Self-organized task allocation to sequentially interdependent tasks in swarm robotics

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Team Non-cooperative Games

Title Breakdown

- Self Organized Task Allocation

- Sequentially Interdependent Tasks

- Swarm Robotics

Focus

- Experiment

- Robotic Leaf Cutter Ants

- Harvest

- Store

Vocab

- Task sequence
- Task interface

Foraging Swarm: Subtask Assignment

- 1 group
- Handoff
- Cache

Goal

- The performance of the swarm depends on the number of robots in each group g_i working on the two subtasks τ_i, $i \in \{1, 2\}$. We refer to the assignment of the N robots of the swarm to the two groups g_i as allocation.

- Optimal allocation

Task Switching Cost

- Low – 1 group
- Higher – 2 groups

High Level Description

- No global knowledge
- No controller
- No communication
- Wait for handoff – interface delay
- Probability based switching

Experiment

- Determine optimal allocation ratio
- No switching allowed
- Task switching cost – m and k
- Swarm Performance

Results

- This method -
- Scalable
- Near-optimal
- No Communication
- Task Independent
- Adaptive
- Extendable

Paper

- http://iridia.ulb.ac.be/IridiaTrSeries/link/IridiaTr2012-008.pdf
- Figures: 2, 4, 7, 8, 9, 14