

Introduction to Special Session (R) on Role-Based Collaboration

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Role-based collaboration is an emerging technology. Role-based approaches may significantly change and improve the infrastructure of management, organization, collaboration, and system development. This is the fourth year to organize a special session for Role-Based Collaboration (RBC). The past successful special sessions were for IEEE Systems, Man and Cybernetics (SMC) (2003: Washington D.C., USA; 2004: The Netherlands; and 2005: Hawaii, USA) encourage us to continue our efforts.

Role concepts have been applied widely in behavioral science, management, sociology, and psychology for many years. Roles are very useful in modeling the authority, responsibility, functions and interactions associated with manager positions within organizations.

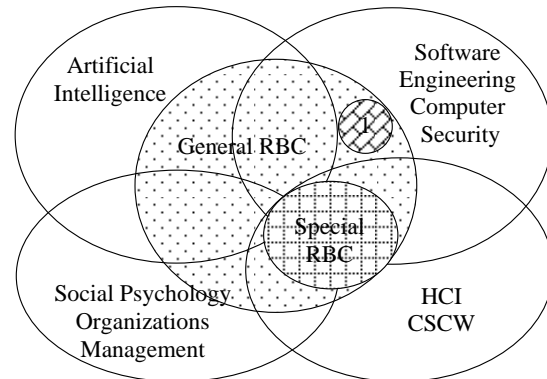
Unclear role specification may create ambiguity and conflict in an organization. Most people like to work in a group with a clear description of their responsibilities and rights. Clear role definition provides a fundamental tool for collaboration and makes it easy for people to collaborate. By roles, we hope to avoid users of collaborative systems being overwhelmed by too much irrelevant information. Collaborative systems are computer-based tools that support collaborative activities. They should not only support virtual face-to-face collaboration among people at a distance but also improve face-to-face collaboration by providing more mechanisms to overcome the drawbacks of face-to-face collaboration among people. Introducing roles into collaborative systems is very important for them to provide efficient facilities to specify clear job descriptions.

It is believed that roles should become underlying concepts and mechanisms information systems [1]. RBC can be divided into two categories, Special RBC and General RBC (Fig. 1).

Where, special RBC means role-based Computer-Supported Cooperative Work (CSCW) research. In this kind of system, it is mainly concerned with how to support people to cooperate with computers [6, 7]. For CSCW system analysis, design, implementation, application and evaluations, that is, it is hoped to apply role theory to CSCW systems. The research on Role-Based Collaboration RBC aims to create concrete

artifacts relevant to the role theory of social psychology in CSCW systems. Therefore, the gap can be bridged between developers of CSCW systems and the sociologists who are more concerned with the usability of CSCW systems.

General RBC is to extend special RBC to the areas such as Human Computer Interaction (HCI), Artificial Intelligence, Software Engineering (Computer Security), Social Psychology (Organizational and Management Theory). General RBC considers supporting cooperation among people with computers but also the cooperation among the components of a system, among people, and among people and machine [5, 7].



1: RBAC

Fig.1 General RBC and Special RBC

In RBC, roles bring the following benefits:

- Identify the human user “self”;
- Avoid interruption;
- Enforce independency by hiding people under roles;
- Encourage people to contribute more;
- Remove ambiguities to overcome expectation conflicts;
- Work with personalized user interfaces;
- Concentrate on a job and decrease possibilities of conflicts for shared resources;
- Transfer roles with the requirement of a group;
- Separate concerns for a complex components;
- Specify concrete processes relevant to specific requirements.

This special session includes four papers that are relevant to role-based approaches in agent cooperation, distributed agent systems, distributed robot agent systems and workflow models.

Bai and Du [1] discusses a model of organization that is built with roles. An organization model describes the personnel and the structure of the organization. While flexible, dynamic changes in organizations is also an important, yet unresolved problem which appears in many domains, but very few approaches of organization modeling can address dynamic changes in organizational structures, so some new approaches and technologies for organization model design seem to be inevitable. In this paper, they discuss the essentiality of organization model design in workflow systems, and propose a novel organization model based on Party Pattern by analyzing and comparing traditional organization models. To integrating it into a workflow model seamlessly, they use a role model connect of these two disparate models. This integrated model is desired to adapt various changes including personnel changes, organization changes and process changes etc., and realize the amalgamation of personnel, organization and computer application system naturally in order to accomplish given tasks successfully.

Cabri et al. [2] discuss how agents cooperate with roles. Thanks to their capabilities of being autonomous, proactive and reactive, software agents are today a powerful paradigm to develop complex systems, which typically involve several interacting agents. In those systems, interactions must be carefully designed and must be smartly managed at run-time. A good paradigm to deal with interaction and run-time situations is represented by the concept of role, which has been exploited in different approaches. In this paper, they investigate the adoption of overhearing, a paradigm to deal with cooperating agents, in order to improve the adoption of roles. The approach presented here can be adopted to support the agent decisions regarding the role to assume and its use.

Zhang and Yin [3] describe how roles are introduced into a robot soccer team that is a good application of role-based approach. Teamwork is becoming more and more important in many dynamic multi-agent systems, such as, virtual training, interactive entertainment, internet-based information integration, and RoboCup soccer. How to ensure agents work as an effective team in dynamic distributed environments still remains a challenging issue. The BDI architecture emphasizes practical reasoning about the current beliefs and goals and then determining the best possible actions. However, it is still difficult to break the activity of

agents into suitable operational concepts. A lower level of abstraction, role, is currently used by many researcher of multi-agent systems to close this gap. They further refine the modeling of teams by using the notions of role-based teams, role-based plans and team/role assignment to develop a method of dynamically composing agent execution models as the agents take on different roles during the execution of a plan.

Zhu [4] explores the properties of intelligent agent systems. In his paper, he introduces the model of role-based collaboration E-CARGO, and proposes that roles can be taken as an underlying mechanism to build intelligent agent systems by describing the process of developing agent systems and the agent dynamics in role-based agent systems. Finally, he points out the research topics of role-based distributed intelligent systems.

It is hoped that this session and the past sessions could be taken as the initial impetus to foster more investigations and researches relevant to RBC.

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