal has similarities in the use of Telegrams as BOT notifications. The result of integrated RFID recording on the BOT Telegram is shown in Figure 2.

Figure 2. Results of integrated RFID recording on BOT telegram

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RFID reader and card using Frequency 125 kHz. RFID is a special device whose role is to integrate tags. It is the most important part of the system. A small section inside the reader plays a vital role in RFID because it can generate electromagnetic waves. It reads stored numbers in the memory of the RFID tag and transfers them. Middleware itself is an interface that transfers numbers from tags to the database management system. The frequency, which is generally used in operations ranging from 125 kHz -2.4 GHz [15, 16]. Frequency 125 kHz is used in this system because of low cost, less power consumption, small form factor, and easy to use [16,17]. This research shows that the tool used as tool research is the same, namely the RFID reader with a card using a frequency of 125 kHz, as shown in Figure 3.

Figure 3. RFID Reader and Cards

In Figure 4. Here is the flow chart used in this study. The following is the explanation Open the RFID attendance web application, an input display will appear and can be used to scan attendance on the reader, then the reader will take the RFID card number, the system will check whether the RFID card number is registered, then the system will check for student tardiness, then the system will display student identity and information that is late or on time, the system will save the data into a database, then the system will automatically send Telegram information to the parents of students.

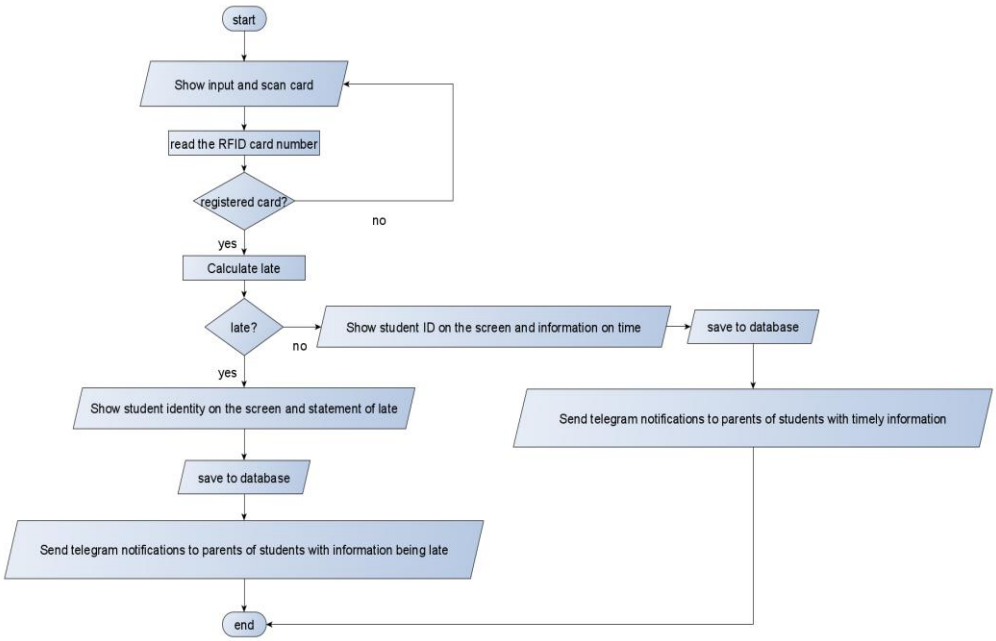

Figure 4. Flow chart

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4. Conclusion

Based on the results, it can be concluded that the system can record data for 3 minutes 33 seconds with an average of 3.5 seconds per student who immediately sent a notification to the Telegram. Besides, it can also see student attendance recaps stored in the database. The success of reading cards is also very good, so it prevents queues in attendance and can make it easier for officers to recapitulate attendance. Attendance with an integrated Telegram application can make it easier to monitor mobile attendance by parents, homeroom teachers, and attendance notification to students.

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