



Path Planning in Search Space using Rapidly exploring Random Trees

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Overview

Historically, Dijkstra's Algorithm, Breadth-First-Search or A* algorithms have been used to implement Path Planning. The major disadvantage in these methods is that the space has to first be discretized, which is not always a practical approach (consider large maps). Instead of discretization, we could use Visibility Graphing on obstacles which generates paths dependent on obstacle positioning. The shortfall here is that the space may have several obstacles, which leads to very high computation complexities for obtaining a feasible path.

In this project, the goal is to implement Path Planning with Rapidly exploring Random Trees (RRT Algorithm). This algorithm constructs a space-filling tree incrementally by drawing samples randomly from the search space. The expansion of the tree is probabilistically biased towards unexplored areas of the search space, leading to rapid exploration of the search space in order to generate feasible paths.

Goal

To understand the working of Rapidly exploring Random Trees in a simulated 2D environment and demonstrate the exploration of search space using this algorithm.

Milestones

- I. Implementing RRT Algorithm in Python from scratch.
- II. Demonstrating the algorithm's working visually in a simulated 2D environment using PyGame.