

Quiz: Follow the Guidelines

Introduction to Mobile Robotics > Follow the Guidelines

1. What is a threshold and how did you calculate it?

A threshold is a number that marks a cutoff point between two classifications of values, such as “light” vs. “dark”. Thresholds help the robot to make sense of sensor inputs by dividing them into two distinct categories. In the case of this activity, we took all Light Sensor values below the threshold number and classified them as “dark,” and all values above the threshold and classified them as “light.” This way, the robot can make decisions based on whether things are “dark” or “light.”

We calculated the threshold by taking readings from the Light Sensor for a “dark” surface, a “light” surface, and then finding the average of the two values. Recording “dark” and “light” values gave us two numbers, one low, one high. We then averaged these two numbers by adding them together and dividing the result by two. This became the threshold, right between the two original readings.

2. Summarize the strategy the robot uses to track the line in the Follow the Guidelines Activity. Be sure to explain the purpose of the threshold value, what the robot does when it sees light/dark, and why this results in the robot moving down the line.

The robot’s overall strategy is to track the left edge of the line. It assumes that the only time it will see light is when the Light Sensor is just to the left of the line, and that the only time it will see dark is when it is directly over the line. Based on this assumption, the robot will move forward and a little to the right from the light area (which should be toward the edge of the line), and forward and a little to the left from the dark area (which should also be toward the edge of the line). By repeating this check and run many times, the robot will eventually bobble its way down the line.

The robot uses the threshold value to determine which Light Sensor readings are “light” and which are “dark”. Any values higher than the threshold value are classified as “light”, and any values lower than the threshold are classified as “dark”. This allows the robot to categorize the full spectrum of possible readings (0-100) into two convenient categories, and proceed with the appropriate left or right swing turn movement based on which category the readings fell into.