

论文

未知环境探测的多机器人协作策略研究

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摘要:

提出了一种基于观测点融合的改进免疫网络探测算法,完成多机器人对未知区域的快速、高效的探索任务.该算法在大大减少通信量,又能准确计算各全局观测点花费的情况下,将不同机器人的局部观测点融合在一张地图上,使机器人的协作能力充分发挥.利用T细胞函数修正了免疫网络浓度模型,同时免疫模型参数的确定考虑各观测点的扩散度和探索方向对系统性能的影响.将仿真试验与市场法和基本免疫算法比较,结果证明INEA算法使机器人之间的协作程度明显提高,而增加观测点扩散度和探索方向一致度指标,加快了系统的探索效率.

关键词: 多机器人 免疫网络 全局观测点 扩散度

Research on the collaboration strategy of multi-robot for exploring unknown environment

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Abstract:

Based on observation point fusion, an algorithm named immune network exploration algorithm was proposed to fast accomplish the exploration task of multi-robot for unknown environment. In the case of greatly reducing communication and well calculating the general observation point costs, local observation points of individual robots fused on a map, which can incarnated the collaboration ability of robots enough. Furthermore, the T-cell function was used to update the immune network concentration model, considering that the system performance was affected by diffuse degree and exploring direction of observation points. Simulation results validated that the complete exploration was effectively realized. Simulation results proved that the robots collaboration extent was obviously improved. In addition, the exploration efficiency was greatly improved by adding diffuse degree and exploring direction coincidence indicator.

Keywords:

multi-robot immune network general observation point diffuse degree

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