A Novel Edge Detection Algorithm for Mobile Robot Path Planning

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Abstract

A novel detection algorithm for vision systems has been proposed based on combined fuzzy image processing and bacterial algorithm. This combination aims to increase the detection efficiency and reduce the computational time. In addition, the proposed algorithm has been tested through real-time robot navigation system, where it has been applied to detect the robot and obstacles in unstructured environment and generate 2D maps. These maps contain the starting and destination points in addition to current positions of the robot and obstacles. Moreover, the genetic algorithm (GA) has been modified and applied to produce time-based trajectory for the optimal path. It is based on proposing and enhancing the searching ability of the robot to move towards the optimal path solution. Many scenarios have been adopted in indoor environment to verify the capability of the new algorithm in terms of detection efficiency and computational time.