IOT BASED HUMIDITY MONITOR SYSTEM

A PROJECT REPORT

Submitted by

M.BRAMMASH (REG. No. 921721104020)

P.ARUNKUMAR (REG. No. 921721104014)

L.ANEESKUMAR (REG NO. 921721104010)

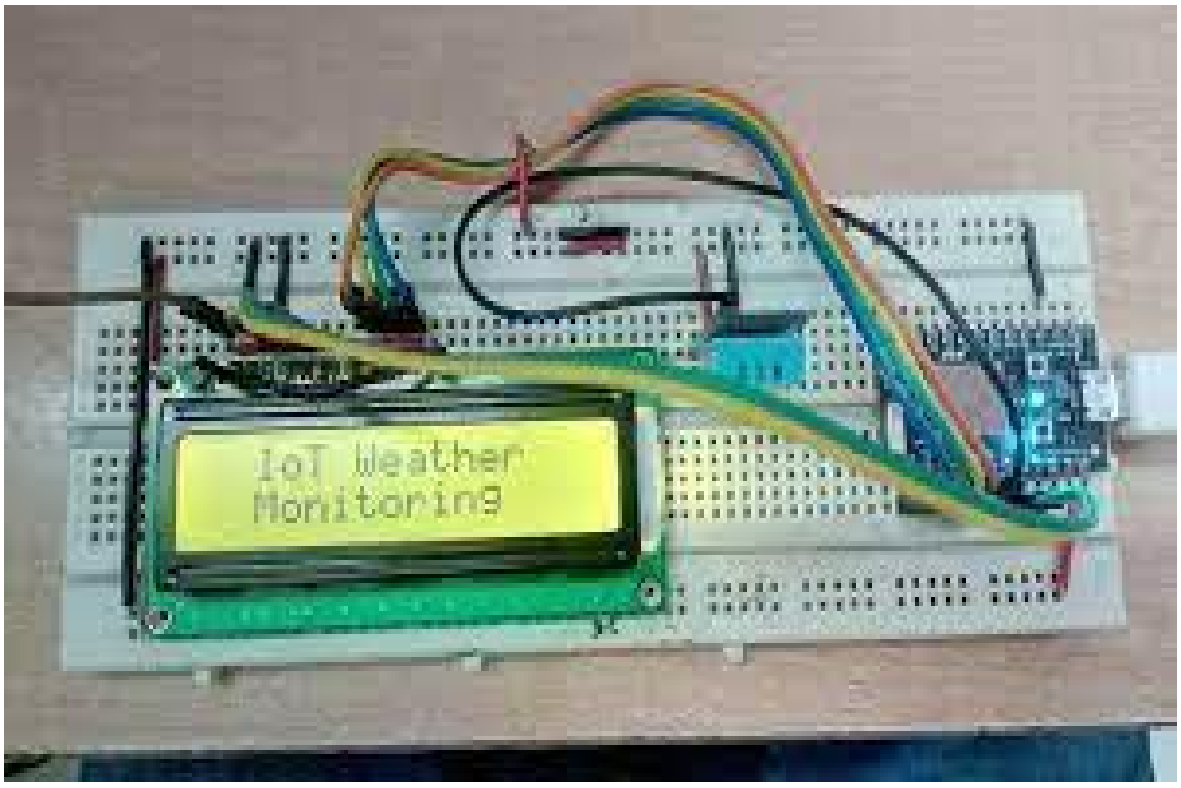


TABLE OF CONTENTS

ABSTRACT

Weather monitoring station or weather monitoring system using Arduino is the simplest arduino project which can help us to monitor the temperature and humidity by using one sensor. There we are using the DHT sensor which is easily capable of measuring the temperature and humidity. Also we are using the arduino uno there which helps to calculate & display the information to the display. DHT11 Sensors have two things inside one is for detecting the temperature and other one is detecting the humidity. Also, there are two systems in this project: one is the transmitter and the other is the receiver. Both have NRF for communication.

nrf has a good range for data transmission that's why we are using the nrf module for communication. At the side of the transmitter there is a dht11 sensor which gives the output to the transmitter microcontroller and the transmitter microcontroller of the weather **monitoring system** sends this information to the receiver via transmitter nrf. Now the receiver nrf receives the same information and sends it to the Arduino microcontroller attached at the receiver end. Now the arduino of the weather station displays this information to the Display.DHT11 sensor in the weather **monitoring system** measuring the temperature and humidity by the inbuilt sensors. There are two sensors, one of them measures the temperature and the other one always measures the humidity. There is an IC too which sends the data in the multiplex form and we always connect this dht11 sensor with the Arduino and Arduino get this information.

LITERATURE SURVEY

Through the weather monitoring system we can collect the information about humidity and temperature and according to current and previous data we can produce the results in a graphical manner in the system. After reviewing many articles, there are presently no papers that mention monitoring the combination of temperature, lighting and humidity in one integrated system and have actuators to modify these settings.

The gathered data is serially fed into a computer, which uses the com port to communicate with the Arduino device and the data recorded is stored in a text file. The text file can be directly imported to an excel file with the functionality of a macro. The imported data is then sorted and formatted, and charts are then plotted with the imported data. The charts present a visual representation of the data, which shows the weather pattern over a recorded period of time.

In addition to this, there is one research paper that has discussed monitoring these three environmental conditions; however, there has been no mention about having actuators to modify. So our main idea was to coin a system that can sense the main components that formulates the weather and can be able to

forecast the weather without human error. Ancient weather forecasting methods usually relied on observed patterns of events, also termed pattern recognition. For example, it might be observed that if the sunset was particularly red, the following day often brought fair weather.

conditions tomorrow. This can be a valid way of forecasting the weather when it is in a steady state, such as during the summer season in the tropics. This method of fo This experience accumulated over the generations to produce weather lore. However, not all of these predictions prove reliable, and many of them have since been found not to stand up to rigorous statistical testing.

The simplest method of forecasting the weather, persistence, relies upon today's conditions to forecast the recasting strongly depends upon the presence of a stagnant weather pattern. It can be useful in both short range forecasts and long range forecasts. Measurements of barometric pressure and the pressure tendency (the change of pressure over time) have been used in forecasting since the late 19th century.

Through the weather monitoring system we can collect the information about humidity and temperature and according to current and previous data we can produce the results in a graphical manner in the system. The graphical charts can also be uploaded to websites from where it can be accessed from anywhere. The data can also be used for pattern analysis, where the weather parameters are recorded for a long period of time.

PROPOSED SOLUTION

1. SENSOR INSTALLATION:

Install the DHT11 sensor in the desired location. The sensor should be placed in an area where it can detect the Humidity accurately.

2. CALIBRATION:

Calibrate the sensor using a known standard weather sample. This will ensure that the readings from the sensor are accurate and reliable.

3. DATA COLLECTION:

Use a microcontroller (such as Arduino) to collect data from the sensor. The microcontroller should be programmed to read the analog values from the sensor at regular time intervals. Building a portable Arduino weather station has many uses. It can provide more accurate weather readings from your own house, as well as remote areas around the world. It can be a cheap way to record data. An option of taking it further could be to take it internationally and place multiple weather stations in remote areas that don't get accurate weather readings that could prove to be an important use.

4. CONVERSION:

Convert the analog values obtained from the sensor to digital values using the ADC (Analog to Digital Converter) of the microcontroller.

5. DATA PROCESSING:

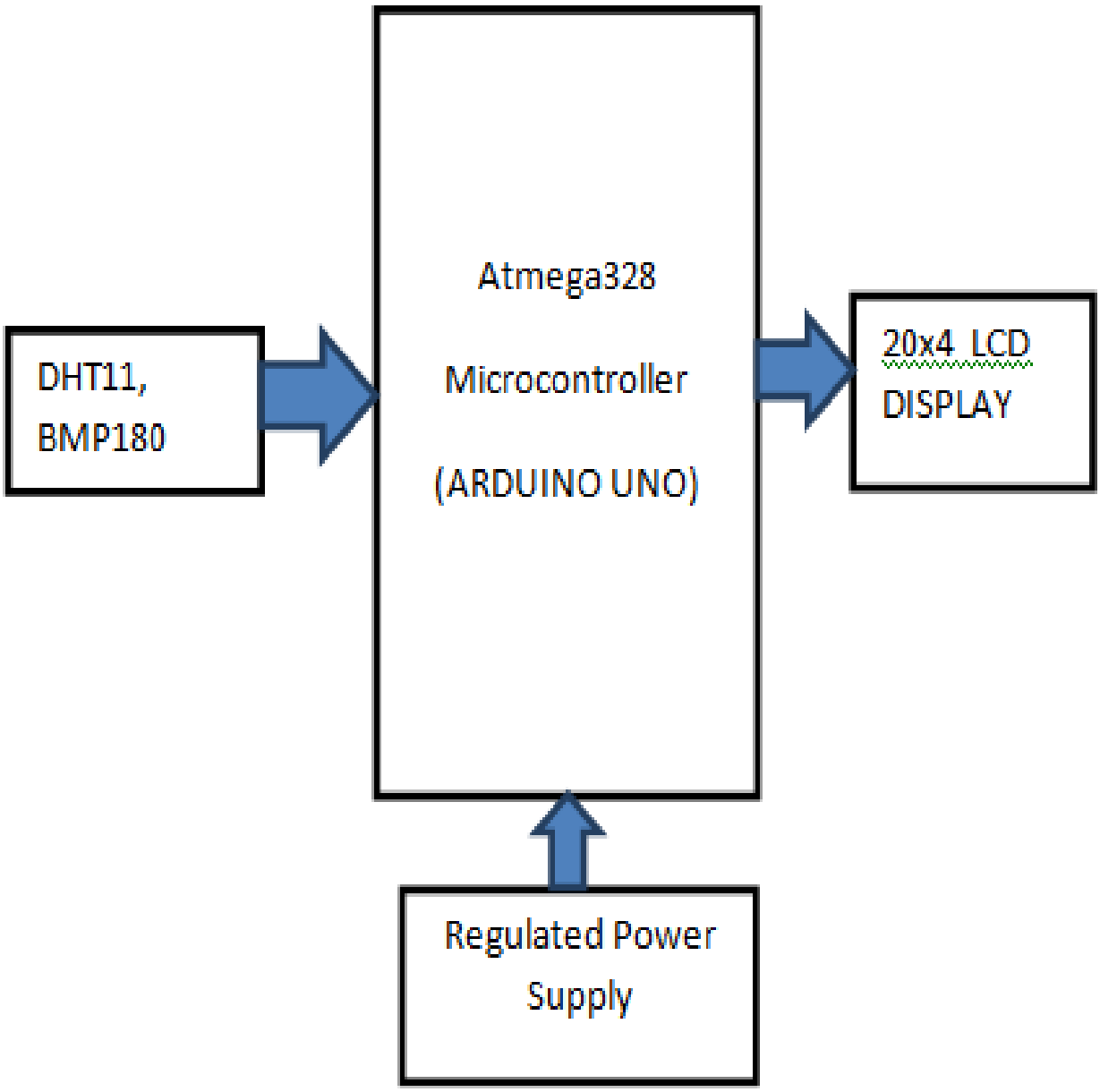
Process the digital values obtained from the sensor to determine the weather parameters such as concentration of moisture level of air and atmosphere.

6. DATA DISPLAY:

Display the processed data on an LCD screen or any other output device connected to the microcontroller. The data can be displayed in real-time or stored for later analysis.

Because of the rapidly changing climate, the weather forecast is uncertain and inaccurate these days. The IoT based Weather Monitoring system features to monitor temperature and humidity level, Barometric pressure, light intensity, air quality and rainfall.

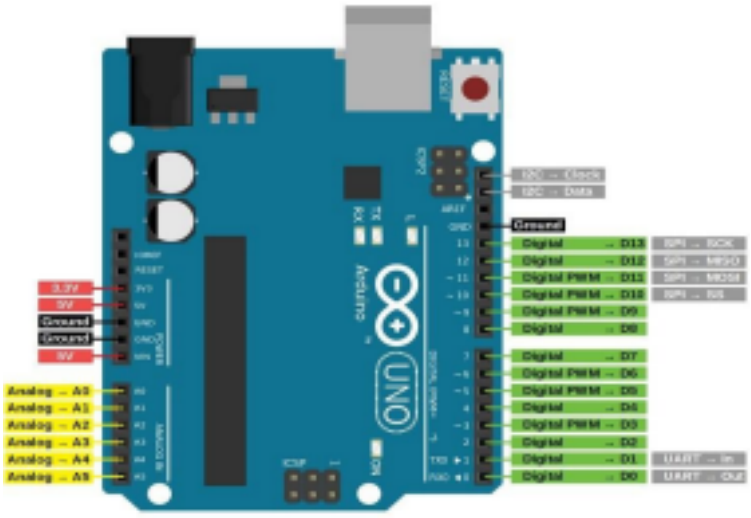
BLOCK DIAGRAM



COMPONENTS REQUIRED

1. ARDUINO UNO

Arduino Uno is a Heart of these projects. It is a microcontroller board. It has 14 digital input/output pins. of which 6 can be used as Pulse Width Modulation(PWM) 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.



2. DHT 11 SENSOR:

The DHT11 is a commonly used Temperature and humidity sensor.The sensor comes with a dedicated NTC to measure temperature and an 8-bit

microcontroller to output the values of temperature and humidity as serial data. The sensor is also factory calibrated and hence easy to interface with other microcontrollers.The sensor can measure temperature from 0°C to 50°C and humidity from 20% to 90% with an accuracy of ±1°C and ±1%. The only difference between the sensor and module is that the module will have a filtering capacitor and pull-up resistor inbuilt, and for the sensor, you have to use them externally if required.

FEATURES

- Full range temperature compensated
- Relative humidity and temperature measurement
- Calibrated digital signal
- Outstanding long-term stability
- Extra components not needed
- Long transmission distance
- Low power consumption
- 4 pins packaged and fully interchangeable

3.LCD DISPLAY

The 16x2 LCD (Liquid Crystal Display) screen is an electronic display module and finds a wide range of applications. A 16x2 LCD display is very basic module very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character

is displayed in a 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. The data register stores the data to be displayed on the LCD

4. SOFTWARE

ARDUINO IDE

The Arduino IDE software is a programming environment specifically designed for writing and uploading code to Arduino boards. It provides a simple and intuitive interface for programming Arduino microcontrollers.

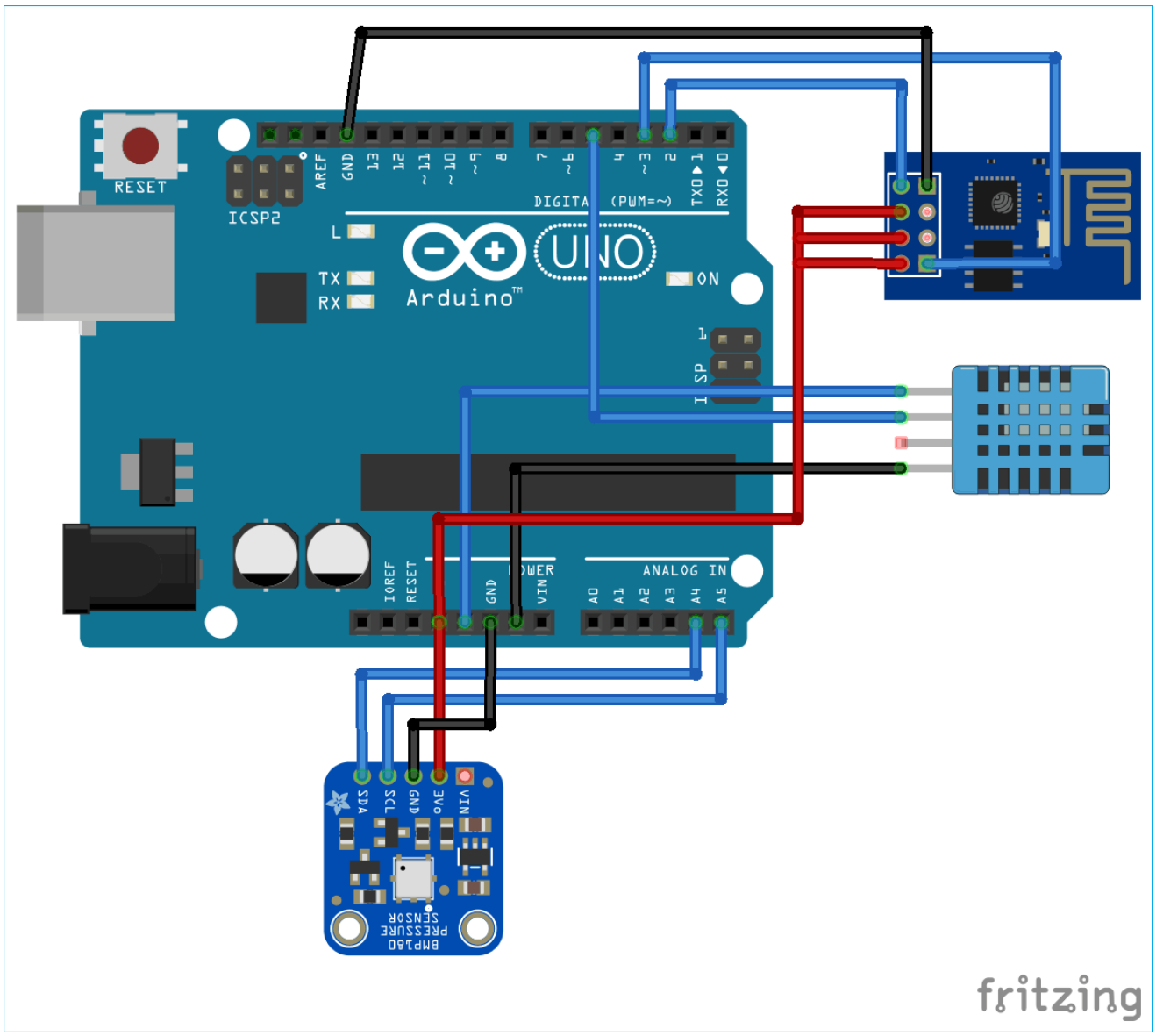
PROGRAMING

```
/ firstly need to add i2c library


#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd(0x27,16,2);  // set the LCD address to 0x27 for a 16
chars and 2 line display

byte degree_symbol[8] =

              {

                0b00111,

                0b00101,

                0b00111,

                0b00000,

                0b00000,

                0b00000,

                0b00000,

                0b00000

              };

int gate=11;

volatile unsigned long duration=0;

unsigned char i[5];

unsigned int j[40];

unsigned char value=0;

unsigned answer=0;

int z=0;

int b=1;
```

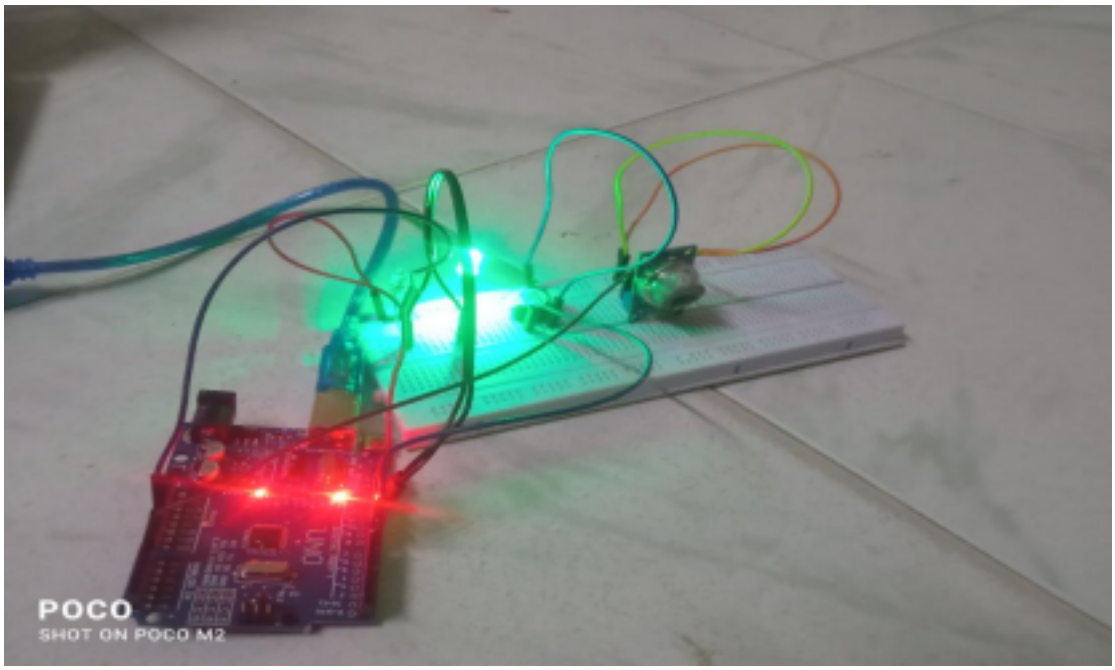
```
void setup()
{
 lcd.init();                      // initialize the lcd
 lcd.init();
 lcd.backlight();
 lcd.print("Temp = ");
 lcd.setCursor(0,1);
 lcd.print("Humidity = ");
 lcd.createChar(1, degree_symbol);
 lcd.setCursor(9,0);
 lcd.write(1);
 lcd.print("C");
 lcd.setCursor(13,1);
 lcd.print("%");
}

void loop()
{

 delay(1000);
 while(1)
 {
  delay(1000);
  pinMode(gate,OUTPUT);
  digitalWrite(gate,LOW);
  delay(20);
  digitalWrite(gate,HIGH);
  pinMode(gate,INPUT_PULLUP);//by default it will become high due to
internal pull up
 // delayMicroseconds(40);



  duration=pulseIn(gate, LOW);
```

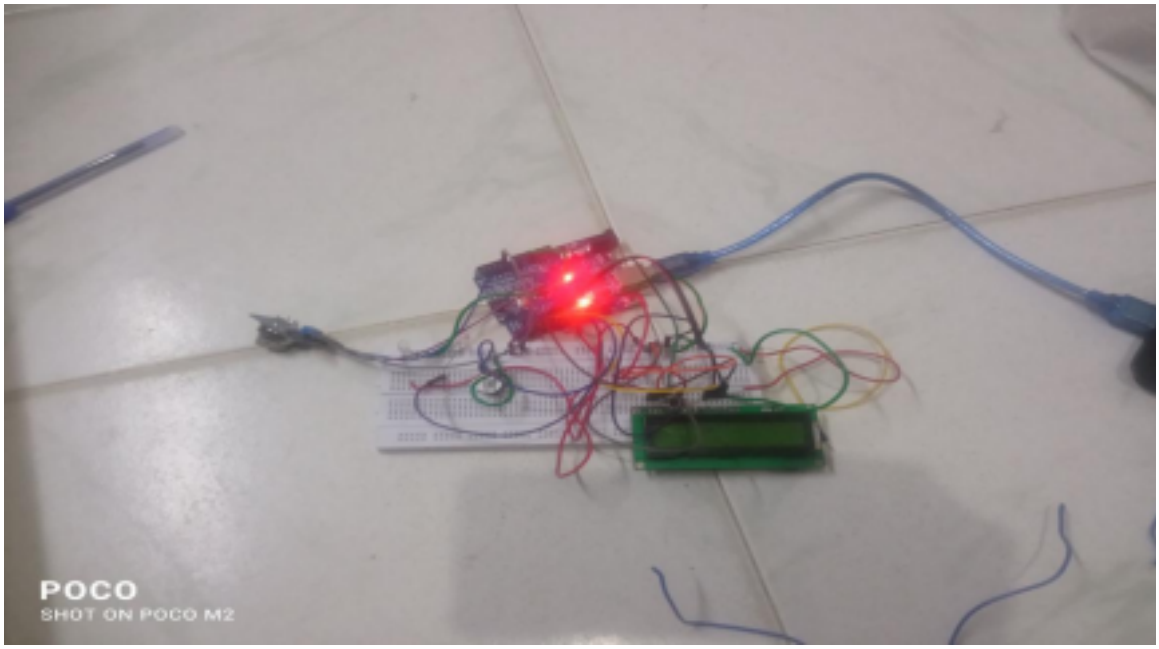
```
  if(duration <= 84 && duration >= 72)
  {
      while(1)
      {
        duration=pulseIn(gate, HIGH);

        if(duration <= 26 && duration >= 20){
        value=0;}

        else if(duration <= 74 && duration >= 65){
        value=1;}

        else if(z==40){
        break;}

        i[z/8]|=value<<(7- (z%8));
        j[z]=value;
        z++;
      }
    }
answer=i[0]+i[1]+i[2]+i[3];

if(answer==i[4] && answer!=0)
{
lcd.setCursor(7,0);
lcd.print(i[2]);
lcd.setCursor(11,1);
lcd.print(i[0]);
}

z=0;
i[0]=i[1]=i[2]=i[3]=i[4]=0;
 }}
```

CIRCUIT DIAGRAM



PROTOTYPE





CONCLUSION

The paper demonstrates a simple and low cost system design to measure climate components in perfect competence. The availability of such a system is extremely preferred particularly, with the establishments, companies that depend considerably on taking decisions based on inputs variations; consequently, weather prediction processes will be taken into considerations. In addition, the system is considered perfect for controlling the sites based on the change in weather conditions. The system works as a supervisor controller, which governs places depending on the fluctuations of the weather or other conditions via feedback operation principles. Hereby, we conclude that the proposed system can be separated into two different parts. The first part is excessively helpful for the companies and other organizations that are put in charge to plan and manage their works based on weather situations; such as, Transportation systems, Airways, and Agriculture as a high priority. These projects can be used in Agriculture and helpful to farmers on uneven climate change.