

Distributed Intelligent Systems

Lab 9

Task Allocation in Multi-Robot Systems

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Content

- Task Allocation
 - Threshold-based Algorithms
 - Market-based Algorithms
- Case Study : Event Handling
 - Robots and Events in environment
 - Problem : assigning robots to handle events (tasks)

Threshold-based Algorithms

- Stimulus
 - Demand from environment
 - Global or local
- Threshold
 - Decision to respond
 - Fixed or adaptive
 - Homogeneous or heterogeneous

Market-based Algorithms

- Inspired by Economics:
 - Robots negotiate over events
 - To find a cost-effective solution
- Requires:
 - Communication
 - Planning
 - Etc.

Market-based Algorithms

- Auctions:
 - Centralized (could be partially distributed)
- Bidding:
 - Robot determines the cost and benefit of performing a task (local objective function)
 - The robot with the best offer wins the task (global objective function)
- What factors influence how a robot bids and which robot wins ?