



Chapter VI

A Negotiation Agent System in E-Commerce

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ABSTRACT

Due to the growth of Internet and computing power of PCs, activities in the real world have been changed with the help of computers. Internet commerce became an interesting research area along with the change of this new computing environment. In a traditional commerce environment, negotiation was an interest topic in the past. In the new Internet commerce environment, computer-supported negotiation becomes interesting in academics. In this chapter, a computer-supported negotiation agent system on the Internet to help buyers to make decisions is then proposed. We believe that a negotiation problem does not focus only on one issue, but rather on multiple issues. Therefore, our negotiation mechanism is based on a multi-attribute utility theory. And, the negotiation strategy focuses on the weighting adjustment on multiple issues. On the other hand, software agent is a useful technology in this new computing environment and the technology has several advantages to solve different computing problems. In a negotiation process the user cannot handle the complex process individually. Also, the process is a time consuming task. Thus, we use the advantage of agent technology as the major system developed approach. With the help of the technology the system can be more efficient in many Internet commerce applications.

INTRODUCTION

With the growth of the Internet, online transactions grow rapidly with services or goods sold on the Internet. Electronic commerce activities are increasing continuously. In the commerce activities of the real world, several merchants could apply the same product or service with different values of product attributes. In general, a buyer does not care about only one issue of a product or service. He/she would consider several issues and set different parameters within these issues and obtain the best choice. In this chapter, a negotiation mechanism and system is proposed as a negotiation mediator between one user and multiple sellers. The negotiation process is a multi-issue negotiation problem. Therefore, a mechanism based on multi-attribute utility theory is proposed and developed. On the other hand, negotiation is a time consuming task for users. Fortunately, agent technology has several advantages that include automatic intelligence, proactivity and reactivity, and so forth, and is suitable for designing a computer supported negotiation system. Therefore, an agent-based negotiation system is proposed.

Negotiation

Negotiation (Faratin, Sierra, Jennings & Buckle, 1999; Guttman & Maes, 1998a, 1998b; Wu & Soo, 1999; Sandholm & Lesser, 1997; Iizuka, Suzuki, Yamamoto & Ohuchi, 1999; Caglayan & Harrison, 1997; Kang & Lee, 1998; Hammer, Huang, Huang, Pluempitiwiriyawej, Lee, Li, Wang, Liu & Su, 2000; Russel & Norvig, 1995; Lomuscio, Wooldridge & Jennings, 2000) is a popular topic in the academic research on electronic commerce. Negotiation is a process in which all parties in the process want to obtain a better benefit with respect to their own preference. According to the number of the participants the negotiation type can be modeled as one-to-one negotiation, one-to-many negotiation, many-to-many negotiation, and many-to-one negotiation (Bui, Yen, Hu & Sankaran, 2001). One-to-one negotiation is a bargaining process between two parties. One-to-many negotiation is the auction process in which several buyers compete with each other to win the goal. Many-to-one negotiation is a reverse auction process that includes one buyer and several sellers. And, many-to-many negotiation is the process in which a broker mediates transactions for several buyers and sellers. According to the number of buyer and seller participants, the summarization of the negotiation types is showed in Table 1.

In Lomuscio, Wooldridge, and Jennings (2000), several research challenges and directions about the automatic negotiation research are proposed. They reveal the basic components of the negotiation process, which include negotiation protocol, negotiation domain and the agent utility function. A negotiation approach based on the multi-issues negotiation is proposed in Faratin, Sierra, Jennings and Buckle (1999). They defined each role's task in the process and how the interaction of these parties can enable them to reach their goals. Their approach is based on the negotiation rules to achieve the negotiation agreement. A negotiation system based on the

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