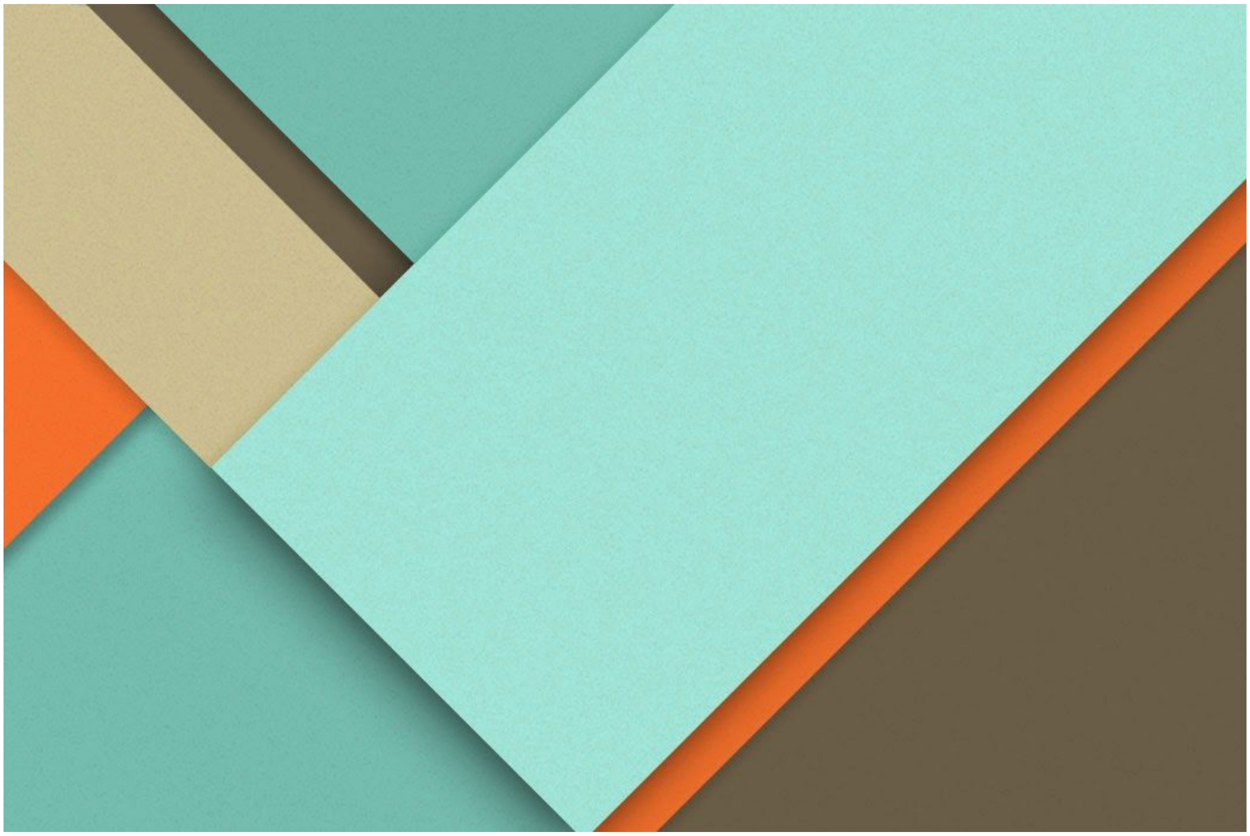


Non-Contact Thermometer

Prof. Muthu Raja S

Subject: ECE1005-Sensors and Instrumentation

—

Team Members

1.Akshunn Trivedi-19BEC0038

2.Shubham Sherki-19BEC0044

3.Nikhil M Jain-19BEC0046

4.Sujal Mehta-19BEC0091

5.Naman Jain-19BEC0234

Overview

Non-Contact Thermometer lets you check the body temperature without even touching the body which is very important considering the current situation. You should avoid using generic/normal thermometers at all cost during this pandemic!

DIY Non-Contact IR Thermometers have been around for ages but they don't take into consideration the distance inaccuracy & limitation of MLX90614 IR temperature sensor. We have solved this problem by using an IR proximity Sensor that only allows temperature measurement from a fixed/predefined distance.

We intend to not only measure the temperature but also give warnings according to the configurations using LED’s,and propose to host the data to a server for real time analysis.This can help us in monitoring the temperatures of people for longer periods and help break the chain.

Sensors in focus

MLX90614 IR Temperature Sensor

The MLX90614 is a Contactless Infrared (IR) Digital Temperature Sensor that can be used to measure the temperature of a particular object ranging from -70° C to 382.2°C. The sensor uses IR rays to measure the temperature of the object without any physical contact and communicates to the microcontroller using the I2C protocol.

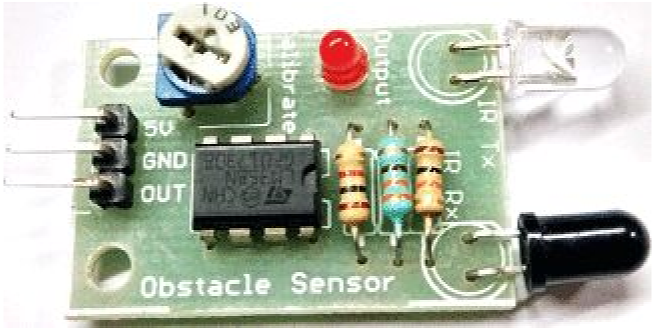
Pin No.	Pin Name	Description
1	Vdd(Power Supply)	Vdd can be used to power the sensor,

		typically using 5V
2	Ground	The metal can also act as ground
3	SDA-Serial Data	Serial data pin used for I2C Communication
4	SCL-Serial Clock	Serial Clock Pin used for I2C Communication

IR Proximity Sensor

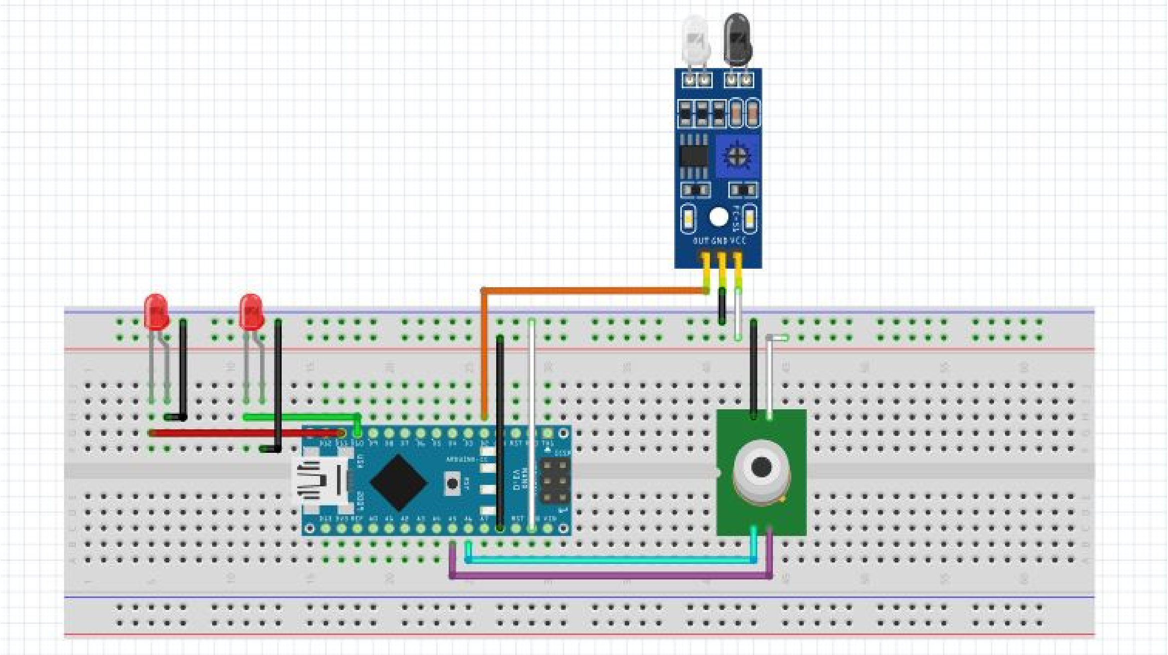
IR, in short for infrared, detects the presence of an object by emitting a beam of infrared light.Infrared proximity sensors consist of an IR LED that emits, and a light detector for detection of reflection. It sends a logic high and low accordingly if it senses an obstacle.

Pin Name	Description
VCC	Power Supply Input
GND	Power Supply Ground
OUT	Active High Output



Circuit diagrams , Components and code

Circuit diagram



Components

- Arduino Nano
- 2 pin LED
- MLX90614 IR Temperature Sensor
- IR Proximity Sensor

- Breadboard
- LED
- Jumper Wires

Software Used

Arduino IDE

Blynk IOT App

Code:

```
#define BLYNK_PRINT SwSerial\
#include <SPI.h>
#include <Wire.h>
#include <stdint.h>
#include <Adafruit_MLX90614.h>
#include<string.h>
String temperature;
Adafruit_MLX90614 mlx = Adafruit_MLX90614();
#include <SoftwareSerial.h>
SoftwareSerial SwSerial(10, 11); // RX, TX
#include <BlynkSimpleStream.h>
// You should get Auth Token in the Blynk App.
// Go to the Project Settings (nut icon).
char auth[] = "SIJw0kbNRtqogbBxebn8fCXLbT6_SM44";
// Use Virtual pin 5 for uptime display
#define PIN_UPTIME V5
// This function tells Arduino what to do if there is a Widget
// which is requesting data for Virtual Pin (5)
LYNK_READ(PIN_UPTIME){// This command writes Arduino's uptime in seconds to     Virtual
Pin (5)  temperature = String(mlx.readObjectTempC(), 1);  if(digitalRead(2)==0){
Blynk.virtualWrite(PIN_UPTIME,temperature);
 }
  if(digitalRead(2)==1){
```

```
  Blynk.virtualWrite(PIN_UPTIME,0);
  }
  }
void setup()
{
  // Debug console
  SwSerial.begin(9600);
  // Blynk will work through Serial
  // Do not read or write this serial manually in your sketch
  Serial.begin(9600);
  mlx.begin();
  Blynk.begin(Serial, auth);
  pinMode(10,OUTPUT);
  pinMode(11,OUTPUT);
}
void loop()
{ int temperature = (mlx.readObjectTempC());
  Blynk.run();
  if(digitalRead(2)==0 && temperature>=25  ){
    digitalWrite(11,HIGH);
    digitalWrite(10,LOW);
  }
  if(digitalRead(2)==1){
    digitalWrite(10,HIGH);
    digitalWrite(11,LOW);
  }
  if(digitalRead(2)==0 && temperature<25){
    digitalWrite(10,HIGH);
    digitalWrite(11,LOW);
  }
  delay(2000);
}
```

Methodology

The IR proximity sensor,upon sensing an obstacle,sends a high signal to the arduino,which further leads to the propagation of the signal to the Blynk IOT platform via a virtual pin.This finally triggers a notification in our mobile app.All this takes place over the cloud enabling blazing fast connection speed.The Arduino microcontroller contains the components(IC's,Oscillators,Timers,LED's etc) which we set up earlier separately,enabling us with increased functioning.The programming for the same was done via Arduino IDE,setting up the relevant logic.The internet was enabled via running a script in the computer.

Results and discussion

Link to our project video: https://youtu.be/q5R9dGG1bLg

Future work

Our non-compact thermometer can be used at all entry points in places like VIT. This product can be installed at a suitable place,and can take temperature values from a distance managed by our proximity sensor.The thermometer will show a green or red light to convey if the person has fever or not.(by evaluating against a predefined temperature)

We can also link this to a FireBase server which can log fever entries to a unique ID like registration number,and thus make a universal database with constant temperature monitoring of the campus.This can help us tremendously in isolating cases as soon as possible.

There is also a nice option to attach an actuator to the microcontroller like LED which can allow or disallow movement based upon the temperature reading.

References

1. https://github.com/blynkkk

2. https://github.com/arduino/Arduino

3.https://www.fda.gov/medical-devices/general-hospital-devices-and-supplies/non-contact-infrared-thermometers

4.https://www.sparkfun.com/products/9570

5.https://en.wikipedia.org/wiki/Proximity_sensor