F20RO Robotics Coursework

(Raymond) Pyra Firkins

Final Word Count: [insert]

# Introduction

Blah blah blah

# Task 1 Methods & Implementation Rationale

Blah blah blah

# Task 1 Results & Analysis

Blah blah blah

# Task 2 Methods & Implementation Rationale

Blah blah blah

The fitness functions in the controller specify fitness changes based around moving forward, spinning, moving backwards, and avoiding obstacles. Moving forward with any speed for both motors gives a +2 fitness, to discourage spinning on the spot of slamming backwards into walls, which itself is punished with backwardsFitness. Spinning on the spot in either direction, detected by both wheels moving in opposite directions at any speeds, nets a -2 to the fitness.

[avoiding obstacles fitness]

The supervisor is used to provide reward incentives based on the ePuck’s final location, both with a general gradient value for any x/z-value and for specific reward values for being in certain “zones”. The ePuck remaining in the starting “zone” gives a flat -3 fitness, to try to encourage exploration and further discourage spinning or running into a corner, and +3 for being in the top 1/3 of the maze. For the sideways paths, if a hint is detected it’ll reward for being on the right, and vice versa for when no hint detected.

Text

Description automatically generated

To tell the supervisor that a hint’s been detected, the emitter was altered to send a hintDetected variable instead of a “fitness:” string. Placing a “t” or “n” to indicate true/false was tested but the supervisor receiver wouldn’t work properly with the extended initial string, so the message had to be sent using the same length of characters before the fitness value itself. These alterations allow a reward based on the square hint to be created inside the supervisor. Otherwise, the ePuck would need to be aware of its own location, using either the GPS module which would modify the template World, or by the supervisor sending the location to the controller, which seemed to be a more difficult task.

Text

Description automatically generated

Text

Description automatically generated

Text

Description automatically generated

# Task 2 Results & Analysis

Blah blah blah

# Discussion & Conclusion

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Time in minutes | | | |
|  | First run | Second run | Third run | Average time |
| Task 1  T-Maze A |  |  |  |  |
| Task 2  T-Maze A |  |  |  |  |
| Task 1  T-Maze B |  |  |  |  |
| Task 2  T-Maze B |  |  |  |  |

Blah blah blah

# References

[insert]

Text, letter

Description automatically generated