Fingerprint Based Door Access System

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Abstract

Actual keys are the most regular method for locking or open an entryway, and everybody knows about it. All about the actual key is an all around demonstrated and notable innovation, it isn't without shortcomings. For a lock, there must be one of a kind key. Different keys are expected for different locks. Conveying a major number of keys is likewise badly designed. Brilliant locks are key-less entryway locks that let you open your entryway without utilizing a genuine key. A brilliant lock is an electromagnetically lock that is intended to lock and open an entryway when it gets directions from an approved gadget and executes the approval of the medhodology utilizing a solenoid lock . Numerous different modalities are in different progressive phases and appraisal. Among these accessible biometric qualities, finger impression ends up being perhaps the best attribute giving great confuse proportion and dependable. The current situation to work a bank storage is with locks which are having hexadecimal keypadss. By It we don't tell that we will give best safety to our storage spaces. To give amazing security and to make our work simpler, we are taking the assistance of two distinct advancements that is inserted frameworks & biometrics.

Introduction

In our day to day routines, security is a main pressing issue. Each individual requires a feeling that everything is safe and secure. Our security design incorporates an entrance control framework for entryways. Solenoid locks are no longer as secure as they are using to be; anybody can get entrance by cutting these solenoid locks. We really want to make a structure that will help whole day, seven days per week. Just approved people approach limited regions on account of a secret word based entryway lock framework. Arduino is accountable for the whole framework. A keypad can be utilized to enter the secret key. The entryway opens assuming the secret key matches the secret phrase entered in Arduino. It secret word based bolt design will give clients a safer and low exertion locking-opening instrument. Mechanical entryway locks will be supplanted by electronic entryway secures from now on, because of

the security entryway lock robotization framework.Yes, as it in the under-development condition we can also use artificial intelligence in the security system to improve its efficiency.

Problem Formulating

In the world, for new innovation new problems are there. In the same thing there are some problems in the project or we can said It guard system.In It project we have faced wire connection, because if we do not use exact connection according to the code , then It project will not operate successfully.In the programming code we provide supply to the fingerprint sensor through Vin pin, but if we connect with 5v. pin then it will not work and also the sensor may be damaged.So we have to carefully to do connection otherwise Itsystem will not work.In It project we use fingerprint sensor, if we put our finger with exact point then it will not take the digital image of our fingerprint.There are also some problem like season wise. In rainy season, If our hand is wet then the fingerprint recognition will not occur and also in winter season, our fingerprint skin uprooted, so there are problem in fingerprint recognition.It project work on power supply, if there will be no power supply, then the project is worthyless. In It case we have to store power in DG/battery etc.But if watch in a long vision, then it is a profitable project.It system guard our home, money, documents etc. There is an also another problem, if we provide more power than the required power It system will burn.In the growing technology there are hacking in all over world. In It project, we have used programming code. A hacker can hack It system , but It system is under development condition. We can use security wall to make safe from the hacker

Project objectives:-

1.The objective of It undertaking is to investigate and dissect an appropriate assortment of parts for fostering a brilliant entryway lock utilizing Arduino that gives fantastic security and speedy access. Coming up next are the particular venture objectives:

2.Knowledge of a shrewd entryway locking framework in view of a microcontroller.

3.Utilizing Arduino to make a straightforward entryway locking framework.

4.As the burglary cases increases day by day, so it is required to secure our houses, so by It security system we can secure our money, documents etc. from thieves.

5.In the project system, we can use survillance camera, voice recognition system, Keypad system to get more benefit.

6. The main motto of the project is to secure our house, institutions etc from robbers.

Fingerprint locking system

Unique mark locking framework is a locking framework that utilizes a finger impression sensor module to get the client's finger impression. The finger impression sensor module utilizes an Arduino or a Raspberry Pi to work. In the proposed framework, there is three level security. Any two degrees of safety clients need to face to open the framework. It is the best choice for keeping away from the problems of a taken or lost key or unlawful access. The approved client should enroll their finger impression in the framework. The enlisted individual's versatile number is then added to GSM, and a super durable picture secret key is appointed to It client. As an initial step, the unapproved individual should pick unapproved as the client type. The administrator gets an arbitrary picture. The individual should appropriately pick the arbitrary picture. Any other way, the framework will return to the principal page. Entryway access framework is a sort of control access framework which control the opening and shutting of the entryway. A system is done on a design to keep people and assets in the construction to be shielded from untouchables. The framework is generally utilized during the movement of individuals going into and get out from the structure. The entryway access framework helps with isolating unapproved and supported people as the structure just permits the approved individual to enter the structure. The entryway access framework has two principle highlights which are:- 1.Keypad 2.Unique mark scanner

Working Principle:-

The reason for It examination is to carry out an entryway locking system that opens or shuts the lock on the entryway naturally with a key code. There are two work processes for It try which are:

Case 1: The lock will open: A Keypad will include values permitting us to contrast the qualities and the line of whole number qualities that are set in the code. While contributing a code involving whole number qualities with the assistance of the Keypad, on the off chance that the line of whole number qualities matches the line of number

qualities previously fixed in the code, the keypad will convey a message to the showcase and the "Code Accepted" message will be shown. On the off chance that the code is acknowledged, the Arduino will convey a message to Servo Motor. The Motor will then turn 90° and open the lock, permitting the way to be opened.

Case 2: The lock will not open: A. If the code inserted in the Keypad doesn't match the fair string in the code, the Keypad will pass a message on to the Showcase to show "Some unsatisfactory Code" message. Pressing a few unsatisfactory characteristics in the Keypad will normally help the client to start again from the beginning. If "Some unsuitable Code" message is shown, the Servo Engine won't turn and the lock won't open allowing the method for remaining locked.

Arduino

Arduino is an open-inception which is processing stage in view of a lonely microcontrolling board. It is utilized when there are associations among information inceptions and results. It is utilized to control the result as per the data inceptions order like controlling the light or engine by utilizing the switch. The programming language which is used in arduino utilizes Wiring which is an incorporated advancement climate (IDE), and a solitary board microcontroller. The language can be extended through C libraries. The upsides of utilizing arduino are [1] :- Modest – Comparision with other microcontroller sheets, arduino board is fairly less expensive. Cross stage - Arduino programming which is run in personal computer with windows, Mac OSX and Linux working framework. While most microcontroller frameworks can runs on Windows as it were. Basic, clear programming climate - Arduino is not difficult to use by amateurs and progressed clients. While contributing a code involving whole number qualities with the assistance of the Keypad, on the off chance that the line of whole number qualities matches the line of number qualities previously fixed in the code, the keypad will convey a message to the showcase and the "Code Accepted" message will be shown. On the off chance that the code is acknowledged, the Arduino will convey a message to Servo Motor. The Motor will then turn 90° and open the lock, permitting the way to be opened. In the task, Arduino is executed by utilizing the Arduino Mega 2560 as the microcontroller board as in Figure 2. it accompanies an ATMEGA2560 microcontroller by which the programming put away in ATMEGA2560 can be 17 altered coming soon for support purposes. The information inceptions and results will be associated with the arduino mega 2560 I/O pins and communicating is finished by utilizing Arduino programming. In light of Figure 3, it shows the square graph of the framework connected by Arduino. Atmega 2560 is the microcontroller which is controlled the information inceptions (hexadecimal keypading and unique mark scanner) and results (LCD show, attractive regulator, alarm & marker).

Fingerprint scanner

A unique finger impression is a kind of fingerprintscanner which filters the man finger impression. It the capacity is to catch the human unique mark as in Figure 3. In this case two sorts of finger impression scanner which is optical like glasses and capable of finger impression scanner. The distinctions between two sorts is a unique mark is that the optical finger impression and capacitive finger 18 impression scanner catches particulars by the light and the current individually. In It undertaking, the optical scanner is utilized in light of the fact that it is less available to electrostatic release (ESD) contrasted with capacitive unique mark scanner. The finger impression scanner is regularly operated in charge access frameworks. The explanation is on the fieldes that each human have different unique mark particulars which helps in distinguishing the genuine information technology of an individual precisely. On account of entryway access framework, the individual who wishes to enter the structure needs to examine their unique finger impression to be Based on Figure 3, in this project the library of adafruit finger impression scanner utilized can hold up to 127 fingerprints. The put away fingerprints are put away in the locally available catching memory which has the size of 256bytes.

Magnetic switch

An magnetic switch is a typically shut dry contact which relies upon attractive field to work. It applies hand-off working rule and control electrical switches by other switches. In It project the attractive switch go about an attractive entryway lock, by which it is actuated to lock the entryways and it will be deactivated for the approved clients. It's likewise utilized as a gatecrasher alert to recognize the safety officers on the composure of interloper.

Relay board

Hand-off sheets are PC sheets with a variety of transfers and switches. They have information and result terminales which is intended to the supply control the voltage. Transfer loads up give sovereign programmable, ongoing control for every one of a few locally available hand-off channels.

Problem Statement

Issue explanations are the issues distinguished by noticing the current entryway access framework. Through perception, there are thrice issues that have been distinguished in request to foster It project which are:-

1.Old parts

The presence of new advances come from the production of new parts. It reality showing that once the old gadgets are old, then are no extra parts would supplant 22 . In It way framework with new parts must be made.

2.Updating issues

The vast majority of control accessing framework these days utilizes PIC [11][12]. It would be troublesome with PIC on the grounds that each time redesigning should be done, the independent PIC should be take out from the circuit and consumed once more.

3.Muddled programming

Since the vast majority of controlling access framework these days utilizes PIC, many architects will confront troubles in the event that issue happen on the gadget. The explanation being is on the grounds that PIC is anything but an open-inception IDE contrasted with Arduino. Subsequently assuming issue happen, additional time is required for the architects to make new coding for the gadget.

FLOW CHART OF THE PROJECT
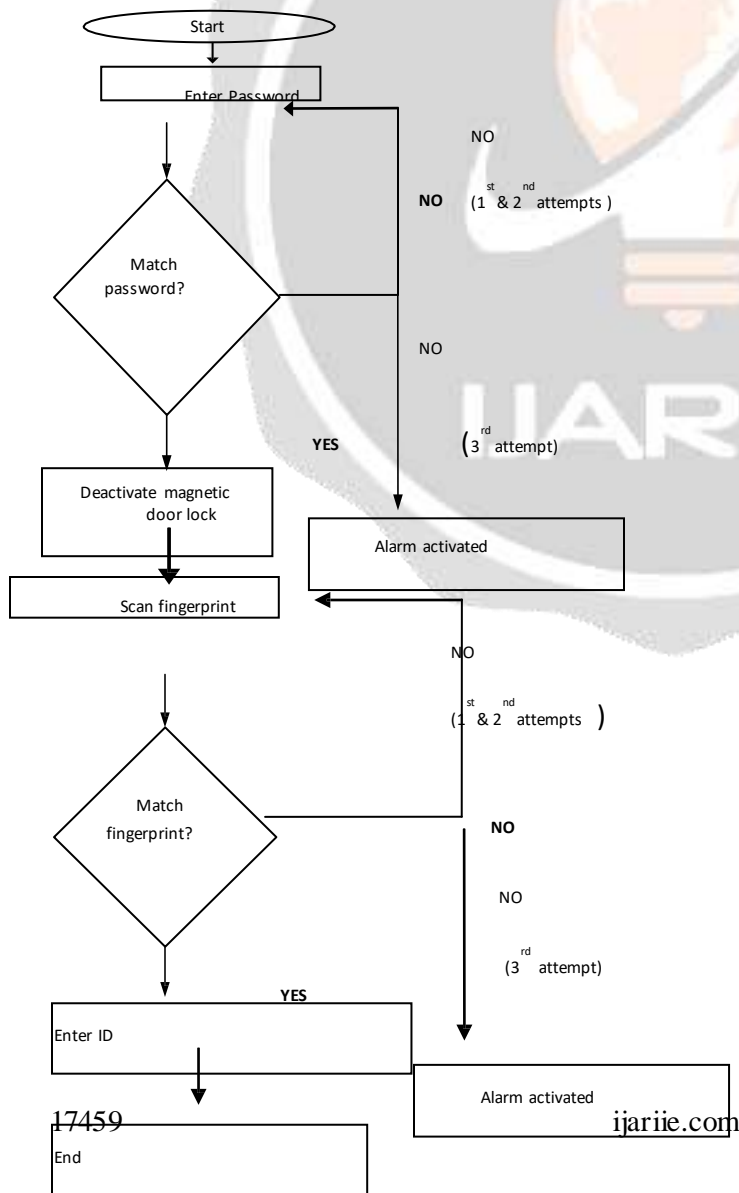
Description of Solenoid

Solenoids are basically electromagnets: they are made of a big coil of copper wire with an armature (a slug of metal) in the middle. When the coil is energized, the slug is pulled into the center of the coil. This makes the solenoid able to pull from one end.

This solenoid in particular is nice and strong, and has a slug   with a slanted cut and a *good mounting bracket*. It's basically an electronic lock. designed for a basic cabinet or safe door. Normally the lock is active so we can't open the door because the solenoid slug is in the way. It does not use any power in this state. When 9-12VDC is applied, tfic slug pulls in so it doesn't stick out anymore and the door can be opened.

Working Principle of Solenoid

A current is applied to the solenoid, it has the effeci of assembling a consistent metre field. Electricity changes to magnetism then it changes to electricity and therefore, these two forces are united into one.

An attractive thing about the uniform field in a solenoid is that, if the solenoid has an

immeasurable length, the magnetic field would be similar everywhere along the element. In a solenoid, sometimes this translates to very small electrical components being able to do a marvelous amount of work. For instance, a powerful solenoid can simply slam shut a valve that would be demanding for even the burliest plumber to close by hand.[6-12]

Physical Principle

Anybody with experience with magnetism understands just how powerful this force can be. In a solenoid, this translates to these sometimes very smail electrical components being able to do a tremendous amount of work. For example, a powerful solenoid can easily slam shut a valve that would be challenging for even tfie burliest plumber to close manually.

By altering the direction of the mechanical force that a solenoid produces, rotary applicaoons and other types of applications can be accommodated .This makes these extm rely flexible devices that make some of the most common electrical components rind appliances possible. This very simple device can make limitless.

Technical Details of Solenoid

- 12a DC (we can use 9-12 DC volts, but lower voluge results in weaker/slower operation)

- -Oraws 650mA at l2V, 500mA at 9V when activated
- -Designed for 1-10 seconds long activabon time
- -MaxDimensions:41.85mm/1.64"•53.57mm/2.1"*27.59mm/11.08"

- Dimensions:23.57mm/0.92"* 67.47mm/2.65"*27.59mm/11.08"

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- • -Wim length:222.25mm/8.75"
- • -Weight: t47.719

Interfacing the Render and LCD with theArduino

We will connect the Reader and the LCD with the Arduino Uno as shown in Fig. andextract the UID(Unique identification) of each RfID tag using the code as given in appendix A. We will note these UIDs and accordingly store the status of each of these UIDs in the microcontroller. The door lock will open or remain closed according to the status of the UID.

Interfacing the Solenoid lock and Power supply with the Arduino

We will connect the solenoid lock and the 18V power supply with the microcontroller as shovm in Fig. The TIP120 is an NPN Power Darlington Transistor. lt can be used with an Arduino to drive motors, turn lights on, and drive other high power gadgets. The TIP120 acts as a power broker or gatekeeper between the Arduino realm and the high power realm composed of the solenoid lock and the external power supply. The Arduino can tell the TIP120 how much power to pass from the external power supply to the solenoid lock but the Arduino does not share any of its power or share pins with the solenoid lock or its power supply. The TIP120 is the go in between. The lN4004 diode allows current to pass in one direction from positive to negative but will block any stray current that mes to go in the opposite direction, which might have undesirable effects on our circuit.

Diagram
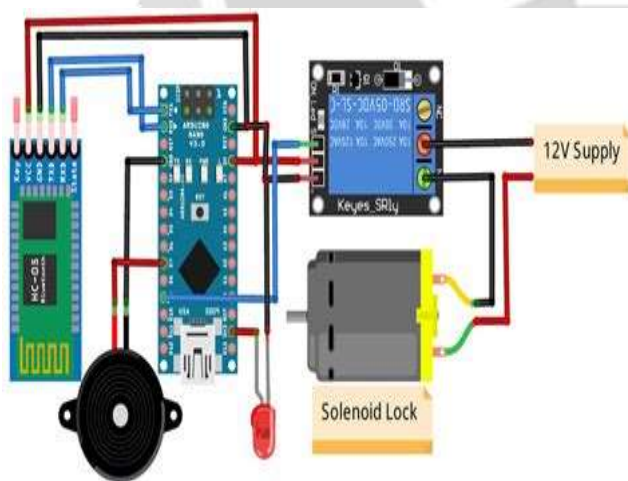
Results and Discussion

We upload the following C code to the microcontroller.

```
#include <SPI.h>
#include <MFRC522.h>
```

```
#define SS_PIN  10
#define RST_PIN  9
#define RELAY  3 //connect the relay to number 3 pin
#define BUZZER  2 // connect the buzzer to 2 pin
#define ACCESS_DELAY  2000
#define DENIED_DELAY  1000
MFRC522 mfrc522(SS_PIN,  RST_PIN); // Create MFRC522 instance.
void setup()
{
Serial.begin(9600);  // Initiate a serial communication
SPI.begin(); // Initiate SPI bus
mfrc522.PCD_Init();  // Initiate MFRC522
pinMode(RELAY, OUTPUT);
pinMode(BUZZER, OUTPUT);
noTone(BUZZER);
digitalWrite(RELAY, HIGH);
Serial.println("Put your card to the reader for scanning …");
Serial.println();

}
void loop()
{
// Look for new cards
if ( ! mfrc522.PICC_IsNewCardPresent())
{
return;
}
// Select one of the cards
if ( ! mfrc522.PICC_ReadCardSerial())
{
return;
}
//Show UID on serial monitor
Serial.print("UID  tag :");
String content="";
byte letter;
for (byte i = 0; i < mfrc522.uid.size;  i++)
{
Serial.print(mfrc522.uid.uidByte[i]  < 0x10  ? " 0" : " ");
Serial.print(mfrc522.uid.uidByte[i], HEX);
content.concat(String(mfrc522.uid.uidByte[i]  < 0x10  ? " 0" : " "));
content.concat(String(mfrc522.uid.uidByte[i], HEX));
}
Serial.println();
Serial.print("Message : ");
content.toUpperCase();
if (content.substring(1)== "AB CD EF GH") // enter your own card number after copying it from serial monitor
{
Serial.println("Authorized  access");
Serial.println();
delay(500);
digitalWrite(RELAY, LOW);
delay(ACCESS_DELAY);
digitalWrite(RELAY, HIGH);

}
```

```
else {
Serial.println(" Access denied");
tone(BUZZER, 300);
delay(DENIED_DELAY);
noTone(BUZZER);
}
}
```

The above tunction determines whether the door is open or locked. The entry control and the tag status are determined trom the previous lines in the code. lf the entry control and the tag status are true, the microcontroller sends a signal to the relay and the relay supplies the power to the solenoid lock. For convenience, we have used a 5 V single channel relay instead of the TIP120 transistor. The advantage of using the 5V single channel relay is that it can switch both ac and dc voltages. To open the solenoid lock from inside the room, a switch is used to turn the relay HIGH so that the user can exit the room. According to the project process we have run and verify our programming code. Then we have uploaded our programming code in the arduino uno.In Itsystem we can store up to 127 fingerprint isoform the process of the project it is concluded that we have testing the project successfully.

Conclusion

Then we have uploaded our programming code in the arduino uno.In Itsystem we can store up to 127 fingerprint isoform the process of the project it is concluded that we have testing the project successfully. In It project if the provide binary code and stored code is matched then it allow the person to enter, otherwise it will decline and not allow the person. The accomplish of entryway access framework is view as an requirement for a structure particularly organizations to had a security framework to keep unique inside and reinceptions for be protecting from undesirable cases like robberies and hijacking. Tricubes Computer Sdn. Bhd. have been accounted for that the organization's current entryway access framework have issues in keeping up with because of old parts couldn't be supplanted. which is converted to binary code and store in arduino uno.After that we have uploaded the programme in the arduino uno. After we have uploade the second programme to verify it is the authenticate person or not. In It process the programming system is working.The Door Access System - Arduino Based is created to defeat It issue as Arduino doesn't utilize a great deal of parts with the presence of the Arduino stage board and Atmel AVR microcontroller. The Arduino approach additionally beat the issue of updating as it accompanies an Atmel AVR microcontroller which can be altered and reconstructed ordinarily. Arduino is additionally known to open inception and cross-stage could facilitate the errand of a software engineer.

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