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| To: | Dr. Berry |
| From: | Christopher Collinsworth, Jordan Patterson |
| Date: | 1/24/2016 |
| Re: | Lab 6 – Hybrid Control |

The purpose of this lab was to use homing/docking with a hybrid control architecture to move the robot from a wall toward a light source, stop before hitting it, and then return it to the wall via path planning to continue wall following. The hybrid control architecture consisted of three layers: a reactive layer for handling obstacle avoidance and wall following, a middle layer for deciding in which layer the updates are handled, and a deliberative layer for handling the current state of the robot and path planning.

Implementation of the reactive layer was achieved by integrating PD control and obstacle avoidance algorithms from lab 4 with the light following algorithm from lab 5. This allowed for the robot to use PD control to follow a wall and leave the wall once a light source was detected, as well as avoid obstacles when necessary. Implementation of the deliberative layer was achieved by using a path planning algorithm to plan a path for the robot to get back to the wall while the robot was moving towards the light source. The middle layer was implemented by altering a state machine from lab 4 to determine which layer was used to handle updates.

In conclusion, the robot performed all tasks well during the lab demonstration. It successfully demonstrated wall following, obstacle avoidance, and was able to detect a light source and dock with it. It was also able to successfully plan a path back to the wall, follow that path, and resume wall following.