

CISC 868 Fall 2011

Week 8

November 7, 2011

The CRUST algorithm

Given a point cloud that is acquired by an optical scanner, algorithms are needed to create faithful representations of the surface that is scanned. The CRUST algorithm is a fascinating approach to solving this problem. We viewed the CRUST algorithm in terms of approximating a one dimensional surface in 2D. The CRUST method uses both the Voronoi diagram and the Delaunay triangulation. Furthermore, concepts related to the medial axis are used to provide a quantifiable performance guarantee for the quality of the approximated surface.

Minkowski sum

The Minkowski sum was defined and we saw how it could be used to solve motion planning problems.

Line arrangements

We will be turning our attention to material from the book by Mark de Berg, Otfried Cheong, Marc van Kreveld, and Mark Overmars, Computational Geometry: Algorithms and Applications for the rest of the term. Line arrangements are covered in chapter 8, and I briefly defined the concept. I will cover a proof of the remarkable zone theorem next week. This will lead us to applications where the efficiency of constructing line arrangements can be used to solve point set problems via point line duality. All of this material is in the book.