

论文与报告

未知环境下势场法路径规划的局部极小问题研究

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收稿日期 2009-4-15 修回日期 2010-1-6 网络版发布日期 接受日期

摘要

势场法路径规划的局部极小问题已经受到了多年关注, 本文对环境完全未知的情况为移动机器人设计了一种基于行为的解决方法. 该方法通过合理设计各种行为间的转换条件以保证可靠性, 并引入记忆信息以增强机器人对周边环境的认知能力, 从而降低决策的盲目性, 更准确地决定当前应采用的合适行为. 本文方法对于凸形边界障碍物的有效性得到了证明. 针对一些复杂的凹形边界障碍物, 仿真结果表明, 该方法相对于一些已有方法更加可靠. 基于真实机器人的实验验证了该方法的可行性.

关键词 [移动机器人](#) [路径规划](#) [势场法](#) [局部极小](#) [未知环境](#)

分类号

Study on the Local Minima Problem of Path Planning Using Potential Field Method in Unknown Environments

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Abstract

The local minima problem of path planning based on potential field has attracted attention for many years. A behavior based solution is proposed in this paper for mobile robots in unknown environments. Proper switching conditions for each behavior are designed to guarantee the validity of the proposed method. Furthermore, memory is incorporated to enhance the capability of understanding the vicinity of the robot, and therefore the robot can eliminate its blindness of decision and select the proper behavior in the current situation more correctly. The validity of the proposed method for obstacles with convex boundaries has been proved. For some complicated obstacles with concave boundaries, simulation studies indicate that the proposed method is more reliable than some previous methods. Experiments based on a real robot verify the applicability of the proposed method.

Key words [Mobile robot](#) [path planning](#) [potential field method](#) [local minima](#) [unknown environment](#)

DOI: 10.3724/SP.J.1004.2010.01122

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