AUTOMATIC THERMOSTAT SYSTEM – ARDUINO-BASED

Mini Project | SY B.Tech (CSE) | Academic Year 2025–26

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ABSTRACT

- This project presents an Arduino-based automatic thermostat system.
- It reads room temperature using a DHT11 sensor and automatically controls
- a LED (as a heater) and a DC fan to maintain a comfortable range (~25°C).
- The system uses an L298N motor driver for control, and all readings appear
- on a 16×2 I2C LCD display. It operates reliably and demonstrates fundamental
- concepts of sensors, actuators, and control logic with Arduino programming.

PROBLEM STATEMENT & GOAL

- Manually controlling fans and heaters is inconvenient.
- Goal: Build a low-cost, automatic temperature control system that:
- Measures temperature using DHT11 sensor
- Controls a heater and a fan
- Displays data on LCD
- Keeps temperature around 25°C automatically

WHY THIS PROJECT

- Everyday relevance: Used in homes and offices
- Educational value: Demonstrates Arduino basics (sensors, PWM, LCD, motor driver)
- Low budget: Under ₹700
- Easy to build and beginner-friendly

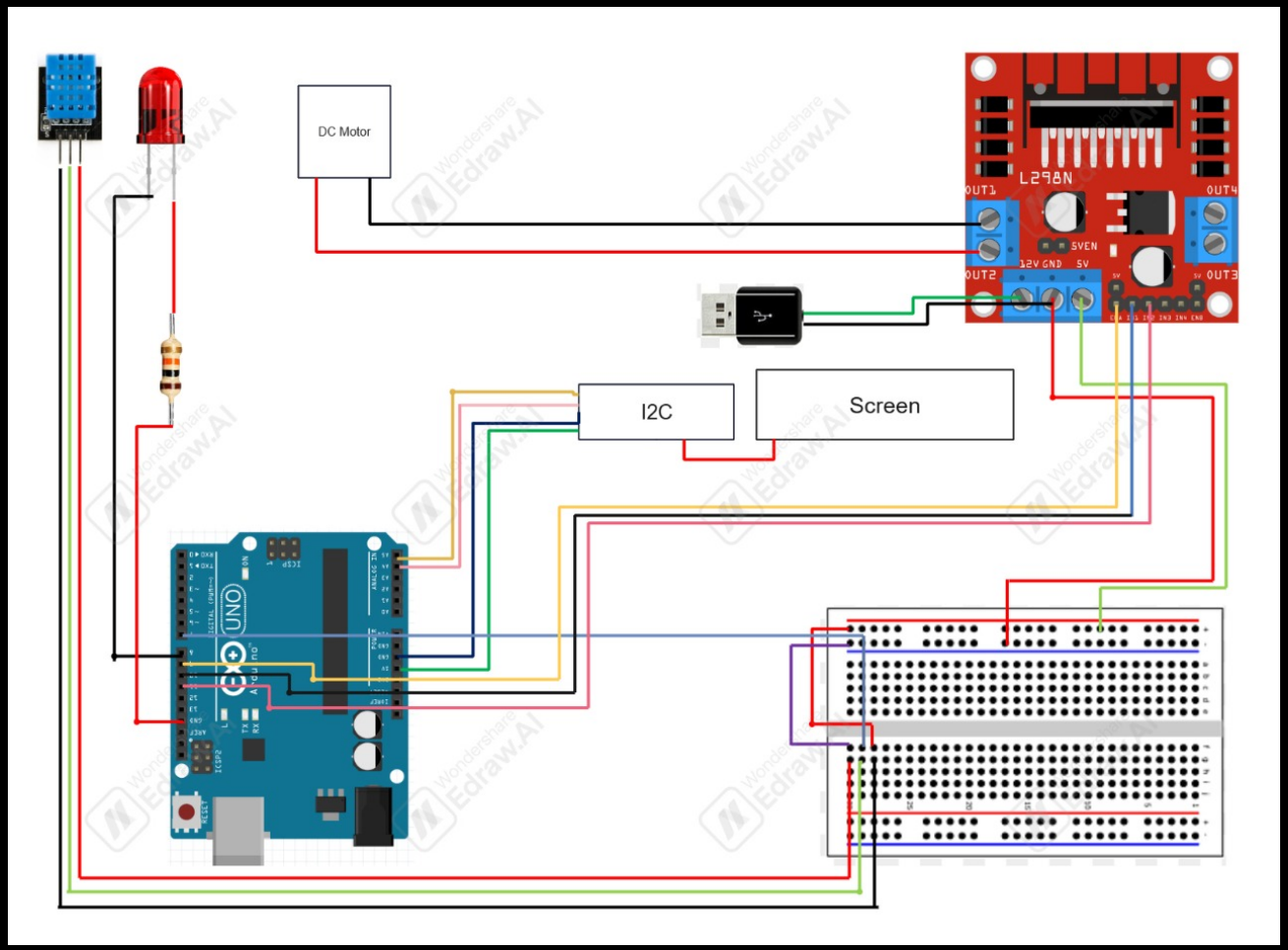
COMPONENTS & THEIR FUNCTION

- Arduino UNO – brain of the system
- DHT11 Sensor – measures temperature
- L298N Motor Driver – controls fan and led
- LED(with 1k ohm register) – acts as heater
- 5V DC Fan – cools the room
- 16×2 I2C LCD – displays temperature & system status
- Breadboard, jumper wires, power supply

WORKING PRINCIPLE / BLOCK DIAGRAM

- Arduino reads temperature from DHT11
- <27°C → Heater ON
- 27–29°C → Fan LOW
- 30–32°C → Fan MEDIUM
- ≥32°C → Fan HIGH

BLOCK DIAGRAM



SOFTWARE FLOW / ALGORITHM

1. Initialize LCD and DHT11 sensor
2. Read temperature
3. Compare temperature range
4. Control heater/fan accordingly
5. Display info on LCD
6. Repeat continuously

TESTING & OBSERVATIONS

Sr no.	Temperature	Action	Display
1	27-29(°C)	Motor speed=low	Temperature = x(°C) Fan speed = low
2	29-32(°C)	Motor speed=medium	Temperature = x(°C) Fan speed = medium
3	32+ (°C)	Motor speed=high	Temperature = x(°C) Fan speed = high
4	<27(°C)	Heater (LED) ON	Temperature = x(°C) Heater ON
5	Error reading temperature	Error!	Temperature sensor error!

CONCLUSION & FUTURE SCOPE

- We successfully built an Arduino-based automatic thermostat that can heat or cool a room automatically.
- Future enhancements:
- Add Wi-Fi (IoT) for remote control
- Use PID for smoother response
- Add battery backup for portability

REFERENCES

1. Arduino.cc – UNO Rev3 Datasheet

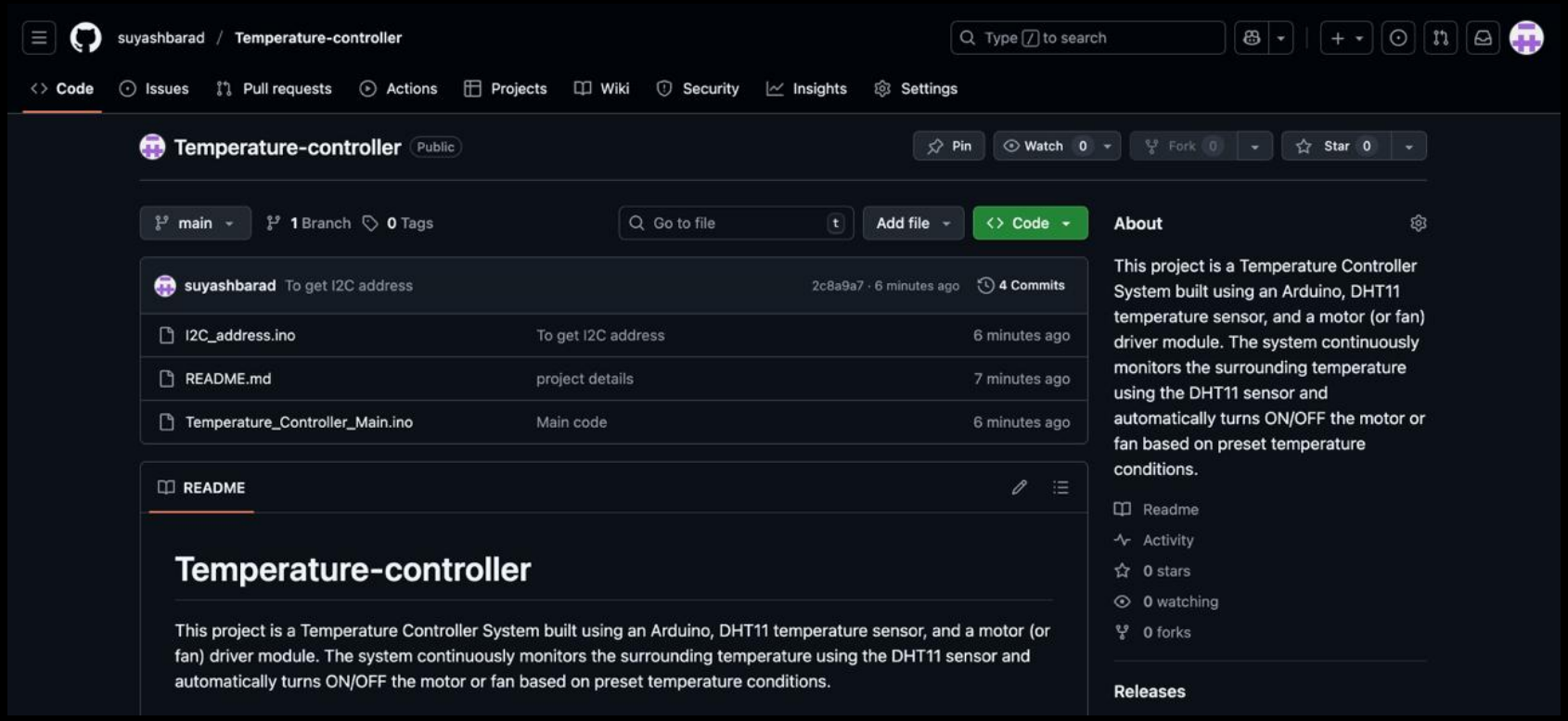
2. Aosong DHT11 Datasheet

3. STMicroelectronics L298N Datasheet

4. Frank de Brabander, LiquidCrystal_I2C Library

5. Massimo Banzi, “Getting Started with Arduino”, O’Reilly Media (2022)

GitHub Repository



HTTPS://GITHUB.COM/SUYASHBARAD/TEMPERATURE-CONTROLLER

THANK YOU!