Sampling-based Algorithms for Path Planning of a Mobile Robot

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Abstract

Mobile robots are robots that can move around in the physical environment. The mobile robot must know where it is, where it should go and how to reach the goal position without any collisions. Navigation is very essential in many robotic applications such as autonomous cars, agricultural robots, and space exploration missions. The main constraints facing by researchers in mobile robot navigation are execution time, finding shortest path, and obstacle avoidance. This paper presents a comparison of algorithms like A*, Bidirectional Rapidly Exploring Random Tree, Artificial Potential field, Probabilistic Road Map (PRM) and Rapidly Exploring Random Tree (RRT) used for path planning. The shortest path and the processing time for each algorithm is determined in a MATLAB environment. Among the sampling-based algorithms, the A* algorithm gives the shortest path and PRM takes the least processing time when compared to other algorithms.

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