Microprocessor and Computer Architecture

UE22CS252B

4th Semester, Academic Year – 2023-24

Mini-Project

Title:

Climate Controlled Fan Speed using Arduino

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Abstract:

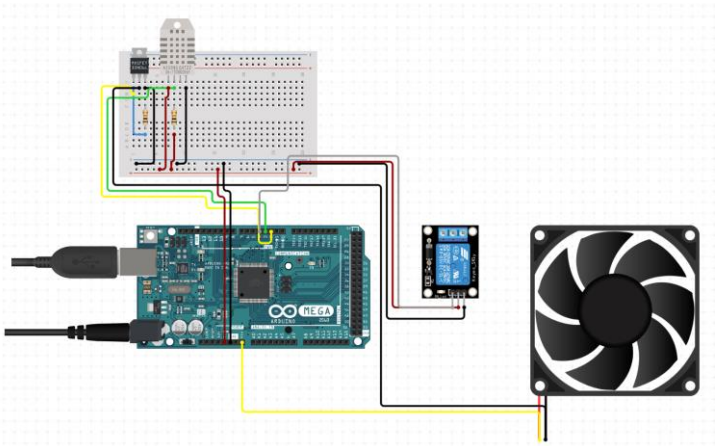
Climate-controlled fan speed using Arduino is a mini-project aimed at providing an easy way to modulate fan speeds using basic hardware. This project can be implemented in various scenarios such as regulating fan speed in homes based on the ambient conditions to enhance comfort levels while also, minimising energy utilisation. Additionally, it can be used in computing hardware to enable additional cooling at higher temperatures to prevent thermal throttling in intensive applications such as gaming, 3D modelling, etc.

The system consists of an Arduino Uno microcontroller, a DHT-11 combined temperature and humidity sensor, a 12V DC fan and equipment to power the 12V fan. Based on the heat index calculated from combining the humidity and temperature, we will use PWM to modulate the fan's RPM. Hence, at lower temperatures and humidity, the fan will run at slower speeds and at higher temperatures and humidity, the fan will run at higher speeds for optimised comfort/performance.

Objective:

The main objective of this system is to offer a sustainable solution which can help create more efficient, comfortable, or performant environments in a variety of applications. The advantages of this system are: Low power consumption, Basic and easy to use hardware, Economical

Circuit Diagram:



Components Used:

Hardware:

Arduino Uno: An 8-bit microcontroller board running at 5V. It has both analog and digital pins for use with a variety of components.

DHT-11 sensor: An economical temperature and humidity sensor based on a Negative Temperature Coefficient thermistor. Its characteristics are:

- Operating Voltage: 3.5 V to 5 V
- Operating current: 0.3 mA
- Output: Serial data to the digital pins
- Temperature Range: 0 to 50° C
- Humidity Range: 20 to 90%

12V DC Fan: A basic computer fan running at 12 V with two terminals for power and ground.

Jumper Wires: An electrical wire having connector (pin) at each end which is used for connecting the components.

Breadboard: A component to help easily connect wires. Using a breadboard eliminates the need of soldering wires and equipment together.

Power-regulating equipment: Using either an 2N2222 transistor alongside an external battery or a relay for running DC components that are rated for higher voltages than what the Arduino can provide.

Software:

Arduino IDE and other supporting software: Using the Arduino IDE to verify and upload sketches to the board and supporting software like the DHT-11 header files for easy reading and manipulation of sensor data.

Thank You!