2022 MOBILE ROBOTS TERM PROJECT

The Hockey Guru

GROUP 6

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Agenda

01 Problem Aimed

02 Implementation Details

03 Future Works

SESSION 1

Problem Aimed

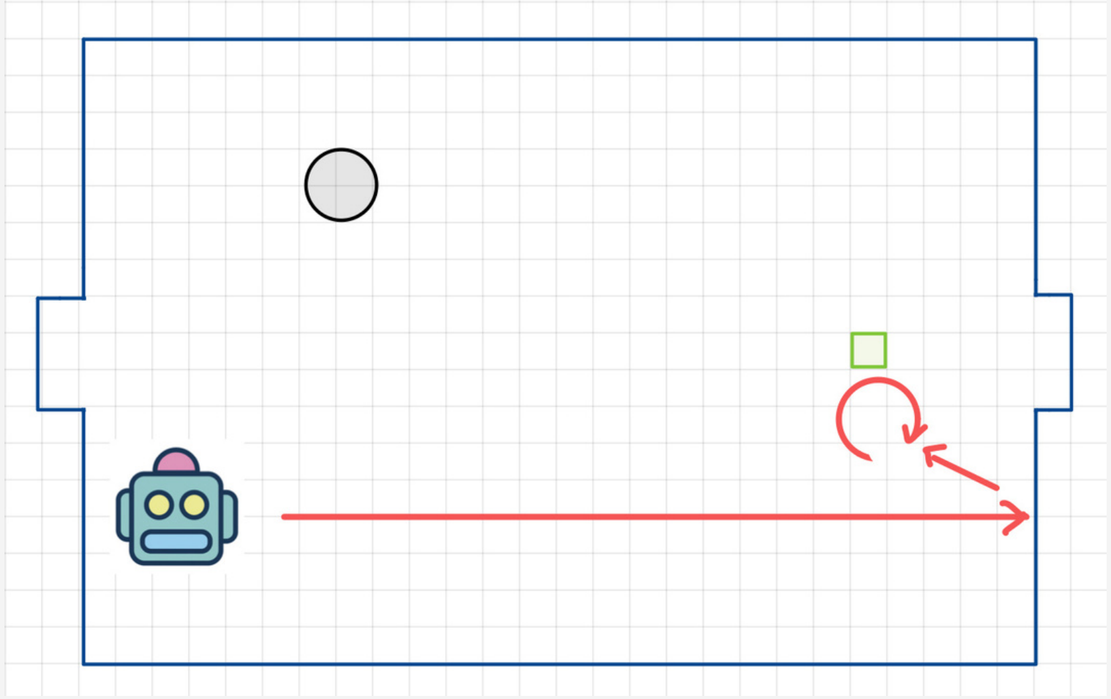
Decisive Factors in the Robot Contest

Speed

Stability

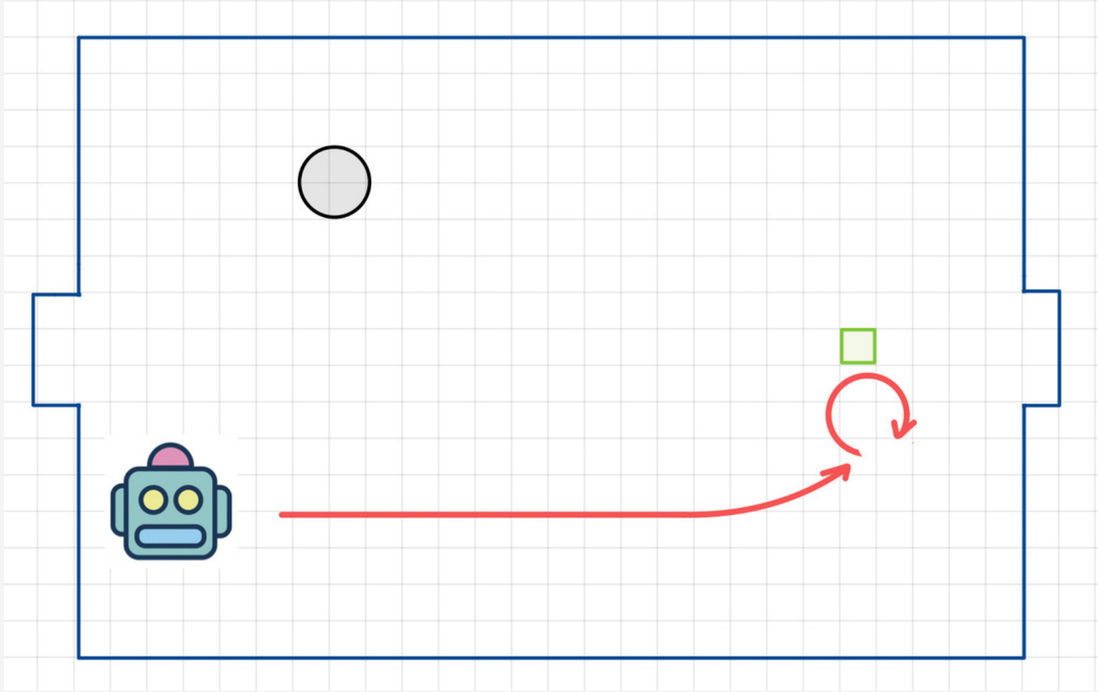
SESSION 1 - PROBLEM AIMED

Time Consuming – Obstacle Avoidance



During the demonstration of Checkpoint 3 and Checkpoint 4, each group's mobile robot must touch the wall first to show the ability of obstacle avoidance, then we can start to find the target. However, this behavior will take us more time to find the target.

What if?



If our mobile robot does not need to touch the wall, it can reduce the distance it needs to walk. That is to say, when our mobile robot approaches the wall, it will slow down and make a turn first. The mobile robot can finish the whole task in a shorter time.

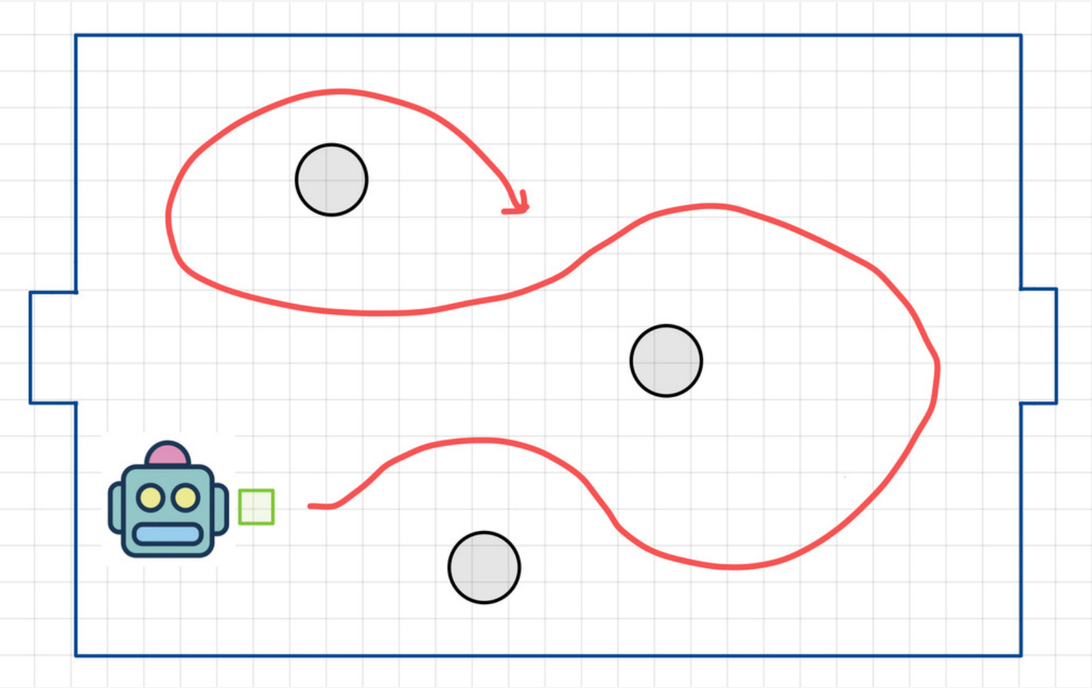
SESSION 1 - PROBLEM AIMED

Unstable – Reversing & Emergency Stop

Using the touch sensor is kind of more tricky for the mobile robot, which makes the mobile robot spend more time when avoiding obstacles. Besides, some parts of the mobile robots might drop out when the robot crashes into the wall. Moreover, the dead area is large when using the touch sensor, it can't get out when it moves to some places.

What if?

We hope our mobile robot can avoid entering its dead area, which can it move freely on the field without reversing after catching the target. Because when the mobile robot moves back, there's a risk that we might lose the target.



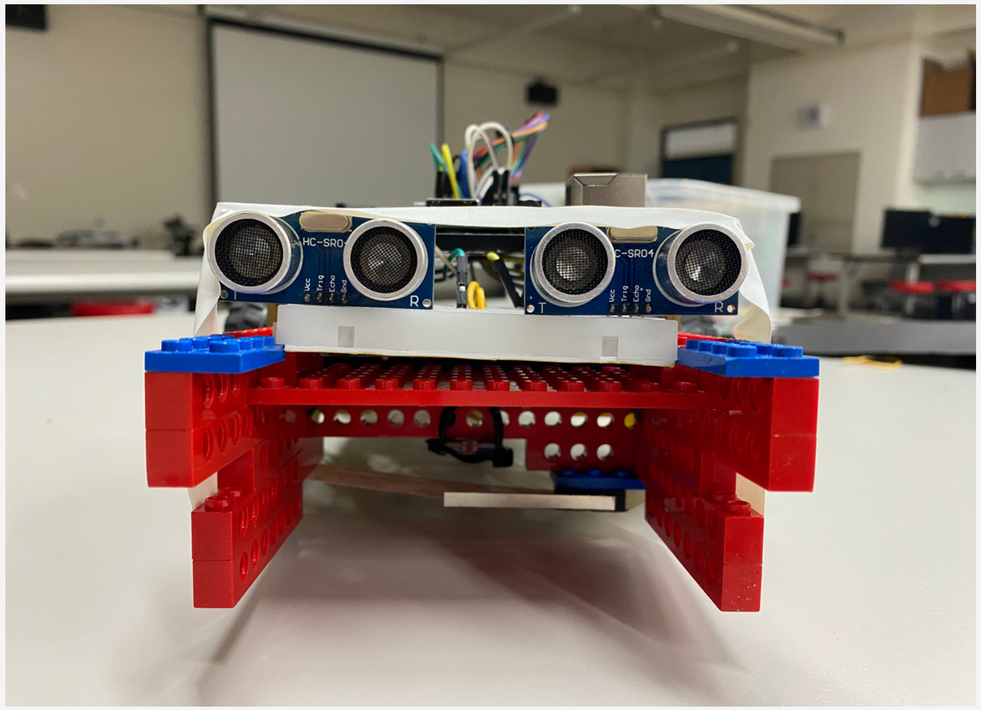
SESSEION 2

Implement. Details

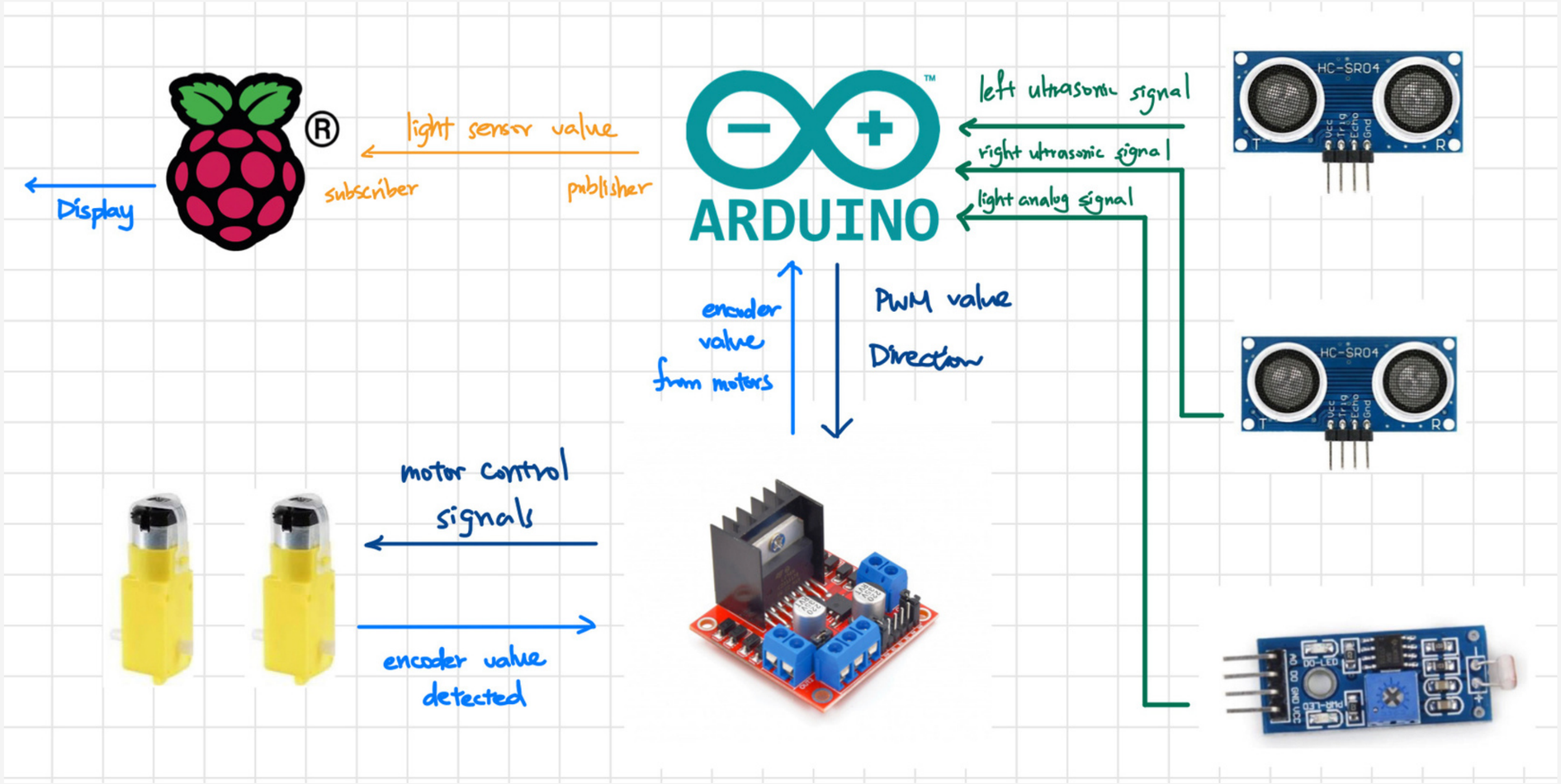
SESSION 2 - IMPLEMENTATION DETAILS

Two "RB URF02" Ultrasonic Sensor Module

We attach two ultrasonic transducers in the front of the mobile robot. By the time between the transmitted wave and the reflected wave, we calculate the distance to the obstacle. As the distance measured on the left side is shorter, the mobile robot turns right. On the contrary, the mobile robot turns left.



Workflow


light sensor value
subscriber
publisher
Display
ARDUINO
left ultrasonic signal
right ultrasonic signal
light analog signal
encoder value from motors
PWM value
Direction
motor control signals
encoder value detected
HC-SR04
HC-SR04

SESSION 3

Future Works

Future Works

- Since this project is to demonstrate how to complete checkpoint 3 more efficiently and the obstacle avoidance function. The IR receiver was not installed on the mobile robot. If we want the mobile robot to be able to find the goal, we only need to install an IR receiver in front of it to complete the task.

- The bean angle of the ultrasonic transducer might cause measurement errors. If the obstacle is out of the bean angle, the mobile robot may not be able to avoid it as we expected. Hence, to solve this problem, the most intuitive solution is to install more transducers or other sensors, such as lidar, on both sides of the mobile robot to solve this problem.

SESSION 4

Demo. Session

Thank you for listening!