EXPERIMENT 22: TELEOPERATED CONTROL USING A MOBILE APPLICATION

Objective: The objective of this experiment is to control a robot using a mobile application developed with MIT App Inventor. The robot's movement is based on joystick values sent from the mobile application via Bluetooth, allowing the user to teleoperate the robot.

Setup:

- Assemble the robot hardware according to the instructions in Section 2.1.
- Connect the robot to the Arduino IDE as explained in Section 2.3.
- **Hardware Connection:**
  - Connect the motors to the motor control pins on the Arduino.
  - Motor A (Left Motor):
    - Pin 8(IN1): Connect to input 1 of the left motor.
    - Pin 9 (IN2): Connect to input 2 of the left motor.
  - Motor B (Right Motor):
    - Pin 10 (IN3): Connect to input 1 of the right motor.
    - Pin 11 (IN4): Connect to input 2 of the right motor.
  - Connect Bluetooth module:
    - RX (Bluetooth) to TX (Arduino pin 0).
    - TX (Bluetooth) to RX (Arduino pin 1).
  - Install the MIT App Inventor Companion app on your Android smartphone.
  - For detailed instructions on installing the MIT App Inventor on your smartphone and understanding the hardware connections, please refer to the following link: [MIT app]. This comprehensive guide will walk you through the step-by-step process for a seamless setup and operation of your teleoperated robot.apk

Connection Instructions:

- Power on the robot and ensure that the Bluetooth module is paired with your smartphone.
- Open the MIT App Inventor Companion app on your smartphone.

Mobile App Usage:

- Launch the MIT App Inventor Companion app.
- Establish a Bluetooth connection with the robot by selecting the appropriate device from the list.
- Use the virtual joystick on the app to control the robot's movement.
  - Move the joystick up and down for forward and backward motion.
  - Move the joystick left and right to turn the robot.
  - The robot will stop when the joystick is in the center position.
- Observe the real-time feedback on the Serial Monitor for troubleshooting and monitoring motor speeds.

Code Example: Teleoperated Robo

Notes:

- Ensure that the Bluetooth module is properly paired and connected to the robot.
- Keep the smartphone within the Bluetooth range for optimal control.
- Adjust the joystick values for sensitivity based on your preferences by modifying the code if needed.
- The robot should respond to joystick movements, providing a teleoperated control experience.

FAQs:

Q: How do I pair the Bluetooth module with my smartphone?
- A: Follow the Bluetooth pairing instructions specific to your smartphone and Bluetooth module. Typically, you need to enable Bluetooth on your smartphone, search for available devices, and select the Bluetooth module to pair.

Q: What should I do if the robot does not respond to joystick movements?
- A: Check the Bluetooth connection between the smartphone and the robot. Ensure that the Bluetooth module is powered and properly paired. Verify the wiring connections according to the provided instructions.

Q: Can I customize the mobile app interface?
- A: The MIT App Inventor provides a user-friendly interface for designing custom mobile apps. You can modify the app's layout, add additional features, or customize the joystick behavior using the MIT App Inventor platform.