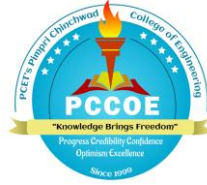


**PIMPRI CHINCHWAD EDUCATION TRUST'S**  
**PIMPRI CHINCHWAD COLLEGE OF ENGINEERING**  
**SECTOR NO. 26, PRADHIKARAN, NIGDI, PUNE- 411044.**



**PROJECT BASE LEARNING REPORT**  
**RFID BASED DOOR LOCK SYSTEM**

**Project ID:- 30**

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**DEPARTMENT OF ELECTRONICS & TELECOMMUNICATION**  
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## **Abstract**

Wireless security based applications have rapidly increased due to the dramatic improvement of modern technologies. Many access control systems were designed and/or implemented based on different types of wireless communication technologies by different people. Radio Frequency Identification (RFID) is a contactless technology that is widely used in several industries for tasks like access control system, book tracking in libraries, tollgate system, supply chain management, and so on. In this paper, automatic RFID-based access control system using Arduino was designed. The system combines RFID technology and Arduino to accomplish the required task. When the RFID reader installed at the entrance detects an RFID tag, the system captures the user unique identifier (UID) and compares it with the stored UID for a match. If the userUID captured match with any of the stored UID, access is granted; otherwise access is denied. It is the best way to lock and unlock door with RFID based door lock system. RFID, Radio Frequency Identification is an inexpensive technology, can be implemented for several applications such as security, asset tracking, people tracking, inventory detection, and access control applications. The main objective of this paper is to design and implement a digital security system which can deploy in secured zones where only authentic people can be entered. We implemented a security system containing a door locking system using a passive type of RFID which can activate, authenticate, and validate the user and unlock the door in real time for secure access. The advantage of using passive RFID is that it functions without a battery and passive tags are lighter and are less expensive than the active tags. A centralized system manages the controlling, transaction and operation task. The door locking system functions in real time as the door opens quickly when the user puts their tag in contact with the reader. The system also creates a log containing check-in and check-out of each user along with basic information of user.

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## 1. INTRODUCTION

Since innovation is so cutting-edge, one of a kind access control frameworks have turned out essential to win security dangers to different associations. Access control framework confines access to a property, a structure, or a space to approved people [1]. In the field of data and protection security, door access control frameworks are assuming major indispensable jobs to shield associations [2]. This is where everything is related with the framework, where anyone can get hold of information from wherever around the world. In this manner, hacking of one's data is a noteworthy issue. On account of these perils, it is basic to have a type of individual recognizable proof (ID) to get to one's own specific data.

### 1.1 Problem statement

To implement or develop the issue of a simple door locking system and key with automation with RFID module. We bring **RFID based door lock system** which is the contactless way to open the door lock.

### 1.2 Objective

- 1.To study the RFID Door Lock that is simple to install and allows the user to easily lock ,unlock doors. It will contain a RFID reader/writer and a magnetic door lock for simple use. All the user will need is an RFID tag to be able to unlock and lock the door
- 2.To design the automated solution for the world of door locks.
- 3.To implement and access more reliable simple door lock.It has wide scope in the private areas as well as government areas as the safest solution to the privacy problem.

### 1.3 Brief Application areas

The RFID card tag of every representative is put away in the principle framework. Each time when a representative brings label near the RFID reader, the antenna wire reader sends a radio wave and reads the information of the RFID card Every one of the activities are shown on the framework in the main office. At whatever point an indivi

with explicit ID label attempts to get into the limited territory he/she needs to contact the On the off chance that the subtleties of that remarkable card are as of now put away in the framework, at that point the green LED lights and ringer rings up and the door opens consequently.

## **1. Literature Survey**

### **1.1 Recent Trends in the project**

1. Locking systems provide security and control access authorization. Whether in administrative buildings, production plant, public institutions, hospitals, commercial buildings.
2. A locking system or simultaneous locking facility is also very beneficial and convenient for smaller properties and residential buildings. For example, you can install a cylinder with the same lock in each door. In a detached house (e.g. entrance door, post box, cellar door and garage).

### **2.2 Summary of Literature survey**

- 1) An RFID based security and access control system. It is the design of RFID based security and access control system for use in hostels in inside Punjab University. The system combines RFID technology and biometrics to accomplish the required task. When the RFID reader installed at the entrance of the hostel detects tag UID, the system captures the user's image and scans the database for a match. If both card UID and captured image matches a registered user, access is granted; access is denied and the system turns on alarm to alert the security personnel.
- 2) In this paper, a prototype of automatic access control system for use in an environment is presented. The system uses radio frequency identification (RFID) with Arduino technology to differentiate between authorized and unauthorized users. The RFID reader reads RFID tag issued to the user, matches it with stored UID on the Microcontroller.

### 2.3 Literature survey

Sr. No.	Title of Paper	Authors & Publication details	Methodology	Limitation
1.	RFID based digital door lock	Shubham soni.Rajani soni AKS university. Sep-2021	1)It consist of three major modules a).Arduino uno R3 microcontroller module	This door lock system is also very secure and saves the information of people coming and going
2.	Automatic opening and closing of door	Sabtosh panchal,shrikant BKIT BHALKI Oct-2016	An embedded system is combination of software and hardware to perform the main devices	Integrating feature of all the hardware component used have been developed
3.	A Digital Security System with Door Lock System Using RFID Technology	August 2010 gyanendra Kumar verma	rfid card is accessed by rfid module along with arduino uno R3 as a microcontroller	using hardware and software developed and automated door lock system

table no. 1.1 literature survey

### **3.Specifications**

#### **3.1 Specifications for RFID**

- Communication frequency 860 – 960 MHz. Transmission power. ...
- Communication range. 6 to 8 m approx. ...
- Size of outline. 210(W) x 210(D) x 130(H) mm. ...
- Weight. 1.5 kg or less. ...
- Power. DC24V +-10% ...
- Operating humidity. 95%RH or less. ...
- External interface. Ethernet x 1 (10/100BASE-TX),

#### **3.2 Power consumption**

- 1.The power consumption of the Arduino Uno is reduced by 88.37% from 98.43m 1.45mA. Also the Arduino Mega has a very low power consumption of 11.85mA for the size of the board. The lowest current consumption has the Arduino Pro Mini with 1.58mA.
- 2.The power consumption of the receiver is several microwatts hence, the lifetime of the battery is limited. In these years, the high-performance transceivers are proposed and implemented in RFID tags to further extend the read range up to over 100 m [5–8]
3. Servos can consume 5 or more watts while moving.
4. The RFID module is primarily used for object identification and tracking. Its abbreviation stands for Radio Frequency Identification Module. Its work is mostly wireless and uses is mostly wireless and uses.



## **4. Proposed Methodology:**

### **4.1 Introduction to the project :**

The mechanism of this door lock system is explained. There are four main processes by which this gadget works. These four blocks are namely RFID Scanner, Arduino board, Servo Motor, and Mechanical Door. First, the RFID tag will be scanned by RFID scanner. When we scan our register card, there is a loop start of store programming in which the servo motor rotates 90 degrees, then the gear mechanism in it works, which locks and opens the lock.

Additionally, this innovation is utilized predominantly in charge of frameworks which have wide scope of uses in regions, for example, staff distinguishing proof, customer products following, etc[8]. RFID frameworks are essentially a blend of RFID innovation and figuring innovation. They principally comprise three segments in particular: examiner (reader), transponder (tag) and PC containing database. The reader goes through the content of different labels and transmits content to the server for confirmation. When the data is prepared and checked, get to is conceded. This RFID framework gives a wide scope of frequencies from low recurrence range to microwave recurrence range. With the expansion in the quantity of illicit sections over the previous decade, different organizations and workplaces empower creation and establishment of robotized door security frameworks.

## 4.2 Flow Chart :

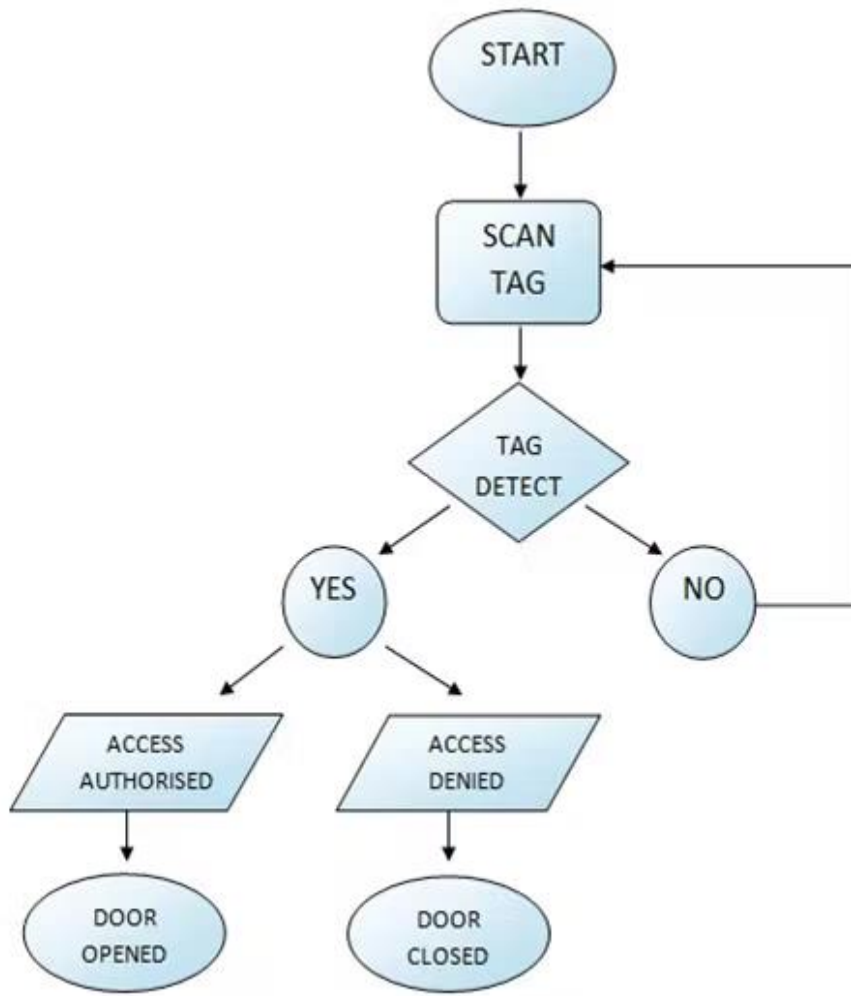


fig. no 1.1 block diagram

### 4.3 CODE:

```
#include<MFRC522.h>
#include<LiquidCrystal.h>
#include<SPI.h>
#include<Servo.h>
#define rs 2
#define en 3
#define d4 4
#define d5 5
#define d6 6
#define d7 7
MFRC522 mfrc522(10,9);
LiquidCrystal lcd(rs,en,d4,d5,d6,d7);
Servo myservo;
void setup()
{
  Serial.begin(9600);
  SPI.begin();
  lcd.begin(16,2);
  myservo.attach(8);
  myservo.write(170);
  lcd.print("#ACCESS CONTROL#");
  lcd.setCursor(0,1);
  lcd.print("    Scan Tag");
  mfrc522.PCD_Init();
  Serial.println("Scan Tag");
}
void loop()
{
  if(!mfrc522.PICC_IsNewCardPresent())
  {
    return;
  }
  if(!mfrc522.PICC_ReadCardSerial())
    return;
}
String uid="";
Serial.println();
Serial.print("UID=");
for(int i=0;i<mfrc522.uid.size;i++)
{
  Serial.print(mfrc522.uid.uidByte[i]<0x10 ? "0" : "");
  Serial.print(mfrc522.uid.uidByte[i],HEX);
  uid.concat(String(mfrc522.uid.uidByte[i]<0x10 ? "0" : ""));
  uid.concat(String(mfrc522.uid.uidByte[i],HEX));
}
uid.toUpperCase();
```

```

if(uid=="9BCB0C99")
{
    Serial.print(":Dwij Patel");
    lcd.clear();
    lcd.print(" ACCESS GRANTED");
    lcd.setCursor(0,1);
    lcd.print(" Dwij Patel");
    myservo.write(10);
}
else if(uid=="D0693C1B")
{
    Serial.print(":Paarth");
    lcd.clear();
    lcd.print(" ACCESS DENIED");
    lcd.setCursor(0,1);
    lcd.print(" Paarth");
    myservo.write(170);
}
else if(uid=="6B42EB66")
{
    Serial.print(":Maneen");
    lcd.clear();
    lcd.print(" ACCESS DENIED");
    lcd.setCursor(0,1);
    lcd.print(" Maneen");
    myservo.write(170);
}
else if(uid=="15AE1CC3")
{
    Serial.print(":Smit");
    lcd.clear();
    lcd.print(" ACCESS GRANTED");
    lcd.setCursor(0,1);
    lcd.print(" Smit");
    myservo.write(10);
}
else
{
    Serial.print("ACCESS DENIED");
    lcd.clear();
    lcd.print(" ACCESS DENIED");
    myservo.write(170);
}
delay(5000);
myservo.write(170);
lcd.clear();
lcd.print(" Scan Tag")} return;}

```

## 5.Design and Implementation

### 5.1 circuit diagram:

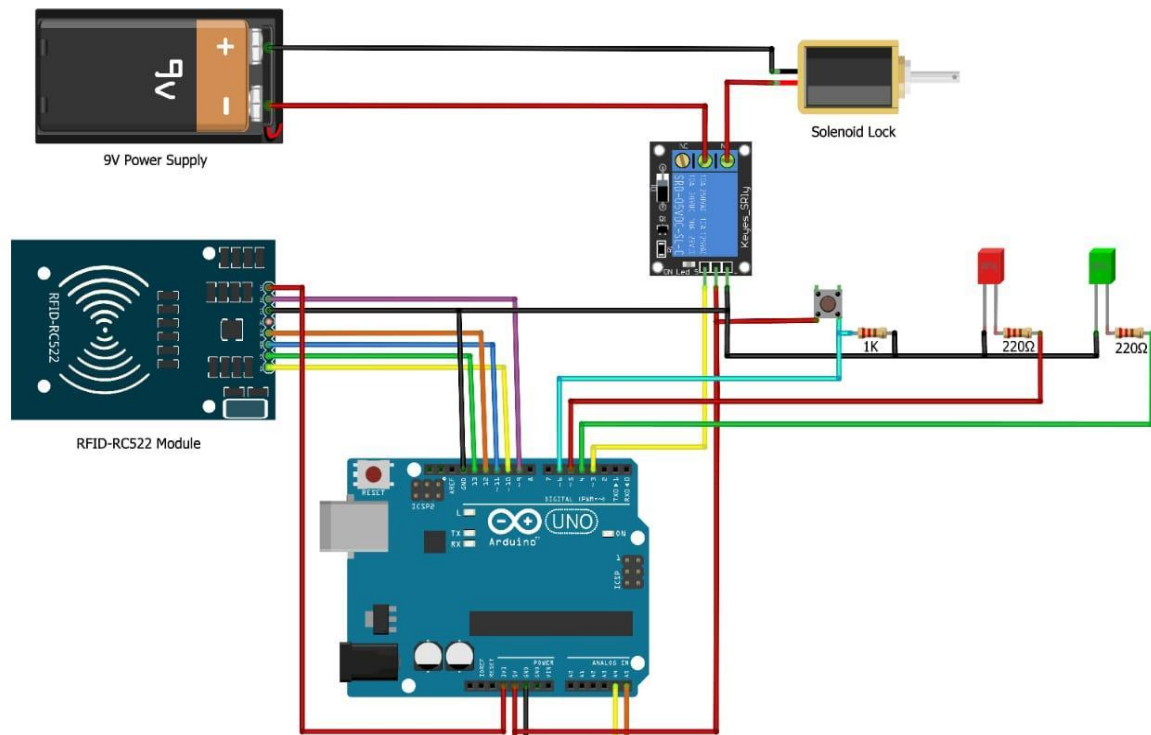
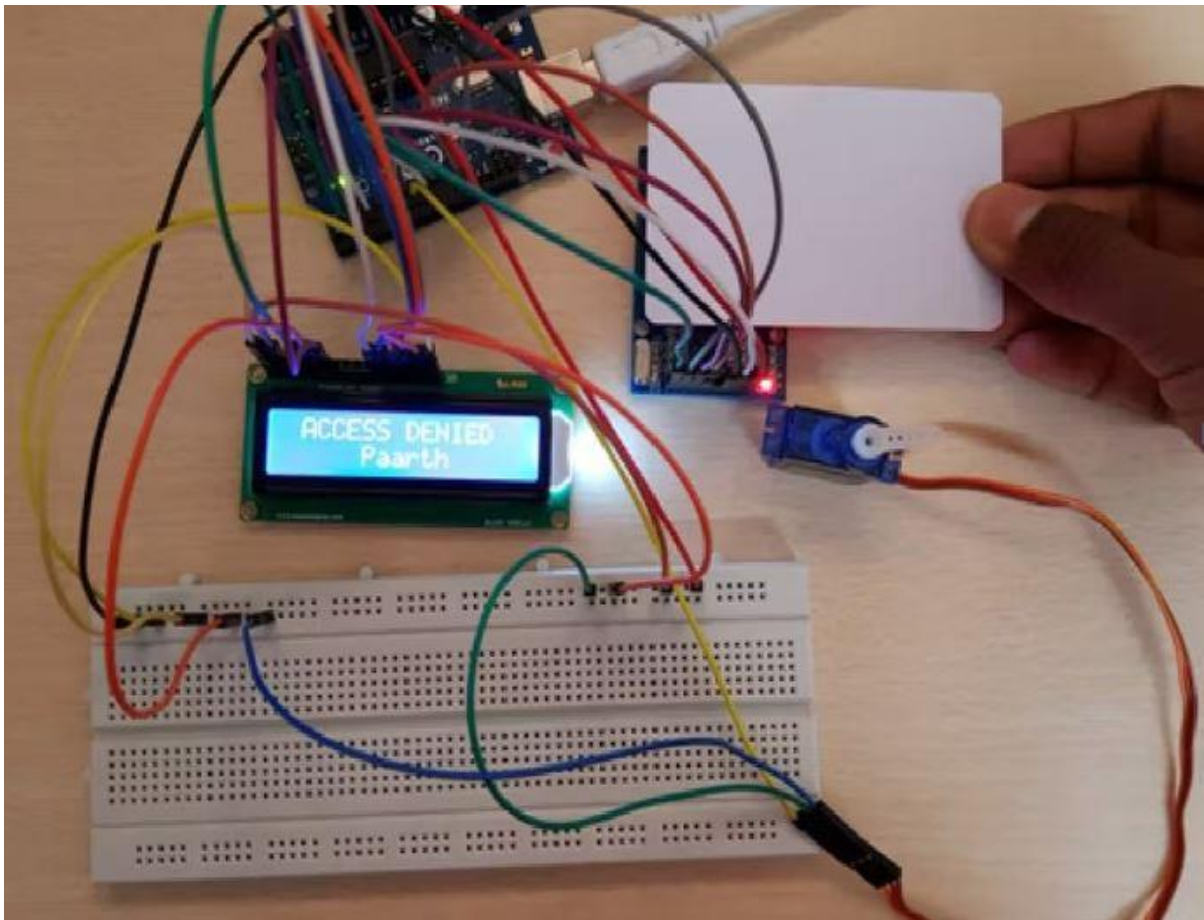


Fig no 1.2 circuit diagram

### 5.2 List of components:

1. Arduino Uno R3
2. RFID module
3. Servo motor
4. LEDs
5. resistors
6. connecting wires

### 5.3 snaps of projects:



## **\6. Results**

It is an RFID based gadget designed for RFID-based door locking systems, developed with the help of Arduino. This gadget is being managed by software programming. Let us see how this door lock system works. A 12-volt power adapter is used for the power supply and can also use a 9-volt battery instead of a power adapter. As can see on the screen, it is displaying welcome to my home. If scan any card which is unregistered it shows the wrong card, and the lock is locked. If scanning the registered card, it opens the door lock. And now scan the registered card again, the lock is locked

RFID based security and access control framework is a quick and profoundly tied down framework when contrasted with some other biometric frameworks. It gives contact less correspondence and works without the observable pathway. With the assistance of Arduino, the framework are effectively open and works inconclusively. Clients can change the capacities in the Arduino code [18].RFID control framework decreases human exertion and mistake. Also, with the assistance of this numerous RFID labels can be read at once which prompts high proficiency of RFID framework. Radio Frequency Identification (RFID) is a remote advancement that can be used to develop the passageway control framework

Our created model RFID based door access control utilizing Arduino **Figure.9.** depends on keen innovation where advanced information is encoded in RFID labels which are caught by the RFID reader by radio waves. These RFID labels have a working recurrence of 13.56 MHz and 1 Kb of memory put away in it. The sign sent by the reader and antenna wire is utilized to control on the tag and mirror the vitality to the reader. When we switch on the power supply, the default white

## **6.1 Future scope**

Applications of the project need to be specified pertaining to following areas but not limited to

### **1. Health & Hygiene:**

Euro-Locks Belgium, we manufacture locks and locking systems which can be supplied in bulk for a large number of industries and applications where sanitation and hygiene are critical. With shopping centres, restaurants and other facilities opening up to the general public again, many are requiring disinfection dispensers to be placed in the entrances and are having to consider enhanced hygiene practices

### **2. Agriculture: Crop, food and water:**

The nature of this lock makes it a great choice for access control in many different industries and applications. They can be used for member access to facilities such as gyms, educational institutions and hospitals.

### **3.Communication & Networking**

a -Bike Carriers

b-Tow Hooks and Hitch Locks



## **7. Conclusion:**

The use of the Arduino UNO microcontroller in this project allows design simplicity, therefore, the project can be achieved in a shorter time than other technologies previously employed. And this door lock system is also very secure and saves the information of people coming and going.

In this paper, a prototype of an automatic access control system for use in an environment is presented. The system uses radio frequency identification (RFID) with Arduino technology to differentiate between authorized and unauthorized users.

The RFID reader reads the RFID tag issued to the user and matches it with stored UID on the Microcontroller. On a successful match, the microcontroller grants access or denies access if no match is found. An automatic access control system using Arduino and RFID has been prototyped and functioned as desired. The system can be installed at the entrance of a secured environment to prevent unauthorized individual access to the environment.

The use of the Arduino UNO microcontroller in this project allows design simplicity, therefore, the project can be achieved in a shorter time than other technologies previously employed. And this door lock system is also very secure and saves the information of people coming and going

## 8. Bill of Material

Sr. No.	Material	Quantity	Price in Rs.
1.	Ardunio uno R3	1	900
2.	Servo motor	1	180
3.	RFID module	1	170
4.	Breadboard	1	200
5.	Led,Battery,wire	2,2,1,30	135
		Total	1585

table no.1.2 bill of the material

## 9. References

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