A New Exploration Method Based on Multi-layer Evidence Grid Map (MLEGM) and Improved A* Algorithm for Mobile Robots

5 Author(s)

Esmaeili, E. ; Dept. of Electr., Comput. & IT Eng., Qazvin Azad Univ., Qazvin, Iran ; Azizi, V. ; Samizadeh, S. ; Ziyadloo, S.
more authors

An efficient exploration of unknown environments is a fundamental problem in mobile robots. This paper proposes a new exploration method, in this method each specific area in environment is considered as a cell that these cells are represented by 3 abstract layers. The value of each cell in first layer is calculated by range finder's free beams. In other layers, the value of each cell is calculated by visual information, the information is received by other sensors' data and image processing that used in potential filed algorithm. We merge the value of these layers to have a single meaning value. We can use this value in many purposes e.g. finding optimal path for exploration or using this value as reward for learning methods. Then it mixed with a new improved version of A* algorithm that introduces for first time to find optimal path in unknown areas. This method implemented in official simulator of Virtual Robots League in Robocop competitions and compared with random search method. The simulation result of this method covers more unknown area compared to last methods.

Published in:
Tools with Artificial Intelligence (ICTAI), 2012 IEEE 24th International Conference on (Volume:1)

Date of Conference: 7-9 Nov. 2012

Page(s):
953 - 957

ISSN :
1082-3409

Print ISBN:
978-1-4799-0227-9

INSPEC Accession Number:
13446805

Conference Location :
Athens

Digital Object Identifier :
10.1109/ICTAI.2012.134

Product Type:
Conference Publications