The Multi-Agent Contest Competition

What does it have to do with planning?

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Introduction

Aim

- stimulate research in the area of multi-agent systems programming
- identify key problems
- collect suitable benchmarks that can serve as milestones for evaluating new tools, models, and techniques

Challenge: solve a cooperative task in a dynamically changing environment.

History

1st: The First CLIMA Contest – 2005

Scenario:

- grid-like world
- food and depot
- goal: collect and store food

Competition:

- 4 participants

2nd: The Second CLIMA Contest – 2006

Scenario:

- grid-like world
- gold and depot
- goal: collect and store gold

Competition:

- internet based environment provided by the organizers
- 3 participants

3rd: Multi-Agent Programming Contest in Association with ProMAS – 2007

Competition:

- slight changes in the environment
- 6 participants

4th: Multi-Agent Programming Contest in Association with ProMAS – 2008

Scenario and Submission:

- new scenario

Competition:

- 7 participants

Tournament

- every team against all others
- different maps
- the team that wins a simulation gets points

The Multi-Agent Contest Scenarios

Details

Technical Infrastructure:

- TCP/IP based client/server-architecture
- the organizers provide the server
- the participants connect

Discrete Simulation: in each step do

- send perceptions to agents
- wait for agents' actions or timeout
- let agents act and evolve world

Scenario: Gold miners

Task: implement a team of agents that collects more gold than the opponent

Environment

- gold-miners
- gold
- a depot
- obstacles

Agents

- fixed visibility range (square)
- actions: move to one of four directions
- manipulate gold
- mark a cell (never used)
- push another agent (complicated)

Scenario: Cows and Cowboys

Task: implement a team of agents that cooperate in order to collect more cows than the opponent

Aim: agents have to cooperate and coordinate their actions

Environment

- Cows
- Cowboys
- Corrals
- Obstacles

Agents

- fixed visibility range (square)
- actions: move to one of eight directions

Cows

- visibility range (square)
- afraid of: agents, obstacles
- feel good: near other cows and empty spaces
- actions: move to one of eight directions
- slower than agents

What is the optimal solution to both scenarios?

What is the optimal solution to both scenarios?

We do not know!

Scenarios Summary

- structure: one on one
- discrete (time/space)
- dynamic
- not fully observable (fog)
- non-deterministic (action-failure, randomness)

Results and Outlook

Results

- roles: herders/explorers and collectors/explorers in almost all teams, differences in coordination, organisation and role-assignment
- two groups: decentralised and centralized approaches
- agent navigation: A* is employed by more and more teams

Download

`http://cig.in.tu-clausthal.de/agentcontest2008`

- packages: server, agent-templates
- can be used in courses

Questions

- Can the multi-agent contest scenarios be expressed as planning problems? (rhetorical)
- Are the scenarios suitable to compare multi-agent planners?
- Should the scenarios be changed?

Resources

End