Subject: Re: IEEE EVIC 2008 Student Travel Grants Awarded
From: Rami Abielmona <rabielmo@ieee.org>
Date: Wed, 26 Nov 2008 07:45:09 -0500
To: Mayerlin Uzcategui <maye@ula.ve>

Thank you Mayerlin and good luck!

Mayerlin Uzcategui wrote:

> Dear Dr. Abielmona,
>
> I am writing to confirm you that I accept the EVIC 2008 IEEE CIS travel grant and that I will be to attend at the Fifth IEEE Latinoamerican Summer School on Computational Intelligence in Santiago de Chile, from Dec, 15th to the 18th. Also, I am prepare to present my PhD thesis work, entitled "Agent-Oriented Modeling and Knowledge Acquisition" in the posters session of the event.
>
> Following instructions of Dr. Pablo Estevez, I submitted last week the registration forms and received the corresponding acknowledgments. I have also completed the arrangements for the trip: I acquired the round ticket Caracas-Santiago-Caracas (12th - 19th, Dec) and I have booked a room at the recommended hotel of the event. Please notice that, as a Venezuelan citizen, I do not need a Visa in Chile. I have, of course, a valid passport to travel abroad. I just need to acquire the internal transport ticket (Mérida-Caracas-Mérida) to be ready for the whole trip.
>
> As you suggested, I will complete my final registration at the event on arrival in Chile. I will show all the original documentation, copy of which I already sent in pdf format (to be evaluated by the referees of the travel grant and posters competition) in order to completing your requirements.
>
> Thank you for accept me and permit me participate in this event,
>
> Best regards,
>
> Maye

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/Rami

Rami Abielmona, Ph.D., P.Eng.
IEEE CIS - Educational Activities Sub-Committee Chair (http://ieee-cis.org/edu/)
IEEE CIS - Ottawa Chapter Webmaster (http://ottawa.ieee.ca/ci)
IEEE CS - Ottawa Chapter Vice-Chair (http://ottawa.ieee.ca/cs)
IEEE Ottawa Section - Robotics Competition Committee Vice-Chair (http://ottawa.ieee.ca/robotcomp)
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Agent-Oriented Modeling and Knowledge Acquisition

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Abstract

The general goal of this project is the definition of a knowledge representation that facilitates the learning process in multi-agents systems. In this context, we understand by ***learning***, the process by which an entity (device or human) generates a knowledge representation, possibly starting from more elementary registers of information and uses that representation to improve its behavior.

To support the experiment we use a widely used tool for knowledge representation: *computational logic*. We, also, intent to build a learning device starting from a design abstraction that is very popular in computing and artificial intelligence[16]: *the intelligent agent*. We, therefore, aim at a logic-based, agent-customized knowledge representation to e used in learning task.

Finally, for effects of regulating the complexity of the project, we intend to concentrate the attention on the representation of knowledge about behaviors of multi-agent systems where it is reflected the collective intelligence, so that the knowledge that it "apprehends" our **apprentice agent** comes from behaviors, actions, events, changes and states that it perceives in the environment that it share with others agents. In fact, we intend for that knowledge to be shared with those agents.

Introduction

Agent-Oriented Modeling influence the design and characterization of systems by allowing for the specification of those entities called ***agents*** that perceive, reason and act modifying their shared environment. By extending the interpretation of multi-agent systems that interact symbolically with each other and with their mutual environment[16],we include in our models, besides simple individuals, aggregated corporative actors, representing social groups or institutions. Individuals are embedded in the model and they partially determine the behavior of that model during simulations. Also, to coordinate and to organize their behavior, these agents use the knowledge of their own capacities and of those others agents.

Agent-Oriented Modeling reflects the concepts of symbolic interaction: subsystems perceive and define domain entities like agents. This provides the conditions and the mechanisms to guide an experiment controlled with software components like those developed in artificial intelligence[20, 8] and distributed artificial intelligence[2, 1, 18], in which each agent has elements of Adaptation, Autonomy, Collaborative behavior, Inference capacity, Natural communication ability, Mobility, Individuality, Reactivity and Temporal continuity[4].

The general goal of this project is the definition of a knowledge representation that facilitates the learning process in multi-agents systems. In this context, we understand by ***learning***, the process in which an entity (device or human) generates a knowledge representation, possibly starting from more elementary registers of information and uses that representation to improve its behavior.

Method

To understand and model an intelligent system, we think necessary to go through the following stages :

- Exploring conceptual base of multi-agent systems with particular emphasis in logic based agents.

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- Exploring conceptual base of techniques for knowledge management, acquisition, modeling, representation and manipulation.
- Exploring the conceptual base of collective intelligence and their relationships with our agent notion.
- Proposing apprentice agents' models.
- Reporting the exercises of the apprentice agents' formalization.
- Evaluating those models in particular applications as the modeling and simulation of social-economic or social-environmental systems.
- Reporting the results of the prototypes evaluation.

Discussions

It is necessary to highlight that the human perception of an intelligent behavior influence the definition of agency: *"It helps us to understand the reason why arriving to a definitive definition of agent's concept it is so difficult: what is an intelligent agent for another for a person is a smart object; and what today is a smart object, tomorrow will be an useless program. The nail of this distinction it is in our expectations and in our point of view"* [4].

In this case, agents are embedded in a system to which we denominate multi-agent system. In the literature they have intended several definitions, coming from different disciplines, for the term multi-agent system. As seen by the distributed artificial intelligence, a multi-agent system is a weakly coupled net of entities that are able to solve problems. But, in that process, they must work in a join effort to find the answer to problems that are beyond the capacity and individual knowledge of each agent. However, the term "multi-agent system" has been giving a more general meaning, and at the moment it is used to define all the types of compound systems for multiple autonomous components that possess the following characteristics[11]:

- Each agent has capacity to solve a problem a least partially.
- There is no global system of control.
- Data are not centralized.
- Asynchronous computation.

One of the factors that interest us is an open environment where the agents interact to get their individual or collective goals, such as described in[18]. To interact in this environment, the agents have to overcome two problems: they have to be able to find each other (agents can appear, disappear or move in any moment); and they have to be able to interact[11].

Our proposal is to study the integration of some tools of knowledge acquisition starting from a logical representation with an agent that, to start with uses that strategy for the representation of the knowledge that manipulates. And as we mentioned previously, we pretend to incorporate this agent in a multi-agent system where communication of so-acquired knowledge is done among the whole community of agents.

Experiments context is controlled by fixing the language, the type of agent, a type of environment and by trying different benchmark cases in knowledge management.

The main objective of this project is the specification of an apprentice agent that can be incorporated in a multi-agent platform for its later evaluation in applications associated with the modeling and simulation of multi-agent systems.

To achieve this objective it is necessary to fulfill certain particular objectives. Among them:

- Evaluating techniques of knowledge engineering associated with knowledge acquisition, modeling, representation and manipulation, making emphasis on knowledge description in logic.
- Evaluating architectures of multi-agent systems that allow incorporating the apprentice agent.
- Evaluating the techniques of collective intelligence.
- Formalizing and developing learning strategies.

Conclusions

To define a knowledge representation for a rational agent, it is necessary to consider four important characteristics related with the agent components: Representability, Inferenceability, Efficiency at problem solving and Efficiency at learning. The knowledge base is a data structure that contains a representation with the agent's available information. There are many alternatives of warehouse implementation. However, in the development of a knowledge base its possible distinguished three phases: Incorporation, Refinement and Reformulation.

Additionally, we pretended incorporate our agent in a multi-agent system with ***collective intelligence***[19, 3], with the intention of reflecting that the knowledge that "apprehends" our agent comes from behaviors, actions, events, changes and states that it observes in its environment where its is immense together with other agents and that, possibly, this knowledge can be transmitted to those agents.

We will use logic for knowledge representation in the agents. The logic, in particular classic logic, has a long history like language to represent knowledge[15]. Artificial intelligence remarks the efforts to model the common sense that culminated in languages, based on logic used to formalize theories of the change, such as the situational calculus[14] and the calculus of event [13]. These languages are particularly useful to code reasonable strategies to plan tasks in the solution of problems[10, 12, 17].

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