

Q and A for Motion Planning and Application

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October 7, 2013

Abstract

In this document I have listed questions repeatedly asked from students taking the course, and reasonable answers to them. Note that answers may be incorrect, but are provided as a starting point to address questions.

1 Path Planning for Point Robots

I think that the concept of the C-Space is very nice. However, it may take a lot of time to compute free spaces out of the C-Space. So, in the end, it may be useless.

As you pointed out, it takes a lot of time to compute free spaces out of the C-Space. Actually, it is one of the most challenging problems to exactly or approximately (with a bound) construct the free space. As a result, instead of constructing such spaces, many techniques use C-Space as a conceptual tool to represent a wide variety of robot and to place the robot at the environment.

2 Proximity Queries

Can we use BVHs for point clouds that are directly acquired from various sensors without converting them into a mesh?

BVHs are a general data structure that can be used for many different representations including meshes and point clouds. As a result, BVHs can be used for identifying collisions among point clouds. Nonetheless, we need to have another concept of identifying collisions from point clouds, since it is rather unintuitive to compute collisions from point clouds, unlike detecting collisions from meshes. Checking collisions on point clouds becomes a recent hot trend and you can find some papers about the topic.