

KIE2001 – Lab 3

Sem II, 2023/2024

Duration: 6 Weeks

Mini Project II: Omnidirectional Robot with Camera Module and PS2 Wireless Controller

Parts & Components

1. Chassis
2. Motors (at least 3 for omnidirectional movement)
3. Omni wheels
4. Camera module
5. Microcontroller
6. Motor driver
7. PS2 wireless controller and receiver
8. Power source
9. Donut board
10. Jumper wires

1. Assemble the Chassis

- i. Design the chassis and assemble it.
- ii. Ensure that it's sturdy and suitable for attaching motors and other components.

2. Mount Motor and Wheels

- i. Attach the motors to the chassis, ensuring they are securely fastened.
- ii. Install wheels onto the motor shafts.
- iii. Position the motors in such a way that they allow omnidirectional movement.

3. Integrate Camera Module

- i. Mount the camera module onto the chassis, ensuring it has a clear view of the surroundings.
- ii. Connect the camera module to the microcontroller using appropriate wiring (refer to camera module documentation for pinout).

4. Wire Motors and Motor Driver

- i. Connect the motors to the motor driver according to the motor driver's datasheet.
- ii. Ensure proper wiring of power, ground, and control signals between the microcontroller and motor driver.

5. Set Up PS2 Wireless Controller

- i. Connect the PS2 wireless receiver to the microcontroller.
- ii. Install the necessary libraries for interfacing with the PS2 controller.
- iii. Configure the microcontroller to receive input from the PS2 controller.

6. Write Motor Control Code

- i. Write code to control the motors for omnidirectional movement.
- ii. Implement algorithms for forward, backward, left, right, and rotational movements based on the input from the PS2 controller.

7. Write Camera Control Code

- i. Develop code to capture images or video feed from the camera module.
- ii. Test camera functionality and ensure proper integration with the robot's movement.

8. Integrate PS2 Controller and Camera Control

- i. Combine motor control, camera control, and PS2 controller integration into a single program.
- ii. Verify that the robot can be controlled wirelessly using the PS2 controller while capturing visual data.

9. Test and Iterate

- i. Test the robot in different environments to ensure its functionality.
- ii. Make adjustments to the code or hardware as necessary based on testing results.
- iii. Iterate on the design and implementation to improve performance and reliability.

10. Document, Present and Compete

- i. Document your design, code, and any modifications made during the development process.
- ii. Prepare a video presentation (max 3 minutes) detailing the project, its objectives, methodology, results, safety measures and any future work or improvements.
- iii. Get ready to compete against robots from other groups.

By following these steps, you should be able to develop an omnidirectional robot equipped with a camera module and PS2 wireless controller. Remember to take your time, test thoroughly, and enjoy the process of building and experimenting with your robot! If you need further assistance with any specific step, feel free to ask.