intelitek
Dynamic Solutions, Inspired Classrooms

Week 6 - Overview

This week, the students will learn to use the color sensor. The color sensor can detect colors as long as it is aimed down towards the ground. Additionally, the color sensor emits red light, and can measure the intensity of that reflected light.

We can use the color sensor to identify visual features on the surface, and use these features as a navigational aid. As the week progresses, the students will learn to track their robots along a line.

Computer Science Skills

- Students will learn line tracking.
- Students will learn about Boolean logic statements.
- Students will use a switch with more than 2 cases or paths.

STEM Skills

- Students will learn about the color sensor and light detections.

CoderZ Techniques

- Students will learn to use the color sensor.
- Students will use an IF-ELSE-ELSE statement.
- Students will configure the robot for different sensors.

Implementation Thoughts

Using the color sensor is a lot of fun for the students, and exciting when it works. The mechanism of line tracking is rather abstract and not as obvious as using the other sensors to navigate.

The line tracking might seem clunky compared to the other sensors, as the robot will often oscillate back and forth as it tracks the line. In terms of performance, tracking along a straight line will be very different than along a curved one.

Next week, we will explore using a proportional line tracker. The will improve the fluidity of the robot's line tracking motion.

Lesson 1: Color Sensor

- Students will detect colors on the surface.
- Students will measure reflected light intensities.
- Students will stop the robot when it detects specific colors or light intensities.

intelitek
Dynamic Solutions, Inspired Classrooms

Lesson 2: Color Navigation

- Students will navigate around the field using the color sensor.
- Students will count lines using the color sensor.
- Students will analyze geometric features using the color sensor.

Lesson 3: Line Tracking

- Students will program the robot to track the line with a 2-level controller.
- Students will program the robot to track the line with a 3-level controller.
- Students will learn to align the robot using 2 color sensors.
- Students will use an if-else-else switch.
- Students will learn to use a Boolean logic statement.

Lesson 4: Line Tracking Challenges

- Students will solve the balloon challenge mission.
- Students will solve the electrical tape racetrack challenge.
- Students will optimize their line tracking for time and accuracy.

Lesson 5: Obstacle on the Line

- Students will continue to optimize their line tracking for both time and accuracy.
- Students will detect an obstacle on the line.
- Students will avoid the obstacle.
- Students will reacquire the line.