An Adapted Virtual Class Based on Intelligent Tutoring System and Agent Approaches

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Abstract

This paper describes a virtual class, which is based on the principles of ITS (Intelligent Tutoring Systems). The virtual class allows to a group of learners to participate into training sessions of an adapted teleteaching system (adapted virtual class), this system takes into account progression rhythm different into a community of remote learners. The virtual class allows adapting the teaching system in a flexible, individual, and collective way. Agent-oriented modeling is being used to specify and implement the architecture of adaptable virtual class. The implementation of virtual class is being developed in distance education context using reactive agents, Internet and Java.

1. Introduction

The principle of the architecture proposed for an adapted training service is to allow the adaptation of knowledge transmission from a teaching function in a virtual class context (figure 1). The architecture proposed (figure 2) takes into account the principles of ITS (Intelligent Tutoring Systems) [6], [2]. Teaching function is distributed taking into account the participation of teachers, system (intelligent tutoring system in this paper), resources and learners in some cases (when a learner has the knowledge or experience necessary for playing the teacher's role).

In this paper, teaching function is represented by a set of group controllers and a class controller (figure 2). We propose for each group controller a specification based on agent-oriented approach.

2. Group Controller

An Adapted Group Training Service (AGTS) or group controller belongs to cooperative service layer (figure 2).

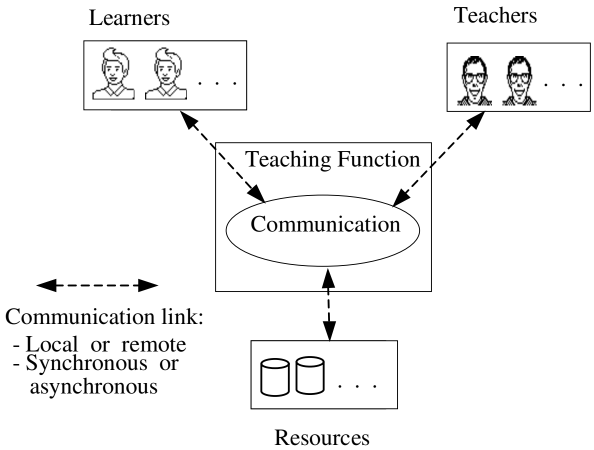

Figure 1. Teaching function in a virtual class context.

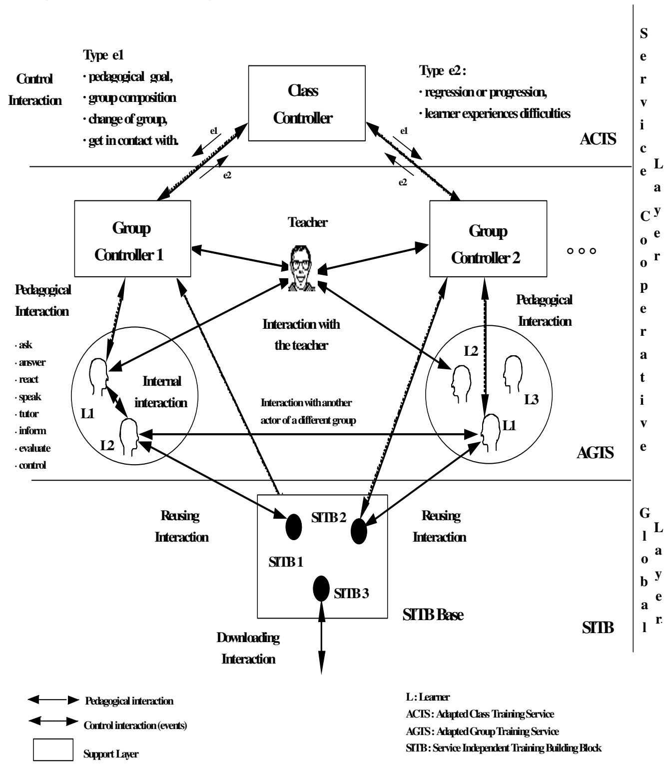

Figure 2. Training architecture of virtual class proposed.

The group controller has to manage: - the communication with the ACTS (Adapted Class Training Service), - the reusing interaction with the server of SITBs (Service Independent Training Building Block) and - the didactic control takes into account a didactic strategy. One group controller allows to consider the behavior of group by behavior zones (which were specified in [3] and two kind of profiles: learner's profile and profile of group). A group controller was specified (based on principles of Intelligent Tutoring Systems [6]) taking into account agent-oriented paradigm. This specification was developed applying the agent-oriented methodology of Wooldrige [7]. The intelligent tutoring system is represented by a set of agents. The agents and their interactions into tutor are represented in figure 3.

Learner profile is represented by personal information (name, e-mail, age, sex,...) and a set of scores such as global score, sum of right responses, sum of wrong responses, sum of empty responses and sum of exercise executed. Group profile is represented by knowledge level, number of learners, name of each learner, arithmetic mean of global score, arithmetic mean of right responses, arithmetic mean of wrong responses and arithmetic mean of empty responses.

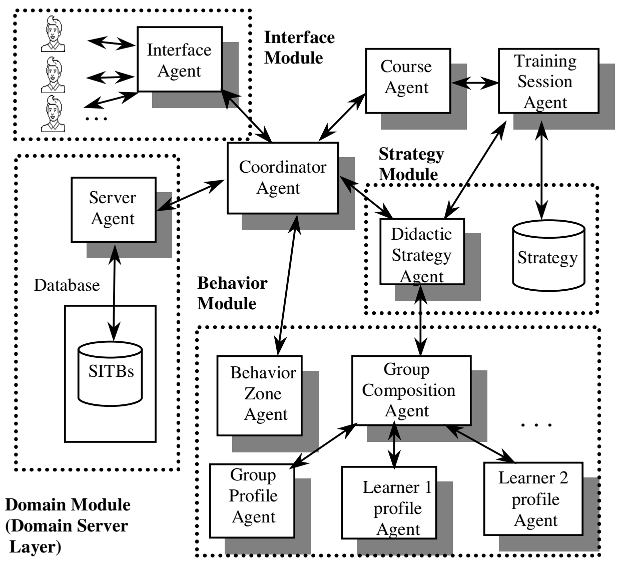

Figure 3: The agents and interactions in group controller based on intelligent tutoring system architecture.

Each agent must interact with others agents by sending and receiving of messages. Agent behavior is determined by receiving of events and a treatment correspondent. Each agent in group controller has three events (start, message receiving, and finish) based on [1].

3. Conclusion

The architecture of the virtual class proposed is a response to traditional virtual classes (using Internet) which are not adapted during training session. The virtual class proposed is considered adapted by using learner and group profiles, which are analyzed in the strategy module (by decision rule tactic) during tactic execution.

A server of reusable SITB was developed in the object-oriented programming domain. This server was implemented using Java and Internet. The same server will be used for each group controller. A group controller was developed, the agent-oriented paradigm (in particular reactive agent) was used for modeling and implementing it (in Java). Some pedagogical patterns may be implemented by tactics proposed in this paper, in particular the pedagogical pattern LDLL (Lab Discussion Lecture Lab) (http://www.lifia.info.unlp.edu.ar/ppp) was specified by a set of tactics proposed and it was taken into account as a strategy in the AGTS developed [5]. Others pedagogical patterns are being analyzed for implementing them as strategies into tutor developed..

4. References

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