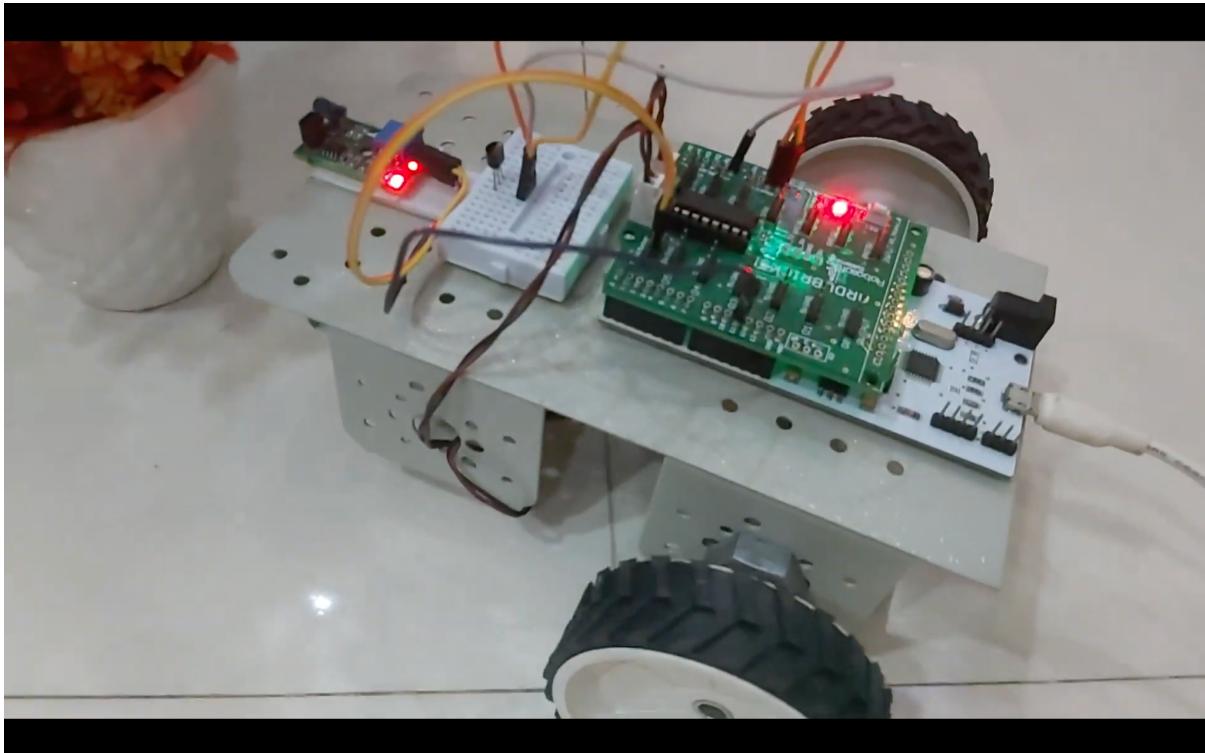


Temperature Monitoring Robot



The Temperature Monitoring robot, as the name implies, is an autonomous vehicle that avoids the obstacle coming at its surface and simultaneously detect the temperature and shares that data to the user. This robot ideally works on the Ultrasonic Sensor but in my project I have used IR Proximity Sensor for its obstacle avoidance. The objective is simple-if the sensors encounter an obstacle they move back and turn left or right as the case may be. Temperature is detected in such an environment where person visit is not possible.

Temperature Monitoring at dangerous environments, where human penetration could be fatal.

THINGS USED IN THE PROJECT

HARDWARE

- Boltduino (Arduino)
- LM35 Temperature sensor
- BreadBoard
- IR sensor x1
- Motor driver shield
- Motors x2
- Chassis
- Standard wheels x2
- Caster wheel
- 12V power adapter
- Few screws & nuts
- USB cable
- A spanner

- A screwdriver

SOFTWARE/ APP / ONLINE SERVICES

- Arduino IDE

HARDWARE SETUP

- 1) Fit caster wheel to chassis with screws and nuts using screwdriver
- 2) Take 2 motors and lose its nut with spanner and fix those motors in a place of wheels from inside of chassis
- 3) Take out the wires of the right motor from the front right side(front wheel side) of the chassis. Similarly, Take out the wires of the left motor from the front left side(front wheel side) of the chassis.
- 4) Lose the screw of both the standard wheels and mount it on the motors.
- 5) Take the motor driver shield and mount it on the Boltduino such that all pins of the motor driver shield are connected to the Boltduino.
- 6) With a double sided tape stick the Boltduino to the top side of the chassis. Such that the USB port is on the edge of the chassis and Boltduino is in the centre of the Chassis.
- 7) Take the wire of the right motor and left motor and connect it to the right and left given pin on the motor driver shield.
- 8) Mount the ESP8266 Bolt Wifi Module on Arduino such that all pins are well connected.
- 9) With a double sided tape stick IR sensor in front of the chassis of the robot such that it can avoid obstacles without robot collision.
- 10) Connect the OUT pin of IR sensors to pin 11 (digital pin) of Arduino, and VCC to 5V and GND to ground pin (GND) of Arduino.
- 11) Connect LM35 to Arduino via BreadBoard, VCC to 5v, OUT to Analog Pin A0, GND to ground pin of Boltduino.
- 12) Our robot is ready to code.



SOFTWARE SETUP

- 1) Open Arduino IDE and select Board as Arduino UNO and Port as per your hardware configuration.

SOFTWARE PROGRAMMING / CODE

- 1) Open a new sketch, name it as **Temperature_Monitoring_Robot** and Code as shown below.

```
void init_motors(){  
pinMode(5, OUTPUT);  
pinMode(6, OUTPUT);  
pinMode(4, OUTPUT);  
pinMode(7, OUTPUT);  
pinMode(12, OUTPUT);  
pinMode(8, OUTPUT);  
digitalWrite(5, HIGH);  
digitalWrite(6, HIGH);  
}
```

```
void Forward(){  
digitalWrite(4, HIGH);  
digitalWrite(7, LOW);  
digitalWrite(12, HIGH);  
digitalWrite(8, LOW);  
}
```

```
void Reverse(){
    digitalWrite(4, LOW);
    digitalWrite(7, HIGH);
    digitalWrite(12, LOW);
    digitalWrite(8, HIGH);
}
```

```
void Right(){
    digitalWrite(4, LOW);
    digitalWrite(7, HIGH);
    digitalWrite(12, HIGH);
    digitalWrite(8, LOW);
}
```

```
void Left(){
    digitalWrite(4, HIGH);
    digitalWrite(7, LOW);
    digitalWrite(12, LOW);
    digitalWrite(8, HIGH);
}
```

```
void Left_Forward(){
    digitalWrite(4, LOW);
    digitalWrite(7, LOW);
    digitalWrite(12, HIGH);
    digitalWrite(8, LOW);
}
```

```
void Right_Forward(){
    digitalWrite(4, HIGH);
    digitalWrite(7, LOW);
    digitalWrite(12, LOW);
    digitalWrite(8, LOW);
}
```

```
void Right_Reverse(){
    digitalWrite(4, LOW);
    digitalWrite(7, LOW);
    digitalWrite(12, LOW);
    digitalWrite(8, HIGH);
}
```

```
void Left_Reverse(){
    digitalWrite(4, LOW);
    digitalWrite(7, HIGH);
    digitalWrite(12, LOW);
    digitalWrite(8, LOW);
}
```

```

void Stop(){
    digitalWrite(4, LOW);
    digitalWrite(7, LOW);
    digitalWrite(12, LOW);
    digitalWrite(8, LOW);
}

#include <SoftwareSerial.h>
SoftwareSerial mySerial(10, 11); // RX, TX
const int LM35 = A0;

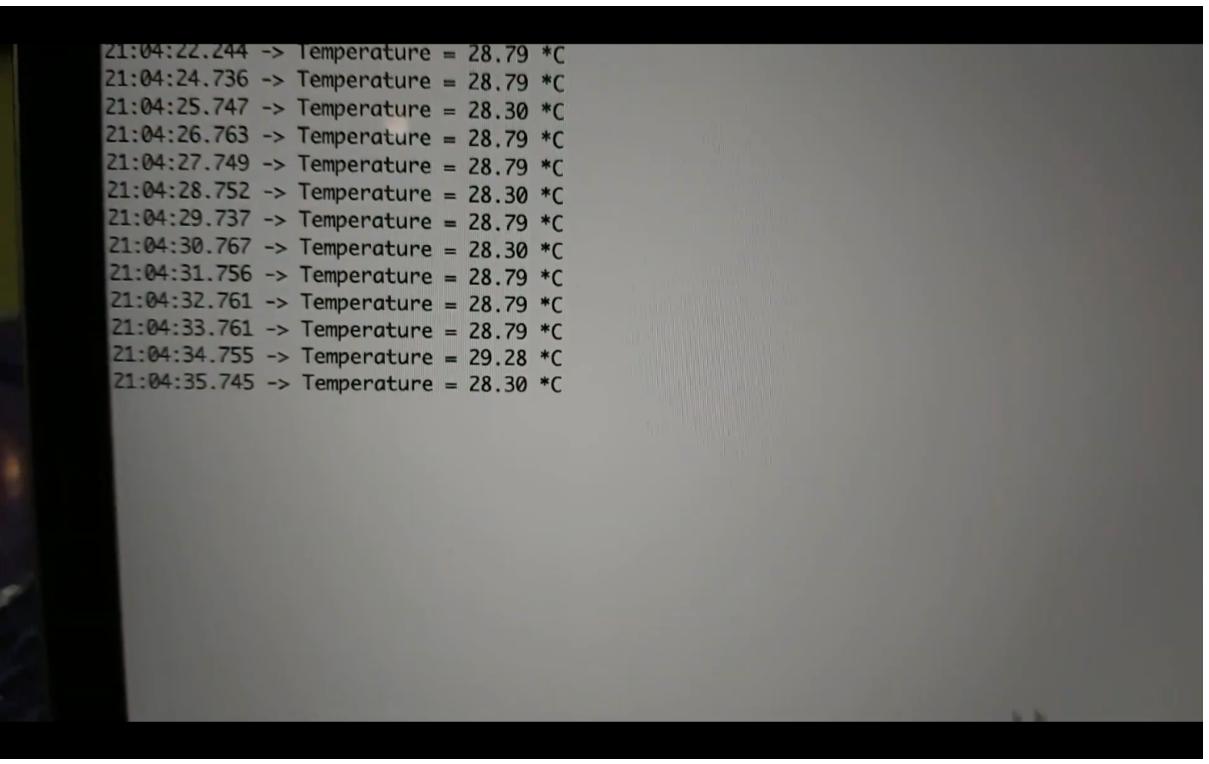
void setup(){
    // put your setup code here, to run once:
    pinMode(11, INPUT); // for IR sensor
    init_motors();
    Serial.begin(9600);
    mySerial.begin(115200);
}

void loop(){
    // put your main code here, to run repeatedly:
    int ADC;
    float temp;
    ADC = analogRead(LM35);
    temp = (ADC * 4.88); // Convert value equ. Voltage
    temp = (temp / 10); // LM35 gives 10mV/*C
    Serial.print("Temperature = ");
    Serial.print(temp);
    Serial.println(" *C");
    mySerial.println(temp);
    delay(1000);

    if(digitalRead(11)==HIGH){
        Forward();
    }else{
        Reverse();
        delay(1000);
        Left();
        delay(500);
    }
}

```

OUTPUT/ VIDEO



```
21:04:22.244 -> Temperature = 28.79 *C  
21:04:24.736 -> Temperature = 28.79 *C  
21:04:25.747 -> Temperature = 28.30 *C  
21:04:26.763 -> Temperature = 28.79 *C  
21:04:27.749 -> Temperature = 28.79 *C  
21:04:28.752 -> Temperature = 28.30 *C  
21:04:29.737 -> Temperature = 28.79 *C  
21:04:30.767 -> Temperature = 28.30 *C  
21:04:31.756 -> Temperature = 28.79 *C  
21:04:32.761 -> Temperature = 28.79 *C  
21:04:33.761 -> Temperature = 28.79 *C  
21:04:34.755 -> Temperature = 29.28 *C  
21:04:35.745 -> Temperature = 28.30 *C
```

YT Video Link:

<https://youtu.be/ESpHuYNOUpo>