**Lab Report**

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In this experiment 2, we solve a robot that runs under a specific environment without failing tasks. Most of the time, my robot can finish its task perfectly. However, we still have some issues that the current hardware cannot solve.

My robot has three sensors in front of it. This sensor can detect the color. When I see the white, when the number of the value is less than 100 and notice the black, when the number of the value is higher than 500. Take advantage of this feature. We can use it to detect our “map” edge. Our map is made of four whiteboards and some back lines. I am using the whiteboards instead of my room ground，I want to increase the contrast between the white and black colors.

Let's introduce my algorithm.

When the left sensor detected the blackline, the robot should move backward a bit and turn a bit right. (The edge is on the left side of the robot.)

A picture containing shape

Description automatically generatedA picture containing shape

Description automatically generated

When the right sensor detected the blackline, the robot should move backward a bit and turn a bit left. (The edge is on the right side of the robot.)

When the right sensor and middle detected the blackline, the robot should move backward a bit and turn more left. (The edge is the robot's right side, and there is an end road in front of the robot.)

A picture containing icon

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When the right and middle sensor detected the blackline, the robot should move backward a bit and turn more left. (The edge is the robot's right side, and there is an end road in front of the robot.)

When the left and middle sensor detected the blackline, the robot should move backward a bit and turn righter. (The edge is the robot's left side, and there is an end road in front of the robot.)

When the left, middle, and right sensor detected the blackline, the robot should move backward a bit and turn 180 degrees. (There is an end road in front of the robot.)

Icon

Description automatically generated with low confidence

Our robot still has a problem; the robot wheel is crossed over the black line from the figure. Under a unique angle, the robot moves forward, and the sensor does not detect the black line; the wheel at the back will cross over the black line. The reason is the front of the three sensors can’t cover the wheel location. When back wheels cross over the edge, the sensor will not realize it.

Shape

Description automatically generated

To solve this problem, we can increase the number of the sensors. The gray line represented the sensor as the light detector. We can have two extra sensors next to the robot’s wheel, which can help the robot know where its wheel is located. When left/right wheel sensors detect the black line, we should move backward and turn right/left to avoid that edge.

A picture containing text, sign

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