On Shortest Paths Amidst Convex Polyhedra (Classic Reprint)

By Micha Sharir

Forgotten Books, United States, 2015. Paperback. Book Condition: New. 229 x 152 mm. Language: English . Brand New Book ***** Print on Demand *****.Excerpt from On Shortest Paths Amidst Convex Polyhedra Let K be a 3-D convex polyhedron having n vertices. A sequence of edges of K is called a shortest-path sequence if there exist two points X, Y on the surface S of K such that is the sequence of edges crossed by the shortest path from X to Y along S. We show that the number of shortest-path sequences for K is polynomial inn, and as a consequence prove that the shortest path between two points in 3-space which must avoid the interiors of a fixed number of disjoint convex polyhedral obstacles, can be calculated in time polynomial in the total number of vertices of these obstacles (but exponential in the number of obstacles). 1. Introduction In this paper we study several problems related to the problem of calculating the Euclidean shortest path between two points in 3-dimensional space, which must avoid the interiors of a collection of polyhedral obstacles having altogether n vertices. This general problem seems to be intractable, and the only known algorithms for it...

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