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**Soft Computing Models in
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Hybrid Dynamic Planning Mechanism for Virtual Organizations

Sara Rodríguez, Vivian F. López, and Javier Bajo

Abstract. It is possible to establish different types of agent organizations according to the type of communication, the coordination among agents, and the type of agents that comprise the group. Each organization needs to be supported by a coordinated effort that explicitly determines how the agents should be organized and carry out the actions and tasks assigned to them. This paper presents a new global coordination model for an agent organization. This model is unique in its conception, allowing an organization in a highly dynamic environment to employ self-adaptive capabilities in execution time.

1 Introduction

Ideally, MAS include the following characteristics [10]: (i) They are typically open with a non-centralized design. (ii) They contain agents that are autonomous, heterogeneous and distributed, each with its own “personality” (cooperative, selfish, honest, etc.). (iii) They provide an infrastructure specifically for communication and interaction protocols. Open MAS should allow the participation of heterogeneous agents with different architectures and even different languages [14]. However, this makes it impossible to trust agent behavior unless certain controls based on norms or social rules are imposed. To this end, developers have focused on the organizational aspects of agent societies, using the concepts of organization, norms, roles, etc. to guide the development process of the system.

Virtual organizations [6] are a means of understanding system models from a sociological perspective. From a business perspective, a virtual organization model is based on the principles of cooperation among businesses within a shared network, and exploits the distinguishing elements that provide the flexibility and quick response capability that form the strategy aimed at customer satisfaction.

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- [2] Carrascosa, Giret, C.A., Julian, V., Rebollo, M., Argente, E., Botti, V.: Service Oriented MAS: An open architecture (Short Paper). In: Decker, Sichman, Sierra, Castelfranchi (eds.) Proc. of 8th Int. Conf. on Autonomous Agents and Multiagent Systems (AAMAS 2009), Budapest, Hungary, May 10–15, vol. Sierra, pp. 1291–1292 (2009)
- [3] Corchado, J.M., Glez-Bedia, M., de Paz, Y., Bajo, J., y de Paz, J.F.: Concept, formulation and mechanism for agent replanification: MRP Architecture. In: Computational Intelligence. Blackwell Publishers, Malden (2008)
- [4] Dignum, V.: A model for organizational interaction: based on agents, founded in logic, PhD. Thesis (2004)
- [5] Esteva, M.: Electronic Institutions: from specification to development Ph.D. Thesis, Technical University of Catalonia (2003)
- [6] Ferber, J., Gutknecht, O., Michel, F.: From Agents to Organizations: an Organizational View of Multi-Agent Systems. In: Giorgini, P., Müller, J.P., Odell, J.J. (eds.) AOSE 2003. LNCS, vol. 2935, pp. 214–230. Springer, Heidelberg (2004)
- [7] Gasser, L., Ishida, T.: A dynamic organizational architecture for adaptive problem solving. In: Proc. of AAAI 1991, pp. 185–190 (1991)
- [8] Giret, V., Julian, M., Rebollo, E., Argente, C., Carrascosa, Botti, V.: An Open Architecture for Service-Oriented Virtual Organizations. In: Seventh international Workshop on Programming Multi-Agent Systems. PROMAS 2009, pp. 23–33 (2009)
- [9] Hubner, J.F., Sichman, J.S., Boissier, O.: Using the Moise+ for a cooperative framework of mas reorganisation. In: Bazzan, A.L.C., Labidi, S. (eds.) SBIA 2004. LNCS (LNAI), vol. 3171, pp. 506–515. Springer, Heidelberg (2004)
- [10] Huhns, M., Stephens, L.: Multiagent Systems and Societies of Agents. In: Weiss, G. (ed.) Multi-agent Systems: a Modern Approach to Distributed Artificial Intelligence, MIT, Cambridge (1999)
- [11] <http://repast.sourceforge.net> (2009)
- [12] Rodríguez, S., Pérez-Lancho, B., De Paz, J.F., Bajo, J., Corchado, J.M.: Ovamah: Multiagent-based Adaptive Virtual Organizations. In: 12th International Conference on Information Fusion, Seattle, Washington, USA, Julio (2009)
- [13] Villatoro, D., Sabater-Mir, J.: Categorizing Social Norms in a Simulated Resource Gathering Society. In: Proceedings of the AAAI Workshop on Coordination, Organizations, Institutions and Norms, COIN @ AAAI 2008 (2008)
- [14] Zambonelli, F., Jennings, N.R., Wooldridge, M.: Developing Multiagent Systems: The Gaia Methodology. ACM Transactions on Software Engineering and Methodology 12, 317–370 (2003)

Combinatorial Auction Control of Manufacturing Prices Methods

Juan José Lavios Villahoz, Ricardo and Alberto Arauzo Arauzo

Abstract. We use the paradigm of manufacturing scheduling problem. It concerns the allocation of manufacturing resources over time periods and its goal is the optimization of the production. We propose a combinatorial auction method where the items to be sold are the time slots that we need to solve the scheduling problems tasks need a combinatorial auction to solve the operations. The use of auctions in manufacturing systems items are considered (e.g. combinatorial auctions) to solve the prices comparing the demand over time periods and the resource in this time slot. Our method is based on combinatorial auctions that meet the requirements in dynamic environments, e.g. robustness to changes in available resources.

1 Multiagent Systems in Manufacturing

Manufacturing and production systems are characterized by the optimization of Scheduling problems. It concerns the allocation of manufacturing resources over time periods and its goal is the optimization of the production operations of some production processes [1]. The Manufacturing scheduling problem is a complex problem and its dynamic nature and its practical application. Multiagent Systems have proved to be a powerful tool for manufacturing and production systems because of

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Emilio Corchado · Paulo Novais · Cesar Analide · Javier Sedano (Eds.)

Soft Computing Models in Industrial and Environmental Applications,
5th International Workshop (SOCO 2010)

This volume of Advances in Intelligent and Soft Computing contains accepted papers presented at SOCO 2010 held in the beautiful and historic city of Guimarães, Portugal, June 2010. This volume presents the papers accepted for the 2010 edition, both for the main event and the Special Sessions. SOCO 2010 Special Sessions are a very useful tool in order to complement the regular program with new or emerging topics of particular interest to the participating community. Special Sessions that emphasize on multi-disciplinary and transversal aspects, as well as cutting-edge topics were specially encouraged and welcome.

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