Smoke and Fire Detection

Supervised By

Prof. Sudip Misra

Department of Computer Science and Engineering, IIT Kharagpur

Team Members

- Suryansh Sharma
- Priyanshu Ranjan
- Kabir Hooda
- Debayan Biswas

Updates

1. Components Required for smoke detection is on its way.
2. Wrote the arduino code for smoke detection and alarm system.
3. Email response system.
4. Built Neural Network for fire detection
5. Successfully completed image extraction from video
6. We could not integrate model with image extraction and are working on it

Neural Network Model


```
Model: "sequential_1"
_____
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 195, 195, 128)     1664

 conv2d_1 (Conv2D)           (None, 194, 194, 64)      32832

 max_pooling2d (MaxPooling2  (None, 97, 97, 64)        0
 D)

 conv2d_2 (Conv2D)           (None, 96, 96, 32)        8224

 max_pooling2d_1 (MaxPoolin  (None, 48, 48, 32)        0
 g2D)

 flatten (Flatten)           (None, 73728)             0

 dense (Dense)               (None, 128)               9437312

 dense_1 (Dense)             (None, 1)                 129

=================================================================
Total params: 9480161 (36.16 MB)
Trainable params: 9480161 (36.16 MB)
Non-trainable params: 0 (0.00 Byte)
```
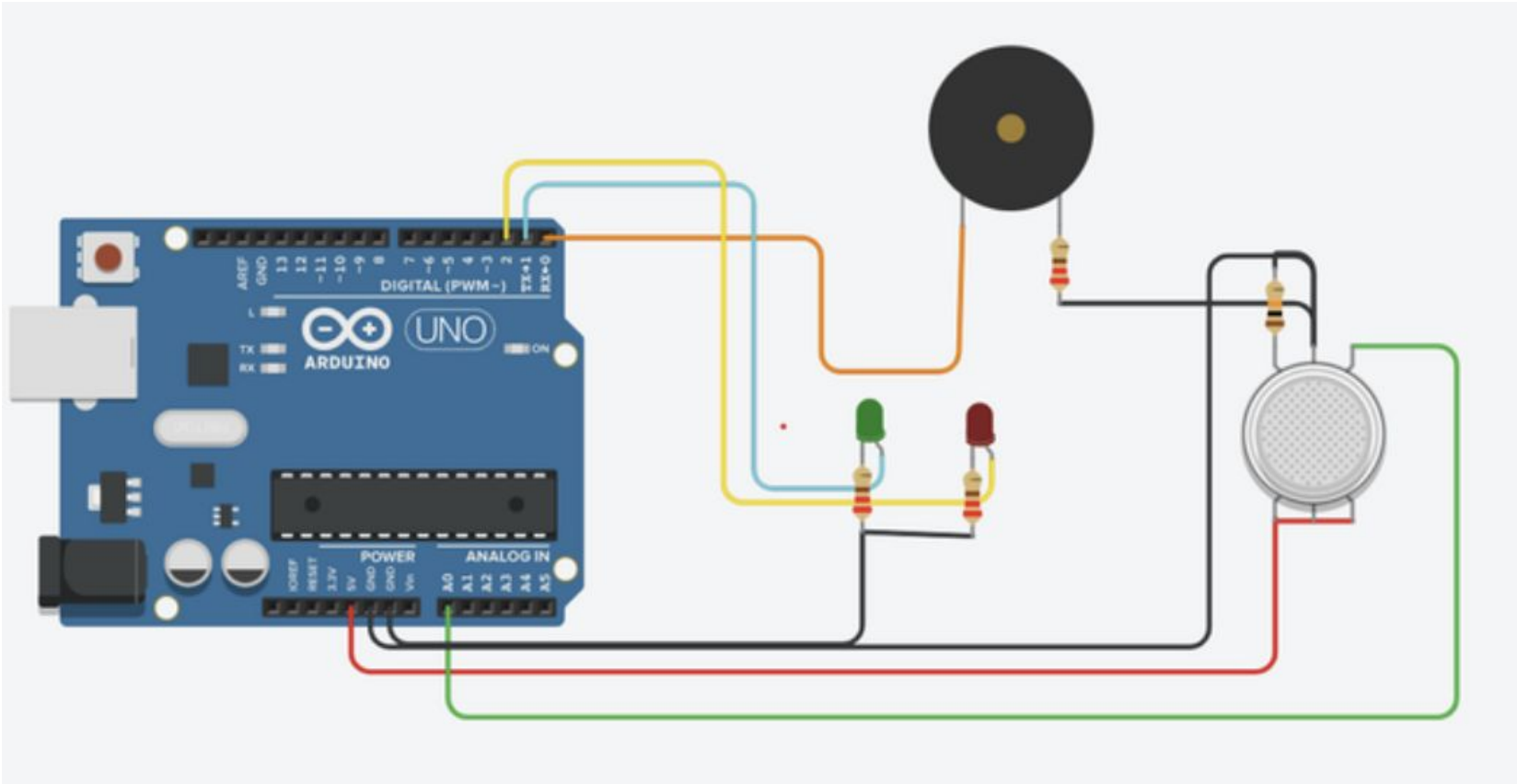
Parts Ordered for Smoke Detection Model

- Gas Sensor : MQ2 (Rs 320)
- Arduino Uno/ ESP8266 (Rs 285)
- Power Supply
- Led (Rs 63)
- Buzzer Alarm (Rs 10)
- Jumper Wire (Rs 29)
- Breadboard (Rs 126)
- Gas Lighter (for testing purpose) (Rs 20)

Proposed Model

Arduino Code

```
#define gasSensor A0
#define buzzer 0
#define ledGreen 1
#define ledRed 2
#define HIGH 600

void setup() {
    //Initialising the pins
    pinMode(gasSensor, INPUT);
    pinMode(buzzer, OUTPUT);
    pinMode(ledGreen, OUTPUT);
    pinMode(ledRed, OUTPUT);
}
```
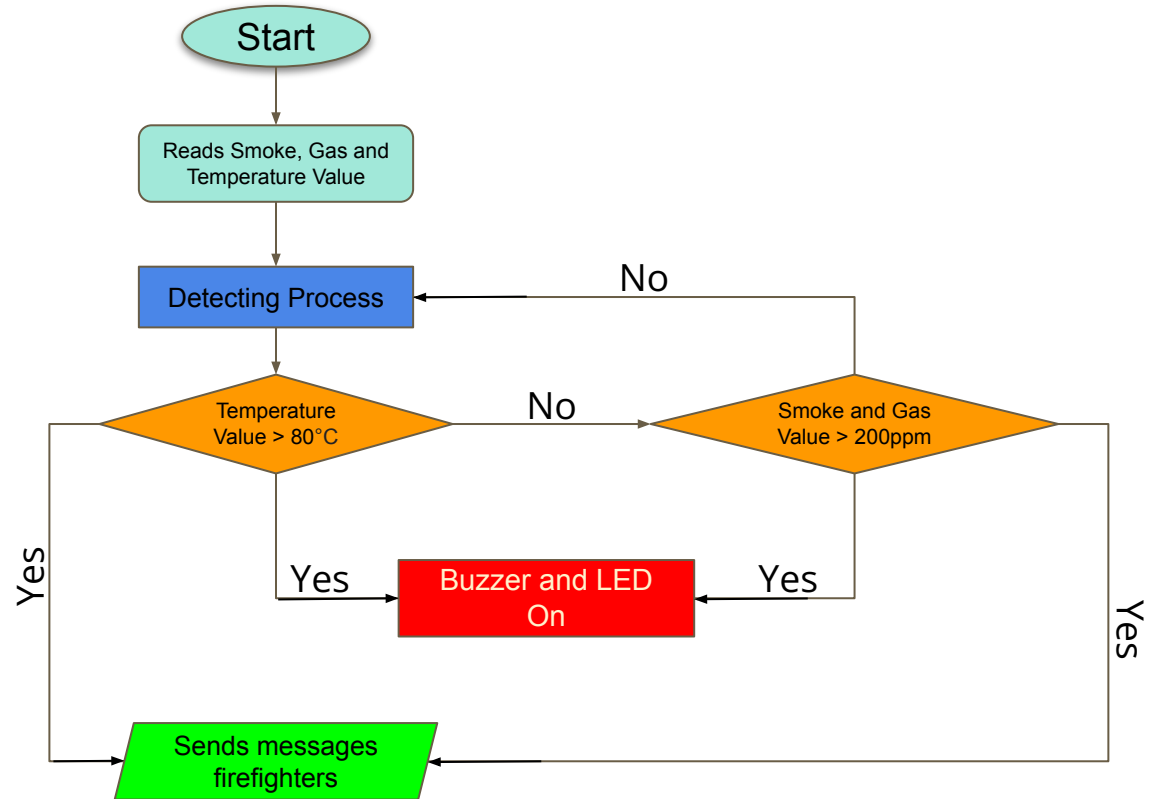
```
void loop() {
    //reads data from the sensor
    int gas_value = analogRead(gasSensor);

    //checks data from sensor
    if(gas_value > HIGH)
    {
        tone(buzzer,1000,500);
        digitalWrite(ledRed, HIGH);
        digitalWrite(ledGreen,LOW);
    }
    else {
        noTone(buzzer);
        digitalWrite(ledGreen,HIGH);
        digitalWrite(ledRed, LOW);
    }
    delay(200);
}
```
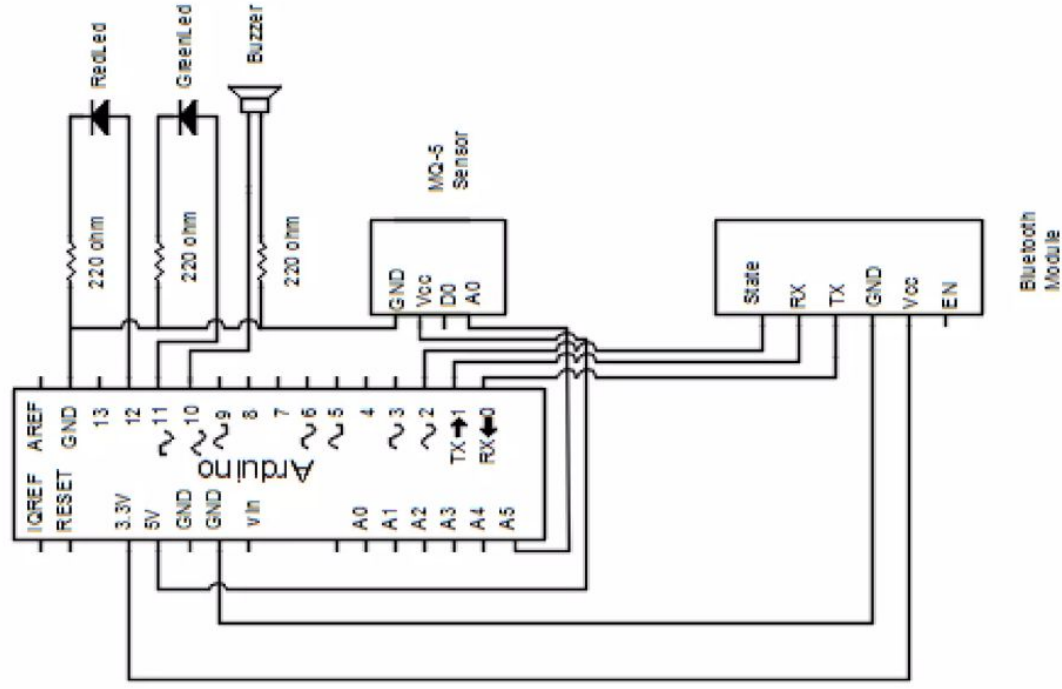
Email Response System to be added

- Fire detection event
- Threshold detection
- Alert trigger
- Email Notification Request(Using SMTP)
- SMS/ SOS Alert system

Flow Chart

Circuit Diagram

Contributions

Suryansh Sharma - Built the neural network model, video integration with model in addition to ppts and write up

Priyanshu Ranjan - Hardware part of fire detection system and arduino coding in addition to ppts and write up

Debayan Biswas - Image Extraction Code and Steps needed for Email Response System in addition to ppt slides

Kabir Hooda - Preparation of Budget and Steps needed for Email Response System in addition to ppt slides