



香港浸會大學
HONG KONG BAPTIST UNIVERSITY
計算機科學系
Department of Computer Science

Department of Computer Science Distinguished Lecture Series 2014/15

New Challenges in Multi-robot Task Allocation



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RRS905, Sir Run Run Shaw Building, Ho Sin Hang Campus, HKBU

Abstract

In this talk we will focus on new aspects of the ubiquitous problem of allocating tasks to multiple robots. Task allocation to robots is distinctive because it involves spatial constraints.

We will address specifically:

(1) allocation of tasks that have temporal constraints, which are expressed as time windows within which a task must be executed.

Temporal constraints create dependencies among tasks, adding complexity to the allocation.

We propose distributed allocation methods that work both off-line, when tasks are known in advance, and on-line, when tasks arrive and need to be allocated while the robots are working.

(2) allocation of tasks that have a cost that grows over time.

An example is fires that grow unless they are contained. By modeling the growth of the tasks costs over time as a recurrence relation we can estimate how the work done by the agents affects the growth of costs and decide where agents should be allocated to minimize the damage. We address the problem both with a static allocation algorithm that operates at start time and with a dynamic allocation algorithm that can change allocations during execution.

Biography

Maria Gini is a Professor in the Department of Computer Science and Engineering at the University of Minnesota. She specializes in robotics and Artificial Intelligence. Specifically she studies decision making for autonomous agents in a variety of applications and contexts, ranging from distributed methods for task allocation, robot exploration, and teamwork. She also works on agent-based economic predictions for supply-chain management, for which she won the 2012 INFORMS Design Science Award with her Ph.D. student Wolf Ketter and colleagues. She is a Fellow of AAIL, a Distinguished Professor of the College of Science and Engineering at the University of Minnesota, and the winner of numerous University awards.



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