Chapter XV
Multi-Agent Tourism System (MATS)

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ABSTRACT

In this chapter we propose the architecture of the multi-agent tourism system (MATS). Tourism information on the World Wide Web is dynamic and constantly changing. It is not easy to obtain relevant and updated information for individual user needs. A multi-agent system is defined as a collection of agents that work in conjunction with each other. The objective of MATS is to provide the most relevant and updated information according to the user’s interests. It consists of multiple agents with three main tiers such as the Interface Module, Information Management Module, and Domain-Related Module. We propose the Rule-based Personalization with Collaborative Filtering technique for effective personalization in MATS which can address the limitations of pure collaborative filtering such as scalability, sparsity, and cold-start problems.

INTRODUCTION

The World Wide Web has become an important way to get information and the ideal environment for publishing information on the Internet. The information on the World Wide Web is distributed, dynamic, and heterogeneous. Users are frustrated with the information obtained by using search engines because of the problem of information overload. It is time consuming to search for relevant information that they need. When surfing Web sites, users are demanding more powerful tools that are capable of integrating and interpreting the vast amount of heterogeneous information available on the Web (Breese & Kadie, 1998). One possible approach is to personalize the Web site
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by creating a system that responds to user queries by aggregating information from several sources depending upon who the user is. Personalization means knowing who the user is, what the user wants, and recognizing a specific user based on a user profile.

Personalization is dynamic, proactive, and personable (Connor, 2001). The interest in personalization has increased as a way to filter information and reduce information overload. We consider personalization to retrieve and share user information in a social network. The social community is the network of interest (personal information of users) and the relationship of users. Kirsch, Gnasa, and Cremers (2006) describes that social information retrieval system as the ability to acquire information that meets the users’ needs through a combination of information retrieval systems and social networks. In social networks, users are described by a relationship, and these relations are used to communicate and share information.

According to Avery and Zeckhauser (1997) and Shearin and Lieberman (2001), Web sites have access to incredible amounts of data about users, their preferences, and their behavior. They also have the ability to dynamically generate all aspects of their Web sites. As a result, there is a great deal of interest in personalization software that can customize the experience of individual users to a Web site or accommodate the message being communicated to the users in order to optimize the effectiveness of the Web site.

Agent-based technology can potentially solve complex, dynamic online decision support tasks and offer a new opportunity in utilizing Web resources. An agent-based system can interact much more personally with the users. Agents are sophisticated computer programs that act autonomously on behalf of the users in a distributed environment. Intelligent agents can search the relevant information and make recommendations to the individual user. Because of the flexible and dynamic characters of intelligent agents, they are being used widely as an interface system between the user and the World Wide Web for different applications.

During the last few years, a wide range of different Web-based tourism-related agents has been established. The acceptance and consequently the competitiveness of a tourism system are mainly determined by the quantity and quality of the data it provides. Therefore, most existing tourism systems try to fulfill the tourist’s request (interest) from an extensive data collection (Rumetshofer & Wob, 2005). In the tourism domain, there is a vast amount of information available about accommodation, transportation, restaurants, and sightseeing places, and it is troublesome to get the right information to the right person at the right time.

The objective of our research is to provide an efficient multi-agent based tourism information system that is able to overcome the information overload problem, and to improve the scalability, sparsity, accuracy, and quality of recommendations.

With this view, we propose a multi-agent tourism system (MATS) to assist users in retrieving and integrating tourism information on the World Wide Web effectively and efficiently. MATS consists of multiple agents with three main tiers: the Interface Module, Information Management Module, and Domain Related Module. In this system, the core technique for the Personalization Agent is the Rule-based Personalization with Collaborative Filtering technique. It identifies the user by retrieving the user’s profile and filters the information to provide only those that match the user’s interest. The information relevant to the user can be obtained by two options. One option is to ask the user to fill in the form, and another option is to use cookies that can be used to track where the user travels over the site. Several agents in each tier perform their relevant tasks to provide the required pieces of information from each domain to satisfy the user’s request.
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