

IEOR 140 Final Project Milestone 5 - 11/16/2012

Team 4: Nate Bailey and Raymond Ma

Responsibilities

In this project, Nate was in charge of program design and coding. Raymond was in charge of hardware design, experimental work, and project writing.

Hours Spent

Approximately 6 hours were spent on this milestone.

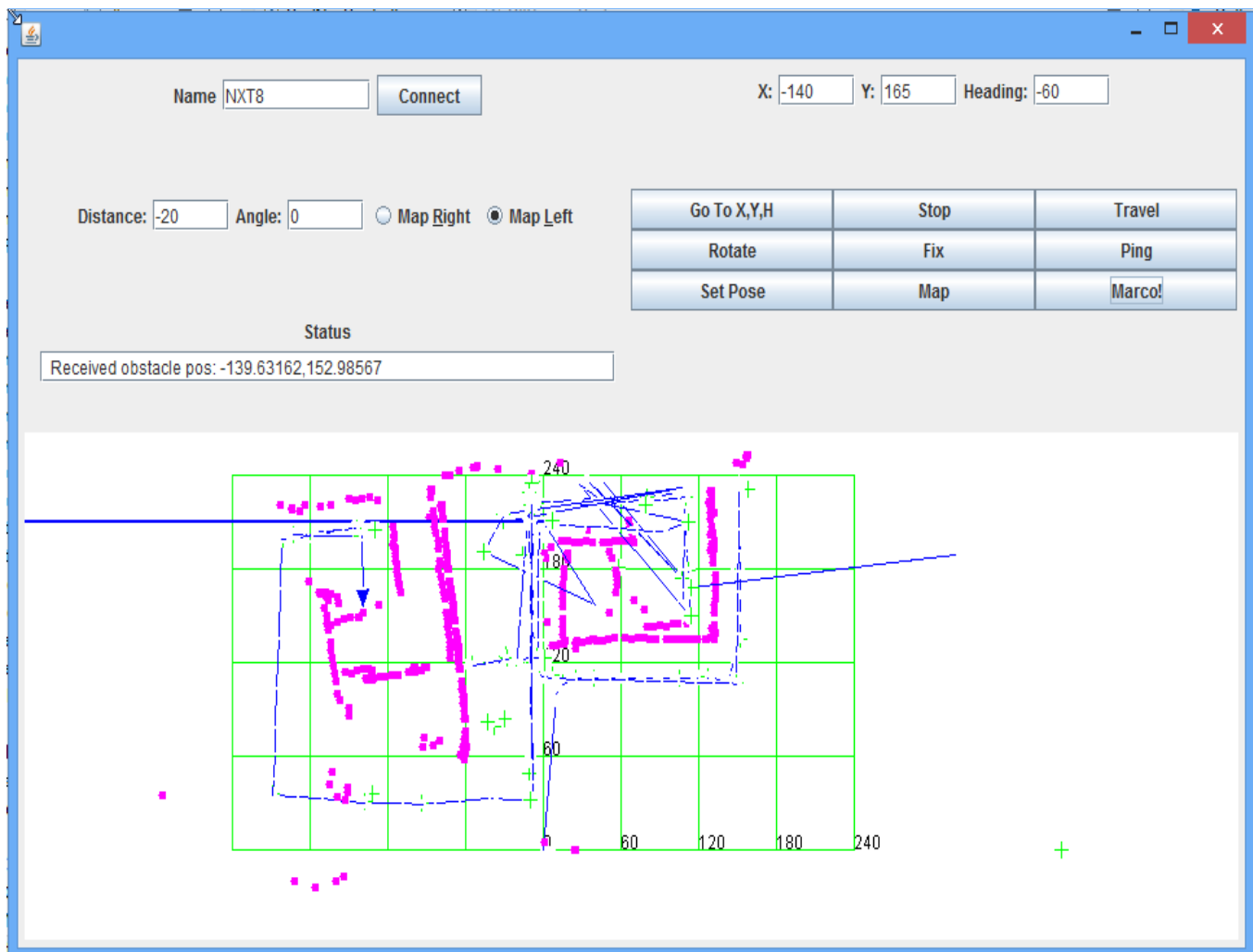
Project Code

<https://github.com/ieor140-team4/FinalProject>

Performance Specifications

Our robot met all of the performance specifications (there were no bonus specifications to meet).

Screenshot of Controller



Strategy for Milestone

In this milestone, we wanted to be able to map objects and also ping unknown locations to see if there were objects there. In order to accomplish this, we wanted to have a control to map the right side of the robot, a control to map the left side of the robot, and a control to ping a direction to see how far objects were (and how far we could travel forward). On our GUI, we added a button Map Left which would turn the head to the left and move to the imputed coordinates while mapping. Map Right did the exact same thing except on the right. The “ping” control was named Marco (after the cultural phenomenon of the game of Marco-Polo). A direction was given and then the robot head would rotate to that direction and ping, returning the echo distance in that direction.

For drawing the obstacles and mapping on our GUI, we used the same Grid as the control grid, but added magenta dots as objects were mapped. A Marco would return one dot (since only one direction was scanned) while Map Left and Map Right would return a string of dots as the ultrasonic scanner scanned while the robot moved to the given coordinates. This string of dots formed a basic line that allowed us to record where objects were on the grid.

Task Analysis

- Map Left - turn the head to 90 degrees from the front of the robot and move to the given coordinates while mapping
- Map Right - turn the head to -90 degrees from the front of the robot and move to the given coordinates while mapping
- Marco - pings the given angle to determine how far away obstacles are in that direction.

Class Responsibilities

Map Left, Map Right, and Marco buttons were added to GridNavController. On the robot, two cases of MAP_TO and MARCO_POLO were added. MARCO_POLO called the Scanner in Locator which then finds an obstacle in the given direction the scanner head was pointed. For MAP_TO, the robot will rotate its head to the angle given using rotateHead in Scanner in Locator and then goes to the given coordinates by sending them to Navigator. While moving, the robot will send its pose back to the GUI in order to map it on the Grid as well as scanning for obstacles every 50ms using getEchoDistance in Scanner in Locator. These are also sent back to the GUI.

Interesting/Challenging/Difficult

The most interesting, challenging, and difficult part of this milestone was mapping the data from the robot in terms of scanned obstacles in an easy to read form on our GUI. It took many tries to find the correct way to have the mapped information be easy to read for the operator.

Appendix

[Source Code](#) | [Java Docs](#)