

**A project report  
on  
Design Of Door Locking System Using Arduino**

*Submitted by*  
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**VADDESARAM-522 502**

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**K L UNIVERSITY**  
**DEPARTMENT OF ELECTRONICS AND COMMUNICATION**  
**ENGINEERING**  
**ANALOG ELECTRONIC CIRCUIT DESIGN**  
**(18 EC 2103)**

**CERTIFICATE**

This is to certify that Mr N.Satish DAR bearing Univ.Regd.No 180040132 of section 2 studying B. Tech in **ELECTRONICS AND COMMUNICATION ENGINEERING** has satisfactorily completed project in the semester - III during the academic year 2019 – 2020.

**Signature of Course Instructor**

**Signature of Course Coordinator**

**Signature of HoD**

## **ACKNOWLEDGEMENT**

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**N. Satish      180040132**

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## **ABSTRACT**

Student understanding of the link between theory and application has always been a critical objective in electronics education. Generally, we forgot to close the door during night times . Our project deals with this problem . In our project we use mainly four components , arduino , servo motor ,12 v Relay, solenoid lock and LDR ( light dependent resistor ) sensor . At we use LDR sensor to determine weather it is night time or day time. And solenoid lock is for to lock the door. And servo motor is for to pull the door if the door is open. And the main electronic module is Arduino , which is used to control the all the remaining components.as the Arduino can able to give only 5 v output supply so we used 12 v Relay to control the solenoid lock.

In our project we use LDR sensor it detects the day or night time and sends to micro controller i.e., Arduino and it analyze the input ,and executes the program. In the program dumped in micro controller we considered certain limits . based on input it executes certain set of instructions. if it was a night time , at first servo motor will run for some time as to pull the door , and the lock present to the door will be locked until the sensor gives the output as same as day time.

So , using this module we can close and lock the door during night times even if we forgot to close the door and it will secure our home from being robbed

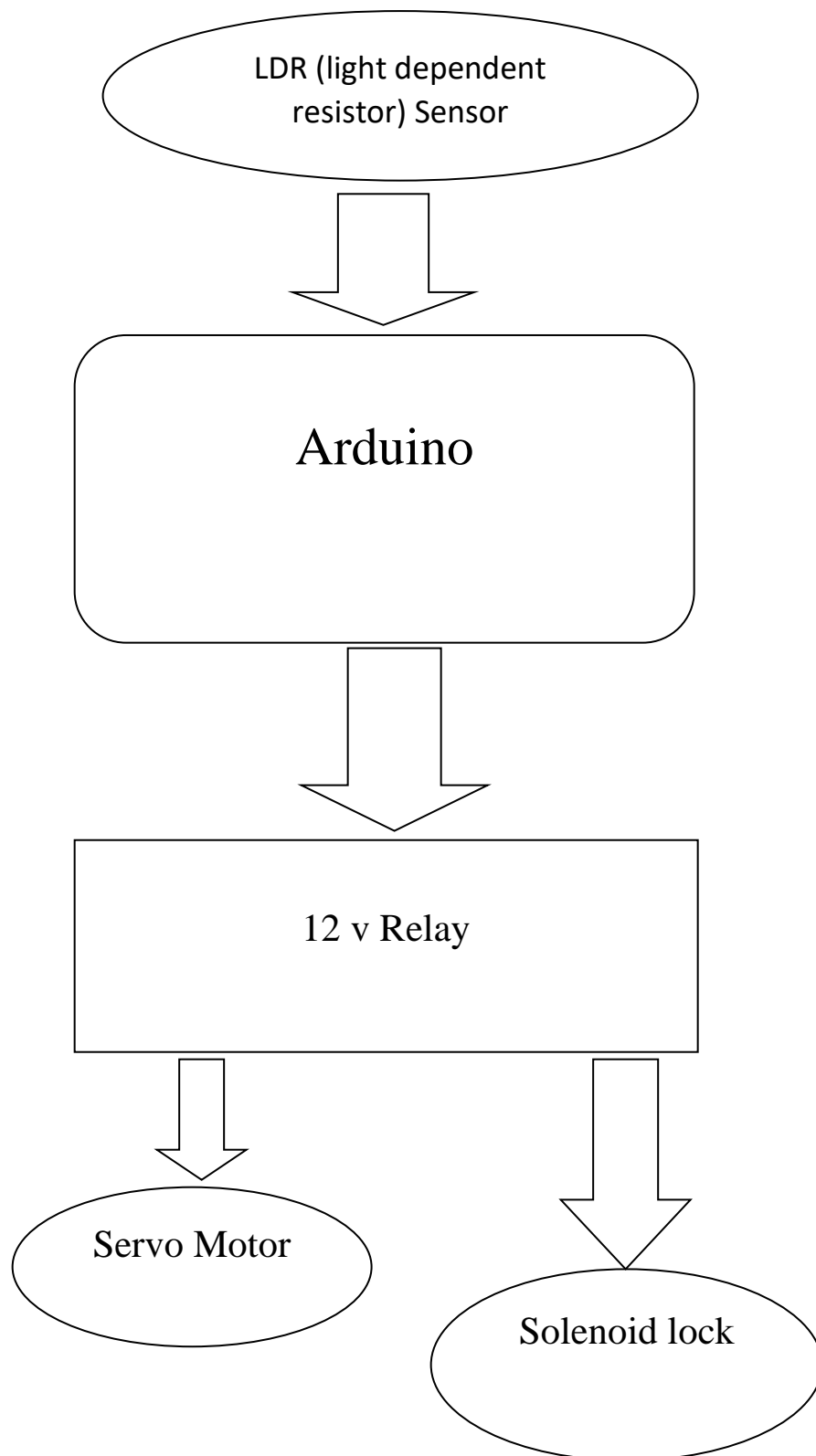
The main advantage using this module is , our home will be secured during night time and it uses less power supply and it is less cost ,so easily affordable.

## **INTRODUCTION**

Generally, we forgot to close the door during night times . Our project deals with this problem . In our project we use mainly four components , arduino , servo motor ,12 v Relay, solenoid lock and LDR ( light dependent resistor ) sensor . At we use LDR sensor to determine weather it is night time or day time. And solenoid lock is for to lock the door. And servo motor is for to pull the door if the door is open. And the main electronic module is Arduino , which is used to control the all the remaining components.as the Arduino can able to give only 5 v output supply so we used 12 v Relay to control the solenoid lock.

In our project we use LDR sensor it detects the day or night time and sends to micro controller i.e., Arduino and it analyze the input ,and executes the program. In the program dumped in micro controller we considered certain limits . based on input it executes certain set of instructions. if it was a night time , at first servo motor will run for some time as to pull the door , and the lock present to the door will be locked until the sensor gives the output as same as day time.

## **BLOCK DIAGRAM**



## **COMPONENTS REQUIRED**

- Arduino uno
- LDR sensor
- Solenoid lock
- Relay
- Servo motor

Software used :-

- Arduino IDE

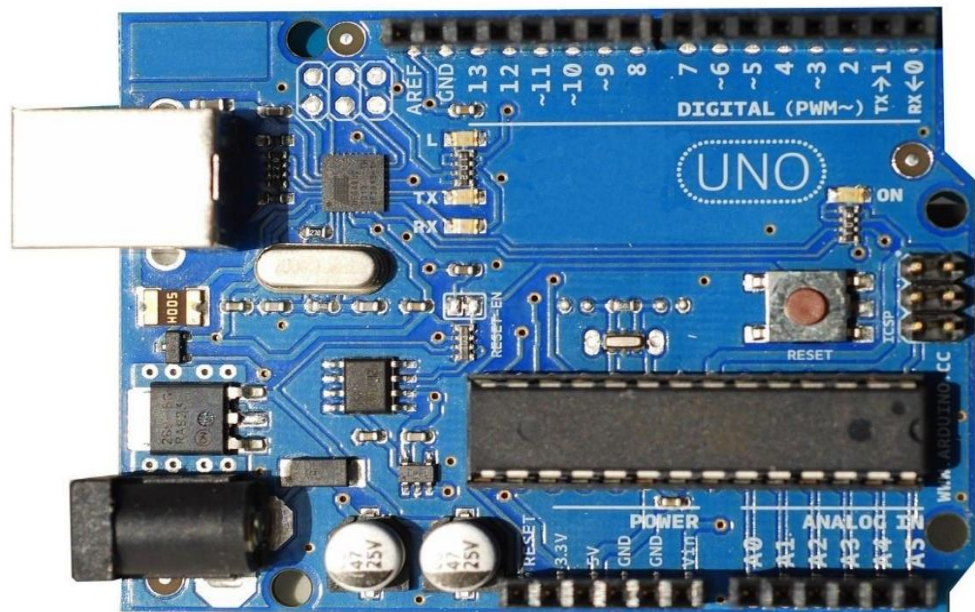


## Arduino Uno :-

- The **Arduino Uno** is an open-source microcontroller board based on the Microchip AT mega 328p microcontroller and developed by Arduino
- The board is equipped with sets of digital and analog input and output (I/O) pins
- The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE
- It accepts voltages between 7 and 20 volts.

## Technical specifications: -

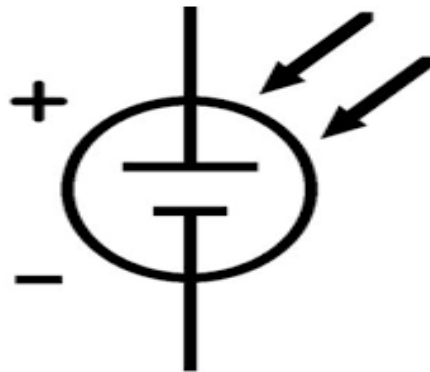
- Operating Voltage: 5 Volts
- Input Voltage: 7 to 20 Volts
- Digital I/O Pins: 14
- Analog Input Pins: 6
- Clock Speed: 16 MHz



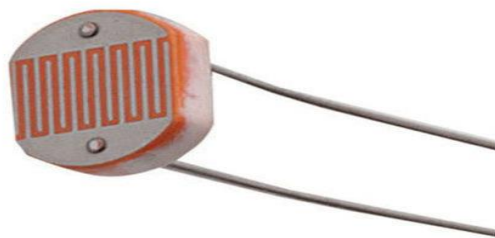
## LDR Sensor:-

- light-dependent resistor, LDR, or photo-conductive cell
- The resistance of a photoresistor decreases with increasing incident light intensity
- A photoresistor can be applied in light-sensitive detector circuits, and light-activated and dark-activated switching circuits.
- A photoresistor is made of a high resistance semiconductor
- In the dark, a photoresistor can have a resistance as high as several megaohms ( $M\Omega$ ), while in the light, a photoresistor can have a resistance as low as a few hundred ohms

## Symbol for LDR:-



## LDR Sensor:-



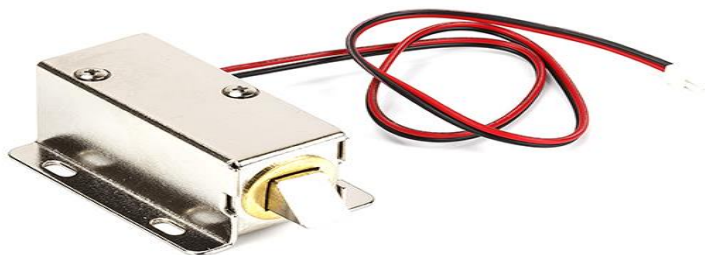
### solenoid lock:-

- 12V Solenoid lock has a slug with a slanted cut and a good mounting bracket. It's basically an electronic lock, designed for a basic cabinet, safe or door.
- When 9-12VDC is applied, the slug pulls in so it doesn't stick out and the door can be opened. It does not use any power in this state
- It is very easy to install for automatic door lock systems like electric door lock with the mounting board. This solenoid in particular is nice and strong.

### Specifications of 12v lock:-

- Operating voltage : 12VDC
- Draws 650mA at 12V, 500 mA at 9V when activated
- Designed for 1-10 seconds long activation time

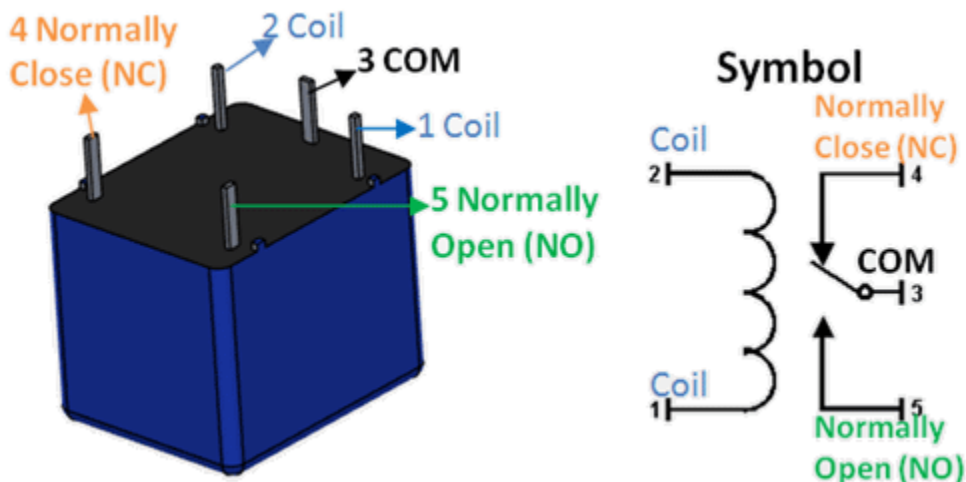
### Solenoid lock :-



## Relay:-

- Relays are most commonly used switching device in electronics.
- There are two important parameters of relay, first is the Trigger Voltage, this is the voltage required to turn on the relay that is to change the contact from Common → NC to Common → NO.
- The other parameter is your Load Voltage & Current, this is the amount of voltage or current that the NC, NO or Common terminal of the relay could withstand, in our case for DC it is maximum of 30V and 10A. Applications

## Relay image and circuit:-



## **WORKING**

The working of the Automatic Door Opener System using Arduino and LDR is very simple. LDR is a device whose sensitivity depends upon the intensity of light falling on it. In the time of darkness or when there is no light, the resistance of LDR is in the range of mega ohms, while in the presence of light or in brightness it decreases by a few hundred ohms.

When the strength of the light falling on LDR is decreased, its resistance increases. Its Data OUT Pin will become HIGH. As this pin is connected to the Arduino, it will detect this HIGH Signal and understand it has to close the door.

Arduino then immediately activates the relay module to close the door. Then the relay module sends signal to servo motor to pull the lock. Then the door will be closed.

## CODE FOR ARDUINO

```
#include <Servo.h>

int servoPin = 3;

Servo Servo1;

void setup() {
    pinMode(5,OUTPUT);
    pinMode(A0,INPUT);
    Serial.begin(9600);
    Servo1.attach(servoPin);
}

void loop(){
    int i;
    for(i=0;i<=180;i=i+1)
    {
        Servo1.write(i);
        delay(1000);
    }
    float p;
    p=analogRead(A0);
    Serial.println(p);
    if(p>0&&p<100)
    {
        digitalWrite(5,HIGH);}
    else
    {
```

```

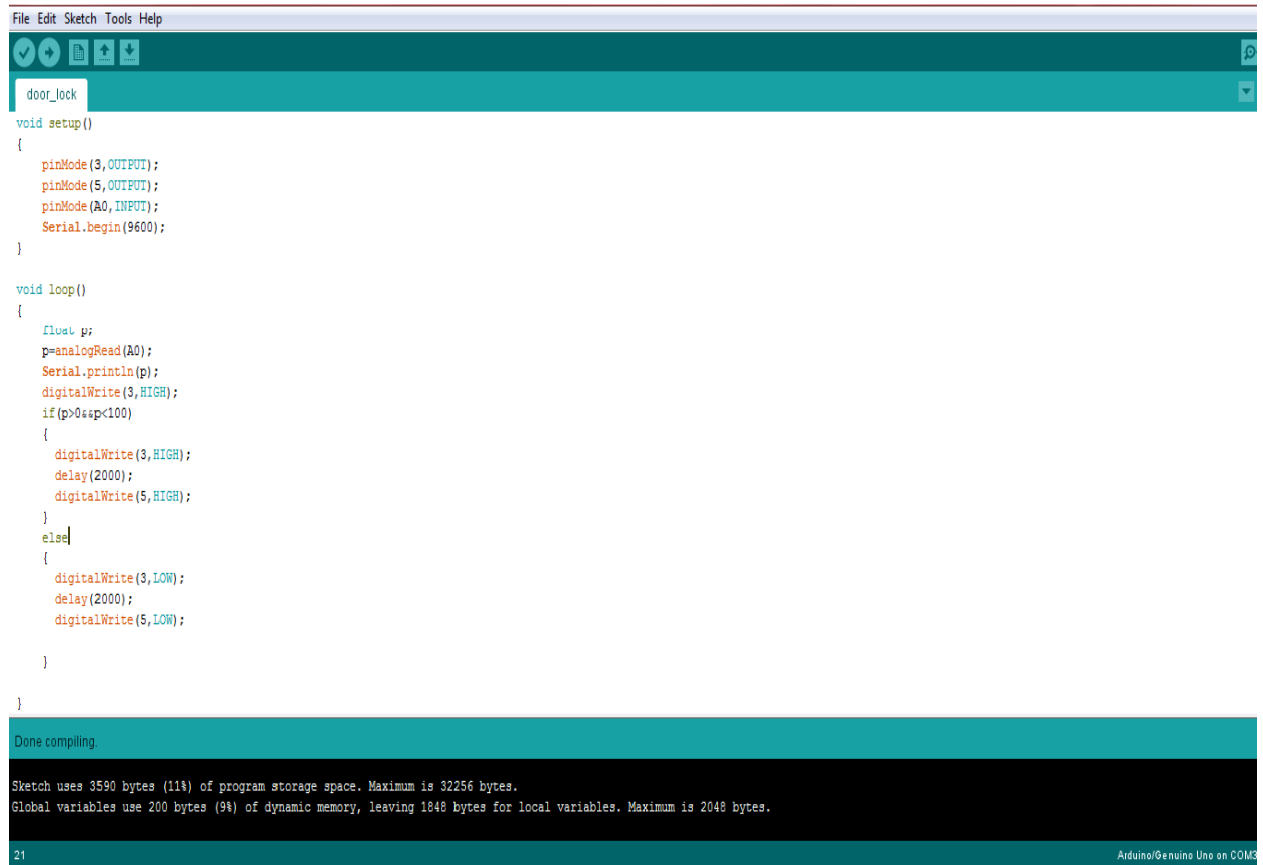
        for(i=180;i>=0;i=i-1)
        { Servo1.write(i);
          delay(1000);
        }
        digitalWrite(5,LOW);
      }}

void setup()
{ pinMode(3,OUTPUT);
  pinMode(5,OUTPUT);
  pinMode(A0,INPUT);
  Serial.begin(9600); }

void loop()
{ float p;
  p=analogRead(A0);
  Serial.println(p);
  digitalWrite(3,HIGH);
  if(p>0&& p<100)
  {
    digitalWrite(3,HIGH);
    delay(2000);
    digitalWrite(5,HIGH);
  }
  else
  { digitalWrite(3,LOW);
    delay(2000);
    digitalWrite(5,LOW);
  } }

```

# OUTPUT



The screenshot displays the Arduino IDE interface. The top menu bar includes 'File', 'Edit', 'Sketch', 'Tools', and 'Help'. Below the menu is a toolbar with icons for opening, saving, and running. The sketch is named 'door\_lock'. The code is as follows:

```
void setup()
{
  pinMode(3,OUTPUT);
  pinMode(5,OUTPUT);
  pinMode(A0,INPUT);
  Serial.begin(9600);
}

void loop()
{
  float p;
  p=analogRead(A0);
  Serial.println(p);
  digitalWrite(3,HIGH);
  if(p>0.5*p100)
  {
    digitalWrite(3,HIGH);
    delay(2000);
    digitalWrite(5,HIGH);
  }
  else
  {
    digitalWrite(3,LOW);
    delay(2000);
    digitalWrite(5,LOW);
  }
}
```

Below the code editor, a status bar indicates 'Done compiling.' and provides memory usage details: 'Sketch uses 3590 bytes (11%) of program storage space. Maximum is 32256 bytes. Global variables use 200 bytes (9%) of dynamic memory, leaving 1848 bytes for local variables. Maximum is 2048 bytes.'

The bottom status bar shows the line number '21' and the board name 'Arduino/Genuino Uno on COM3'.



## **APPLICATIONS**

- Commonly used in switching circuits.
- For Home Automation projects to switch AC loads
- To Control (On/Off) Heavy loads at a pre-determined time/condition
- Used in safety circuits to disconnect the load from supply in event of failure

## **CONCLUSION**

- Hence we can conclude our project we had successfully completed and got the expected output in hardware , with less cost .
- So we can also implement this or use in our day to day life for more safety purpose during night time.
- Every one can afford the cost and it requires less power consumption.

## **FUTURE SCOPE**

Machine replaces manpower which is user friendly and this model helps to improve security with under low cost . so, we can also use this in old age home , as elder people forgot to lock the door at night times , banks , shopping malls , home , work places etc.