



CSE461

Introduction to Robotics Lab

Lab No. : 06

Group : 03

Section : 08

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Submitted to -

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1. **Objectives:** Interfacing a 5-Pin Analog Joystick with Arduino for Directional Control of DC Motors via Motor Driver.

2. **Equipments:**

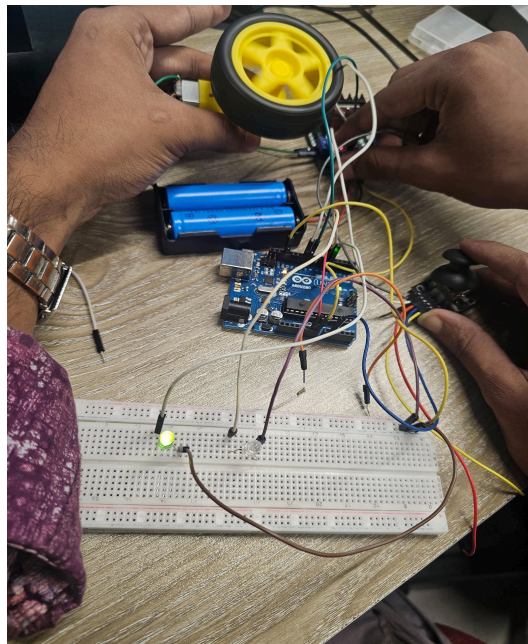
- Arduino Uno R3
- L298N Motor Driver Module
- 4-Pin Analog Joystick Module
- DC Motor (6V–9V, depending on power source)
- External Power Supply or Battery Pack (for motor)
- Breadboard
- Jumper Wires

3. **Experimental Setup:**

Explanation:

The joystick's Y-axis was connected to the Arduino to detect forward and backward movement. The Arduino sent control signals to the L298N motor driver, which powered and controlled the DC motor's direction. Three LEDs were added as indicators: the forward LED turned on when the motor moved forward, both side LEDs lit when it moved backward, and all LEDs stayed off when the motor was stopped.

Picture:



4. Code: (If Applicable)

```
# Enter Code Here
#define VRy A1
#define threshold 200
#define IN1 10          // Motor control
#define IN2 9

#define LED_FWD 6        // Green LED for Forward
#define LED_BWD 5        // Red LED for Backward

void setup() {
    pinMode(IN1, OUTPUT);
    pinMode(IN2, OUTPUT);

    pinMode(LED_FWD, OUTPUT);
    pinMode(LED_BWD, OUTPUT);

    Serial.begin(9600);
}

void loop() {
    int y = analogRead(VRy);

    if (y < 512 - threshold) {          // Forward
        digitalWrite(IN1, HIGH);
        digitalWrite(IN2, LOW);

        digitalWrite(LED_FWD, HIGH);
        digitalWrite(LED_BWD, LOW);

        Serial.println("Forward");
    }
    else if (y > 512 + threshold) { // Backward
        digitalWrite(IN1, LOW);
        digitalWrite(IN2, HIGH);

        digitalWrite(LED_FWD, LOW);
        digitalWrite(LED_BWD, HIGH);

        Serial.println("Backward");
    }
    else {                               // Stop
        digitalWrite(IN1, LOW);
        digitalWrite(IN2, LOW);

        digitalWrite(LED_FWD, LOW);
        digitalWrite(LED_BWD, LOW);

        Serial.println("Stopped");
    }

    delay(300);
}
```

5. Results (Output of the experiment):

The system performed as expected:

- Moving the joystick forward rotated the motor forward, with only the forward LED turned on.
- Pulling the joystick backward reversed the motor's direction, and both left and right LEDs lit up.
- When the joystick was centered, the motor stopped and all LEDs turned off.

This confirmed successful real-time directional control of the DC motor with simultaneous LED indication.

6. Discussions/Answers:

In the lab task, a DC motor was controlled using the joystick's Y-axis, while LEDs were used as visual indicators of the motor's state. The Arduino read the joystick's analog input and, based on the direction, sent appropriate control signals to the L298N motor driver. At the same time, LEDs were activated to provide feedback: one LED for forward motion, two LEDs for backward motion, and all LEDs off when the motor was stopped. This integration demonstrated how multiple outputs (motor + LEDs) can be synchronized with a single input device.