Chapter I

An Intelligent Agent-Based Cooperative Information Processing Model

Li Yao
National University of Defense Technology, China

Weiming Zhang
National University of Defense Technology, China

ABSTRACT

This chapter presents a Basic Organization Structure (BOS) model for building the large and complex distributed cooperative information system in large mutual networks. It argues that a large and complex cooperative information system and its subsystems in a LAN can be modeled by multi-agent organization and basic organization respectively. With the BOS model, such a cooperative information system can be developed easily and it is more manageable, effectively supporting the complicated cooperative methods under uncertain conditions. BOS is mainly used to support the cooperative problem solving among the coarse-grained, loosely coupled, and groups of semiautonomous agents. The essential characteristics, knowledge
representations, and computational models of the BOS model are illuminated in this chapter. As an application example, we use the BOS model to realize the distributed Assumption-based Cooperative Problem Solving (ACPS) in the Distributed Traveling Information Management System prototype.

INTRODUCTION

With the rapid development of new and high information technologies, such as distributed artificial intelligence, data ware, data mining, and computer supported cooperating work, the cooperative information systems appear more and more in various aspects in man’s work and management. Establishing a cooperative information system on the Internet or Intranet can unify the different organizations, personnel, cultures, and machines on a virtual platform; therefore, it plays an important role for modern business enterprises to manage their information and knowledge.

However, constructing the cooperative information system on large network is a very sophisticated and difficult work. First, a system of such kind, involving hundreds, perhaps thousands of parts interacting with each other, is so complex that the work to implement and manage it is very hard. Second, the cooperative information system may include various kinds of information sources that often vary constantly over time in a dynamically changing environment. Such a system must dynamically and effectively process a great deal of complicated, incomplete, and inaccurate rude data from different information sources in order to generate information of reliability with good quality for the users. Thus, there is a pressing need for new models and techniques to support the developing and managing processes of such complex information systems.

Agent and agent-based computing provide the natural and valid means for building complex cooperative information systems (Mike, 1991) and are becoming a powerful paradigm for designing and developing complex software systems (Jennings, 2000; Zambonelli, 2001). However, although agent and agent-based computing have been an active research area for many years, it is only now that agent technologies are beginning to be applied to the development of large-scale and complex commercial, industrial, military, educational, and medical treatment information systems. So knowing how to build actual agent-based applications or multi-agent systems is still in its infancy.

To solve the information-processing problems by multi-agent systems cooperatively and efficiently, we present the Basic Organization Structure (BOS) model, which can support the complicated cooperative methods under uncertain conditions. We have used the BOS model as an organization framework to realize the
Putting Me in Media: Communicating and Creating Screen Media with a Purpose
Christine Wells (2013). Enhancing Instruction with Visual Media: Utilizing Video and Lecture Capture  (pp. 221-240).
www.igi-global.com/chapter/putting-media-communicating-creating-screen/75424?camid=4v1a