

Cooperative and Load-Balancing Auctions for Heterogeneous Multi-Robot Teams

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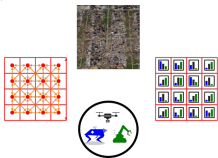
Multi-Robot Systems

- Multi-robot systems are advantageous as they facilitate faster mission completion.
- They are more flexible to failures as they can still complete the mission even if some robots stop functioning.
- They take advantage of distributed sensing.

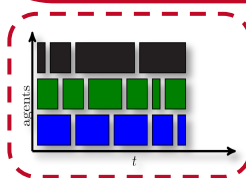
Search and Rescue

- This field requires solutions that are generated fast and are flexible to failures and circumstances.
- Our approach performs efficient task allocation on multi-robot teams.
- The algorithm takes advantage of distributed approach while maintaining spatial and temporal constraints.

Mission Model



1. Acquiring task graph



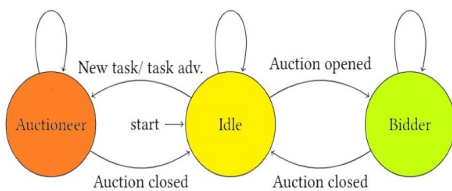
2. Feeding the algorithm with agent profiles

Mission Makespan

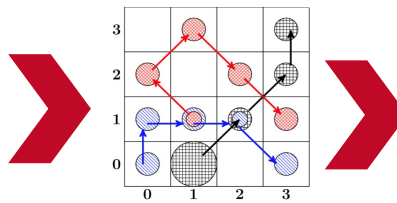
3. Obtaining final Makespan

Our Algorithm- CoLoSSI

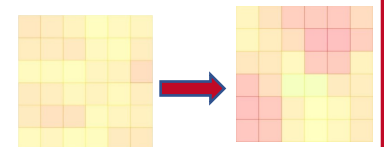
- CoLoSSI - Cooperative Load-Balancing Sequential Single Item Auction



1. Normal Sequential Single item Auction

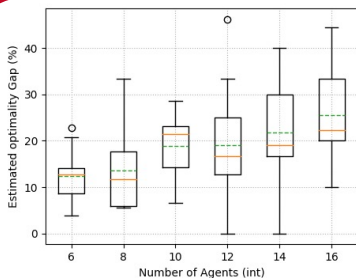


2. Leveraging cooperative actions over overlapping tasks

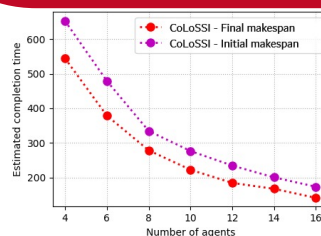


3. Load-Balancing through task redistribution

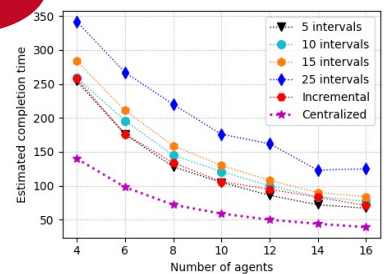
Experimental Evaluations



1. Comparison to CPLEX solver.



2. Final Makespan vs Initial Makespan.



3. Performance in communication restricted env.