

Advanced Smart Lock

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BONAFIDE CERTIFICATE

Certified that this project report entitled “**Advanced Smart Lock**” is a bonafide work of **Deepthi M – 20BPS1133, G Sushobith – 20BPS1052, Raghav Aditya – 20BPS1150 and Swetha S – 20BPS1153** who carried out the Project work under my supervision and guidance for **CSE2006 – Microprocessor and Interfacing**.

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ABSTRACT

In this paper, the design and implementation of a Arduino based Smart lock have been presented and analysed. An Arduino Uno, r307 fingerprint module, a 12V Solenoid Lock, Node MCU, Other basic requirement such as relays, resistors(2.2k), jump wires etc., and an internet connection are responsible for the reliable operation of the proposed Smart Lock. The end user will be able to interact with a web-based application that provides them with information and different ways to unlock the door and enable/disable the smart lock.

ACKNOWLEDGEMENT

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1. INTRODUCTION

1.1 OBJECTIVES AND GOALS

- To create a smart lock based on Arduino using Wi-Fi/Bluetooth which can unlock/lock the door using voice command and having a backup fingerprint scanner. A mobile application is also built for seamless use of smart lock and to show the status of the smart lock. The goal of the smart lock includes ease of use for consumers by having both voice command and fingerprint for unlocking the door and at the same time prioritizing safety of their belongings and home.

1.2 Applications

The Arduino based smart lock using voice command and fingerprint scanner provides ease of use to the consumer. By using the mobile based application, the status of the lock can be accessed and the lock can be opened with hands free mode without any hassle.

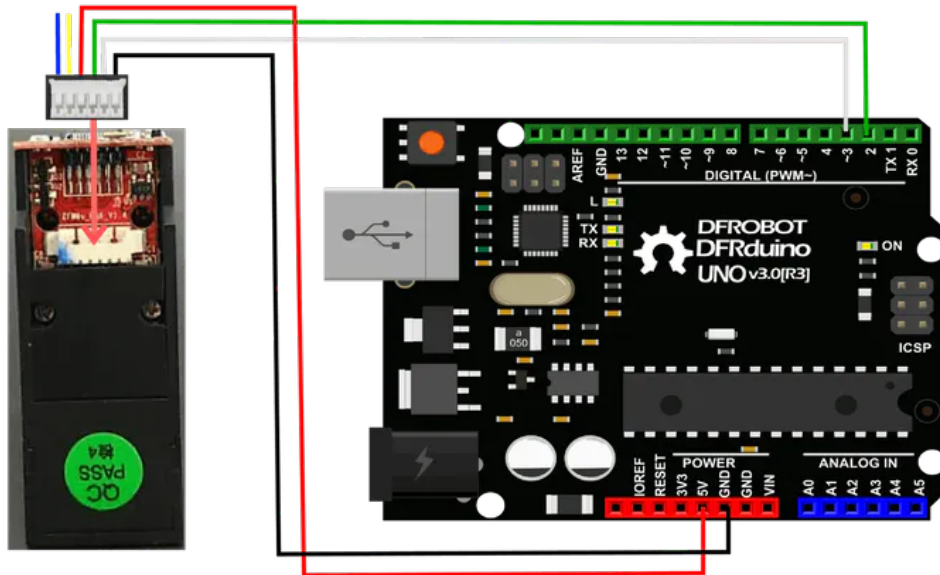
1.3 Features

The smart lock contains an Arduino board, R307 Fingerprint module, 12V Solenoid lock and Node MCU. These are accompanied by a mobile application built which can be installed in any android phone.

2. Design and implementation

2.1 Block Diagram

Block Diagram for fingerprint:



2.2 Hardware Analysis

An Arduino Uno, r307 fingerprint module, a 12V Solenoid Lock, Node MCU, Other basic requirement such as relays, resistors(2.2k), jump wires etc.,

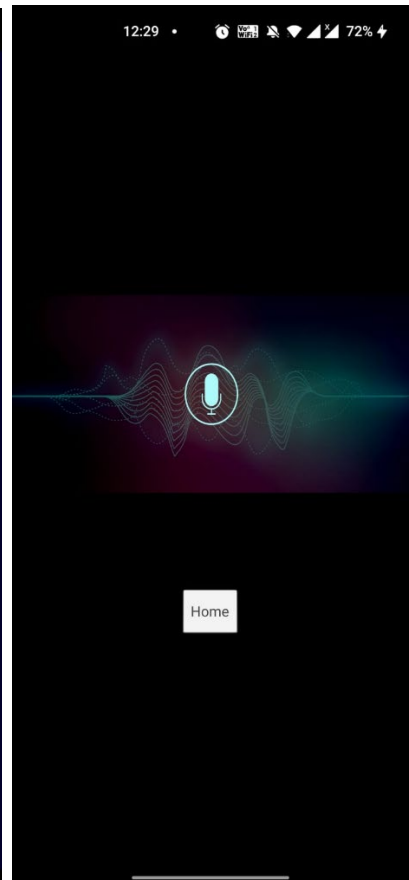
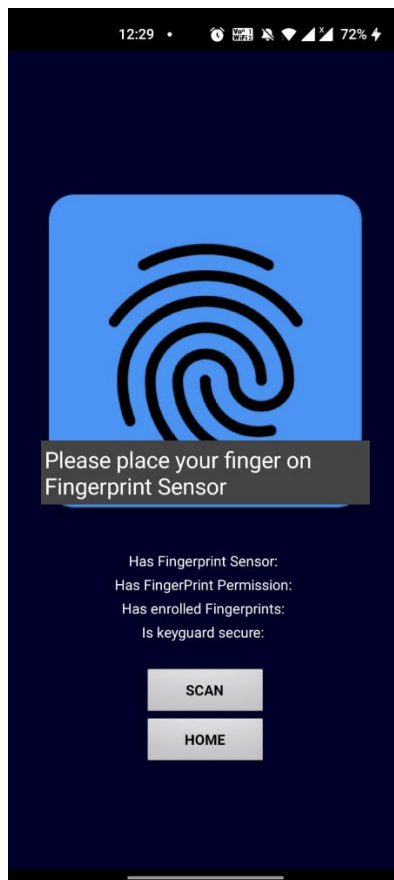
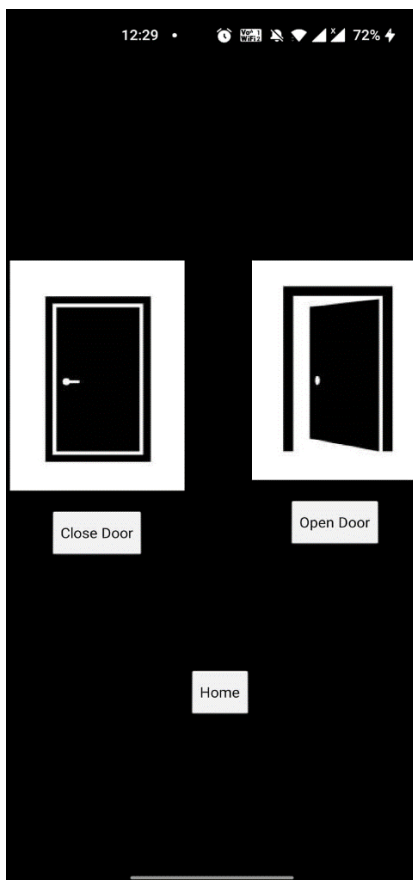
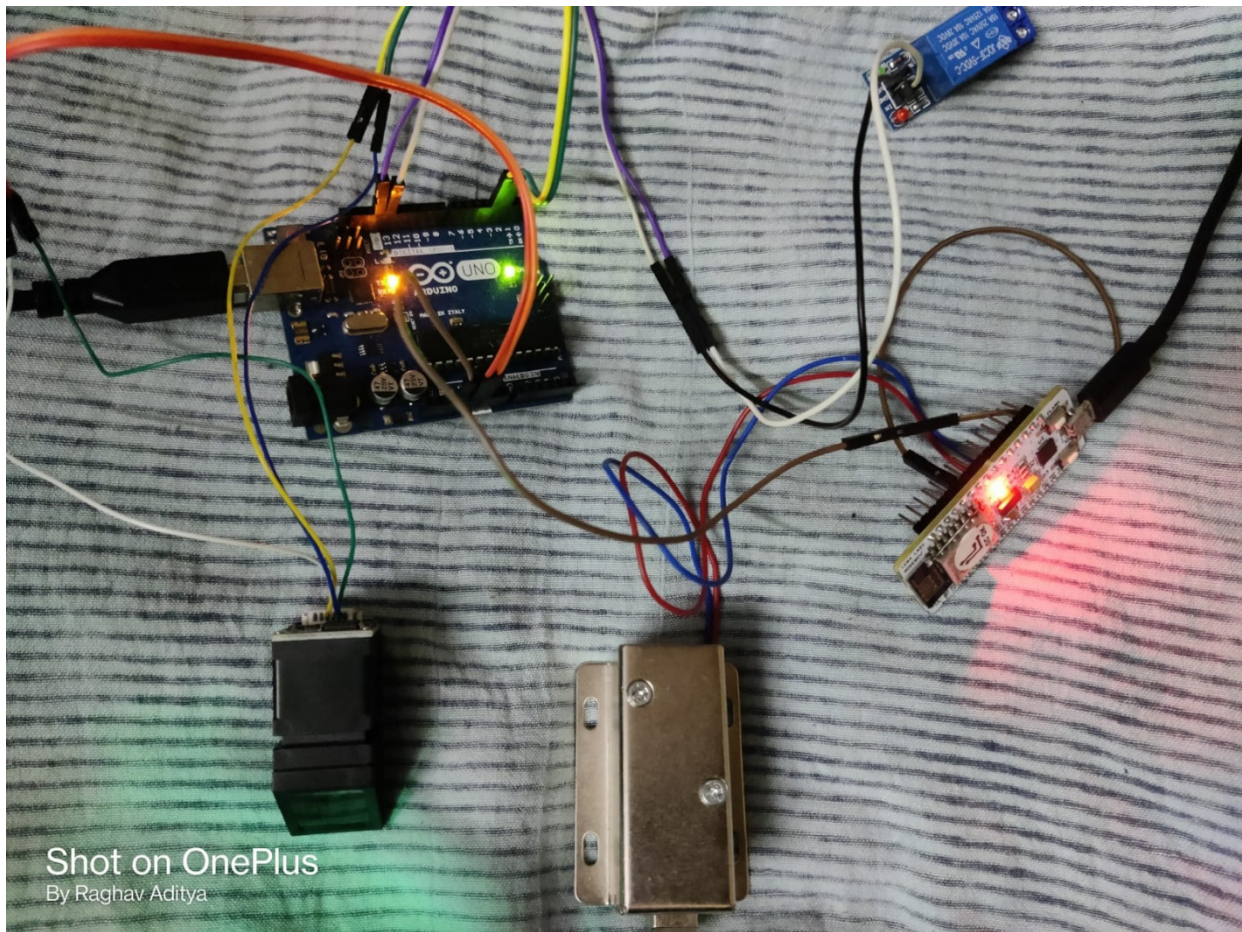
2.3 Snapshots – Project, Team, Results

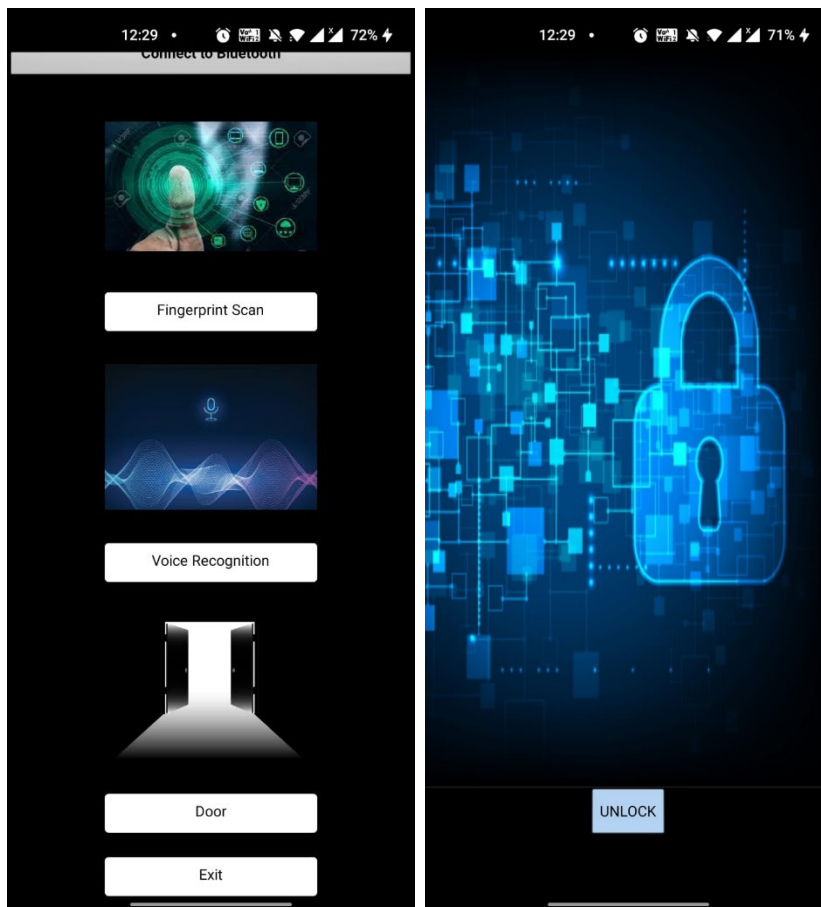
USE LOG

```
lock use log 0
2021/12/06 12:15PM Default
lock use log 1
2021/12/06 12:16PM Default
lock use log already opened
2021/12/06 12:18PM Default
lock use log 1
2021/12/06 12:19PM Default
lock use log closed already
```

USE LOG

```
lock use log already opened
2021/12/06 12:18PM Default
lock use log 1
2021/12/06 12:19PM Default
lock use log closed already
2021/12/06 12:20PM Default
lock use log fp1
2021/12/06 12:20PM Default
lock use log 0
```





3. Software

3.1 Coding and analysis:

@brief Helper function to receive data over UART from the sensor and process it into a packet

@VAHGAR packet A structure containing the bytes received

@VAHGAR timeout how many milliseconds we're willing to wait

@returns `FINGERPRINT_OK` on success

@returns `FINGERPRINT_TIMEOUT` or

`FINGERPRINT_BADPACKET` on failure

/*****/

```
#ifndef ADAFRUIT_FINGERPRINT_H
```

```
#define ADAFRUIT_FINGERPRINT_H
```

```
#include "Arduino.h"
```

```
#if defined(_AVR_) || defined(ESP8266)
```

```
    #include <SoftwareSerial.h>
```

```
#elif defined(FREEDOM_E300_HIFIVE1)
```

```
    #include <SoftwareSerial32.h>
```

```
    #define SoftwareSerial SoftwareSerial32
```

```
#endif
```

```
uint8_t Adafruit_Fingerprint::getStructuredPacket(Adafruit_Fingerprint_Packet * packet,
                                                    uint16_t timeout) {
```

```
    uint8_t byte;
```

```
    uint16_t idx=0, timer=0;
```

```
    while(true) {
```

```
        while(!mySerial->available()) {
```

```
            delay(1);
```

```
            timer++;
```

```
            if( timer >= timeout) {
```

```
#ifdef FINGERPRINT_DEBUG
```

```
    Serial.println("Timed out");
```

```
#endif
```

```

return FINGERPRINT_TIMEOUT;
}
}

byte = mySerial->read();
#ifdef FINGERPRINT_DEBUG
    Serial.print("<- 0x"); Serial.println(byte, HEX);
#endif

switch (idx) {
    case 0:
        if (byte != (FINGERPRINT_STARTCODE >> 8))
            continue;

        packet->start_code = (uint16_t)byte << 8;
        break;
    case 1:
        packet->start_code |= byte;
        if (packet->start_code != FINGERPRINT_STARTCODE)
            return FINGERPRINT_BADPACKET;
        break;
    case 2:
    case 3:
    case 4:
    case 5:
        packet->address[idx-2] = byte;
        break;
    case 6:
        packet->type = byte;
        break;
    case 7:
        packet->length = (uint16_t)byte << 8;
        break;
    case 8:
        packet->length |= byte;
        break;

```

default:

```

    packet->data[idx-9] = byte;
    if((idx-8) == packet->length)
        return FINGERPRINT_OK;
    break;
}
idx++;
}
return FINGERPRINT_BADPACKET;

```

Snapshots:

```

sketch_aug01a
#include <ESP8266WiFi.h>
#include <Adafruit_MQTT_Client.h>

#define wifi_name "Raghavaditya4G"
#define password "raghavadi1"

#define server "io.adafruit.com"
#define port 1883
#define username "Lucifer_RAS"
#define key "aio_rSnr73YxY7OOCOgGyBZzU0yit2rs"

WiFiClient esp;

Adafruit_MQTT_Client mqtt(&esp, server, port, username, key);

Adafruit_MQTT_Publish feed(&mqtt, username"/feeds/ldr");

void setup() {
    Serial.begin(115200);
    WiFi.begin(wifi_name, password);
    while(WiFi.status() != WL_CONNECTED) {
        delay(500);
        Serial.print(".");
    }
    while(mqtt.connect()) {
        Serial.print(".");
    }
}

```

sketch_aug01a

```

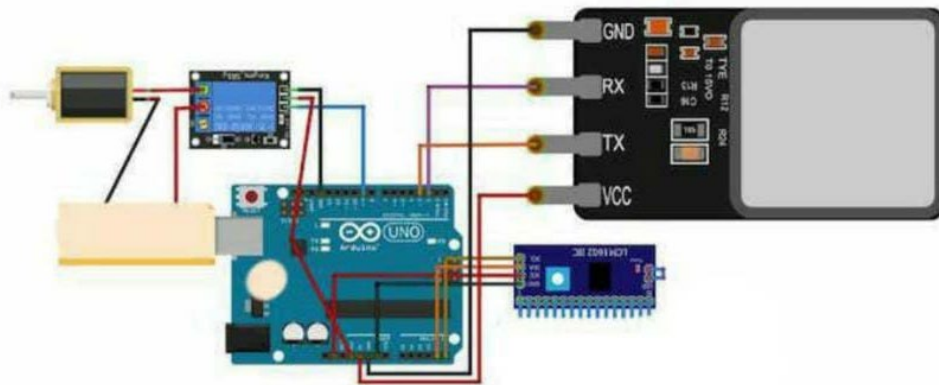
Adafruit_MQTT_Client mqtt(&esp, server, port, username, key);

Adafruit_MQTT_Publish feed(&mqtt, username"/feeds/ldr");

void setup() {
  Serial.begin(115200);
  WiFi.begin(wifi_name, password);
  while(WiFi.status() != WL_CONNECTED){
    delay(500);
    Serial.print(".");
  }
  while(mqtt.connect () ) {
    Serial.print(".");
  }
}

void loop () {
  if(mqtt.connected()){
    int ldr = analogRead(A0);
    Serial.println(ldr);
    if(feed.publish(ldr)) {
      Serial.println("Success");
    }
  }
  else{
    Serial.print("Fail");
  }
  delay(2500);
}

```



4. CONCLUSION AND FUTURE WORK

4.1 RESULT, CONCLUSION AND INFERENCE:

The project was completed and the smart lock with voice recognition and fingerprint backup was completed successfully. Additionally, an app was also built for additional safety and convenience. A Website for keeping log of opening and closing the door has also been done.

4.2 Future Works:

An app for IOS needs to be created and the present app must be built bug free and listed in android app store.

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