Using Roles, Rules and Contracts to Promote Group Collaboration

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Abstract: In this paper we introduce Virtus, a web-based platform that provides enhanced functionalities to automate the management of users, groups and virtual communities using an expert rule-based system. Virtus supports collaborative learning using a group contract by automating the execution of the rules of the contract. The originality of our work consists, on the one hand, in proposing a declarative language to express contracts using declarative rules, commitments and role responsibilities assigned to members of a group or participants of a community and, on the other hand, in automatically executing the contract, implemented by an expert system. Once the contract is defined, it is translated into an executable rule language. Periodically, Virtus platform extracts information from the virtual environment and activates a knowledge-based system for each group.

Keywords: Role-based collaboration, rule-based contract, collaborative learning

1. Introduction

Virtual communities with learning or working (or both) purposes generally use collaborative learning and cooperative work in order to improve the benefits of learning/working together and to improve the effectiveness of the social interaction. A community whose organization and methods are based on these techniques normally obtains better results than the ones where individuals are working by themselves [1].

In this direction, we propose a contract model with a role-based coordination approach to support individual and group management in collaborative learning activities. The main idea is to create a contract that can be used to automate some substantial administration work and to both create and maintain mutual commitments between users and their working groups. Our aim is to increase individual and collective efficiency adding an automatic management service which reminds the users their commitments in a personalized way and applies the terms of the contract [2]. By using explicit contracts in collaborative learning scenarios we intend to encourage the users to commit themselves in the learning process [3]. By defining roles within groups, responsibilities between members can be shared. This sharing is established through the contract, which describes the responsibilities and formalizes the rights and duties of each role.

2. Virtus platform

The Virtus platform consists of two modules: VirtusWeb which manages the services of the on-line environment (like usual LMS or Groupware systems) and VirtusCharte which implements an Intelligent Support System to support users following the rules of the

contract. This means that the Virtus platform supplies a regulation and monitoring mechanism for group activities based on the concepts of contract (a set of rules) and roles. This mechanism is fully configurable through the rules expressed in the proposed contract language using freely defined roles. VirtusCharte is based primarily on an intelligent tool that will automatically support collaborative work using VirtusWeb.

The key point is the dynamic process between VirtusWeb, where users are performing activities and VirtusCharte, which monitors the way the members honor their commitments. The regulation mechanism of VirtusCharte is based on the relation between rules and roles. Rules mean a guideline, a formula that indicates what needs to be done within a certain context. Roles mean that each person is identified with a role, so that he/she can quickly identify his/her participation, prerogatives and commitments. A role is a set of requirements that define how a member should behave in a group [4]. The assigned user's roles indicate the responsibilities and expected actions of each group member. The rules could question the work carried out by other roles or those that are performed outside the specified time constraints.

Using the charter, the users will benefit from an automatic group management support mechanism. As a human user, VirtusCharte may act on VirtusWeb working environment and could also recall the users' commitments by sending notifications. These actions and/or notifications are obviously a consequence of the group charter execution. To avoid black box behavior, VirtusCharte actions are emphasized as executed by a virtual user.

3. Conclusions

We have designed and implemented a software component to automate the execution of a contract. The Virtus Platform is composed of VirtusWeb which manages the contexts and services of the learning environment and of VirtusCharte which reasons automatically in terms of the rules of the contract [3]. The regulation and follow-up mechanism is based on the concepts of rules, role and contracts. This contract, freely discussed in the group and then adopted, boosts the commitment of members for the tasks ahead [4].

VirtusCharte run the contract and monitor how the members of the group comply with the terms of the contract when performing cooperative work. For further developments, our aim is turn Virtus in an adaptive environment [5] in the sense that Virtus could propose modifications to the contract in order to be more in line with the members' behavior.

4. References

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