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Thème

OVERVIEW OF TASK ALLOCATION PROBLEM FOR SWARM ROBOTICS

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Abstract

Task allocation is an essential requirement for swarm systems functioning in unknown dynamic environments. It allows robots to achieve the main goal with more efficiency, that is, less time and less costs. Emergent coordination algorithms for task allocation that use only local sensing and no direct communication between robots are attractive because they are robust and scalable. However, a lack of formal analysis tools make such algorithms difficult to design. In this thesis we present an overview of the task allocation problem for swarm robotics and focus on the different methods and approaches designed to output the exact or approximate solution to it. The goal is to achieve a desired task division in the absence of explicit communication and global knowledge. Robots estimate their internal state and/or the state of the environment from repeated local observations and based on the chosen task allocation approach, static or dynamic, robots perform the assigned tasks. Each method has its own constraints, advantages, drawbacks. Hence, the aim of this paper is to formally define the problem of task allocation in swarm robotics, and provide an overview of the different approaches proposed to solve it.