Multi-agent system for supporting cooperative learning

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Abstract: Over the last several years there has been significant progress in techniques for creating autonomous agent, i.e, systems that are capable of performing tasks and achieving goals in complex and dynamic environments. In this paper we presente the architecture of the system SACA(Système d’Apprentissage Cooperatif basé sur le modèle d’Agent). Which is a multi-agent system to support cooperative learning.

In this system, the agent is modelled in terms of their capabilities and mental states. This system is composed of a set of agents(human and artificial). We present here its main features.

1. Agent Model :

Shoham proposes an agent architecture in which each agent possesses the concept of mental state(e.g. belief, intention, obligation) as an internal expression(Shoham 1993). Also, the agents in GRACILE have already been designed adopting the framework proposed by Shoham (Ayala & Yano 1995). To design and construct an agent model, we referred to their view of an agent model.

For us, an agent consists of a knowledge base which includes beliefs and commitments to itself and to other agents, a set of function modules that constitute the agent’s capabilities, a communication module in order to communicate with other agents and a reasoning module for updating the mental state/commitments of the agent.

2. Architecture of SACA :

SACA is composed of a set of agents (human agent and artificial agent). The human agents are: Learner agent, Author agent and Formative agent. The artificial agents are: Tutor agent, Domain agent and Evaluator agent. Artificial agents are cognitive agents.

1. Domain agent : allows to represent the matter to be taught. This matter is organised on educational objectives related by a « prerequisite » relations(Lafifi & Bensebaa 2000).
2. Tutor agent : orients the learner (propose an educational objective to the learner, this educational objective is adopted to his knowledge level) and provide learner with informations about cooperation opportunities with their peers.
3. Evaluator agent : evaluates a learner in an educational objective.
4. Learner agent : has informations about learner and facilates the task of learner to communicate with their peers or in the learning task.
5. Author agent : is the responsible of the construction of the matter to be learned. It creates the educational objectives and makes the conditions to present theses educational objective, i.e. « prerequisite » objectives.
6. Formative agent : is the responsible of the formation process of learner from the initialisation to the achievement of their formation goals.

3. Conclusion :
We had presented an architecture of a system that offer the possibilities to the learner to cooperate/collaborate with their peers. For doing this, the tutor agent posseses information about the knoweledge state of learner(Student Model). This tutor can give advices to learners and can provide them by informations about cooperation opportunities. Our system is a multi-agent system that is composed of a set of agents(human and artificial). Now, we are in the step of implementing this system.

References: