Chapter XXXVII
Intelligent Product Brokering Services

Sheng-Uei Guan
Brunel University, UK

ABSTRACT

Agent-based system has great potential in the area of m-commerce and a lot of research has been done on making the system intelligent enough to personalize its service for users. In most systems, user-supplied keywords are normally used to generate a profile for each user. In this chapter, a design for an evolutionary ontology-based product-brokering agent for m-commerce applications has been proposed. It uses an evaluation function to represent the user's preference instead of the usual keyword-based profile. By using genetic algorithms, the agent tries to track the user's preferences for a particular product by tuning some of the parameters inside this function. A Java-based prototype has been implemented and the results obtained from our experiments look promising.

INTRODUCTION

In this age of information technology, there has been an increasing demand for more and more sophisticated software that are capable of integrating and processing information from diverse sources. Traditional software technologies have failed to keep pace with these increasing demands, and alternative solutions are been considered. Agent-based systems (Nwana & Ndumu, 1996; Aylett, Brazier, Jennings, Luck, Preist, & Nwana, 1998) have been proposed as a potential solution, and much research has been done on this relatively new technology.

One of the potential applications for agent technology is in the area of m-commerce. According to a study done by Frost and Sullivan[1], it has been projected that electronic commerce conducted via mobile devices such as cellular

phones and PDAs (personal digital assistants) will become a whopping $25 billion market worldwide by 2006. Some of the driving factors behind the m-commerce "revolution" have been attributed to the compactness and high penetration rate of these mobile devices. This, along with the relatively low cost of entry for most service providers, has made m-commerce the buzzword of the next century.

CURRENT SITUATION AND MOTIVATION OF RESEARCH

However, despite all the hype and promises about m-commerce, several main issues (Nwana & Ndumu, 1997; Morris & Dickinson, 2001) will have to be resolved before agent technology can be fully adopted into any m-commerce systems. Clumsy user interfaces, cumbersome application, low speeds, flaky connections, and expensive services have soured many who have tried m-commerce. In fact, a usability study done in London by the Nielsen Norman Group[2] has found that about 70% of the participants have said that they would not want to use a WAP- (wireless application protocol) enabled phone again within a year, after they tried it for a week. Security and privacy concerns have also dampened enthusiasm for m-commerce. One of the concerns has been the fact that mobile devices such as PDAs are very easy to lose. They are also an easy prey for thieves, and unauthorized personnel can have easy access to the valid user ID and passwords stored in these devices to make fraudulent transactions.

Taking all these concerns into account, it seems like good old e-commerce will remain as the preferred choice for online transactions for many years to come. Customers will only use wireless mobile device to access the Internet if they have a good reason to do so. Therefore, in order to entice customers to participate in m-commerce, the developers will have to offer something that is unique and which no self-respecting consumer can live without. One of the potential "killer" applications for m-commerce could be an intelligent program that is able to search and retrieve a personalized set of products from the Internet for its user.

Currently, when a user wants to search for a particular product on the Internet, what he will normally do is to use popular search engines such as Altavista[3] or Yahoo![4], and enter keywords that describe the product. These search engines will process these keywords and churn out a large number of links for the user to visit. On the other hand, if the user already knows of some URLs that might have the product information, he will visit these Web sites and hopefully get the information that he is looking for.

Although these are the more common methods of searching for information on the Internet, it need not necessarily be the best or the most efficient ones. Neither the search engine nor the Web site knows the preference of the user and hence might provide information that is totally irrelevant to the user. For example, if the user wants to search for information about "software agents," the search engine could return links to "insurance agents" instead. A significant amount of time could be wasted on such irrelevant information which could have been better spent on other, more important tasks.

In an agent-based m-commerce, agents act on behalf of their users by carrying out delegated tasks automatically. Currently, there is no single agent that can perform all the tasks meted out by the user. Like humans, specialized agents are required that are able to work in a specific type of environment. A product brokering agent seems to be a potential solution for this scenario. The agent will search for the