

EXPERIMENT 6: TILT TRACKING USING IMU

Objective

This experiment's objective is to create a two-wheel robot activated by a push button and monitored for turning angles using an Inertial Measurement Unit (IMU). The IMU provides real-time angle data, and the robot moves forward when the push button is pressed.

Setup

Before starting the experiment, ensure the Chelonia Bot is assembled according to the hardware setup instructions provided in Section 2.1. Additionally, connect the Chelonia Bot to the Arduino IDE following the guidelines in Section 2.3.

Hardware Setup

1. Motor Connections:

- **Motor A (Left Motor):**
 - Input 1 (IN1): Connect to pin 8.
 - Input 2 (IN2): Connect to pin 9.
- **Motor B (Right Motor):**
 - Input 1 (IN3): Connect to pin 10.
 - Input 2 (IN4): Connect to pin 11.

For this experiment, it is important to note that the ENA (Enable Motor A) and ENB (Enable Motor B) pins on the L298N motor driver should be shorted or connected. This means you should physically connect or make a short circuit between the ENA and ENB pins. This configuration is applied to ensure that both motors receive the same control signals, as the code primarily controls the individual input pins (IN1, IN2, IN3, IN4) for directional control rather than using separate enable pins for each motor.

2. Push Button:

- Connect the push button to pin 7. For connection, please refer. experiment4.

3. IMU:

- Connect the IMU sensor according to this link:[IMU Arduino connection](#)
- Ensure the following connections:
 - VCC to 5V on Arduino
 - GND to GND on Arduino
 - SDA (Serial Data) to SDA on Arduino
 - SCL (Serial Clock) to SCL on Arduino

4. Bluetooth Module HC-05:

- Connect the TX pin of the Bluetooth module to pin 2 on Arduino.
- Connect the RX pin of the Bluetooth module to pin 3 on Arduino.

Note: Connect the RX and TX pins of HC-05 after uploading the code.

Libraries

The required libraries for this experiment are:

- MPU6050_light (This library is included in the Arduino IDE by default.) You just installed it from the library manager [.library install](#)
- Software Serial library (Included in Arduino IDE)

Code Example: [push button](#)

Usage Instructions

1. Download the "Bluetooth Serial Monitor" app from the Play Store.
2. Open the Arduino IDE, load the provided code, and upload it to the Arduino board.
3. Turn on the Chelonia and connect to the Bluetooth module.
4. Open the "Bluetooth Serial Monitor" app on your mobile device.
5. Press and hold the push button to make the robot move forward.
6. Release the push button to stop the robot.

Mobile app installation please follow this link [Bluetooth serial monitor](#)

Expected Results

The Chelonia should move forward when the push button is pressed, and the turning angles should be monitored and displayed on the Bluetooth Serial Monitor app.