

A Model for the Structural, Functional, and Deontic Specification of Organizations in Multiagent Systems

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Abstract. A Multiagent System (MAS) that explicitly represents its organization normally focuses either on the functioning or the structure of this organization. However, addressing both aspects is a prolific approach when one wants to design or describe a MAS organization. The problem is to define these aspects in such a way that they can be both assembled in a single coherent specification. The MOISE⁺ model – described here through a soccer team example – intends to be a step in this direction since the organization is seen under three points of view: structural, functional, and deontic.

1 Introduction

The organizational specification of a Multiagent System (MAS) is useful to improve the efficiency of the system since the organization constrains the agents behaviors towards those that are socially intended: their global common purpose [8,7]. Without some degree of organization, the agents' autonomy may lead the system to lose global congruence.

The models used to describe or project an organization are classically divided in two points of view: *agent* centered or *organization* centered [10]. While the former takes the agents as the engine for the organization formation, the latter sees the opposite direction: the organization exists *a priori* (defined by the designer or by the agents themselves) and the agents ought to follow it. In addition to this classification, we propose to group these organizational models in (i) those that stress the society's *global plans* (or tasks) [12,11,13] and (ii) those that have their focus on the society's *roles* [5,6,9]. The first group concern is the *functioning* of the organization, for instance, the specification of global plans, policies to allocate tasks to agents, the coordination to execute a plan, and the quality (time consumption, resources usage, ...) of a plan. In this group, the global

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