Lab Report

Xiaoxin Zhou

Introduction:

In this Lab, we solved the task: surviving in the world while in continuous motion for no less than two minutes without falling off the edge, and the robot must also avoid collision with any object on the surface.

My algorithm:

When the robot encounters edges detected from the (left/right/middle) sensor, the robot will act on the opposite side of the detected border. This progress is similar to our lab 2, but I have added an extra statement to avoid collision with any object on the surface task.

(Detected edge = FALSE AND detected object = False):
    Moving forward.
(Detected edge(L/M/R) = FALSE AND detected object = False):
    Moving back,
    Turn (L, R).
(Detected object = True):
    Moving back,
    Turn Left. (Around 30 degree)
    Stop for give ultrasonic time to reflect the wave. #To scan the robot front
    if (Detected object = False):
        if (Detected object = False): # if an object in front of the robot (after turn left)
            Turn Right. (Around 60 degree)
                If (Detected object = False): # object in front of the robot (after turn right)
                    Turn Right. (Around 60 degree). #Adding previous 60 the angle is 180
        Move forward.

Since the detect range of ultrasonic is longer than the light detector, we can use ultrasonic as the main sensor. If ultrasonic detected the object, we don't need to consider if there is an edge in front of the robot. If ultrasonic didn't detect the object and the light detector detected the edge, we can go to the action to avoid the edge.

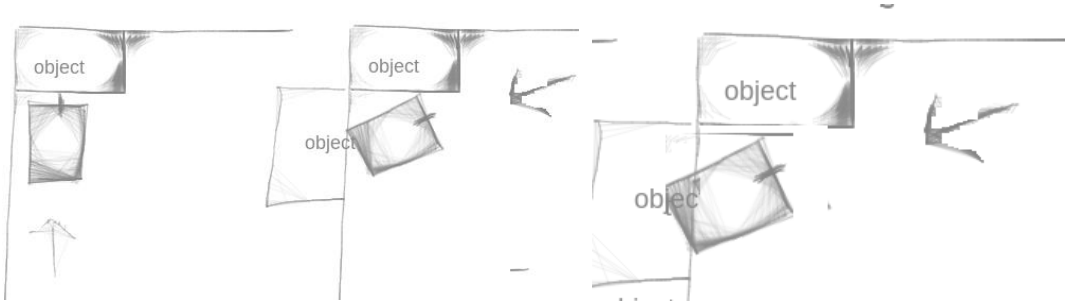
Disadvantage:

The ultrasonic sends a long and thin line to its front, hits the object, turns back, and calculates the sound wave returning time. However, the robot is more width than the detected area. The left and right wheel will hit the object in a particular case.

Compare with sample code and mine"

The algorithm from sample code is:

objectDetect(Detected object = True):
    Turn the robot until the robot can't detect the object.
    Moving backward



The problem of the sample code algorithm is when the robot detects the object, rotates itself and moves backward. However, when the robot goes backward, it might hit the object which is behind itself. My algorithm is backward before the robot rotates; in my algorithm, the robot can guarantee no objects that the robot is just passing by. That is the main difference between the sample algorithm and my algorithm.

Both algorithms are having the same problem. In the below figure(left), the ultrasonic cannot detect the object, and the robot should move forward. However, the robot will collide with the object because the ultrasonic did not detect that area when the robot's left side approached. The simplest way to solve this problem is to put two ultrasonic on both sides as below figure (right).