Experiment No: 05

Experiment Title: Controlling DC Fan Motor Using Arduino

Course Code: CSE 460

Course Title: IoT Laboratory

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Experiment 05: Controlling DC Fan Motor using Arduino

Objectives:

The main objectives of this experiment are:

- To gain practical knowledge of interfacing an Arduino with a DC fan motor.
- To learn how to control the speed of a DC fan motor using pulse width modulation (PWM) signals from the Arduino.
- To observe the correlation between PWM signal variations and changes in fan motor speed.

Apparatus:

- Arduino Uno Board
- USB Cable
- Diode
- Breadboard
- L293D Motor driver IC
- L7806CV regulator
- Jumper Wires

Methodology:

Experimental Setup:

- Connect the collector pin of the transistor to the positive terminal of the DCfan motor.
- Connect the emitter pin of the transistor to the ground (GND) of the Arduinoand the negative terminal of the DC fan motor.
- Connect the base pin of the transistor to a PWM pin of the Arduino through a regulator.
- Place a diode across the fan motor terminals, cathode connected to the positiveterminal of the motor.
- Ensure the Arduino is connected to the computer via the USB cable.

Source Code:

```
const int IN1 = 4;

const int IN2 = 7;

const int EN1 = 5;


void setup()

{

pinMode(IN1, OUTPUT);

// connected to IN1 pinMode(IN2, OUTPUT);

// connected to IN2 pinMode(EN1, OUTPUT);

//connected to Enable1

}


void loop() {

digitalWrite(IN1, HIGH);

digitalWrite(IN2, LOW);

digitalWrite(EN1, HIGH);

delay(10000);


digitalWrite(IN1, LOW);

digitalWrite(IN2, HIGH);

digitalWrite(EN1, HIGH);

delay(3000);

}
```
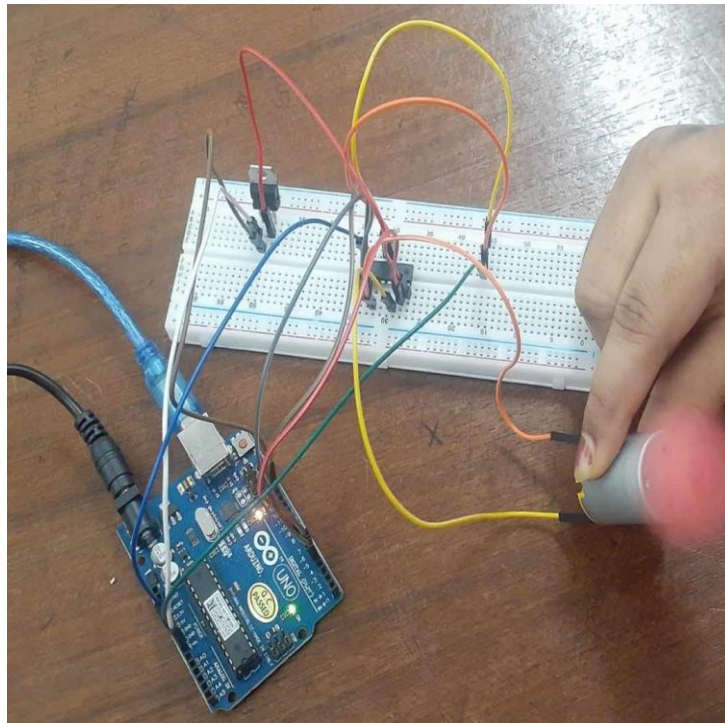
- Click on the "Upload" button to transfer the code to the Arduino board.
- Power up the Arduino board by connecting it to the computer.
- Observe changes in the speed of the DC fan motor as the PWM signal is variedby the Arduino.

Result and Discussion:

The experiment demonstrated successful control of the DC fan motor speed usingthe Arduino Uno and PWM signals. By altering the duty cycle of the PWM signalusing the **setup()** and **loop()** function, the speed of the fan motor was effectively regulated. Higher PWM values resulted in an increased speed of the fan motor, while lower values slowed it down.

The speed variations of the DC fan motor were directly influenced by changes in the PWM signal. Increasing the duty cycle resulted in a faster rotation of the fan motor, while decreasing it had the opposite effect. This demonstration highlighted the Arduino's capacity to control external devices, exemplified in this case by the motor, through the manipulation of PWM signals.

Conclusion:

After performing this lab, we will be able to demonstrate the control of a DC fan motor's speed through PWM signals. The comprehension of interfacing electronic components and manipulating PWM signals was emphasized, showcasing the ability to exert precise control over motor speed— a crucial skill in numerous real-world applications. Serving as a foundational experience, this experiment lays the groundwork for more intricate projects involving motor control and the interfacing capabilities of Arduino technology.