



Chapter XVI

Supporting Mobility and Negotiation in Agent-Based E-Commerce

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ABSTRACT

This chapter presents recent advances in agent-based e-commerce, addressing the issues of mobility and negotiation. It reports on selected research efforts, focusing on developing intelligent agents for automating the e-commerce negotiation and coalition formation processes and mobile agents for supporting deployment of intelligent e-commerce agents and enabling mobile e-commerce applications. Issues such as trade-off between decision-making in negotiation and mobility capabilities of the agents are also discussed in this paper.

INTRODUCTION

Electronic commerce offers new channels and business models for buyers and sellers to effectively and efficiently trade goods and services over the Internet. Agent-mediated e-commerce is concerned with providing agent-based solutions for different stages of trading processes in e-commerce, including need identification, product brokering, merchant brokering, contract negotiation and agreement, payment and delivery, and service and evaluation (Bailey & Bakos, 1997; Chavez et al.,

1997; Guttman & Maes, 1998; Gutman et al., 1998). As the market quickly evolves, new advanced dynamic e-commerce (also called negotiated e-commerce, or e-negotiation) solutions emerge to enable mapping more sophisticated and efficient negotiation models in business transactions to e-commerce; in particular, in the contract negotiation and agreement stages of the trading process. It involves the development of e-commerce agents with more intelligent decision-making and learning capabilities in the context of automated contracting that can include comparison shopping, bidding in auctions and contract negotiations. At the same time, the e-commerce environment also becomes more complex and dynamic due to the business trends to trade in several inter-connected marketplaces, and use new wireless communication channels and portable computing devices (e.g., PDAs, mobile phones) in emerging location-aware mobile e-commerce (m-commerce). Here, the mobility aspects of agent technology are predicted to play a significant enabling role.

This chapter presents recent advances in agent-based e-commerce, addressing the issues of mobility and negotiation. It reports on selected research efforts, focusing on developing intelligent agents for automating the e-commerce negotiation and coalition formation processes, and mobile agents for supporting deployment of intelligent e-commerce agents and enabling mobile e-commerce applications. The mobility of e-commerce agents covers advances in location-aware, mobile and networked comparison shopping, mobile auction bidding and mobile contracts negotiation. The negotiation agents are presented in the context of e-commerce negotiation, with incomplete and imprecise information and dynamic coalition formation, where agents negotiate the distribution of the coalition value and the agent level of resources. Furthermore, issues such as trade-off between decision-making in negotiation and mobility capabilities of the agents also are discussed in this paper.

MOBILE E-COMMERCE AGENTS: RECENT ADVANCES

Mobile agents have been recognized as a very prospective technology for both dynamic and mobile e-commerce applications (Sandholm, 2000; Griffel et al., 1997), but the research in that area is still in the very early stages. Although most of the related research considers mobile communication and location-aware computing, there also is growing research on deploying mobile and intelligent agents in advanced e-commerce, including location-aware, mobile and networked comparison shopping, mobile auction bidding and mobile contracting.

Location-Aware Shopping

Agora (Fonseca et al., 2001) is a project conducted at HP Labs to develop a test-bed for applications of agent technology to a mobile shopping mall. A scenario

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