Internship subject M2 Research

Internship subject	Learning reflex for intelligent robots
Supervisors	Damien Pellier, Humbert Fiorino

Duration : 5 mois
Research laboratoiry : Laboratoire d'Informatique de Grenoble, 700 avenue Centrale, 38058 Grenoble cedex 9 (Équipe Marvin)
Keywords : Artificial intelligence, machine learning, automated planning

1. Context

Designing robots or intelligent agents leads to develop their analytical skills to learn from their successes and mistakes. This learning step is crucial to devise agents able to make informed decisions and to adapt themselves to their environment.

As part of this internship, we are interested in looking at learning reflex for agents in the context of sequential decision-making. In other words, how an agent can learn conditioned reflexes, i.e., sequences of actions to be performed, depending on its current state and used this reflex to reach the goal that was given? This internship is clearly positioned in the field of artificial intelligence straddling the field of machine learning [1] and automated planning [2].

Automated planning and scheduling is a branch of artificial intelligence that concerns the realization of strategies or action sequences (plans), typically for the execution by intelligent agents, autonomous robots and unmanned vehicles. Given a description of the possible initial states of the world, a description of the desired goals, and a description of a set of possible actions, the planning problem is to find a plan that is guaranteed (from any of the initial states) to generate a sequence of actions that leads to one of the goal states.

2. Objectives

In the image of Ivan Petrovich Pavlov [3] who developed the theory that the reactions acquired by learning and habit become reflexes when the brain make a relationship between a stimulus and an action that follows, we would like in its internship to investigate some algorithmic mechanisms for learning such reflexes. You will demonstrate their suitability for simple domains, e.g, games, etc. We will also expect implement a demonstration based on one of the robotic platforms and simulators available in our research team.

3. Profile of the candidate

The candidate must have:

- be registered in Master 2
- advanced programming skills (design and implementation), especially in Java
- knowledge of how to take users into account in interactive systems

- a good academic level attesting to his ability to combine practice and theory
- a level of professional oral and written English
- general knowledge in the fields of data analysis and artificial intelligence is a plus

4. Contact procedure

Send to Damien.Pellier@imag.fr and Humber.Fiorino@imag.fr

- Your Master marks 1
- Your CV

Applications are managed on a case-by-case basis. You will be informed promptly by email of the admissibility of your application and if you are invited to a first interview.

5. References

[1] Kevin Patrick Murphy. Machine Leaning Machine Learning: a Probabilistic Perspective, MIT Press, 2012.
[2] M. Ghallab, D. Nau, and P. Traverso. Automated Planning Theory and Practice. Morgan Kaufmann Publishers, 2004.
[3] http://en.wikipedia.org/wiki/Ivan_Pavlov