SMART LOCK

A Mini Project Report Submitted By

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ABSTRACT

Mechanical locks are exposed and are easily breakthrough. Here we desire a lock that doesn’t require manual locking/unlocking,which can operate automatically and only to be accessible by concerned/authorized personnel.. This remotely operated secure door opening system can be used for domestic as well as commercial purposes.

The proposed system puts forward a secure door opening system that can be used for a variety of purposes. We operate a lock that is locked on the inside through rf signals. Only a specified encrypted rf signal in the proximity area can unlock the door. The receiver unlocks the door only when it receives a specified encoded signal. We here use the rf module,an Arduino UNO microcontroller to demonstrate the system working.

1.INTRODUCTION

Why use a locking system?

Locking systems provide security and control access authorization

Whether in administrative buildings, production plants, public institutions, hospitals, commercial or private buildings, now more than ever security is a top priority in society.

A locking system or simultaneous locking facility is also very beneficial and convenient for smaller properties and residential buildings.

Locking systems provide access control

Having to carry a bunch of keys and a complicated key management system not only costs time, it will also test your patience. From janitors to office staff to personal assistants everyone is given a key for his/her particular area in the organization.

The same applies to electronic locking systems. Here too, the user just needs one chip key or proximity device to unlock the doors he/she is authorized to use. These authorizations can be managed flexibly and modified as required.

Systems with an additional code option are also used in the domestic sector. The advantage here is that the user can use his/her own code to open the door if it closes accidentally or if he/she has forgotten the key or chip card.

2.OBJECTIVES AND SCOPE

The goal of this project is to research and analyze a suitable collection of components for developing a smart door lock using Arduino that provides excellent security and quick access. The following are the specific project goals:

•Familiarity with a smart door locking system based on a microcontroller.
•Using Arduino to create a simple and smart door locking system

3.EXISTING SYSTEM

Fingerprint Locking System

A fingerprint locking system uses a fingerprint sensor module to secure the user's fingerprint.The fingerprint sensor module uses an Arduino to operate.

In the proposed system, there is three-level security. Any two levels of security users have to face to unlock the system. This is the ideal option for avoiding the hassles of a stolen or lost key or illegal access. The authorized user must register his or her fingerprint in the system. The registered person's mobile number is then added to GSM, and a permanent image password is assigned to this user. As a first step, the unauthorized individual must choose unauthorized as the user type. The admin receives a random picture. The person must properly choose the random image.

Drawbacks of existing system

There is a **lack of flexibility to identify the person in case of a cut or wound or when fingerprints are smudged with dirt or grease**.

Fingerprint sensors are sensitive, which works in their favor if the fingers are clean, but these sensors are inefficient for industries like mining, construction, and manufacturing.

METHODOLOGY AND MODELING

Introduction

In this project,we implemented the Id-based security system using arduino and rf modules . As thefts are increasing day by day,security is becoming a major concern nowadays. So a digital lock can secure our home or offices or lockers easily. It will open your door only when the id matches. Only authorized people are allowed access to restricted sections due to the mechanism used. The arduino is responsible for the entire project's operation.

Working process

The process of this experiment is to implement a door-locking mechanism that opens or closes the lock on the door automatically with a rf digital id. There are two work processes for this experiment which are:

Case1: The lock will open:

The id values allow us to compare the values with the integer values that are set in the code. When the id matches with the id given in the code,then the door unlocks with the name of the person .

Case2: The lock will not open:

If the id doesn't match with the id given in the code the door will not open and it displays the message as ONLY AUTHORIZED PERSON ALLOWED. And the door remains locked.

Components Required:

Hardware:

1.Arduino UNO

2.RF 433 module

3.HT 12E , HT 12D

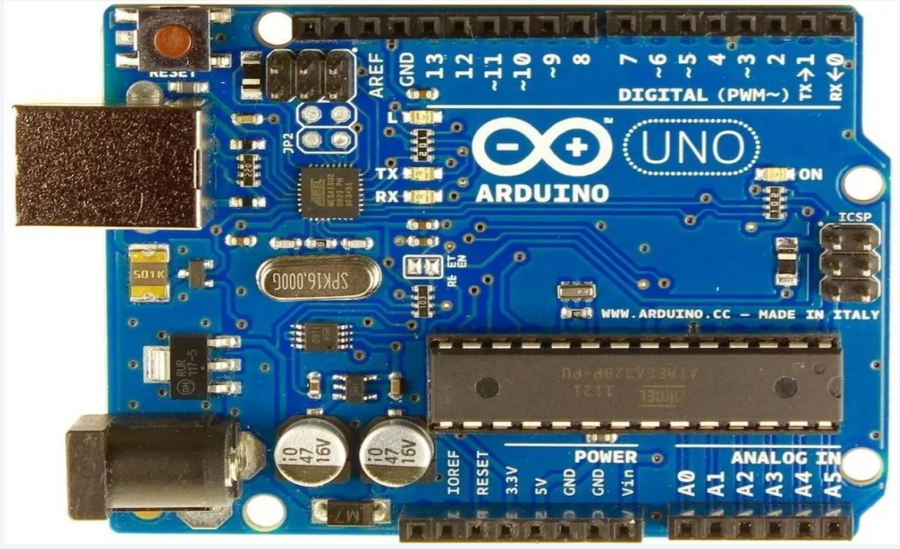
4.16X2 LCD

Software:

Arduino IDE

Arduino UNO:

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE(Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.The Arduino platform has become quite popular with people just starting with electronics, and for good

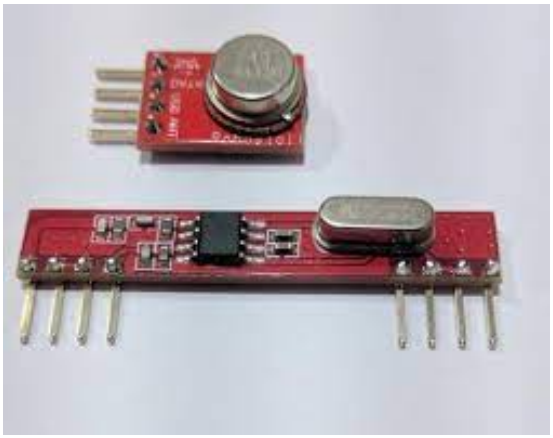


reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) to load new code onto the board -- you can simply use a USB cable. Additionally,
The Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package.

16×2 Alphanumeric Display:

An LCD (Liquid Crystal Display) screen is an electronic display module and has a wide range of applications. A 16x2 LCD is a very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in a 5x7 pixel matrix. The 16 x 2 intelligent alphanumeric dot matrix display is capable of displaying 224 different characters and symbols. This LCD has two registers, namely, Command and Data.

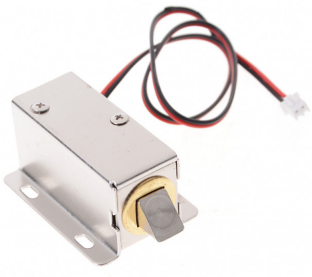
Rf 433 module:



RF stands for Radio Frequency.the arduino can be made to communicate data with other microcontrollers via RF.

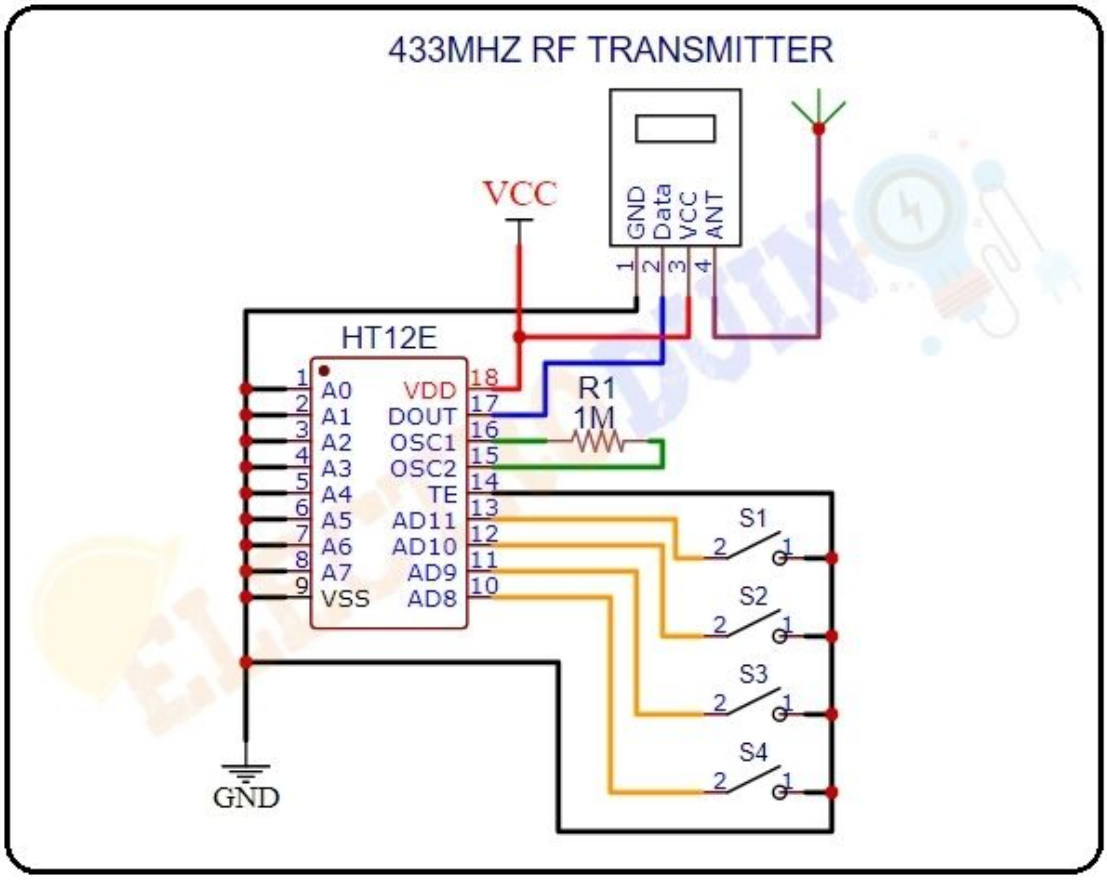
It is a small electronic device used to transmit and/or receive radio signals between two devices.The data is sent and received by the transmitting and receiving end of the respective modules.This RF signals will have a frequency of 433Mhz.

Other components:



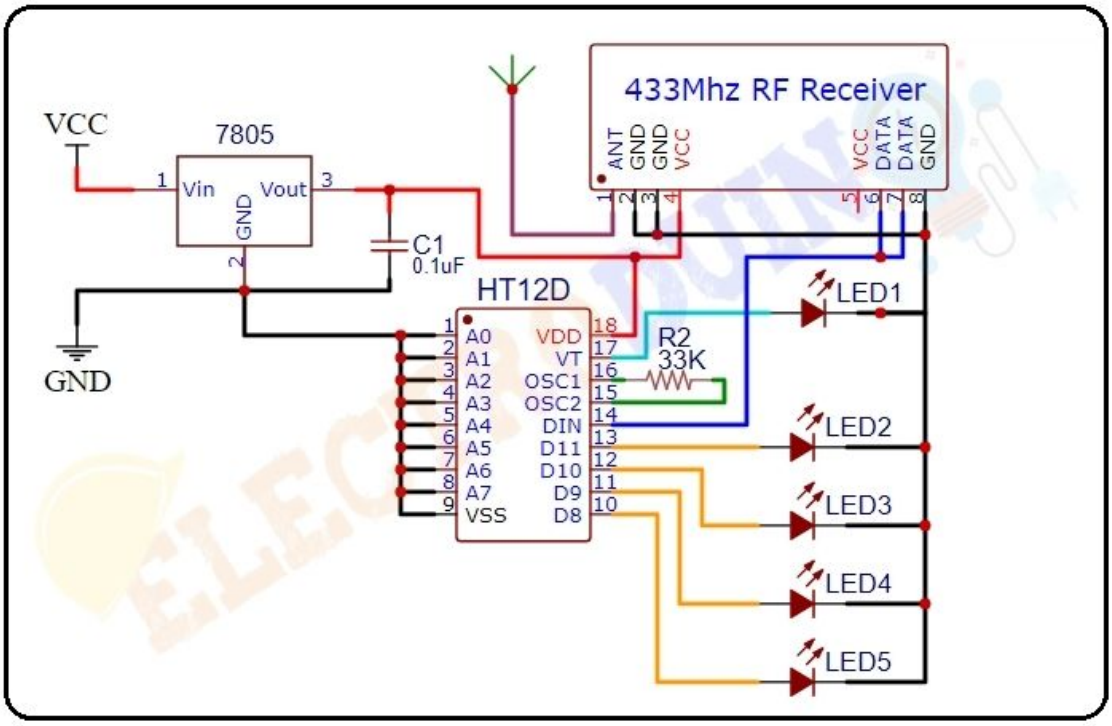
Implementation:

Circuit Diagram of RF Transmitter



The HT12E encoder IC **VSS pin** is connected to the power supply **Ground (-)** and the **VDD** is connected to the power supply **VCC (+).** IC **A0 – A7 pins (pin 1 – 8)** are connected to the **Ground(-)** to set the **address** at **0b00000000**. The **Switch 1 (S1), Switch 2 (S2), Switch 3 (S3),** and **Switch 4 (S4)** are respectively connected to AD11 **(13), AD10 (12), AD9 (11),** and **AD8 (10)**. The **1M ohm** resistor is connected between the pin **15** and **16**, which provides the external resistance for the operation of the internal oscillator of **the HT12E IC**. The RF Transmitter module **GND pin** is connected to the power supply **Ground (-)** and the **VCC** is connected to the power supply **VCC (+).** The **Data** pin is connected to the **DOUT (pin 17)** of the IC.

Circuit Diagram of RF Receiver



The HT12D decoder IC **VSS pin** is connected to the power supply **Ground (-)** and the **VDD** is connected to the power supply **Vout (+)** of the 7805 5v voltage regulator. IC **A0 – A7 pins (pin 1 – 8)** are connected to the **Ground(-)** to set the **address** at **0b00000000**. The **LED2, LED3, LED4,** and **LED5** are respectively connected to the **D11 (13), D10 (12), AD9 (11),** and **D8 (10)**. The **33K ohm** resistor is connected between pin 15 and 16, which provides the external resistance for the operation of the internal oscillator of **the HT12D IC**. The RF Receiver module **GND pins** are connected to the power supply **Ground (-)** and the **VCC** is connected to the power supply **VCC (+).** The **Data** pin is connected to the **DIN (pin 14)** of the IC.

How RF Transmitter and Receiver Circuit Works

The HT12E encoder IC's 4 data pins are connected to the 4 push buttons. The push buttons provide **4-bit data** to the HT12E encoder IC. Then the IC converts these 4-bit data into **serial data** and this serial data will be available at the **DOUT pin (pin17)** of the IC. This output serial data is given to the **RF**

Transmitter module. Then the RF transmitter module transmits this serial data using **radio signals**.

At the receiver side, the RF receiver module receives this **serial data** coming from the transmitter. Then this serial data is given to the **DIN pin (14)** of the HT12D Decoder IC. Now the decoder IC will convert the received serial data into **4 bit parallel data**. The 4 data pins of the decoder IC are connected to 4 LEDs, which are controlled according to the transmitted data from the transmitter.When we will provide Power supply to both circuits, we should notice that all LEDs will start glowing. Because the push-button pins (IC pin D8-D11) are **pulled up internally** by the Encoder IC. If we press one push-button the data pin is connected to the ground in the transmitter circuit, then the respective LED will be turned off in the receiver circuit.

For example, if we press **Switch 1 (S1)** which is connected to the **AD11 (pin13)** of the Encoder IC, then the **LED 2** will turn off which is connected to the **D11 (pin13)** of the Decoder IC.

Source code :

```
#include <Wire.h>

#include <LiquidCrystal_I2C.h>


LiquidCrystal_I2C lcd(0x27,20,4);  // set the LCD address to 0x27 for a 16 chars and 2 line display


void setup()

{
```

```
 int a,b;
 pinMode(A0,INPUT);
 digitalWrite(A0,LOW);
pinMode(13,OUTPUT);
pinMode(12,OUTPUT);
digitalWrite(12,HIGH);
 lcd.init();                    // initialize the lcd
 lcd.init();
 // Print a message to the LCD.
 lcd.backlight();
 lcd.setCursor(1,0);
 lcd.print("Hello");
 delay(1000);
 lcd.setCursor(0,1);
 lcd.print("Mini Project by:");
 delay(2000);


 lcd.clear();
lcd.setCursor(16,0);
lcd.print("Saniya, Huda");
lcd.setCursor(16,1);
```

```
lcd.print("Aiman");
for(a=0;a<=15;a++)
{
lcd.scrollDisplayLeft();
  delay(200);
}
delay(2000);
lcd.clear();
lcd.setCursor(3,0);
lcd.print("2020 batch");
lcd.setCursor(5,1);
lcd.print("V sem");
delay(2000);
lcd.clear();
lcd.setCursor(3,0);
lcd.print("Presenting");
lcd.setCursor(3,1);
lcd.print("Smart ID");
delay(3000);
digitalWrite(13,OUTPUT);
```

```
while(1)
{
  lcd.clear();
lcd.setCursor(0,0);
digitalWrite(12,HIGH);
lcd.print("Door is locked...");
delay(500);
  b=digitalRead(A0);
  while(b==1)
  {
   digitalWrite(13,HIGH);
   lcd.clear();
lcd.setCursor(0,0);
lcd.print("Welcome SANIYA");
digitalWrite(12,LOW);
delay(3000);
digitalWrite(13,LOW);
delay(1000);
digitalWrite(13,HIGH);
delay(1000);
```

```
 b=digitalRead(A0);

  }




}
```

Conclusion:

Thus “Digital Id using Arduino” is a modern successor of the conventional door locking system.The conclusion of the discussion of digital id using Arduino is the innovation created from the lock system with no more direct contact between the user and the lock. This system is very cost-effective and easy to install. In conclusion, it was discovered that the project performed according to specification and can be implemented. The use of the Arduino UNO microcontroller in this project allows for design simplicity, hence, the project can be achieved in lesser time compared to other techniques previously employed. This work proposes a secure locking/unlocking system based on a rf and Arduino. Adding Id to the Arduino side increases the system security. The system also has a feature for locking itself after some delayed time. This system could be used to prevent houses, companies, institutions from stealing or losing the ordinary key