Smart Security System Using R.F.I.D.

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Abstract - *Radio Frequency Identification (RFID) is a renowned technology which came into existence in 1970's, it was used initially to monitor railway carriages. Today, it is used for various purposes all over the world. RFID for security purposes solves many problems in today's world as hacking is getting more and more popular. RFID cannot be hacked as the RFID tag stores the particular information and if a new tag has the same information, it will not be scanned as it won't match the radio frequency of the original tag. Thus, RFID is a very safe and secure mode of locking system. But that does not mean that it does not have any disadvantages.*

Key Words: *RFID, Security, Locking System, Arduino, Communication.*

1.INTRODUCTION

Crime rates in India are going up gradually with time, and crime rates were especially high after the COVID-19 situation. It was because many people lost their jobs and chose the criminal path. An extra measure of security is needed for precautions. RFID is the perfect technology for this, since it is been in use for more than 50 years and shows that it is reliable and trusted technology.

In real life applications RFID can be used in various areas for extra security measures like in main doors of residential buildings, offices, hotels etc. It can also be used for doors and entries reserved for special access to selected individuals. It can further be used as an extra measure for lockers as well.

RFID chip can be in various forms according to the user's convenience like cards, tags, key chains. Furthermore, the RFID chip can also be implanted

in our body, but the implantation method is very controversial as of now. Thus, it provides ease of use as the card can be kept in the wallets and the key chains can be attached to the keys, so people will not forget or misplace the RFID tag

But since we also forget or misplace our wallets and keys, the RFID tag can also be misplaced in a similar way and that is its biggest disadvantage. If a door is locked and the

only way to get in is through RFID and the tag is lost, in this case there is no alternative and the door lock may need to get the door opened through external measures. So, as an alternative the RFID reader can also have password with a keypad, so the if someone loses the RFID tag, the person can also enter the password to access the door/locker.

2. LITERATURE REVIEW

The door lock system traditionally uses of the conventional key which is operating mechanically by inserting the correct key and rotating it thus the door open. Unfortunately, it's not ok to spot the unauthorized access. It is less reliable and vulnerable the theft attacks [2].

Safeguarding homes has turn into one of the concerning topics. Today homes are being farther hospitable numerous threats mainly being burglarised. Hence home security is required [3]. So, RFID can be used as an extra measure to protect our homes from burglars and other threats.

Fig.1- RFID Reader/Writer, RFID Card, RFID Keychain

Fig.2 - RFID Cards

K.Srinivasa Ravi et.al[5] abstracted Primarily, the 2 main components involved during a frequency Identification system are the Transponder (tags that are attached to the object) and therefore the Interrogator (RFID reader). When the RFID card or keychain is brought near to the RFID module it reads the data in the card and displays on the LCD. The data within the card is compared with the info within the program memory and displays authorized or unauthorized message. The door opens for a licensed person, closes for an unauthorized person; it alerts the persons through a buzzer. The RFID module indicates a buzzer alongside a LED whenever it reads the info from the RFID card.

RFID, frequency Identification is a cheap technology, are often implemented for several applications like security, asset tracking, people tracking, inventory detection, access control applications [1].

RFID technologies are more proficient and more secure as compare to other networks [4].

3. METHODOLOGY

Components-

1. Arduino R3 Uno
2. RC522 - RFID Reader/Writer 13.56MHz
3. RFID Tags
4. Servo Motor
5. 16*2 LCD Display
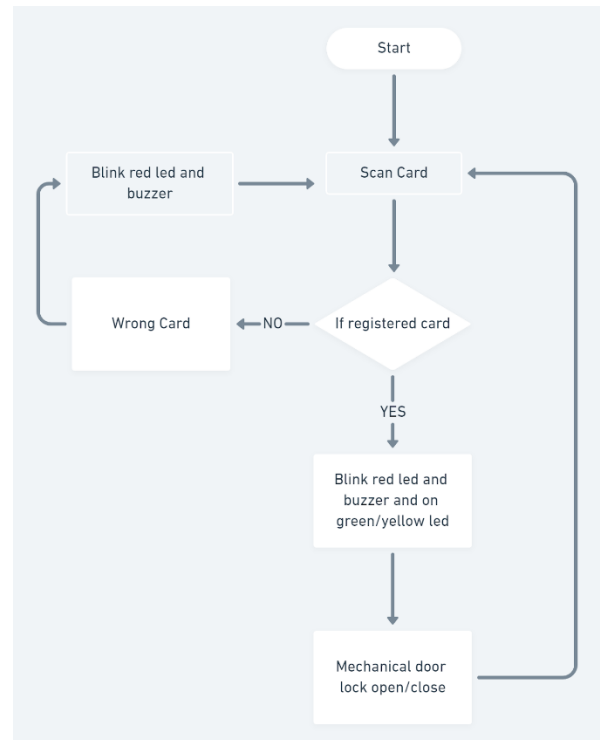6. LED
7. Breadboard
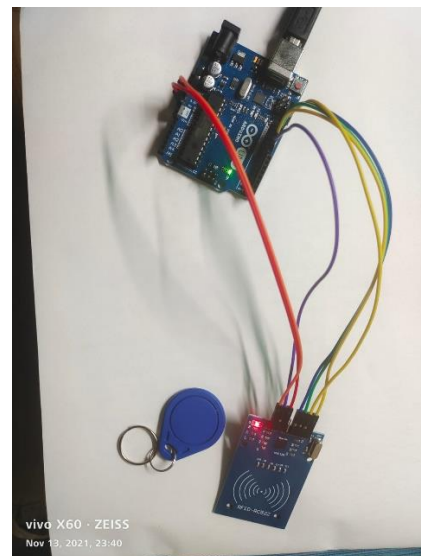8. Buzzer

Fig.3 - Flowchart

Fig.4 - Arduino connected to RFID Reader

In Fig (3) we can see the flowchart explaining the whole process of the RFID authentication.

In Fig (4) we can see that the Arduino Uno is connected to the RFID reader (RC552), and also a RFID tag is kept near the scanner. If that tag is shown to the RFID reader, then the scanner will read it and will allow access depending on if it is verified or not.
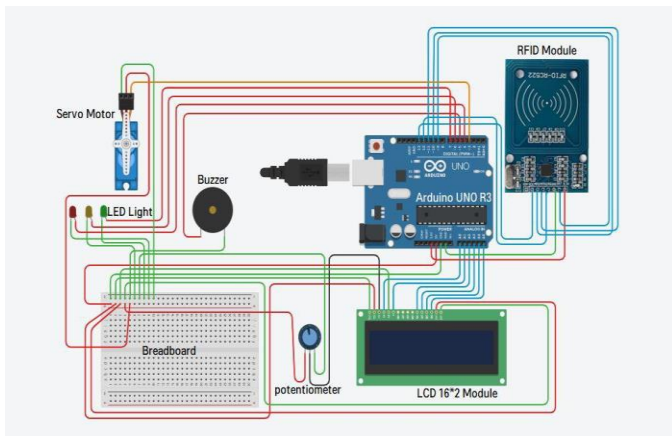
Fig.5 – Circuit Diagram

In Fig (5) we can see the whole circuit diagram, where all the components are connected to each other. All the components are connected to the Arduino Uno Board. Then the Arduino Uno board is connected to the PC/Laptop to push the code from the Arduino IDE to the board.

4. RESULT

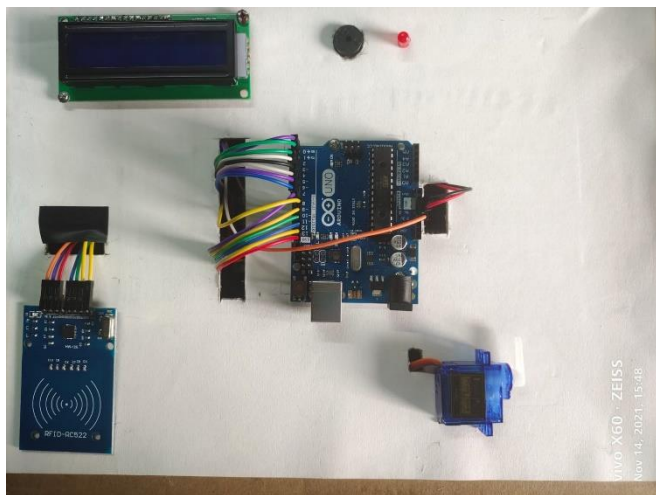The circuit is completely ready and working. Also, the code is working properly.

Fig.5 – Final Circuit

Whenever the correct RFID tag is shown in front of the RFID Scanner, the Scanner reads the tag and then the LED glows with the display indicating that the person is authenticated and can enter the premises. And if the RFID is wrong the LED will glow with the buzzer also buzzing and the LED display indicating that the person is not welcomed in the premises.

This will therefore only allow the authenticated person to enter the premises and the person with the wrong RFID tag cannot enter.

5. FUTURE SCOPE

An extra layer on top of the existing RFID Scanner would be better. If the circuit would be connected to cloud for data analysis or data visualization then the project could have more advantages and applications. It could be connected to Blynk for controlling the circuit remotely. And for data analysis and data visualization, Thingspeak could be used. Also, instead of a servo motor for unlocking of the door, a solenoid electromagnetic door lock could have been used.

6. CONCLUSIONS

We all know how much the need of security is in today's generation. RFID is a technology which is proven and reliable. It is also convenient and more secured compared to the traditional lock and key method. It is convenient as RFID tags are can be made many forms like keychains, cards and much more.

But this is not completely perfect as it does have some limitations like the tags can be damaged more easily as compared to metal keys. Also, the reliability can be affected by liquid or moisture. The results vary on various conditions.

There is nothing wrong with RFID tags and reader in its own but methods like data analytics and data visualization according to the RFID reads will have added advantages and applications.

Also, if a record can be kept of the reads of the RFID tags with unique identifications for various people, so the we can have a record of the people who entered the premises.

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