

SJD_Maze_Find: Sparki Maze Navigation and Object Retrieval

Special Maneuvers Algorithms

1. Line Find Maneuver

The Problem: If Sparki gets off the center line of the maze, he must try to find the line again. When he is off the line, none of his sensors are detecting the line, so he has no way of knowing which direction to go to get back on the line. His previous moves have not been stored.

The Solution:

- a. Turn 5-degrees in a random direction (right or left) to find the line.
- b. Move Backwards one step.
- c. For every 5 times this maneuver is performed in a row, move forward 2 steps. This keeps Sparki close to the line so that he has a better chance of finding it again.

2. Right Turn Maneuver

The Problem: When Sparki wants to turn right when there is no obstacle to his right, he must execute a right turn so that he lines up with the center line after the turn.

The Solution:

- a. Keep moving Sparki forward (one step at a time) until the right edge sensor detects the intersecting right line.
- b. Line up for the turn (move forward 5 steps)
- c. Turn right (90 degrees)

3. Turn Around Maneuver

The Problem: If Sparki tries to turn around by just spinning 180 degrees, his grabber will hit the wall.

The Solution:

- a. Turn Sparki Right 45 degrees.
- b. Move Sparki Backward two steps (to avoid hitting the wall).
- c. Turn Sparki the remaining way around; right 150 degrees (slightly more than 180 degrees to better detect the center line)

4. Front Object Position Maneuver

The Problem: When Sparki detects something in front of him, he must position himself a fixed distance from the object before making any turns so he has a point of reference from the forward object.

The Solution:

- a. Adjust Sparki's position so that he is 5 cm from the detected forward object by either moving forward (in most cases) or backward one step at a time.
- b. If he cannot 'range' the object (if the object is not there any more) Sparki will just give up and turn around. This is his best possible option give that something may be obstructing his path. He knows that the path behind him should be clear.