

Group Formation and Communication of Multitasking Multi-Robots for Smart City Cleaning Process

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Abstract

In this research paper, we focus on how multitasking robots team up to clean a city. In particular, we consider how they build their team, how they position themselves in their positions, how they work with teams, how they face obstacles along the way, and how to move groups out of control in an emergency. We use a leader-follower strategy here, and we are also tasked with selecting a leader for each group. The leader finds the shortest route to avoid the obstacle by considering the obstacle details such as obstacle location, obstacle width, and destination. The leader decides the best way for the team to go. If the leader wants to change the group, it gives the message to the relevant member. In the event of meeting an obstacle, it changes its shape and moves. A ROS framework was created to perform real-time experiments with ROS-capable mobile robotic TURTLEBOTs to evaluate this control strategy. Simulations performed on a mobile robot team demonstrate the effectiveness of the proposed approach.

Keywords

ROS, Mobile Robot, MRS, Homogeneous, Multi-Robot, Formation