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ACE Laboratory Smart Access System Using RFID

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ABSTRACT: This project is concerning developing ACE Laboratory automation system, which can automatize the login of the computers and no have to be compelled to enter the arcanum manually. this method enhances the safety of the computers and knowledge gift in it. at the present laboratory, students are mistreatment computers with one approved access, with this project that may be created approved through attaching good labels with student's ID card and allocating a private pc to individual student. The unknown person while not the label cannot access the computers or knowledge in laboratory.

KEYWORDS: RFID, Smart Labels, Micro Chip, Radio Frequency.

I. INTRODUCTION

In college laboratories, Students are accessing the computers without any authorized access. Due to this, data is unauthenticated where data theft can be done from the computers. Also, students are using different computers in different sessions thus, managing students has become more complicated during the lab sessions. Above complications are solved through this project.

I.I. Objective

The proposed work has been designed to provide the Secured and authenticated access to the computers in the college laboratory, which aims to:

- Deny unauthorized user.
- Provide secured and easy environment.
- provide a bit faster access than other systems.

II. LITERATURE REVIEW

- [1] X. L. Meng, Z. W. Song, and X. Y. Li, "RFID-Based security authentication system based on a novel face-recognition structure," in Proc. WASE International Conference on Information Engineering, 2020, pp. 97-100.
- [2] F. Lourenco and C. Almeida, "RFID based monitoring and access control system," in Proc. INFORUM, 2019.
- [3] K. S. Huang and S. M. Tang, "RFID applications strategy and deployment in bike renting system," in Proc. ICACT 2017, pp. 660-663.
- [4] D. L. Wu, Wing W. Y. NG, Patrick P. K. Chan, H. L. Ding, B. Z. Jing, and D. S. Yeung, "Access control by RFID and face recognition based on neural network," in Proc. International Conference on Machine Learning and Cybernetics, July 11-14, 2016, pp. 675-680.

III. EVOLUTION OF RFID

The success of RFID technology primarily centers on the arrival of radio technology. The developments in radio technology were a requirement to harness the essence of RFID technology.

III.I. Components of an RFID System

An RFID system consists of assorted parts that are unit connected to at least one another by an ardent communication path. The individual parts are unit integrated into the system to implement the advantages of RFID answer.

The list of parts is as follows:

III.I.I. Tags

An object that is hooked up to any product and uses a unique sequence of characters to define it. It contains of a chip and the antenna.

III.I.II. Antenna

It is accountable for the transmission of knowledge between the reader and tag exploitation radio waves.

III.I.III. Reader

A scanning device that uses the antenna to comprehend the tags that are in its neck of the woods. It transmits signals at some sure frequencies.

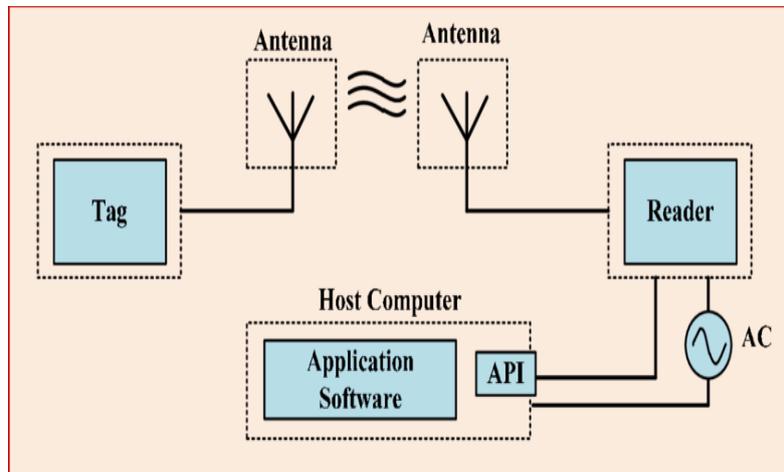


Figure 1: Working of RFID

III.I.IV. Middleware

It is a communication interface to interpret and process data being fed by the readers into information. It takes under consideration all relevant ports of communication and a software application to represent this information.

III.I.V. Backend database

A repository of knowledge, that is meant specific to the application. The database stores records of data specific to individual tags.

IV. BLOCK DIAGRAM

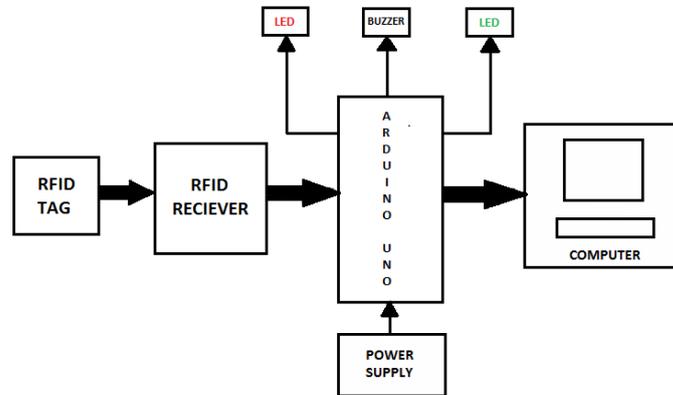


Figure 2: Block Diagram

V. WORKING

- ACE laboratory smart access system consists of RFID reader, RFID Tag and microcontroller unit.
- RFID can be interfaced to microcontroller through ATmega328p chip. Data is transferred from RFID cards to reader and from there to microcontroller.
- RFID tags are of two types:
 - Active Tags
 - Passive Tags
- Passive tags contain 13 digits number tag inbuilt in it, here as active tag is read/write.
- Here passive tags are attached to every student’s id card. RFID tags contains a copper winding in it. This winding acts as an antenna.
- A java code is written through Atmel Flip software (java run time environment) for the microcontroller to perform some keyboard operations. Then Arduino UNO acts as both microcontroller and keyboard.

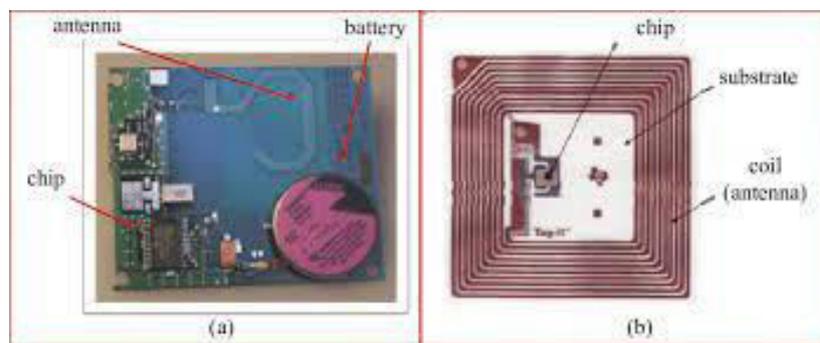


Figure 3: Types of RFID Tags

- When an Id card of the student with the tag is placed near the reader, due to induced mutual inductance energy, data is transferred to reader. Reader then transfers to microcontroller.
- Microcontroller checks for the data continuously, if any data is received, microcontroller compares the data with the authenticated data. If the tag is authenticated, microcontroller prints the password stored in it and unlock the computer and the GREEN LED is enabled else RED LED is enabled.

V.I. Circuit Diagram

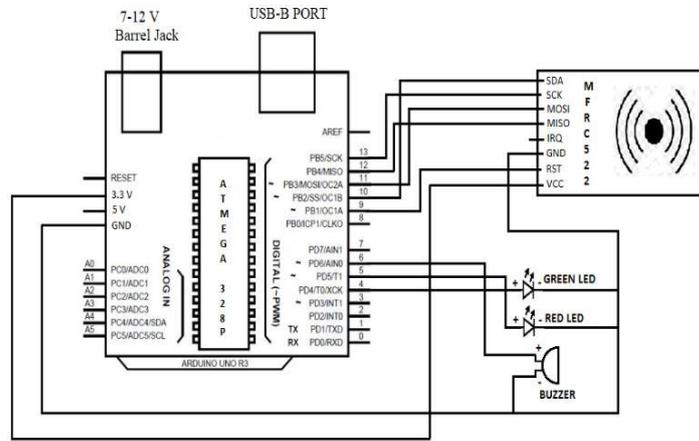


Figure 4: Circuit Diagram

V.II. Flow chart

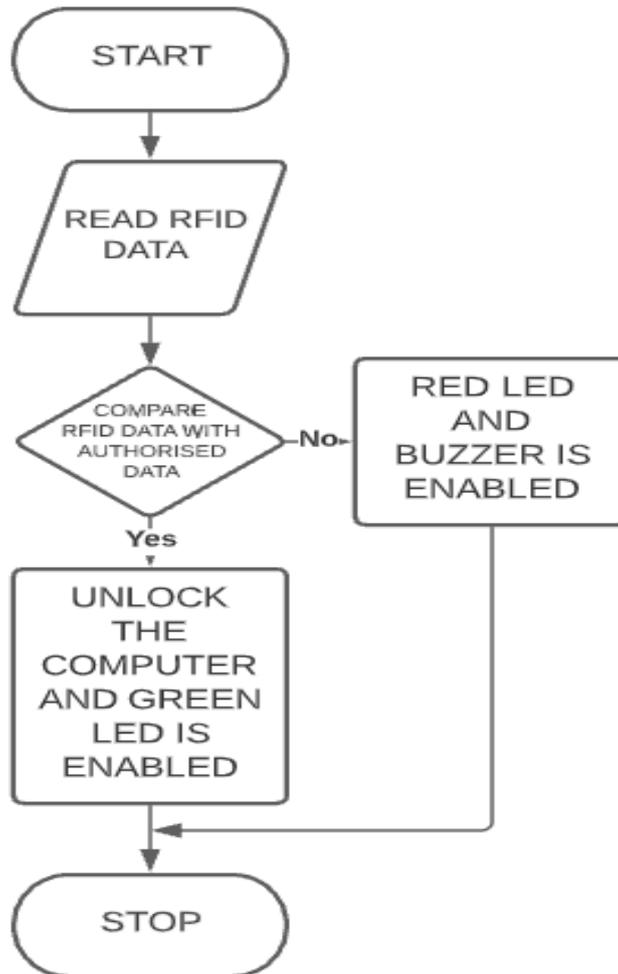


Figure 5: Flow Chart



VI. OUTPUT

When the Setup is turned on, the RFID reader starts reading the data. The student should bring his/her unique card near to the RFID receiver. Then the RFID receiver reads the data from the card and the data is sent to the Arduino now, the Arduino compare the received data with the data already stored in the microcontroller. If the received data is matched with the authorized data then the Green LED is enabled and the Computer get unlocked. If it is not matched then the Red LED and Buzzer is enabled.

For example,

1. Received data: 11820569

Data in Microcontroller: 11820569

Here, the received data and data in microcontroller is matched and the Green Led is Enabled, the Computer also get unlocked.

2. Received data: 11820606

Data in Microcontroller: 11820569

Here, the received data and data in microcontroller is not matched, The Red LED and Buzzer is enabled to alert the admin.

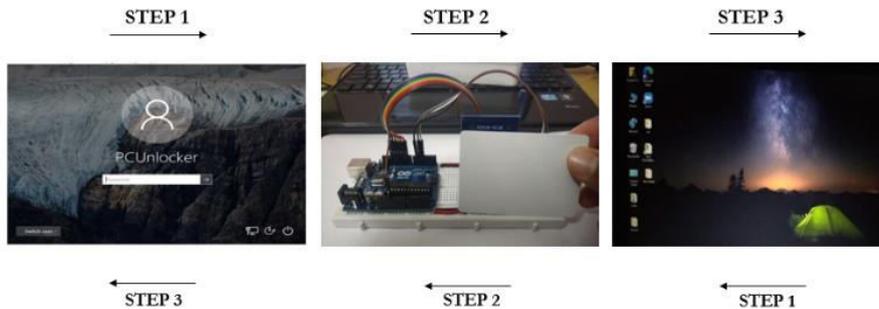


Figure 6: Output

VI.I. Hardware Output

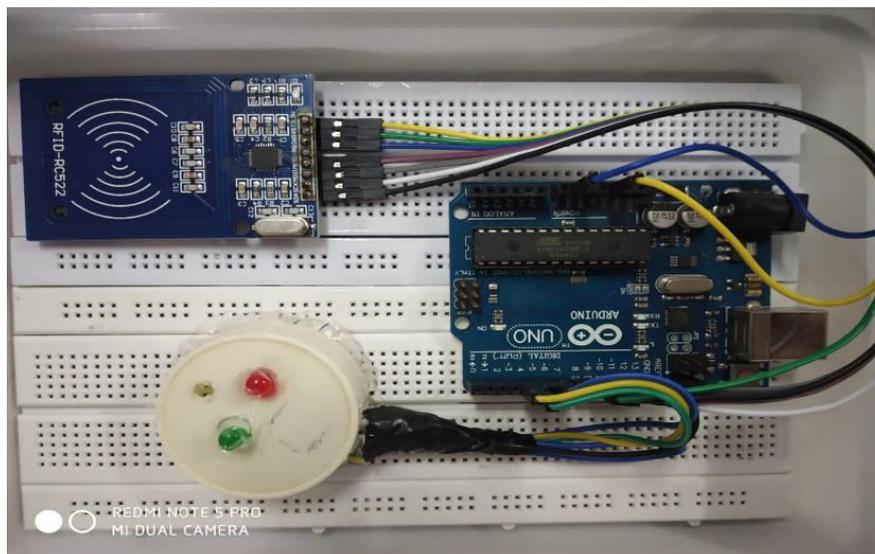


Figure 7: Hardware Output



VII. RESULT AND CONCLUSION

ACE Laboratory Smart Access System Using RFID has been implemented. It is cost efficient, low in power consumption, compact in size and standalone system to maintain the security in the laboratory as it restricts the unknown user to access the computers in the laboratories. RFID receiver takes less time to receive the data and process it hence it saves the time. This is also cost efficient and easy to use. Since, RFID doesn't need line of sight. It is used in this project to provide a user-friendly setup.

VIII. FUTURE ENCHANCEMENT

- Range of the RFID reader can be increased, so the reader can detect the tag from far distance.
- The transferred data can be saved and store in computer as a database using specific software.
- It can be extended for a greater number of students and laboratories by using RFID cards with identification numbers of more length.

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BIOGRAPHY



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