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Solenoid Based Home Security System Using RFID

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ABSTRACT: This paper represents a home security system using RFID with the help of a solenoid door lock. Security is the most important factor in everyone's life, so it's been a great research topic for many people. This embedded system project based on a home security system is trying to achieve Affordability and Simplicity. Our project mainly focuses on security using RFID which is very budget-friendly. People use a conventional key for opening and closing doors, but here we are using a smart security system that is we use an RFID reader and tag. There will be access given to the person if we scan the accessed or authorized RFID tag to the reader. If an unauthorized card is scanned near the RFID reader, then it will deny and not allow the person to enter the house. Here we use the GSM module to send a message alert to the owner by using a small message service (SMS). Whenever a reader reads something there will always be a message sent to the owner that someone is trying to enter the home. We are using LDR sensors to sense the intensity of the light, if the intensity of light is low, we will automatically switch on the lights, if not we will not switch on the lights

KEYWORDS: *RFID, Solenoid door lock, Security, GSM module, Small Message Service (SMS), LDR sensors.*

I. INTRODUCTION

Home security is the top concern for every person who owns or rents a home. Every person thinks that he has to be in a safe and secure society. There are many households where none of the family members stays in the home, they go for their work, and in that case, they are more concerned about their home security. Home security is not just a thing for the one class people it's a concern and a very important need for every individual. Any person will never want to take a risk by losing their assets or valuables. Nowadays technology is doing miracles in many fields. So here we are using smart technology for security purposes. We are using RFID which is Radio Frequency Identification for security purposes. RFID is used in many ways for security purposes like monitoring. RFID is a wireless technology that uses radio waves. RFID has both reader and tag in which the reader is used to read the tag and give output, to see whether the tag is accessed or not. There are many ways in which we can have high home security. Fingerprint door lock, Face reorganization, conventional lock, and key method, RFID method, etc. But why we are only using RFID? This will be the main question in this project, we are using RFID because
it's very cost effective, and every person can afford it without any problem. Home security is a concern for every person it is not like that it's a thing for certain people, So the main objective is this project should be affordable for everyone and it should work as effectively as it can be. Mainly in this project, we focus on affordable home security so we are using RFID, a solenoid door lock for automatic door opening and closing, an LDR sensor to sense the intensity of the light, and a GSM module to send message alerts to the owner.

II. LITERATURE SURVEY

Peter Adole, Joseph M. Mom and Gabriel A. Igwue: This project has focused on accessed technology by using RFID and GSM technology. Here whenever an RFID reader reads from the tag, if the tag is an accessed tag or authorized tag then it will send the information to the dc motor to open the door at the same time it also activates the GSM module to send a message alert that a card is scanned. Else when a tag is read and it is an unauthorized tag then it will send information to the dc motor and it will be in off state and will not allow a person to enter the place, and also activates the gsm module and sends an alert message that an unauthorized tag has been scanned. Here they did particularly not mention where they are used but they can be used in homes, organizations, etc to increase the level of

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security. The main purpose of the implementation of this project is to make more efficient and affordable prices for security rather than manually opening and using the lock and key process.

Swaapnik Alguri: This project focused on allowing only authorized people into the locations. These systems can be used in different locations for more security purposes. In this process, dubious people can be easily identified and there will be more security in those locations. Here RFID is the radio thing used for the development of remote access entry for security purposes. Remote security-things innovations have immediately extended for the electrifying development of current advances.

Yordan Hasan, Abdurrahman, Yudi Wijanarko, Selamat Muslimin, Renny Maulidda: This paper focused on security of a class room using an RFID. Here they used an ID card as input to trigger the microcontroller they used and send data accordingly to the server. Normally an RFID has both reader and a tag so, here ID card of a student in that classroom is given an authorized RFID tag that is a security key. When an authorized ID card is placed near the reader it will allow the student into the classroom, when an ID card is scanned it takes that card as input and triggers to the microcontroller if it is an authorized card, it will send data to the server and allow door lock to open, if it is an unauthorized card, it will send data to the server and will not allow the student to enter the classroom. The results of this project have shown that lecturers find this as most effective for classroom security and comfortability.

Ni Ni San Hlaing, San San Lwing: This paper focused on developing a smart home security system using RFID. In this project whenever an RFID tag is placed near the reader it reads the tag and verifies whether it is an accessed tag, if it is an authorized tag then it will send data to the Arduino and the microcontroller will open the keypad to enter the password, if the person enters the password correctly it will open the door and allow the person enters the home, if a person enters the password incorrectly then the doors will not open and don't allow the person to enter the house. The tag is an unaccessed tag then the Arduino will not open the keypad to enter the password and it will not allow the person to enter the home. Smart cards are easier to use and more secure, the password way is more traditional but can be used for more effectiveness.

Sadia Akter Prity1, Jannatul Afrose, Md. Mahmudul Hasan2: For every household, security is one of the main concerns. In this age of constantly increasing count of crime, various attempts have been made to secure the entrance and control the accessibility of the household. Traditional mechanisms such as lock and key, Deadbolts, Door chains, and Mortise locks; all have their limitations. Some of them are heavy in weight but fragile. Some others are more of an inconvenience than being a thing of actual benefits. This paper proposes an RFID-based secure door lock system and tries to draw upon its various advantages over traditional door security systems. Radiofrequency identification (RFID) is a wireless technology that allows the development of scalable control systems with flexibility. The goal of this work is to develop a system in which ease of use comes together with better security but without any extra cost.

III. PROPOSED SYSTEM

Block Diagram:

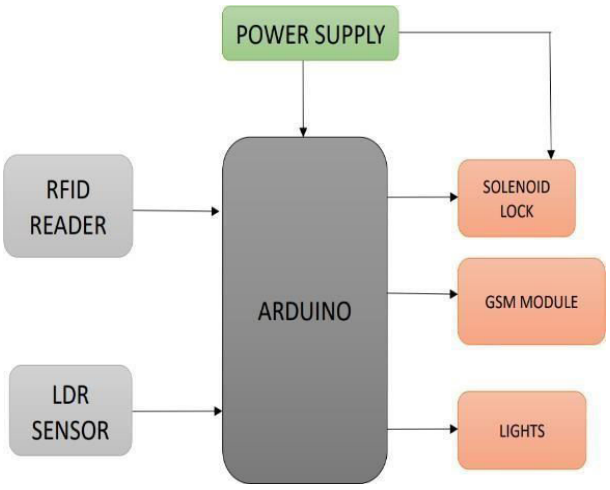

Fig 1: Block Diagram

In this project we have used the most inexpensive method that is rfid for home security. For door locking and opening we have used solenoid door lock system. We are also using GSM module to send a short message service for the owner

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for more security purpose we will send message using short message service (SMS). Here, we are using LDR sensors for detecting light intensity in the room and if there is no light then we will keep a light automation process and switch on the lights. The main purpose of this project is to give an affordable and more secure purpose so that every can afford it and can feel the security.

Flow Chart:

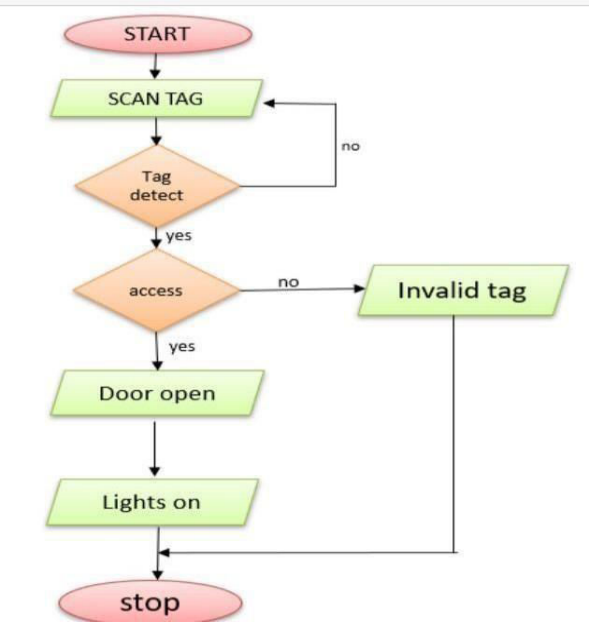

Fig 2: Flow Chart

Basically, flow chart is a systematic representation of any project or problem. In our project the first step is to scan a tag. Normally we have both reader and tag in rfid, so firstly we scan a tag near a reader after scanning the reader detects whether the tag is valid or invalid if it is valid tag then there will be two cases giving access and not giving access. If the tag is an accessed tag that is a verified tag then it gives access or else if the tag is not an accessed tag then it will not allow person to enter the house. After entering the house using LDR sensors we detect the intensity of lights and we will on the lights accordingly with the automation only.

Circuit Diagram:

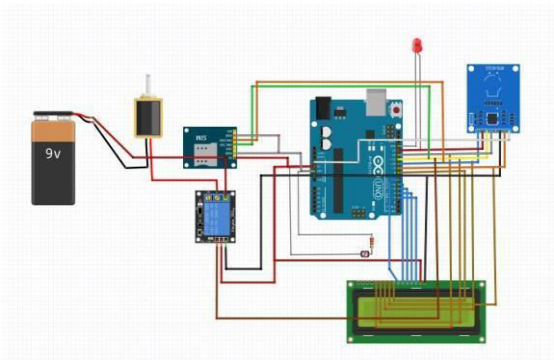

FIG 3: CIRCUIT DIAGRAM

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IV.WORKING PROCESS AND RESULT

After connecting the circuit as per the above circuit diagram, we give the power supply to the Arduino Uno using a cable that is connected to pc.
According to our project, we should check whether the solenoid lock is opening or not whenever an accessed tag is kept near the RFID reader.
Whenever an unaccessed tag is placed then the solenoid lock should not open and it should not allow the person enter the house, only the accessed tag person has to be entered.
After entering the house by the intensity of the light the LDR sensor has to do light automation. Whenever intensity of light is low lights has to be switched ON, if not the lights has to be off.
When an accessed card is scanned GSM module will send message to the owner by short message service

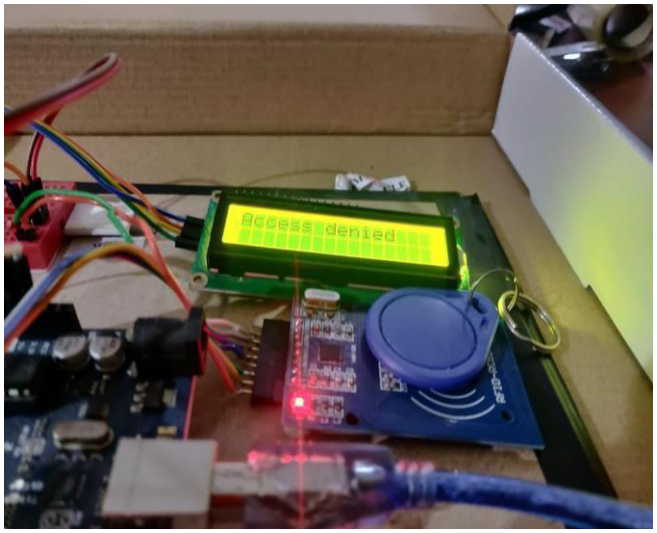

Fig 4: When unaccessed card is scanned

Whenever an unaccessed card is been scanned it will deny the access and will not allow the person enter the house.

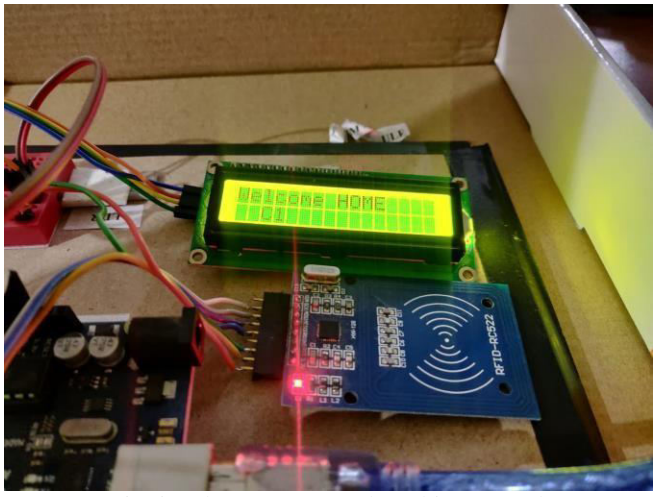

Fig 5: When an accessed card is scanned

Whenever an accessed card is scanned it will allow the person to enter the house that is it grants the access and shows the message on the led that “Welcome home c1”

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