CSCI-4965/6963: Robot Motion Planning
Lecture 19: November 5, 2001
Sensor-Based Exploration, and Visibility Roadmaps

Announcements

- Course project proposal is due today.
- Assignment 5 is due on Thursday, November 8.
- CS Colloquium: Dr. Jeff Trinkle will talk about "Complete Motion Planning for Planar Polygonal Chains" on Thursday, November 8, DCC 324, 4:00–5:00 p.m.

Today's Class

In today's class, we will see variants of two basic motion planning methods we are familiar with, Voronoi roadmaps and probabilistic roadmaps.

1. Sensor-based exploration using the hierarchical generalized Voronoi graph:

   Ming Jiang will discuss a method to create a *hierarchical generalized Voronoi graph* (HGVG) in an unknown environment using sensor information. The HGVG can be constructed incrementally, and provides completeness properties.

2. Visibility roadmaps:

   Gautam Kunapuli will then describe an interesting variant of the probabilistic roadmap called the *visibility roadmap*, which appears to perform better than the basic PRM. Note that the visibility roadmap is not the same as the visibility graph we studied earlier.

References

Sensor-Based Exploration: The Hierarchical Generalized Voronoi Graph, H. Choset and J. Burdick. *International Journal of Robotics Research*, Vol. 19, No. 2, pages 96–125, February 2000.

Notes on visibility roadmaps and path planning, J.-P. Laumond and T. Simeon. In B. R. Donald, K. M. Lynch, and D. Rus, editors, *Algorithmic and Computational Robotics: New Directions*, pages 317–328. A. K. Peters, Natick, Massachusetts, 2001.

Next Class

Evader pursuit strategies, and multiple robot coordination