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A fast path search algorithm for omnidirectional entities in 3D environments using dimension transform

Suk Gyu Lee
Yeungnam University, South Korea

This paper suggests the method which finds the path of the moveable object in a three-dimensional environment such as underwater or aerial environments. Currently, research for generating a three-dimensional path has become active due to the increase in robots moving in a 3D environment and drones and underwater robots. The method of generating a path in a three-dimensional environment is extended by using an existing two-dimensional path search algorithm in a three-dimensional environment. In this method, the range of the search is widened so that it takes a long time to search and there is a possibility that an optimal path cannot be generated. The proposed algorithm is transforming the dimensional information of the space in 3D environment to search the path, creates a 2D plane space of the starting point and the target point, finds a 2D path in the generated plane space and then converts back the 2D path into a three-dimensional path. This generated path leads to a narrow range of 2D path generation, shows advantage in computation time than the existing algorithm, guarantees real-time property of path generation in three-dimensional environment. Since the path generated in this way leads to a narrow range of two-dimensional path generation, it has advantages over computation time over existing algorithms, thereby ensuring real-time generation of paths in a three-dimensional environment. In this paper, we propose an efficient algorithm to search the path efficiently by using the dimension transformation. The proposed algorithm has an advantage in generating the path to the target point in the shorter time than searching the optimal path in the 3D environment.

sglee@ynu.ac.kr