

Task6.3

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1 Introduction to Path Planning

Let's say you have a map and you want to go from point A to point B then you would plan the route you will take. That's exactly what path planning is. Path planning lets a robot find the shortest and easiest path from a start point to an end point.

2 Types of Path Planning Algorithm

There are two categories for path planning algorithms:

1-sampling-based.

2-search-based.

Sampling-based algorithms generate random samples in a map and connect them to form a path or a tree. They are used for complex problems, but they are not accurate.

Examples of sampling-based algorithms:

1-Probabilistic RoadMap (PRM).

2-Rapidly-exploring Random Trees (RRT).

Search-based algorithms discretize the configuration space into a grid and use heuristic search methods to find the optimal path. They are efficient.

Examples of search-based algorithms:

1-A*3

2-Dijkstra's algorithm4.

3 Practical Applications of Path Planning

1-Automated parking

2-Indoor dynamic replanning

3-Automated highway lane change

4-Online path planning

4-Collision-free trajectories

4 Conclusion

Implementing path planning is essential for making fully autonomous robots. Finally, i hope that this small introduction to Path Planning will help beginners wrap their heads around a subject as big as this.