Control of Mobile Robotics

Spring 2016

Lab 3

Sensors and Actuators

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**Task Description**

The objective of this lab is to develop an algorithm to navigate, localize, and build maps for three different mazes. The lab is divided into 3 tasks.

1. This task requires us to develop an algorithm to navigate all of 3 different mazes and the robot must visit each cell at least once. The robot can start in any cell and must complete the navigation without any human intervention.
2. This task requires us to develop an algorithm to navigate the mazes and mark which cells have been visited. “0” represents the visited cells and “X” represents the cells that have not been visited. These will be displayed on the LCD display. Additionally, the LCD must provide a flashing color every time the robot moves to a new grid. When moving to a grid on the right, the color red will be flashed, when moving to a grid on the left, green will be flashed, when moving to a grid up, blue will be flashed, and when moving to a grid down, yellow will be flashed. Other than these cases, the LCD should show a white background.
3. This task requires us to provide a map built by the robot after navigating the complete maze. As the robot navigates the maze, it needs to collect necessary information to build the map of the maze. When this is done, we will be able to download the maze map from the robot using a USB cable.

**Navigation**

*Video link:*

Description

FLOW CHARTS

**Figure 1 - Navigation Test**

**Localization**

*Video link:*

Description

FLOW CHARTS

**Figure 2 – Localization Test**

**Mapping**

*Video link:*

Description

FLOW CHARTS

**Figure 3 – Mapping Test**

**Code Description**

**Navigation**

Description

Code

**Localization**

Description

Code

**Mapping**

Description

Code

**Conclusion**