INTEGRATING A STANDARD COMMUNICATION PROTOCOL INTO AN E-COMMERCE ENVIRONMENT BASED ON INTELLIGENT AGENTS

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Abstract: Communication among intelligent agents which take part in negotiation protocols is not frequently considered as an important topic in the negotiation stage. These mechanisms are often designed for specific problems, without taking into account the interoperability among agents involved. In this paper, we suggest a standard communication protocol to ensure the interoperability among intelligent agents based on fuzzy logic in an E-Commerce environment. Moreover, this environment is integrated into a FIPA-compliant multi-agent system, formalizing the communication among agents at message and payload levels. The standard messages and the protocols used are described in depth, together with a detailed example.

1 INTRODUCTION

Electronic Commerce (E-Commerce) can be defined as any business form, administrative transaction, or information exchange carried out by employing communication and information technologies. There are two main types of E-Commerce: business-to-business (B2B) and business-to-consumer (B2C). Both models share six main tasks of the buying process: need of identification, product brokering, merchant brokering, purchase and delivery, and product service and negotiation. Several applications have been designed for automating all of these tasks or some of them. For example, an important class of these systems has been developed for automating the negotiation stage. Agent technology has become very popular in E-Commerce and, more specifically, in automated negotiation. Frequently, developers focus their effort on the agent design and other important topics, such that the communication ability of agents, do not get all the attention required. This way, the communication mechanisms employed are limited to particular approaches.

In this paper, we address the necessity of adding interoperability to a buyer agent previously developed (Castro-Schez et al., 2004b) to make negotiation easier. This buyer agent was designed from a functional point of view, without paying attention to its interactions with other agents in a standard way. The general scenario consists of a number of agents based on fuzzy logic, one acting as a buyer and the other agents acting as sellers. The buyer leads the interaction by receiving offers, by studying them, and by asking sellers for new proposals. To formalize this communication, we propose a solution based on the FIPA Iterative Contract Net Interaction Protocol which is deployed into a FIPA-compliant multi-agent system.

The paper is structured as follows. Section 2 addresses the importance of using standards in the negotiation stage. Section 3 exposes the application frame, formalizing the agent concept and describing a negotiation example. Section 4 describes the proposed solution in depth. Finally, concluding remarks and future works are discussed in Section 5.

2 PROBLEMATIC QUESTIONS

Currently, there are many protocols which have been designed to solve problems related to the negotiation among intelligent agents (Lomuscio et al., 2003). However, most of the researchers have created their own negotiation protocols without taking interoperability into account. In other words, researchers do