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Optimal path planning of a disinfection mobile robot against COVID-19 in a ROS-based research platform

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A B S T R A C T

Due to COVID-19 pandemic, there is an increasing demand for mobile robots to substitute human in disinfection tasks. New generations of disinfection robots could be developed to navigate in high-risk, high-touch areas. Public spaces, such as airports, schools, malls, hospitals, workplaces and factories could benefit from robotic disinfection in terms of task accuracy, cost, and execution time. The aim of this work is to integrate and analyse the performance of Particle Swarm Optimization (PSO) algorithm, as global path planner, coupled with Dynamic Window Approach (DWA) for reactive collision avoidance using a ROS-based software prototyping tool. This paper introduces our solution – a SLAM (Simultaneous Localization and Mapping) and optimal path planning-based approach for performing autonomous indoor disinfection work. This ROS-based solution could be easily transferred to different hardware platforms to substitute human to conduct disinfection work in different real contaminated environments.

A R T I C L E I N F O

Keywords:
Disinfection mobile robot;
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Optimal path planning;
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Simultaneous localization and mapping (SLAM);
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