Future Vehicle Education Workshop

Subject: Assignments

Automation Lab.

Exercise1

■ **Motor control using LiDAR**

1. When an object is detected within 20 cm in the range of 170 degrees or more and less than 190 degrees of the LiDAR angle, stop the motor.

2. When there is no object within 30 cm in the range of 170 degrees or more and less than 190 degrees of the LiDAR angle, and an object is detected within 70 cm, drive the motor at ½ of the maximum speed.

3. When there is no object within 70 cm in the range of 170 degrees or more and less than 190 degrees of the LiDAR angle, operate the motor at maximum speed.

Exercise2

■ **Motor control using Camera**

1. When the red light is detected and the variable resistance value is less than x
    -> Rotate the motor clockwise (CW)

2. When the green light is detected and the variable resistance value is greater than y
    -> Rotate the motor counterclockwise (CCW)

3. Meanwhile, if the ultrasonic sensor distance value is less than 10 cm,
    stop the motor and leave it in a stationary state.

Exercise3

■ Multi-modal Sensing

Run the camera and LiDAR simultaneously in a single Python code
-(Hint: Read the camera frame each time you receive LiDAR values.)

1. Camera detects red
    -> Motor stops

2. Camera detects green
    -> LiDAR detects an object within 70 cm in front
    -> Motor stops

3. Camera detects green
    -> LiDAR does not detect an object within 70 cm in front
    -> Motor starts

Exercise4

■ Simple Parking Mission

1. Create a small L-shaped space using wood blocks.

2. Slowly insert the LiDAR into the L-shaped space
   so that it shows motor movement corresponding to the parking command.