

An Improved Dynamic Window Approach with Environment Awareness for Local Obstacle Avoidance of Mobile Robots

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Abstract : Local obstacle avoidance is critical for mobile robot navigation. It is a challenging task to ensure path optimality and safety in cluttered environments. We proposed an Environment Aware Dynamic Window Approach in this paper to cope with the issue. The method integrates environment characterization into Dynamic Window Approach (DWA). Two strategies are proposed in order to achieve the integration. The local goal strategy guides the robot to move through openings before approaching the final goal, which solves the local minima problem in DWA. The adaptive control strategy endows the robot to adjust its state according to the environment, which addresses path safety compared with DWA. Besides, the evaluation shows that the path generated from the proposed algorithm is safer and smoother compared with state-of-the-art algorithms.

Keywords : adaptive control, dynamic window approach, environment aware, local obstacle avoidance, mobile robots

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