
OTHER ISSUES ON MULTIAGENT INTERACTIONS

Video segment: multiagent path finding

- Amazon warehouse robots
 - <https://www.youtube.com/watch?v=Ox05Bks2Q3s>
 - Robots for parcel delivery
 - <https://www.youtube.com/watch?v=jwu9SX3YPSk>
 - How can robots coordinate to plan and follow their paths in the environment?
-

Multiagent path finding

- Given a number of agents (each with a start and goal location in a known environment), find collision-free paths for the agents from their start to their goal locations that minimize some objective function
 - Makespan: latest arrival time of an agent at its goal location
 - Flowtime: sum of the arrival times of all agents at their goal locations
- Coordination in the physical world
- Suboptimal solving algorithms: cooperative A^* , ...
[presented by Kai Dong]
- Optimal solving algorithms: conflict-based search, ...
[presented by Marco Cannici]

Video segment: stigmergy

- From a group at University of Essex, UK
 - <https://www.youtube.com/watch?v=Yfjucvvju7I>
 - How to make agents communicate through their environment?
-

Swarm approaches

- Stigmergy: agent interaction through the environment
 - Actions make changes to the environment and those changes influence other actions (of all robots)
 - Collective constructions of objects
[presented by Luigi Lanuzza]
 - Bottom-up approaches are limited in coordinating several agents, because global information is difficult to reconstruct
-

Video segment: coordination of moving entities

- From a group at the Department of Computer Science and Engineering, University of Minnesota at Minneapolis (USA)
 - <https://www.youtube.com/watch?v=6KkMVir83uk>
 - Applications in crowd simulations

 - So, how can multiple agents coordinate their actions for managing their interactions?
-

Coordination without communication

- Coordination is the selection of the same object (action) from sets of objects (actions)
- Without (or with very limited) communication, agents associate, through a function F , a value to every object and select the object with the maximum value
 - Common knowledge: function F
 - Without communication, it is hard to devise smarter techniques...

[presented by Massimiliano De Benedetti]

- Balance between communication and common knowledge
-