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Application of Attendance Monitoring System Using RFID (Radio Frequency Identification) and Interface

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`A B S T R A C T

The design of the attendance monitoring system prototype is made using the RFID (Radio Frequency Identification) sensor. RFID equipped with a reader and tag. Reader used as a medium for reading attendance information and tags used as ID cards. The tools to be made will be integrated with a database so that the attendance system can be monitored using a desktop application. The database will be designed using Mysql and Xampp. The GUI (Graphic User Interface) which will be used as a media interface is designed using the Visual Basic application so that data that has been integrated with the database can be easily monitored using a desktop application. The system that is integrated with the database allows data to be automatically stored in the database, making it easier for admin to recap their attendance.

1. Introduction

Attendance is a reporting activity and attendance data collection inan institution. Based on how it is used, attendance systems can be grouped into manual and digital. The manual attendance system that is carried out in higher education requires students to fill out an attendance form with a signature during lectures. This system has several drawbacks such as signature storage, requires a lot of paper and ink, and requires a lot of space for storage. These deficiencies can be overcome by utilizing technology combined with the RFID system. This system consists of an RFID reader and a tag which can be developed as a student attendance machine during lectures.[2]

Several researchers have conducted research on the digital student attendance system. The system designed is a portable attendance system that uses an RFID tag to identify student attendance and is equipped with a DS1307 Real Time Clock which can limit student tardiness. [10] The present list is displayed in the database, but the database that is displayed is only the output ID number, time, date, and data input success rate. The data obtained is inaccurate because the owner of the ID number is not in the database so that the owner of each ID number must be identified first. [3]

Digital attendance system using RFID which is integrated with databases, Visual Studio software, Microsoft Access and MicrosoftbExcel. This tool designed has not been able to limit student tardiness. The same research also where the data is integrated with the Academic Information System (SIA) and the software used by Visual Basic and MySQL database. The weakness of this research is the use of SIA which can only be accessed by certain parties and requires an internet connection. [5]

Based on the problems that have been described, research was carried out fordesigning attendance systems using RFID sensors. Integrated systemdirectly with the MySQL XAMPP database and Visual Basic as an interface. Databaseshown can provide a description of attendance and absence. [11] The RFID card is brought closer to the RFID reader, the process of sending and receiving data can occur if the emitted frequency reaches the resonant frequency. This study aims to design a student attendance system using RFID based Arduino Uno R3 and Real Time Clock DS1307 with Visual Basic software and MySQL XAMP database. [4]

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2. Literature

A. Definition of Monitoring

Monitoring or monitoring is an activity carried out to check the appearance and activities that are being carried out, systematic and continuous collection of relevant data related to a certain process without considering it.[6]So it can be concluded from the description above that monitoring or monitoring is an activity of observing activities by recording and recording all activities carried out by a person Data.

B. RFID (Radio Frequency Identification)

RFID stands for radio frequency identification which is a development of wireless communication technology that is used to uniquely identify the object or person being tagged. RFID uses technology that utilizes radio frequency for automatic identification of an object. Devices that store RFID data are often referred to as RFID tags. RFID Tags can be in the form of cards, stickers or labels that can be affixed to other fields. There are two types of RFID tags, namely active RFID and passive RFID. Active RFID requires electric power to generate a signal beam on the Tag. Meanwhile, passive RFID uses a signal from the reader to generate data to be sent to the RFID reader. Active RFID is generally used for long distance reading. While passive RFID is used for short distance reading by only sending data when the RFID label / card approaches the reader. At that time the signal from the reader is converted into electrical energy capable of generating radio frequencies and carrying data. [7]

C. Arduino Uno

Arduino is a control board that uses the Atmel AVR processor which is open source and designed to make it easier for users to develop various electronic projects. Arduino has its own software called Arduino IDE, Arduino IDE is software that is light enough so that it doesn't burden the computer when running. From the arduino.cc website, there are various kinds of Arduino models, but the one most often used to work on electronic projects is Arduino Uno. With a very affordable price, Arduino Uno can control various electronic devices according to the program code created by the user through the Arduino IDE software. Arduino uno was originally created by the Smart Project company, one of the creators is Massimo Banzi [1]

D. *Visual Basic .NET*

According to Edi Winarno (2013: 1) Visual Basic.NET is the most popular programming language. This is a programming that runs on the .NET Framework platform. Therefore, every time this VB .NET programming releases a new version, of course, it will be followed or in conjunction with the latest developments. NET Framework. Framework is software that contains a large library and provides programming language interoperability. Programs written for the .NET framework are executed in a software environment known as the Common Language Runtime (CLR). [5]

Common Language Runtime (CLR) is a virtual machine that provides important services such as security, memory management, exception handling, and class libraries. This makes the .NET Framework a complete and reliable framework. There are several reasons why Visual Basic is the ideal place for desktop based programming. Visual Basic is highlevel programming. What is called high-level programming is programming that has used “human language” scripts so that it is easier to understand, especially by ordinary people. Visual Basic itself manifests in several forms, such as Visual Basic For Applications (VBA) in the MS Office world (often referred to as Macros) and VBScript which works in the world of websites so that if you master Visual Basic, then you will not need long to adapt while working. with VBA or VBScript. Even if you want to learn ASP (Active Server Pages), web-based programming, the syntax that you will find is not that different from Visual Basic. In general, the Visual Basic ecosystem has been formed. [8]

3. Research methods

A. Research Design

Broadly speaking, the stages of the entire study are as follows:

1) Describe the Problem

Describing the problem clearly will help in designing and making an attendance system monitoring tool using RFID and the interface to be studied must be described first, because without being able to describe the problem, determine and define the boundaries of the problem to be studied, there will never be a best solution of the problem. So this step is the most important first step in this research. [12]

2) Problem Analysis

The problem analysis step is the step to understand the problem that has been determined in its scope or boundary. By analyzing the problems that have been determined, it is expected that the problem can be understood properly.

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3) Setting Goals
Based on the understanding of the problems of the problem, the objectives to be achieved in this study are determined. In this goal the targets will be determined, especially those that can overcome the existing problems.

4) System Design
This stage is the stage of designing the tools made, at this stage the design of the tool and the design of a series of monitoring tools for the attendance system using RFID is made.

5) Making The System
This stage is the stage for making an attendance system monitoring tool using RFID, making the tool based on the design and design of the tool that was made in the previous stage. [9]

6) System Testing
Tool testing is done by testing the attendance system using RFID, where the system will be monitored using an interface, namely a desktop application.

7) Testing Results
At this stage the process of drawing conclusions and suggestions on what should be done during the Final work. Basic conclusions and suggestions which are the result of analysis and discussion.[10]

B. Research Design

In this study a block diagram design of the system is made. The block diagram design can be seen in the picture below:

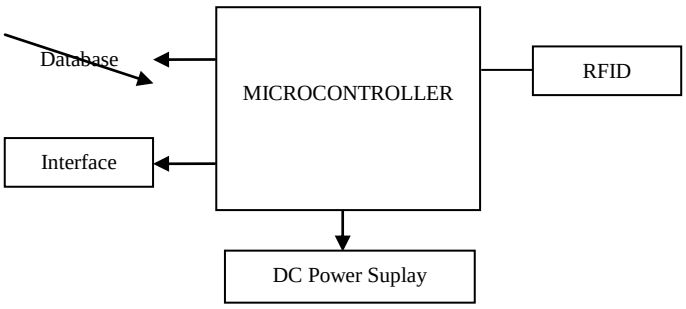

Fig 1. Circuit Block Diagram

In addition there is also the structure of the running of the program which is described in the form of flowchat.

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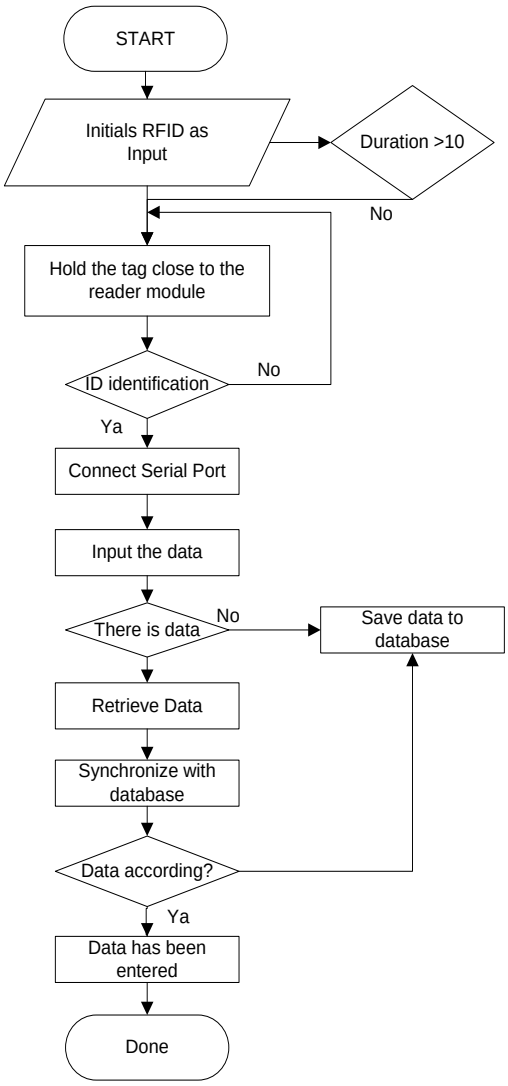

Fig 2. System Flowchart

The flowchart above can explain how the series of tools to be made works. The flowchart that starts from Start is doing attendance which is processed by the user who brings the RFID card closer to the RFID reader within a limited delay time (10 minutes). When the card is brought near, the card identification will occur and it is connected to the serial port and the data will be entered. If the data matches the database, it will be processed directly with the MySQL database display. If the attendance is outside the tolerance limit, the information is not present in the database.

4. Results and Discussion

In this study, it will be explained and displayed how the results of testing the design of the tool are made along with a discussion of the interface application. The results of the tests carried out are a software interface, which is a desktop application designed using Visual Code and tools created or designed and programmed using the Arduino IDE application. As for each program view will be explained one by one.

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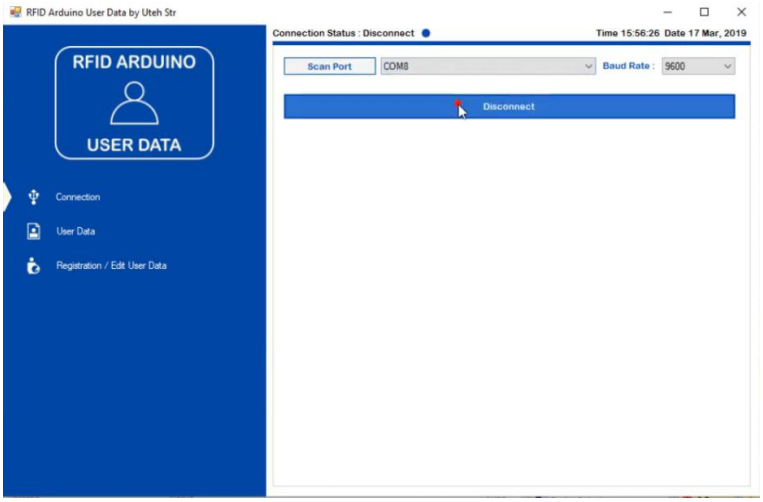

Fig 3. Display Microcontroller Connection Process

In the picture above shows the process of connecting between interfaces designed using Visual Basic with Arduino Uno. In the port scan button, you can see that the active port is Com8, then the connection button after clicking it will connect automatically. After the device is connected to the application, it will register so that user data will enter the database. To see the registration process, see the image below.

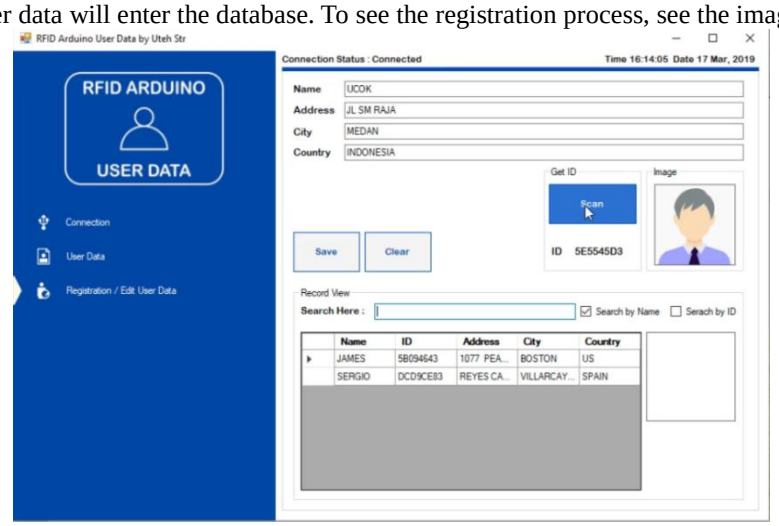

Fig 4. Display User Registration Process

In the picture above, it explains that the process for registering user data with RFID configuration so that each user enters for attendance, the name in the database has been registered. After that, the RFID test is carried out whether the registered user data can enter the desktop application system. To see the process can be seen in the image below.

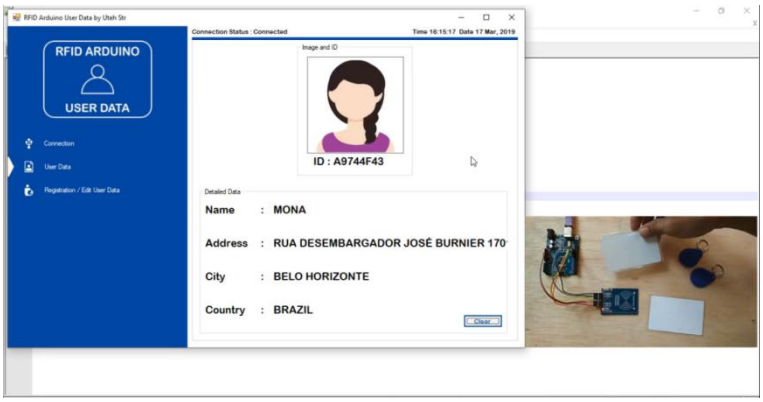

Fig 5. Display User Registration Process

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In the picture above, it explains that after the registration process is carried out, the user data is registered in the database, then after being registered the user can make attendance using RFID according to the registration data that has been entered.

5. Conclusion

From the results and discussion of the research that has been done it can be concluded several things:

1) Based on the results of the error handling test in the data processing carried out by the admin, it has been successfully carried out and when there is an error in the process of entering data, the system will provide a notification in the form of a message.
2) The implementation of RFId is not only used for commercial aspects, but in the world of education, in particular it can be used as a Student Card which is also a medium for lecture attendance.
3) Based on the test results indicate that the system can overcome conditions that may occur during the verification process of user activity. The condition that occurs is verification of user activity by scanning the id tag of unregistered users.

6. References

[1] Amin, M, Novelan, M. S. (2020). Sistem Cerdas Kontrol Kran Air Menggunakan Mikrokontroler Arduino dan Sensor Ultrasonic. Jurnal Nasional Teknologi dan Jaringan, Vol 4. NO.2 (2020).

[2] Dewanto, F. M., Herlambang, B. A., Tri, A., & Harjanta,J. (2017). Pengembangan Sistem Informasi AbsensiBerbasis Radio Frequency Identification (RFID)Terintegrasi dengan Sistem Informasi Akademik, 02(02),90–95.

[3] Hamdani, F., "Penerapan RFID di Perpustakaan : Kelebihan dan Kekurangannya", (Jurnal Ilmu Perpustakaan dan Kearsipan Khizanah Al-Hikmah, UIN Syarif Hidayatullah, 2014), hal.71-79.

[4] M. Sabar, K. Ismail, dan S. Riyanto, "Rancang Bangun Sistem Akses Kontrol Keluar Masuk Rumah Menggunakan Selenoid Doorlock Dan Sensor Fingerprint Berbasis Mikrokontroler Atmega328," CITISEE, 2017

[5] MS Novelan, E. M. (2018). Control of motion stability of the line tracer robot using fuzzy logic and kalman filter. *JPhCS*, 012066.https://iopscience.iop.org/article/10.1088/1742-6596/978/1/012066

[6] Muhammad Syahputra Novelan, Z. S. (2020). Sistem Kendali Lampu Menggunakan NodeMCU dan Mysql Berbasis IOT (Internet Of Things). *InfoTekJar: Jurnal Nasional Informatika dan Teknologi Jaringan*, 117-121.https://jurnal.uisu.ac.id/index.php/infotekjar/article/view/2976

[7] N. Natalianto, J. T. Elektro, F. Sains, D. A. N. Teknologi, and U. S. Dharma, "Sistem presensi perkuliahan menggunakan rfid," 2017.

[8] Setiawan, E.B. dan Kurniawan, B., "Perancangan Sistem Absensi Kehadiran Perkuliahan dengan Menggunakan Radio Frequency Identification (RFID)", (Jurnal CoreIT, Bandung, 2015), hal.44-49.

[9] Sukowati, A.I., "Rancang Bangun Sistem Absensi Mahasiswa Sekolah Tinggi Teknik Cendeki (STTC) Berbasis Radio Frequency Identification (RFID) Menggunakan Arduino Uno R3", (Jurnal Ilmiah Komputasi, Sekolah Tinggi Teknik Multimedia Cendekia Abditama, 2017), hal.93-100.

[10] Susanto, R., "Sistem Absensi Berbasis RFID", (Jurnal Teknik Komputer, Jakarta, 2009), hal.67-74

[11] Yusuf, M., "Rancang Bangun Aplikasi Absensi Perkuliahan Mahasiswa dengan Pengenalan Wajah", (Jurnal Teknik ITS, Jurusan Teknik Informatika, 2016), hal.66-70.

[12] Oktarina, Dwi, M. K., Halim, J., & S.Kom. (2017).SISTEM INFORMASI PENJUALAN DENGAN MENERAPKAN TEKNOLOGI RFID, 3(2), 146–155