

ECEN 3033 - Lab #5 Report

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2) Why is sensor noise problematic when mapping?

Mapping functions by taking in detections from sensors and registering them as objects in the robots operational space. Noise can make a robot perceive an obstacle that isn't there.

3) How did you choose the value with which you increment the map entry? What happens if the value is too small, what happens if it is too large?

We chose to increment the map entries at a value of $5e-3$. If this value is too small, readings consistent enough to indicate an obstacle in the way of the robot are not summed high enough to pass the level at which they are filtered out. If these values are too large, noise could have a substantial impact on the map, and the robot could potentially map a non existing obstacle.

4) How did you choose the value to threshold your map? What happens if the value is too small, what happens if it is too large?

We chose a middle value of 0.5 as a good approximation above standard noise from the robots sensors. Too low would map random noisy readings, and too high would prevent any substantial readings from being mapped.

5) As Tiago is traveling along the path that the planner provided, suppose it detects an object in its way. How could you modify your solution to plan around/gracefully handle this unforeseen object in the robot's path?

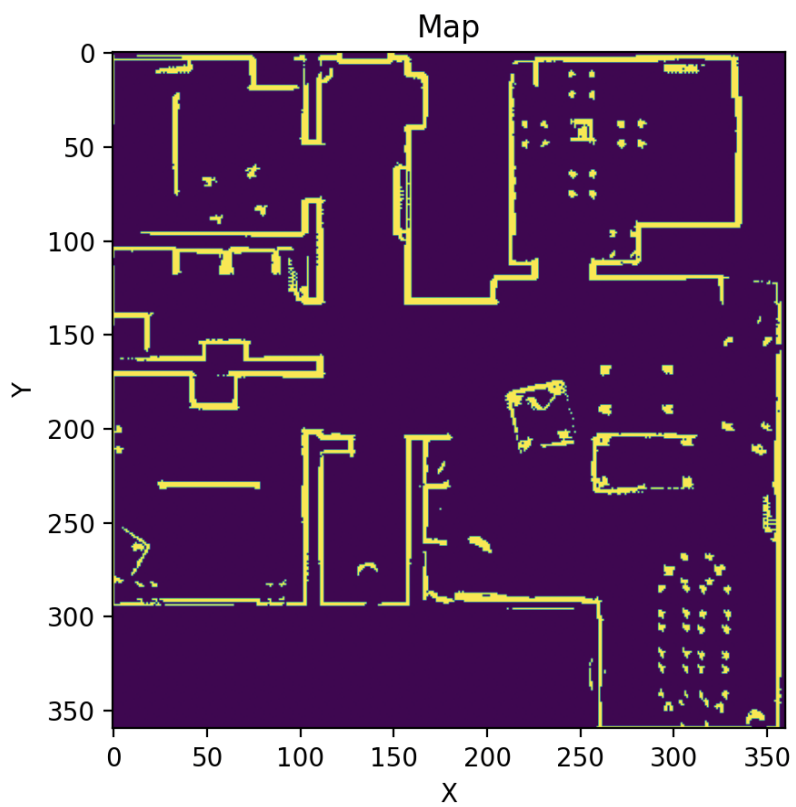
Assuming the object triggers a sensor reading above the threshold required to register an obstacle, the path planning algorithm will register the map space where the obstacle is found as an area the robot must avoid and will look for a viable path in an alternate direction towards its goal.

6) Could we use an algorithm like RRT to generate a viable path instead of Dijkstra's algorithm/A*? If yes, how would the path look different? If no, why not?

Yes, we could implement RRT to generate a viable path. The random samples can be taken from each spatial measurement generated from our map. The map would look different based on which random sample is used as the path increments.

7) Roughly how much time did you spend programming this lab?

This lab was completed over the course of three days.



Scanned map

