KARNATAKA LAW SOCIETY'S

GOGTE INSTITUTE OF TECHNOLOGY

UDYAMBAG BELAGAVI -590008

(An Autonomous Institution under Visvesvaraya Technological University, Belagavi)

(APPROVED BY AICTE, NEW DELHI)

A Lab Project Report on

Interface DHT11 temperature sensor with Arduino Nano to display temperature and humidity on serial monitor/lcd and turn 'on' buzzer if temperature exceeds 25 degrees centigrade.

Submitted for the requirements of 6th semester B.E. in CSE

for **"Embedded Systems and IoT Lab (18CSL68)"**

Submitted by

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KARNATAKA, INDIA.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the Lab Project work titled **"DHT11 TEMPERATURE SENSOR WITH ARDUINO NANO"** carried out by **SHRADHA PATIL, SRUSHTI MUDENNAVAR AND YASH HEREKAR** bearing **2GI20CS144, 2GI20CS158, 2GI20CS184** for **Embedded Systems and IoT Lab (18CSL68)** is submitted in partial fulfilment of the requirements for 6th semester B.E. in **COMPUTER SCIENCE AND ENGINEERING,** Visvesvaraya Technological University, Belagavi. It is certified that all corrections/ suggestions indicated have been incorporated in the report.

The lab project report has been approved as it satisfies the academic requirements prescribed for the said degree.

Date: 24/06/2023

Place: Belagavi

Signature of guide

Dr. Sharda Kori

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Marks allocation:

	Batch No.:				
1.	Seminar Title: **Micro Controller 8051 – Architecture and Salient features**	Marks Range	**USN**		
			2GI18CS144	**2GI18CS158**	**2GI18CS184**
2.	Abstract (PO2)	0-2			
3.	Application of the topic to the course (PO2)	0-3			
4.	Literature survey and its findings (PO2)	0-4			
5.	Methodology, Results and Conclusion (PO1, PO3, PO4)	0-6			
6.	Report and Oral presentation skill (PO9, PO10)	0-5			
	Total	20			

*** 20 marks is converted to 10 marks for CGPA calculation**

1.Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

2.Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and Engineering sciences.

3.Design/Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4.Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5.Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6.The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7.Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need
for sustainable development.

8.Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9.Individual and team work: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.

10.Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological channel

Signature of Staff

ACKNOWLEDGEMENTS

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1. TITLE

DHT11 Temperature sensor with Arduino Nano

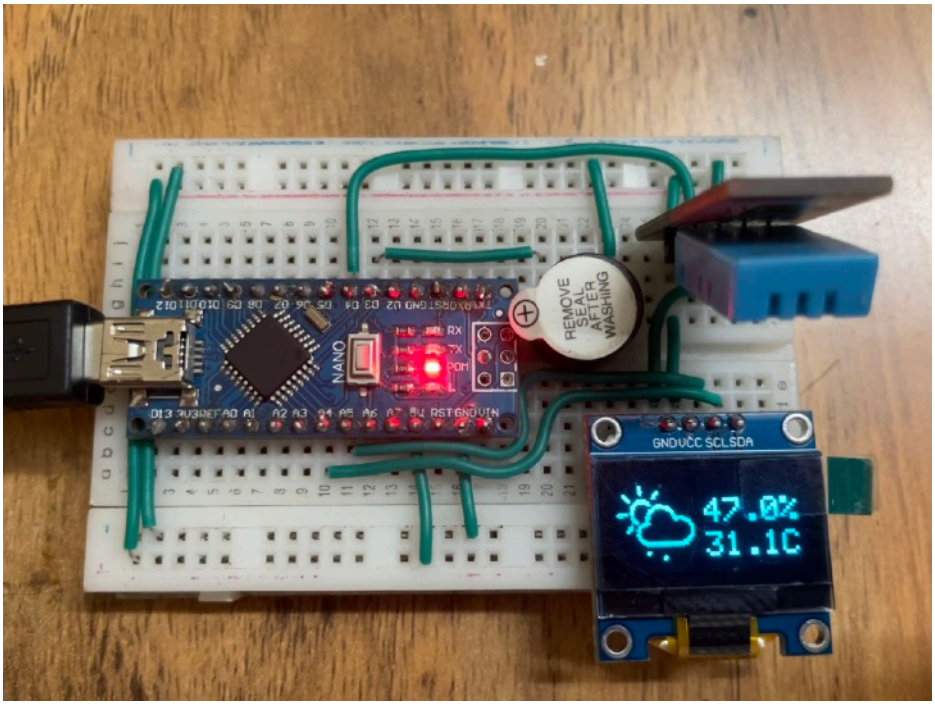
2. PROBLEM DEFINITION

Interface DHT11 Temperature sensor with Arduino Uno to Display Temperature and Humidity on Serial Monitor/LCD and Turn ‘ON’ Buzzer if temperature exceeds 25 degrees centigrade.

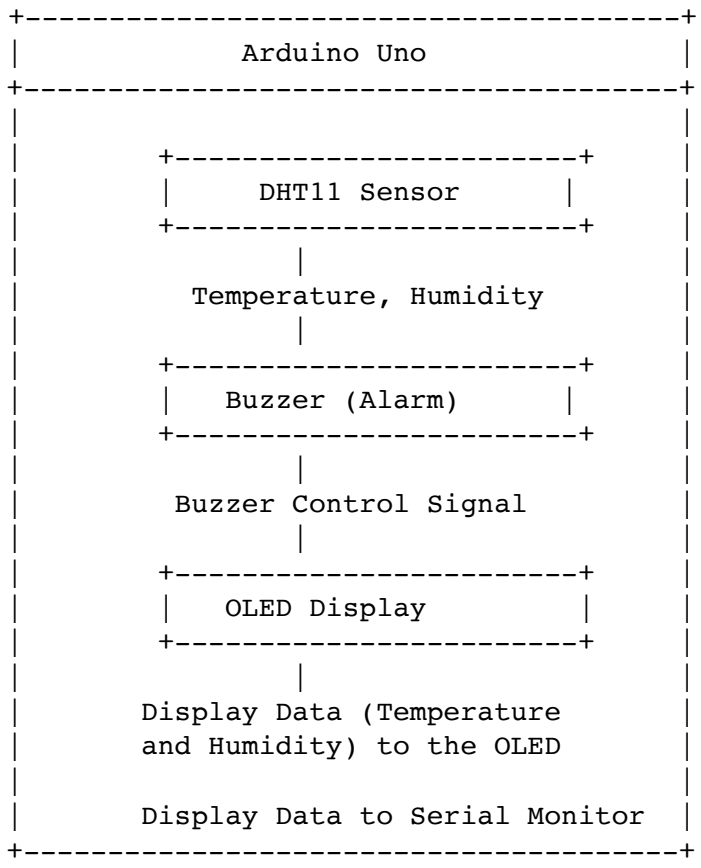
3. COMPONENTS USED

1. **Arduino Nano:** The Arduino Nano is a small form factor like the UNO based on the ATmega328P. It provides the processing power and digital/analog input-output capabilities necessary for the project.
2. **DHT11 Temperature and Humidity Sensor:** The DHT11 is a low-cost sensor that can measure temperature and humidity. It has a digital interface and provides reliable data readings.
3. **Buzzer:** The buzzer is an electronic component that can generate sound when powered. In this project, it is used to sound an alarm when the temperature exceeds 25 degrees Celsius.
4. **OLED Display:** The OLED (Organic Light-Emitting Diode) display is a compact display module that uses organic compounds to emit light. It is used to show the temperature and humidity readings in a clear and visually appealing manner.
5. **Bread board:** Used to connect all the components on a single prototyping base
6. **Single stranded wire:** Used to wire the circuit

4. WORKING MODEL OF THE FINAL SOLUTION



5. Design/Functional Block Diagram



6. Working code for mini project

6.1. Main

```
#include "GLOBALS.h"

void setup()
{
  Serial.begin(9600);
  Wire.begin();                                  // Start Wire library for I2C

  // SSD1306_SWITCHCAPVCC = generate display voltage from 3.3V internally
  if(!display.begin(SSD1306_SWITCHCAPVCC, SCREEN_ADDRESS)) {
    Serial.println(F("SSD1306 allocation failed"));
    for(;;);                                   // Don't proceed, loop forever
  }                                            // initialize OLED with I2C addr 0x3C

  buzz.initBuzzer();                             //Initialize the buzzer

  display.setTextColor(WHITE);                  //Set the color - always use
white despite actual display color
  display.clearDisplay();                        // Clear the display buffer

  scrollAnimation();
}

void loop()
{
```

```
  if (dht.alarmTemperature())
  {
    // buzz.on();
    buzz.nonBlockOn();
  }
  else
    buzz.off();

  // dht.display();

  weatherAnimate(5,10,true);

}
```

6.2. BUZZER.H

```
#ifndef BUZZER_H
#define BUZZER_H

#include "Arduino.h"

class buzzer
{
  private:
    uint8_t buzzPin;
    bool buzzState;

  public:
    buzzer(uint8_t);
    void begin();
    void on();
    void off();
    void display();
    void nonBlockOn();
    void initBuzzer();
};
#endif  //END BUZZER_H
```

6.3. DHT11SENSOR.H

```
#ifndef DHT11Sensor_H
#define DHT11Sensor_H

#include <DHT.h>

class DHT11Sensor
{
  private:
    DHT* dht;
    uint8_t dhtPin;
    float temperature;
    float humidity;
    const float CRITICALTEMPRATURE = 31;

  public:
    DHT11Sensor(uint8_t);
    void begin();
    float readTemperature();
    float readHumidity();
    bool alarmTemperature();
    void display();
};

#endif // DHT11Sensor_H
```

6.4. ADDITIONAL HELPER FILES

Buzzer.cpp
DHTSensor.cpp
Globals.h

7. CONCLUSION

In conclusion, the project successfully demonstrated the integration of a DHT11 temperature and humidity sensor with an Arduino Uno. By utilizing the Arduino platform's capabilities, we were able to measure temperature and humidity, display the readings, and incorporate an alarm system.

The project showcased the versatility and flexibility of the Arduino Uno, which acted as the central microcontroller, processing data from the DHT11 sensor and controlling the buzzer. The inclusion of an output display, whether an LCD or an OLED, provided a user-friendly interface to view the temperature and humidity readings.

The implementation of the alarm system added an important functionality, alerting the user when the temperature exceeded a specified threshold. This feature can be particularly useful in applications where temperature monitoring is crucial, such as in environmental control systems or temperature-sensitive equipment.

8. REFERENCES

- David Hanes, Gonzalo S, Patrick G, Rob Barton, Jermone Henry, Rowan T, IoT Fundamentals Networking Technologies, Protocols, and Use Cases for the Internet of Things, Pearson (Cisco press) 2018.
- Using DHT11: https://projecthub.arduino.cc/arcaegecengiz/using-dht11-12f621
- Using Buzzer: https://www.ardumotive.com/how-to-use-a-buzzer-en.html
- OLED display: https://arduinogetstarted.com/tutorials/arduino-oled