ECE 5425 Robotic Systems 1

|  |
| --- |
| C:\Users\uic32513\Downloads\Robotics\Wayne_State_University_College_of_Engineering_logo.jpg |

Anu Chechi  –

Akshata More – gn4989

Angela Yassine – gc4342

TRAFFIC JAM: Finding the best way

Group 7

Contents

[Results of Obstacle Avoidance 2](#_Toc26388559)

[Interpolation Methods used 2](#_Toc26388560)

[Results and Conclusions 3](#_Toc26388561)

[Algorithms used 3](#_Toc26388562)

[Without interplotion 3](#_Toc26388563)

[Mtraj(@tpoly) 3](#_Toc26388564)

[Mtraj(@lspb) 3](#_Toc26388565)

[D\_Star 3](#_Toc26388566)

[PRM 3](#_Toc26388567)

[DxForm 3](#_Toc26388568)

# Results of Obstacle Avoidance

We have designed our robot to follow three path planning algorithms:

* DStar
* PRM
* DxForm

Figure 1: GUI designed with the functionality to select the path planning algorithm, interpolation method and the starting point of the path.

Figure 2: Maze developed by GUI as well as the hardware

Figure 3: path followed by the robot with various starting points (4)

Figure 4: path followed by the robot to return to its starting point

Figure 5: Path followed by the robot using D star algorithm(hw/sw)

Figure 6: Path followed by the robot using D star algorithm when an obstacle is placed in its path

Figure 7: Path followed by the robot using PRM algorithm

Figure 8: Path followed by the robot using PRM algorithm when an obstacle is placed in its path

Figure 9: Path followed by the robot using DxForm algorithm

Figure 10: Path followed by the robot using DxForm algorithm when an obstacle is placed in its path

# Interpolation Methods used

Once the path points are found using the path planning algorithms we have used the interpolation methods in order to make the trajectory more smooth.

The different interpolation methods implemented are:

**Mtraj with tpoly**

**Mtraj with lspb**

Figure 11: Path followed by the robot using D\_Star algorithm with mtraj(@tpoly) interpolation method

Figure 12: Path followed by the robot using D\_Star algorithm with mtraj(@lspb) interpolation method

Figure 13: Path followed by the robot using PRM algorithm with mtraj(@tpoly) interpolation method

Figure 14: Path followed by the robot using PRM algorithm with mtraj(@lspb) interpolation method

Figure 15: Path followed by the robot using DxForm algorithm with mtraj(@tpoly) interpolation method

Figure 16: Path followed by the robot using DxForm algorithm with mtraj(@lspb) interpolation method

# Results and Conclusions

|  |  |  |  |
| --- | --- | --- | --- |
| Algorithms used | Without interpolation | Mtraj(@tpoly) | Mtraj(@lspb) |
| D\_Star |  |  |  |
| PRM |  |  |  |
| DxForm |  |  |  |