Week 6 – Beta Demonstration for Client Report

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Goal: To explain the results of the demonstration and compare it with the client’s need.

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# Expectation from Client

The robot should be able to localize on a 3 x 3 grid placed at any orientation and any position. To signalize that the robot is done localizing in order for the client to keep record of the time, the robot will send a beep signal. Next, the robot will navigate to the shooting area and fire an unlimited amount of Ping-Pong ball to hit one target of 7.5 cm radius.

# Results

The robot successfully demonstrated its capabilities to the client. In fact, the localization took 47 seconds (multiple localizations has been done to ensure its accuracy). Next, the robot travelled to the shooting area which took only 42 seconds. It is important to note that the robot almost collided to one of the obstacles because the conditions to disable obstacle avoidance has been activated once the robot reaches a certain x and y. Next, another accurate localization has been done which took another 43 seconds, followed up the firing of 3 Ping-Pong balls to hit one target. 2 out of 3 balls successfully landed on the target and 1 missed (short by ~10 cm). The whole run took 2:20 minutes.

# Conclusion, improvements & follow-up

The robot met the client’s requirement. Thus, the robot should be able to perform as expected for the final competition. However, the robot still needs improvements.

## Improvements

The robot’s speed can be increased in order to reduce the amount of time spent navigating to the shooting area and localizing (overall performance). Also, an improved obstacle avoidance algorithm may allow safer obstacle avoidance, such as having a quick sweep of its surrounding during navigation. Finally, the robot launcher needs to be adjusted such that it can shoot in a more parabolic trajectory to meet the final competition’s requirement (Target located at only 30 cm from wall).

## Follow-up

The post-demo modifications will be passed onto the hardware and software department to further improve the robot’s overall performance. The software team will work on improving its avoidance algorithm and speed increase and the hardware team will develop a launcher that will allow a more parabolic trajectory. Also, further tests will be performed to report its accuracy.