



Implementation of Smart Attendance at Polytechnic State of Sriwijaya

Alan Novi Tompunu¹(✉), Azwardi Azwadi¹, Adi Sutrisman¹, Annisia Nh Nufus²,
and FakhriHerdiansyah¹

¹ Department Computer Engineering, State Polytechnic of Sriwijaya, Palembang, Indonesia
alan_nt@polsri.ac.id

² Department Computer Science and Information Engineering, National Chin-Yi University of
Technology, Taichung, Taiwan

Abstract. This project aims to create hardware and software that can be utilized as a security system to enter the Sriwijaya state polytechnic. It uses an RFID Tag that will be used as a Student Identity Card access to join the class. This device utilizes a UHF RFID sensor to read the ID number from the RFID Tag, while 3 LEDs and 1 Buzzer serve as a signal of student differentiation. The microcontroller used is Arduino Mega which functions to process a data or datas from RFID and is sent to a web-based and visual basic database. The way this system works is that the Student Identity Card used is not affixed to UHF RFID, because the UHF RFID sensor has a distance of about 3–5 m, if the Student Identity Card ID number is registered in the database, the system will issue an LED output according to the class of the card. Student Identity, then the visual basic application will display data from the Student Identity Card ID and save it into the database. Operators can view student history scanning via the web and can control certain students via the web.

Keywords: RFID · UHF RFID · Attendance · IoT

1 Introduction

RFID utilizes an electronic field that can automatically identify and search for tags attached to each object. Tools like this are used for logistical security, hotel security, electronic passports, and others. The tall level of wrongdoing, particularly burglary that frequently happens nowadays makes security an in superfluous necessity. One way to create this innovation is to supplant the conventional Understudy Character Card into an Electronic Understudy Character Card.

An alternative to replacing conventional Student Identity Cards with Electronic Student Identity Cards is to utilize RFID. With the Electronic Student Identity Card or E-KTM, a tool is needed that can process and read the unique ID of the E-KTM. A RFID peruser is utilized to examined the interesting IDnumber on the E-KTM.

In making this apparatus moreover utilizes a web-based application as an data framework to clients and administrators. As an information provider, website-based applications can control the use of E-KTM so that the use of E-KTM is by the instructions

provided because in its development this technology has Driven markers and alerts (buzzers) which have a function as a support for equipment methods that can work according to the instructions provided.

2 Literature Review

2.1 Radio Frequency Identification

RFID is one of three development of barcode technology in the form of wireless. Compared to barcode technology, RFID can increase the efficiency of reading data over a longer distance and with greater security. The RFID tag is a unit that is needed in addition to the rfid reader. Tags are divided into two, namely passive and active tags, where passive tags do not have resource while active tags have resources while active tags have resource. RFID itself has several groups, including:

a. Low Frequency

Frequency between 120–134.2 kHz, has a close reading distance of 10 cm. Slow to read a tag and have little sensitivity to radio waves.

b. High Frequency

It has a frequency between 13.56 MHz and a reading distance between 10 cm to 1 m.

c. Ultra High Frequency

It has a frequency of 850–960 MHz and a reading range of up to 3 m. Has the cheapest tags to produce compared to others. UHF RFID is typically used in large-scale warehouses where speed and efficiency are key factors.

The RFID tag contains a small chip that stores data as an ID number, transponder, or radio cable tag. The way RFID tags work is that they transmit information by crossing radio waves that have been transmitted by RFID peruser and the capacity wrapper performs its function to ensure that the chip is safe.

2.2 Application

An application is a program that has commands to process data. The application has various attributes consisting of several well-built form columns to form an attractive appearance so that it can make users easy to operate. An application is a software that is embedded into a computer that has various commands to be able to perform the form of work in accordance with the instructions carried out by the user. From the description above, it can be concluded that the application is software created with various attribute components that are suitable for the user in order to assist the user in processing each data to produce input and output.



Fig. 1. Board Arduino Mega

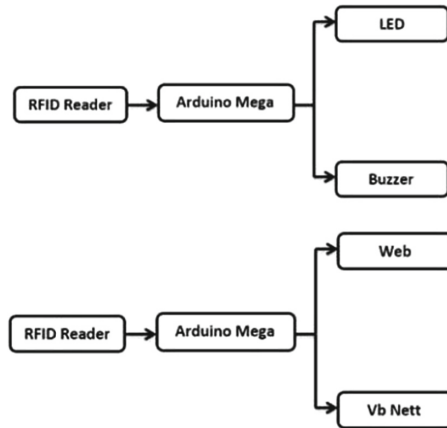


Fig. 2. Block Diagram

2.3 Arduino Mega

This circuit board features 54 digital inputs and outputs (1 of which can be used as PWM outputs). Sixteen analog inputs, 4 UARTs (Universal asynchronous receiver/transmitter), 16 MHz crystal oscillators, a USB connection, a power jack, ICSP (In-circuit System Programming) socket, and a reset button (Fig. 1).

3 Methodology

The design on the E-KTM uses RFID tag technology and web-based applications (Fig. 2).

With in the input area, there's an RFID peruser that capacities as a interesting ID number peruser from the RFID tag or E-KTM. Mega to be approved with a unique ID number that has been put away within the database to recognize the E-KTM. On the off chance that the RFID Tag is as of now enrolled, when the RFID Peruser readsagain, an Driven or Buzzer pointer will show up.

3.1 Result and Discussion

The Arduino Mega 2560 module, RFID reader HW-VX6330, Ruddy, Yellow, Green Driven, Buzzer, and UHF ISO18000-6C RFID Tag were utilized for testing hardware. It

Table 1. Test Results RFID Reader HW-VX6330 with E-KTM as RFID Tag

Testing Scenario	Expected results	Results
Scan the RFID Card to the RFIDReader that has been registered as a morning class	Red LED will light up if student rfid card is morning class	Succeed
Scan the RFID Card to the RFIDReader that has been registered as a morning class	Red LED will light up if student rfid card is morning class	Succeed
Scan the RFID Card to the RFIDReader that has been registered as a afternoon class	Yellow LED will light up if student rfidcard is afternoon class	Succeed
Scan the RFID Card to the RFIDReader that has been registered as a afternoon class	Yellow LED will light up if student rfidcard is afternoon class	Succeed
Scan the RFID Card to the RFID Reader that has been registered as a night class	Green LED will light up if student rfid card is night class	Succeed
Scan the RFID Card to the RFID Reader that has been registered as a night class	Green LED will light up if student rfid card is night class	Succeed

makes use of the Arduino IDE (Coordinates Improvement Environment), which is used to create and upload Arduino programs. The role of the RFID Reader is to learn the ID on the tag card; when the tag card is brought closer, the RFID will verify the ID card on the tag card, and then the ID will be processed by Arduino Mega 2560. The results of testing RFID card reading with Arduino Mega 2560 and RFID reader HW-VX6330 are provided below. RFID testing for ID verification on e-KTM involves comparing the pointer's capacity to the framework's specifications. Table 3 shown the results of the e-KTM verification test (Table 1).

4 Conclusion

In this test, it was found that the RFID Reader and the RFID Tag run according to the system that has been made, if the registered RFID Tag is a morning class, then when it is scanned using an RFID Reader, a red LED indicator will appear. If the registered RFID Tag is an afternoon class, then when it is scanned using an RFID Reader, the Yellow LED indicator will light up. If the registered RFID Tag is night class, then when the RFID Tag passes through the RFID Reader, the Green LED indicator will light up. However, if the RFID Tag that passes through the RFID Reader is not registered, the buzzer will light up indicating that the RFID Tag is not a student from the Polytechnic State of Sriwijaya.

References

1. Alan Novi Tompunu, Yulian Mirza, Azwardi. 2020. Room Door Security System Using Microcontroller-Based On E-KTP
2. Dang, H. T. 2013. Investigate And Design A 13.56MHz RFID Reader. Tesis. School Of Electrical Engineering Ho Chi Minh City International University (Vietnam National University). Ho Chi Minh.
3. Desy Yeniwati, Riswan, Nilawati, Trigina. 2022. STUDENT ATTENDANCE SYSTEM USING FINGERPRINT BASED ON ARDUINO MEGA 2560.
4. Dorman L I 1975 Variations of Galactic Cosmic Rays (Moscow: Moscow State University Press) p 103
5. Szytula A and Leciejewicz J 1989 Handbook on the Physics and Chemistry of Rare Earths vol12, ed K A Gschneidner Jr and L Erwin (Amsterdam: Elsevier) p 133
6. Titus Aditya Kinaswara, Nasrul Rofi'ah Hidayati, Fatim Nugrahanti. 2019. Website-Based Inventory Application Design in Bantengan Village.
7. Welly Tedja Kusuma, Yulia, Resmana Lim. 2020. Penggunaan Ultra High Frequency RFID pada Sistem Inventarisasi Creatrix Organizer.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

