

Multi-Agent Programming Contest 2020

The GOAL-DTU Team

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Abstract. We provide a brief description of the GOAL-DTU system, including the overall system design and the tools that we plan to use in the agent contest.

General

Introduction

The name of our team is GOAL-DTU. We participated in the contest in 2009 and 2010 as the Jason-DTU team [1,2], in 2011 and 2012 as the Python-DTU team [3,4], in 2013 and 2014 as the GOAL-DTU team [5], in 2015/2016 as the Python-DTU team [6], in 2017 and 2018 as the Jason-DTU team [7,8] and in 2019 as the GOAL-DTU team [9].

The members of the team are as follows:

- Jørgen Villadsen, PhD
- Alexander Birch Jensen, PhD student
- Benjamin Simon Stenbjerg Jepsen, MSc student
- Erik Kristian Gylling, BSc student

We are affiliated with DTU Compute (short for Department of Applied Mathematics and Computer Science, Technical University of Denmark (DTU) and located in the greater Copenhagen area).

We are using the GOAL agent programming language. We also used GOAL last year, and we managed to get a decent agent system up and running in just thousand lines of code. We expect to have an even better system this year while keeping the amount of code lines minimal. We are not using any other agent related platforms or frameworks.

Our tips to give the other participants: Keep it simple. It is sad when a lot of work goes into advanced ideas that never become functional.

References

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4. Jørgen Villadsen, Andreas Schmidt Jensen, Mikko Berggren Ettienne, Steen Vester, Kenneth Balsiger Andersen, and Andreas Frøsig. *Reimplementing a Multi-Agent System in Python*. Lecture Notes in Computer Science, 7837:205-216, Springer 2013.
5. Jørgen Villadsen, Andreas Schmidt Jensen, Nicolai Christian Christensen, Andreas Viktor Hess, Jannick Boese Johnsen, Øyvind Grønland Woller, and Philip Bratt Ørum. *Engineering a Multi-Agent System in GOAL*. Lecture Notes in Computer Science, 8245:329-338, Springer 2013.
6. Jørgen Villadsen, Andreas Halkjær From, Salvador Jacobi and Nikolaj Nøkkentved Larsen. *Multi-Agent Programming Contest 2016 — The Python-DTU Team*. International Journal of Agent-Oriented Software Engineering 6(1):86-100 2018.
7. Jørgen Villadsen, Oliver Fleckenstein, Helge Hatteland and John Bruntse Larsen. *Engineering a Multi-Agent System in Jason and CArTAgO*. Annals of Mathematics and Artificial Intelligence, 84:57-74, Springer 2018.
8. Jørgen Villadsen, Mads Okholm Bjørn, Andreas Halkjær From, Thomas Søren Henney and John Bruntse Larsen. *Multi-Agent Programming Contest 2018 — The Jason-DTU Team*. Lecture Notes in Computer Science, 11957:41-71, Springer 2020.
9. Alexander Birch Jensen and Jørgen Villadsen. *GOAL-DTU: Development of Distributed Intelligence for the Multi-Agent Programming Contest*. To appear, Springer 2020.

Specifics

Organization

- Who is the main-contact? Please also provide an email address.
The main contact is associate professor Jørgen Villadsen, DTU Compute, email: jovi@dtu.dk
- The contest is planned for October/November. If possible, please indicate any preferences/constraints you might have regarding the dates.
Students have vacation 12-16 October 2020. Tuesdays are problematic due to teaching. September is too early and December is too late.

System Analysis and Design

1. What is the **main strategy** of the agent team?
The agents explore the map to build up a representation of the map while looking for teammates. As tasks pop up, we assign agents into teams to solve them.
2. Do you use any existing MAS **methodology**, e.g. Prometheus, O-MaSE, Tropos, ...?
We build our agents from scratch using only the GOAL agent programming language as our platform. As such, our methodology is to apply intuition and programming experience.
3. Do you plan to **distribute** your agents on several machines?
We plan to run the agents on a single machine.

Agent Development

1. Which **development** platform and tools (e.g. IDEs) are you using?
We are using the Eclipse IDE with the GOAL plugin. We are running the server from the command-line for local testing purposes.
2. If you used agent technology, did you have previous experience?
We have used the same tools in previous years.
3. Do you think your choice of tools/platforms/... already paid off?
Eclipse is a familiar IDE for many students so we skip any steps about learning to navigate new IDEs etc.

Evaluation

1. What are strengths of your (agent) team?
Our strengths are the flexibility of our agents and the minimal amount of code, hence easier to maintain, refactor, etc.
2. What are the (known) weaknesses of your (agent) team?
Known weaknesses are poor movement and map awareness.
3. How far do you think you are with your agents? What are you planning to add/change until the contest?
We still have some way to go with our ideas for building and sharing map representations (to increase map awareness and improve movement). We also need to come up with ideas on how to incorporate accepting tasks via task boards. We may also need to consider how to increase robustness of our agents in case we need to restart the system.

Further details about the previous DTU teams are available here:

<https://people.compute.dtu.dk/jovi/MAS/>