

Dependence Relations Between Roles in a Multi-Agent System

Towards the Detection of Inconsistencies in Organization*

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Abstract. With the growing interest in Multi-Agent Systems (MAS's), the need of useful tools to design and make such systems evolve has become an important domain of research. In this context, on the one hand, we are interested in modeling the organization of a MAS and on the other hand, in adapting this organization to environmental changes during the execution of the system. In our sense, the organization has to deal with the structure of the system according to the definition and the allocation of responsibilities regarding execution of tasks among agents. In this paper, we present our organizational model whose core notions are roles and links. By combining this organizational model with the dependence theory, we explore a way that allows the detection of inconsistencies in the organization of a MAS.

1 Introduction

At the beginning of Distributed Artificial Intelligence (DAI), the research projects were mainly focused on the design of architecture of agents with sophisticated reasoning capabilities [9, 18]. Recently, the focus has moved onto the social aspects of knowledge and action [13, 4, 1]. Research is now directed toward the definition of social mechanisms that install cooperative modes in the system, in particular the agents' organization (structural aspect of a cooperative collection of agents [22]).

Organizations presented in MAS range between implicit and explicit structures. On the implicit side, the organization is mixed up with the interaction protocols [21] or like in emergent computation [8], the organization is just an observed result by the user of the system. Expression of causal graphs [6, 7], of

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