CW 2 TOPIC SELECTION

Topic Selection (What subsystem / behaviour will you investigate):

Coverage of an unknown Grid, and how it can be improved in time and accuracy.

What will you implement:

Minimum expectation (We must…):

Coverage 50% of the Grid in 3 minutes.

Normal expectation (We should…):

Coverage of 80% of the Grid in 3 minutes with improved accuracy.

Stretch Goal (We could…):

Coverage of 100% of the grid in 3 minutes with improved accuracy.

How will you assess the success of your work?

- What experiments will you conduct?
- What will you measure?
- What do you expect to see?

We will start with the evaluation of the coverage of the grid, measuring the amount of visited cells, comparing with the real amount of cells existent.

Improve the coverage accuracy by enhancing encoders reading with sensor fusion. This will be done in a grid with same weights which sum will represent the visited cells. This will be compared with ground-truth to obtain the accuracy percentage. This method will be enhanced to cover the grid in the required time.

Experiment:

A grid will be made with a cell separation of 7.2cm. The robot will explore each cell in the grid with a defined exploration algorithm.

First, it will cover it by using only encoders odometry in the required amount of time.

Each cell will have a weight of 1, after the full coverage, a sum will be produced to compare with the ground-truth.

By including other sensors to improve odometry, we will measure if the amount of visited cells is better than previous method. Finally, speed will be tuned to cover the entire grid in the less amount of time.

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Proposed timeline (**Must** include a cut-off date for implementation work and provisional division of work)

Week 1: Topic Selection and Planning

Week 2: First test experiment. A method to measure the performance and stablish ground-truth.

Week 3: Research exploration and sensor fusion.

Week 4: Implementation of the exploration algorithm with only encoders reading for 50% coverage.

Week 5: Improvement of the exploration algorithm by using sensor fusion, with 80% coverage.

Week 6: Second experiment to write results and comparing. Reduce Time for full coverage.

Week 7: Writing of full report.