

ON ACHIEVABLE GOALS AND FEASIBLE PLANS IN OPEN MULTI-AGENT SYSTEMS

Jaime Simão Sichman ^{*,1}

** University of São Paulo
Computer Engineering Department
Av. Prof. Luciano Gualberto, 158, travessa 3
05508-900, São Paulo, SP, Brazil
jaime@pcs.usp.br*

Abstract: In this paper, we present a subjective representation of the notions of *feasible plans* and *achievable goals*, in order to model the decision mechanism of autonomous agents, immersed in an open multi-agent context. By open, we mean that agents may enter or leave the agency at any moment, without a centralized control. We believe that an agent who uses this model can better adapt himself to the changing conditions of the system, specifically to the fact that services may dynamically become available/not available.

Keywords: adaptative systems, agents, autonomous

1. INTRODUCTION

In (Tokoro, 1993; Hewitt, 1993), the future information processing environments are presented as being composed of huge heterogeneous networks of processing resources. These resources, autonomous and distributed, may consist of computers, huge applications and huge databases. Authors call these environments “societies of objects” or “electronic organizations”. Simply referring to such processing resources as agents², a system composed of these agents will have the following characteristics: *decentralized design*, *openness*, and *local autonomy*. We call this kind of system an *open multi-agent system* (open MAS). In an open MAS, as services may become available or may disappear in running time, without a centralized control, agents have to cope with these changes by *representing and exploiting internally*

some properties of the other agents. They will have to *adapt themselves* to these changes in the environment. By this expression, we mean specifically that as services may dynamically become available/not available, agents must therefore reason about each other, for instance in order to choose different partners with whom to work cooperatively. This choice depends on the available services at the agency level.

In this paper, we address one particular point of such *adaptation* procedure. We present both a model and an implementation of an agent’s decision mechanism, specifically regarding the choice of a goal to be pursued and a plan that achieves this goal. This model is based on the notions of *feasible plans* and *achievable goals*, which are explicitly represented within the agents, as described next.

2. SOCIAL REASONING MECHANISM

We believe that an agent must have a *social reasoning mechanism* to cope properly with the

¹ Partially supported by CNPq (Brazil), grant number 301041/95-4.

² This definition of agent is obviously vague and poor, and it is being used exclusively to enable us to explain some essential features of this work. A complete formal definition may be found in (Sichman, 1995).