# ABSTRACT

This project provide two functions. First one is, control the switching (turned on/off state) of the jet fan with respect to the fog detection by CO-level sensor, rather than the use of manual switching system. Another function is controlling the speed of a fan with respect of the amount of fog (CO) in the car parking area. In this project Arduino Uno forms the processing part, which firstly detect the amount of CO with the use of MQ-7 CO- sensor. According to the control program feeding, Arduino Uno senses the amount of carbon monoxide(fog) in the parking area and control the speed with the set CO level. This is set by the user. Here there are three fans that must be controlled in this operation namely, supply fan, jet fan and exhaust fan. If there is no fog detected in the specified area, all the three fans must remain idle. But, whenever there is fog detected the fan must be turned on and after turning on the fan speed will be changed accordingly with CO-level. When the current CO level is less than or equal to the lowest CO value, only the exhaust fan and the jet fans are being turned on at a speed range of 1-30 rpm. When the amount of fog present in the area is in the range between 3433----4543 ppm, the speed of the exhaust fan and jet fans are set to run between the speed range of 30---60 rpm and the supply fan is within the range of 50---70 rpm, otherwise for the CO level detected more than 7800 ppm, the speed of the exhaust and jet fans should be set with range from 1000 rpm—to its full capacity, but the supply fan is set to be between the range of 67---45 rpm. In each step, whenever the amount of fog increases, fan speed will also be increased with the same amount within the given range.

Keywords: Arduino, Speed control, MQ7 CO-sensor, jet fan

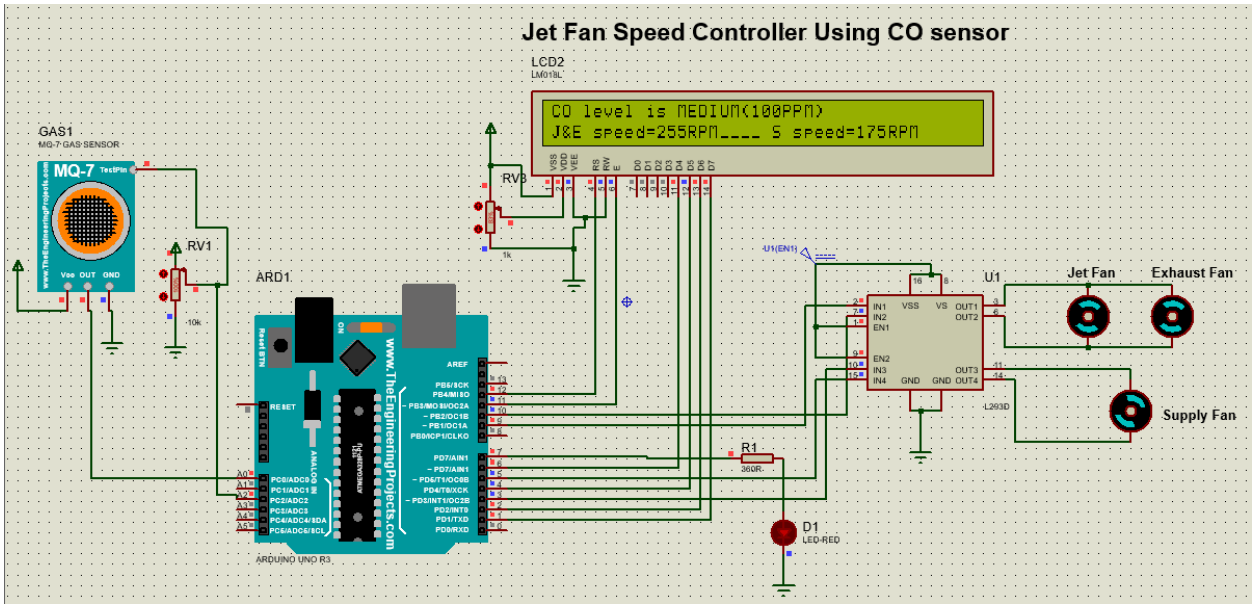


*Figure1 : Electrical modeling of Jet fan speed controller using CO sensor*

## Arduino Code

```
#include <LiquidCrystal.h>

LiquidCrystal lcd(12,11,6,4,2,1);

int COvalue;

void setup() {

  pinMode(A2,INPUT);

  pinMode(9,OUTPUT);

  pinMode(10,OUTPUT);

  pinMode(3,OUTPUT);

  pinMode(5,OUTPUT);

  pinMode(7,OUTPUT);

  lcd.begin(40,2);

  lcd.print("Prepared by: Zewidu,Birhanu,Biruk,Melaku,Henok");

  delay(3000);
```

```
  lcd.clear();
}
void loop() {
  int val = analogRead(A2);
  COvalue = map(val,0,1023,0,100);
  if((COvalue >= 0) && (COvalue < 30))
    {
      lcd.setCursor(6,0);
      lcd.print("CO level is Low");
      lcd.println("(");
      lcd.print(COvalue);
      lcd.print("PPM)");
      if(COvalue == 0)
        {
          int JE_Speed = 0;//jet fan and Exhaust fan motor speed
          int supply_Speed = 0;
          analogWrite(9,JE_Speed);//Jet Fan and Exhaust Fan motor
          analogWrite(10,0);
          analogWrite(3,supply_Speed);//supply fan motor
          analogWrite(5,0);
          lcd.setCursor(0,1);
          lcd.print("J&E speed=");//Jet Fan and Exhaust Fan motor speed
          lcd.print(JE_Speed);
          lcd.print("RPM");
          lcd.print("____ S speed=");//Supply Fan motor speed
```

```
  lcd.print(supply_Speed);
  lcd.print("RPM");
 }
if((COvalue > 0) && (COvalue <= 10))
 {
  int JE_Speed = 25;//Jet Fan and Exhaust Fan motor
  int supply_Speed = 0;
  analogWrite(9,JE_Speed);//Jet Fan and Exhaust Fan motor
  analogWrite(10,0);
  analogWrite(3,supply_Speed);//supply fan motor
  analogWrite(5,0);
  lcd.setCursor(0,1);
  lcd.print("J&E speed=");//Jet Fan and Exhaust Fan motor speed
  lcd.print(JE_Speed);
  lcd.print("RPM");
  lcd.print("____ S speed=");//Supply Fan motor speed
  lcd.print(supply_Speed);
  lcd.print("RPM");
 }
 if((COvalue > 10) && (COvalue <= 20))
  {
  int JE_Speed = 50;//Jet Fan and Exhaust Fan motor
  int supply_Speed=0;
  analogWrite(9,JE_Speed);//Jet Fan and Exhaust Fan motor
  analogWrite(10,0);
```

```
  analogWrite(3,supply_Speed);//supply fan motor
  analogWrite(5,0);
  lcd.setCursor(0,1);
  lcd.print("J&E speed=");//Jet Fan and Exhaust Fan motor speed
  lcd.print(JE_Speed);
  lcd.print("RPM");
  lcd.print("____ S speed=");//Supply Fan motor speed
  lcd.print(supply_Speed);
  lcd.print("RPM");
  }
if((COvalue > 20) && (COvalue < 30))
  {
  int JE_Speed = 75;//Jet Fan and Exhaust Fan motor
  int supply_Speed = 0;
  analogWrite(9,JE_Speed);//Jet Fan and Exhaust Fan motor
  analogWrite(10,0);
  analogWrite(3,supply_Speed);//supply fan motor
  analogWrite(5,0);
  lcd.setCursor(0,1);
  lcd.print("J&E speed=");//Jet Fan and Exhaust Fan motor speed
  lcd.print(JE_Speed);
  lcd.print("RPM");
  lcd.print("____ S speed=");//Supply Fan motor speed
  lcd.print(supply_Speed);
  lcd.print("RPM");
```

```
        }
   delay(100);
   }
else if((COvalue >= 30) && (COvalue < 90))
{
  lcd.setCursor(0,0);
  lcd.print("CO level is MEDIUM");
  lcd.print("(");
  lcd.print(COvalue);
  lcd.print("PPM)");
  if((COvalue >= 30) & (COvalue <= 50))
     {
      int JE_Speed = 100;//Jet Fan and Exhaust Fan motor
      int supply_Speed = 60;
      analogWrite(9,JE_Speed);//Jet Fan and Exhaust Fan motor
      analogWrite(10,0);
      analogWrite(3,supply_Speed);//supply fan motor
      analogWrite(5,0);
      lcd.setCursor(0,1);
      lcd.print("J&E speed=");//Jet Fan and Exhaust Fan motor speed
      lcd.print(JE_Speed);
      lcd.print("RPM");
      lcd.print("____ S speed=");//Supply Fan motor speed
      lcd.print(supply_Speed);
      lcd.print("RPM");
```

```
    }
if((COvalue > 50) && (COvalue <= 70))
   {
    int JE_Speed = 150;//Jet Fan and Exhaust Fan motor
    int supply_Speed = 90;
    analogWrite(9,JE_Speed);//Jet Fan and Exhaust Fan motor
    analogWrite(10,0);
    analogWrite(3,supply_Speed);//supply fan motor
    analogWrite(5,0);
    lcd.setCursor(0,1);
    lcd.print("J&E speed=");//Jet Fan and Exhaust Fan motor speed
    lcd.print(JE_Speed);
    lcd.print("RPM");
    lcd.print("____ S speed=");//Supply Fan motor speed
    lcd.print(supply_Speed);
    lcd.print("RPM");
    }
 if((COvalue > 70) && (COvalue <= 90))
   {
    digitalWrite(7,LOW);
    int JE_Speed = 200;//Jet Fan and Exhaust Fan motor
    int supply_Speed = 120;
    analogWrite(9,JE_Speed);//Jet Fan and Exhaust Fan motor
    analogWrite(10,0);
    analogWrite(3,supply_Speed);
```

```
      analogWrite(5,0);
      lcd.setCursor(0,1);
      lcd.print("J&E speed=");//Jet Fan and Exhaust Fan motor speed
      lcd.print(JE_Speed);
      lcd.print("RPM");
      lcd.print("____ S speed=");//Supply Fan motor speed
      lcd.print(supply_Speed);
      lcd.print("RPM");
      }
   delay(100);
 }
else if(COvalue >= 90)
 {
  digitalWrite(7,HIGH);
  lcd.setCursor(0,0);
  lcd.print("CO level is MEDIUM");
  lcd.print("(");
  lcd.print(COvalue);
  lcd.print("PPM)");
  int JE_Speed = 255;//Jet Fan and Exhaust Fan motor
  int supply_Speed = 175;
  analogWrite(9,JE_Speed);//Jet Fan and Exhaust Fan motor
  analogWrite(10,0);
  analogWrite(3,supply_Speed);//supply fan motor
  analogWrite(5,0);
```

```
  lcd.setCursor(0,1);
  lcd.print("J&E speed=");//Jet Fan and Exhaust Fan motor speed
  lcd.print(JE_Speed);
  lcd.print("RPM");
  lcd.print("____ S speed=");//Supply Fan motor speed
  lcd.print(supply_Speed);
  lcd.print("RPM");
  delay(100);
  }
}
```