

Technical Report 1

Revive Team



“Smart Home Project”



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Project Description

The LCD is connected to the Arduino and receives its action from the keypad through the Arduino and to its job through the function named keypadEvent().

When the project starts, the LCD prints "Enter Password". The Arduino will check the password through the function named checkPassword(). If the entered characters is equal to the right password, the LCD prints "OPEN". If the entered characters is not equal to the right password, the LCD prints "Try again".

When the magnet is kept away from the reed switch, the reed switch sense its magnetic field and the active buzzer starts its sound.

When the temperature sensor senses a higher temperature than 30, the DC motor starts rotating and the serial monitor prints the temperature value.

When the LDR detects darkness, it sends a signal to the Arduino to light the LED that is connected to it through the function named light().

Keywords: Smart home, code, Proteus, control, sensor.









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1. Design & Development of the Smart Home

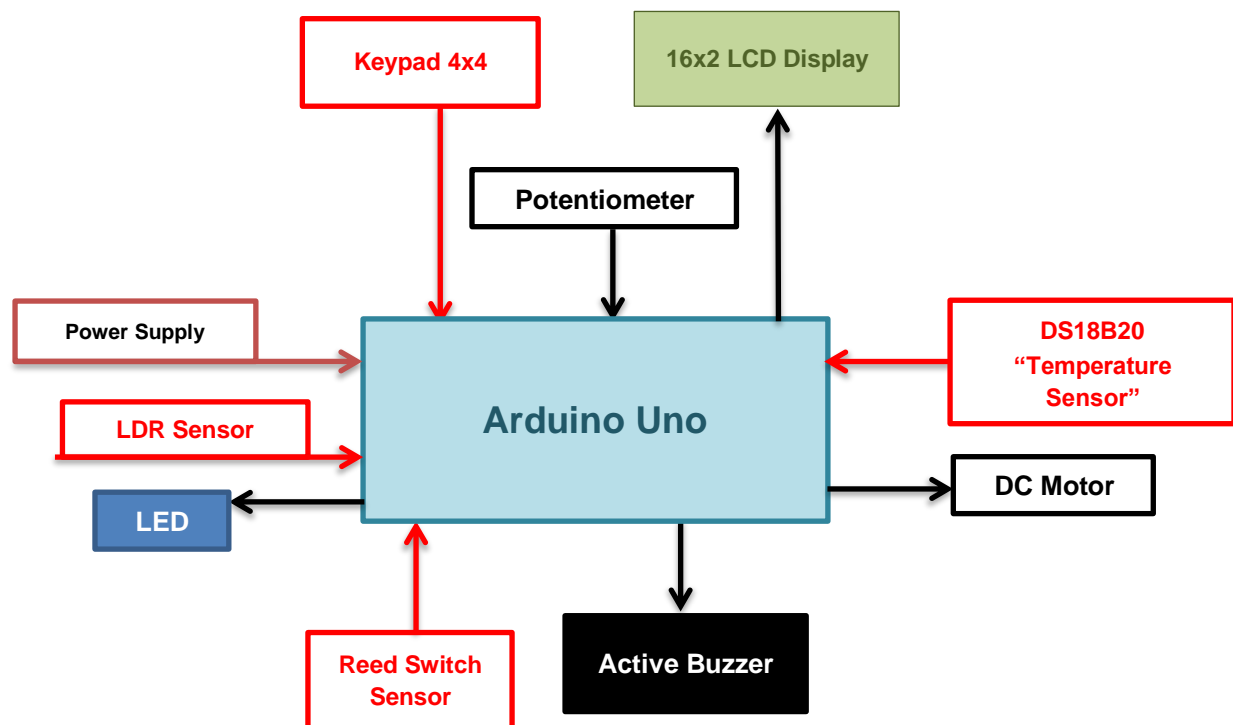
1.1 Materials of the Smart Home System

Table (1). The basic materials for the whole system

Material	Function	Figure
Arduino Uno	The main controller of system and the one which the code was uploaded to	
USB Cable	Connecting Arduino with PC for uploading the code	
PC with “Arduino IDE” software	Software for coding	
Keypad	Home password “lock” input	
16*2 LCD Display	Displays i/p and o/p of Keypad	
Potentiometer	To control the light intensity of LCD	
Reed Switch Sensor	Sense the magnetic field when getting close to magnet and send signals to the Arduino Mega board	
Magnets	To test reed switch functionality	

LDR1 “Light Dependent Resistor”	Measures the brightness of the light source	
DS18B20 “Temperature Sensor”	Sense the temperature difference	
DC motor	“Fan”	
Resistors	Limit the flow of electrical current	
LED	In case of darkness	

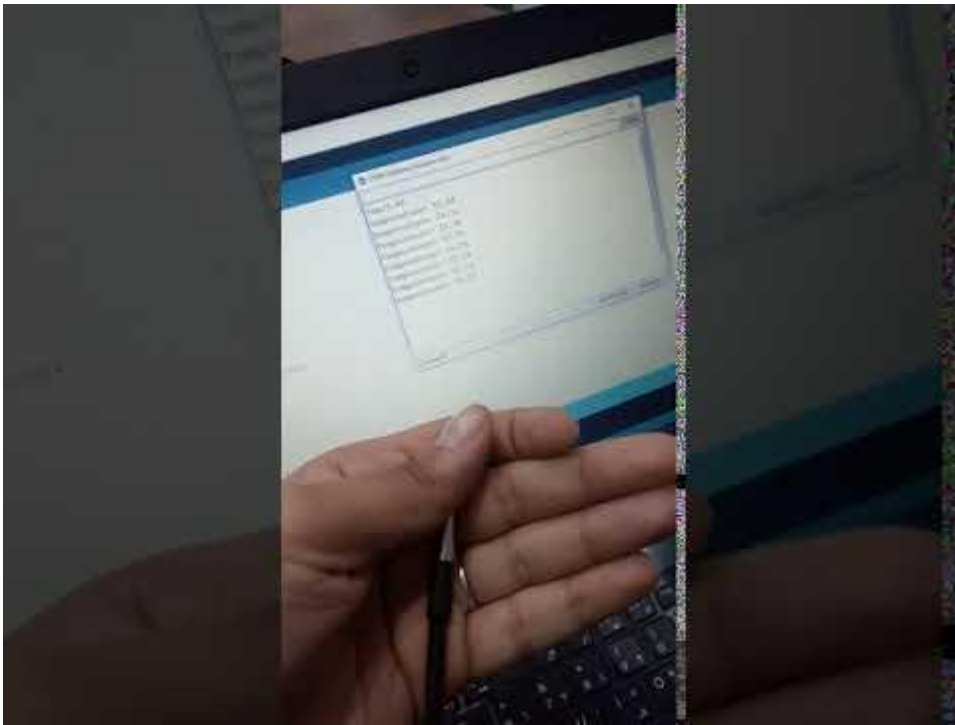
1.2 Block diagram for system design control



Video1



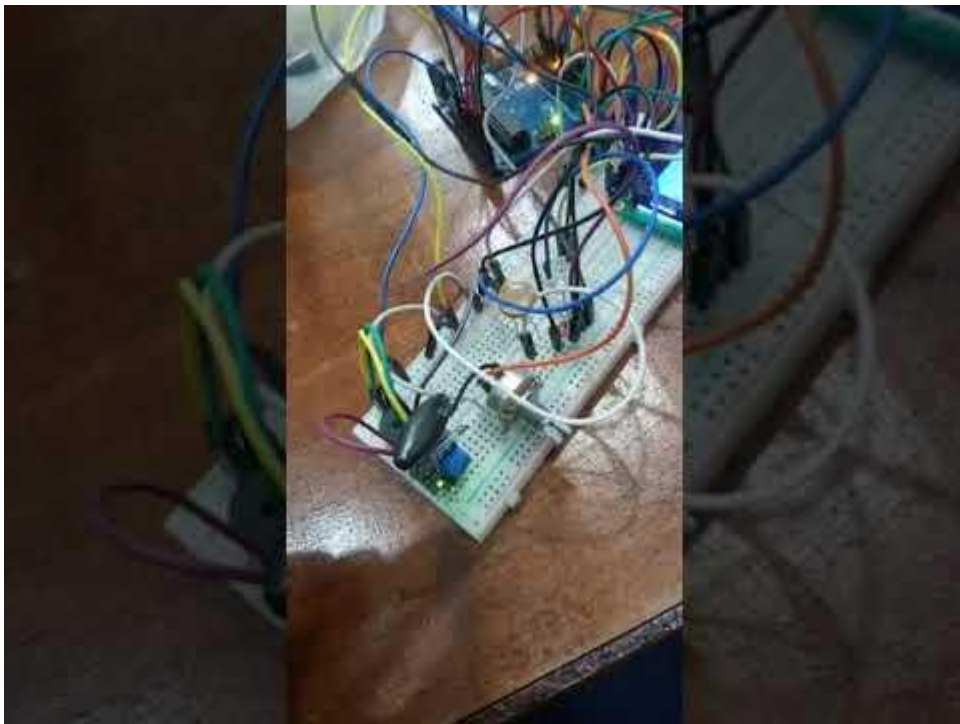
Video2



[Video3](#)



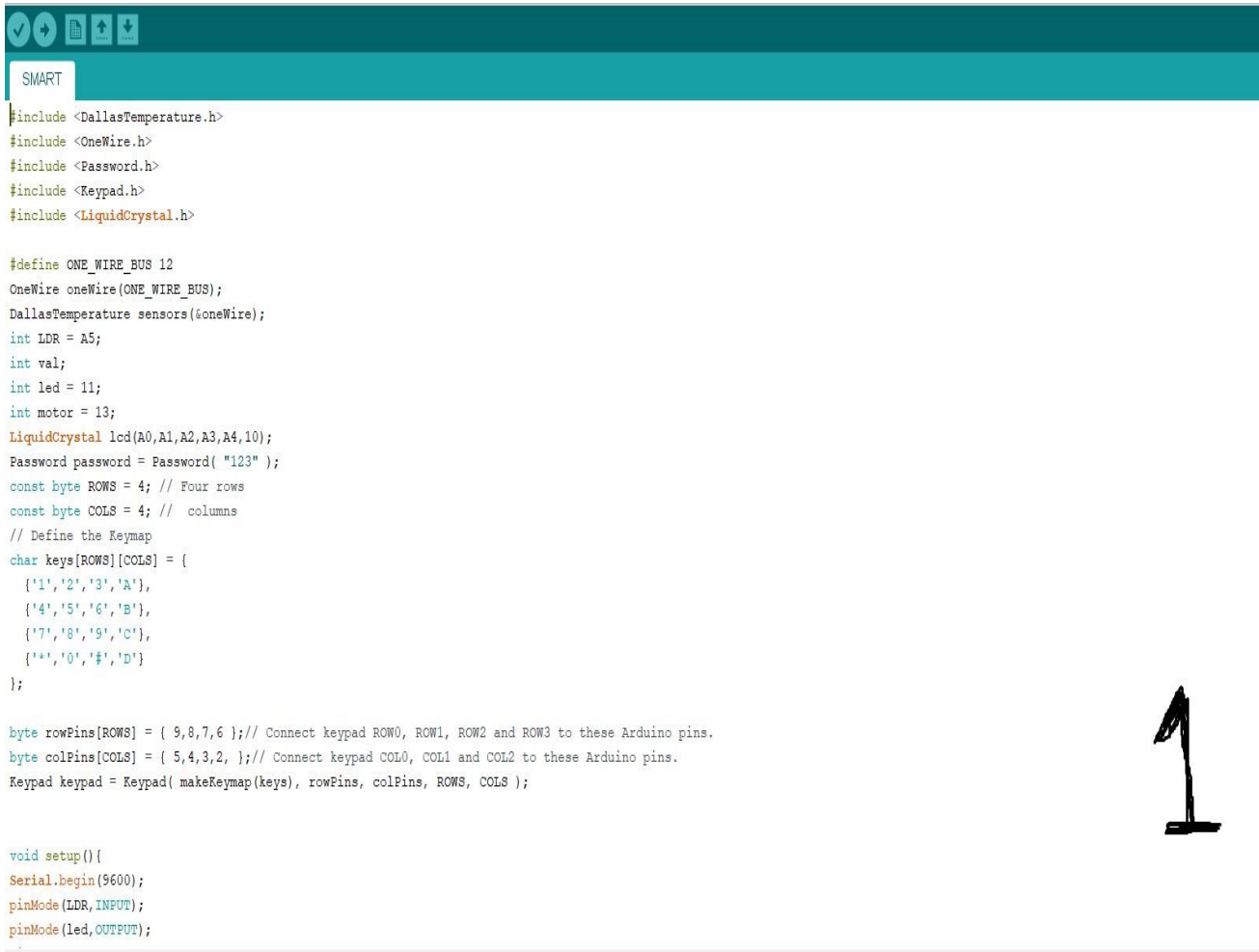
[Video4](#)



1.3 System Methodology

Our final **code** to be uploaded to the Arduino is attached in the drive link below; it also contains comments that illustrate each working step for the smart home development.

<https://drive.google.com/file/d/1zulLCGpxCA3BvwKMaUU4WVesaorlkIem/view?usp=sharing>



```
SMART
#include <DallasTemperature.h>
#include <OneWire.h>
#include <Password.h>
#include <Keypad.h>
#include <LiquidCrystal.h>

#define ONE_WIRE_BUS 12
OneWire oneWire(ONE_WIRE_BUS);
DallasTemperature sensors(&oneWire);
int LDR = A5;
int val;
int led = 11;
int motor = 13;
LiquidCrystal lcd(A0,A1,A2,A3,A4,10);
Password password = Password( "123" );
const byte ROWS = 4; // Four rows
const byte COLS = 4; // columns
// Define the Keypad
char keys[ROWS][COLS] = {
  {'1','2','3','A'},
  {'4','5','6','B'},
  {'7','8','9','C'},
  {'*','0','#','D'}
};

byte rowPins[ROWS] = { 9,8,7,6 };// Connect keypad ROW0, ROW1, ROW2 and ROW3 to these Arduino pins.
byte colPins[COLS] = { 5,4,3,2, };// Connect keypad COL0, COL1 and COL2 to these Arduino pins.
Keypad keypad = Keypad( makeKeymap(keys), rowPins, colPins, ROWS, COLS );

void setup(){
  Serial.begin(9600);
  pinMode(LDR,INPUT);
  pinMode(led,OUTPUT);
```





SMART

```
pinMode(motor,OUTPUT);
lcd.begin(16, 2);
lcd.print(" Enter Password ");
keypad.addEventListener(keypadEvent);
}

void loop(){
  keypad.getKey();
  temperature();
  light();
}

void keypadEvent(KeypadEvent eKey){
  switch (keypad.getState()){
    case PRESSED:
      lcd.clear();
      lcd.setCursor(0,0);
      lcd.print(eKey);
      switch (eKey){
        case '*': checkPassword(); break;
        case '#': password.reset(); break;
        default: password.append(eKey);
      }
    }
}

void checkPassword(){
  if (password.evaluate()){
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("      OPEN      ");
  }else{
    ...
  }
}

void checkPassword(){
  if (password.evaluate()){
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("      OPEN      ");
  }else{
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("    Try Again    ");
  }
}

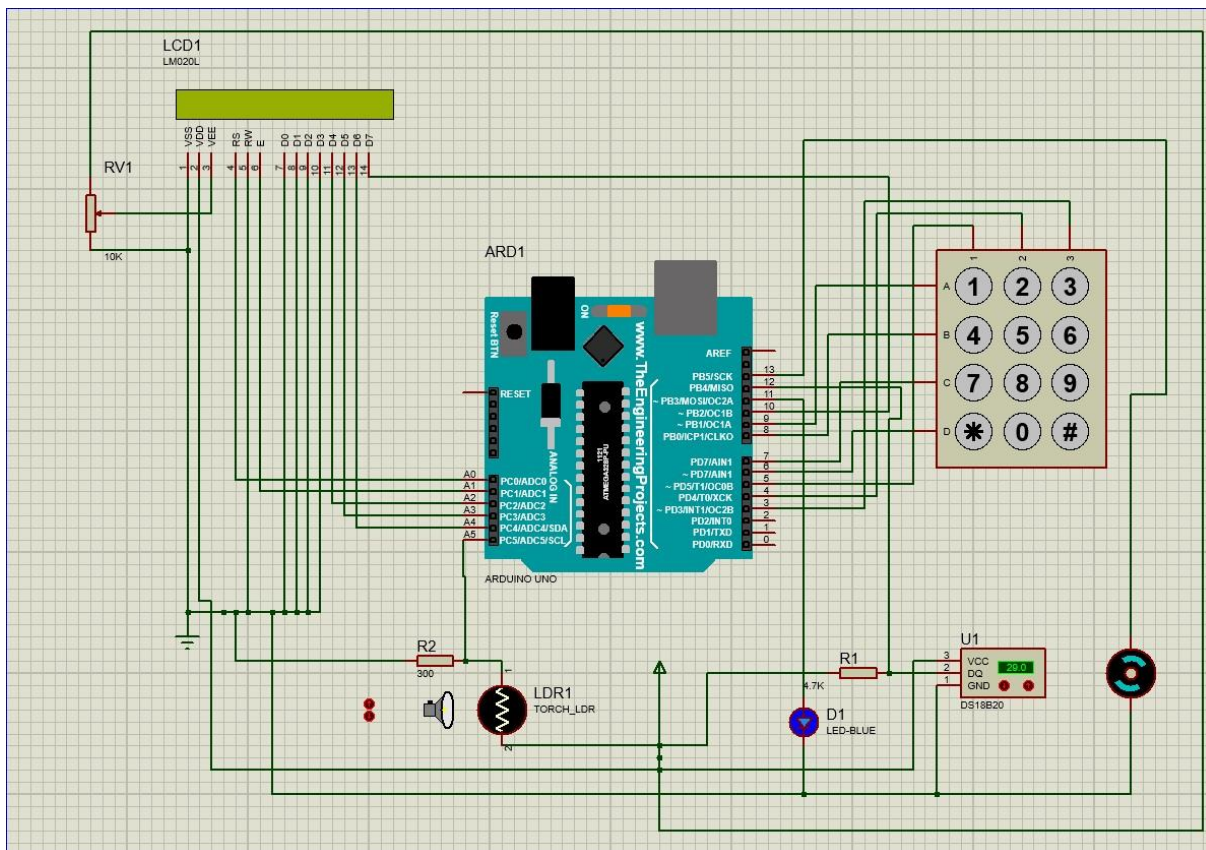
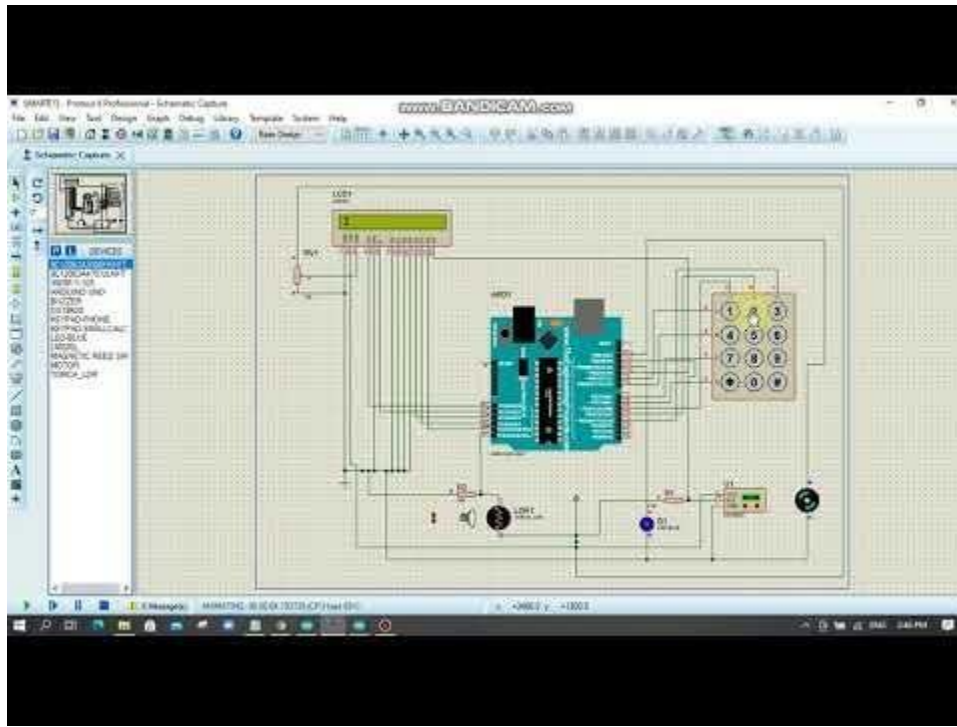
void temperature(){
  sensors.requestTemperatures();
  float heat = sensors.getTempCByIndex(0);
  Serial.print("Temperature= ");
  Serial.println(heat);
  if (heat > 30){
    digitalWrite(motor,HIGH);
  }else{
    digitalWrite(motor,LOW);
  }
}

void light(){
  val=analogRead(LDR);
  if (val < 300){
    digitalWrite(led,HIGH);}
  else
    digitalWrite(led,LOW);
}
```

2

3

Proteus Simulation for system development



2. Validation &Critical Analysis

The sensors' response was very good but sometimes there was a lag but it is not effectible.

We faced some problems as there were little pins in the Arduino Uno and we need more but we fix this problem by connecting some circuit together. I think if we use Arduino Mega, it will be easier and there will be a lot of pins to use.

Overall, we did not face many problems and the implementation was easy.

3. Next Phases of Development

1) Hardware

I. Adding more sensors like a camera (Using Stereo 360 degree camera that works with IR) using principles of Computer vision and Machine learning II. Using Raspberry Pi as a controller III. Using ESP32 “WiFi”

2) Communication and data transmissions

IOT (Internet of things): We can use it with sensors so that it can be connected, send and receive data from the controller without any wires. Also we can use it to make an interface between the controller and the user.