

工程与应用

## 提高移动机器人路径规划效率的方法

王 杰, 周永年, 刘金锋

郑州大学 电气工程学院, 郑州 450001

收稿日期 2008-4-15 修回日期 2008-7-7 网络版发布日期 2009-7-9 接受日期

**摘要** 针对传统遗传算法存在的初始种群数目庞大, 寻优效率和收敛速度慢的缺点, 提出了一种基于粗糙集约简决策规则和删除冗余属性的方法。首先建立基于特定栅格法的环境模型, 获得机器人路径规划的初始决策表, 然后根据粗糙集约简推导最小化决策规则, 并用于训练初始种群。最后利用遗传算法优化初始种群, 获得最优规划路径。分别在简单和复杂的环境模型下进行了实验, 仿真结果表明该方法能够大大减小遗传算法初始种群的规模, 缩小算法搜索范围, 提高遗传算法的收敛速度和寻优效率, 验证了该方法的可行性和优越性。

**关键词**

[移动机器人](#) [路径规划](#) [粗糙集](#) [遗传算法](#)

分类号

## Efficiency improving method for mobile robot path planning

WANG Jie, ZHOU Yong-nian, LIU Jin-feng

School of Electrical Engineering, Zhengzhou University, Zhengzhou 450001, China

### Abstract

The traditional genetic algorithm exists some disadvantages, such as huge number of initial population and slow velocity of optimization and convergence. The method based on rough set reducing decision-making and deleting redundant attributes was proposed. Firstly, this paper established the environment model based on specific grid method, obtained the initial decision-making table of mobile robot. Secondly, it deduced the minimum decision-making rules with rough set reduction, and used it in training the initial population. Finally, it optimized the initial population with genetic algorithm, and obtained the optimal path planning. The experiments both in simple and complex environment have been carried on. The simulation results indicate that the method can reduce the scale of the population, minimize the searching scope, improve the velocity of the convergence and optimization, and also, confirm the feasibility and the superiority of the method.

**Key words** [mobile robot](#) [path planning](#); [rough set](#) [genetic algorithm](#)

DOI: 10.3778/j.issn.1002-8331.2009.20.065

通讯作者 王 杰 [wj@zzu.edu.cn](mailto:wj@zzu.edu.cn)

### 扩展功能

#### 本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(653KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

#### 服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

#### 相关信息

- ▶ [本刊中 包含“  
移动机器人”的 相关文章](#)
- ▶ [本文作者相关文章](#)
- [王 杰](#)
- [周永年](#)
- [刘金锋](#)