Chapter 5

Exploiting a Map-Based Interface in Conversational Recommender Systems for Mobile Travelers

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ABSTRACT

Nowadays travel and tourism Web sites store and offer a large volume of travel related information and services. Furthermore, this huge amount of information can be easily accessed using mobile devices, such as a phone with mobile Internet connection capability. However, this information can easily overwhelm a user because of the large number of information items to be shown and the limited screen size in the mobile device. Recommender systems (RSs) are often used in conjunction with Web tools to effectively help users in accessing this overwhelming amount of information. These recommender systems can support the user in making a decision even when specific knowledge necessary to autonomously evaluate the offerings is not available. Recommender systems cope with the information overload problem by providing a user with personalized recommendations (i.e., a well chosen selection of the items contained in the repository), adapting this selection to the user’s needs and preferences in a particular usage context. In this chapter, the authors present a recommendation approach integrating a conversational preference acquisition technology based on “critiquing” with map visualization technologies to build a new map-based conversational mobile RS that can effectively and intuitively support travelers in finding their desired products and services. The results of the authors’ real-user study show that integrating map-based visualization and critiquing-based interaction in mobile RSs improves the system’s recommendation effectiveness, and increases the user satisfaction.

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INTRODUCTION

The users of travel and tourism web sites often find it difficult in choosing their desired travel products and services due to an overwhelming number of options to consider, and the lack of the system’s help in making product selection decisions. The problem becomes even harder for users of the mobile Internet, who browse travel sites and their product repositories using a mobile device. This additional difficulty is due to the intrinsic obstacles of the mobile usage environment, i.e., mobile devices have small screens and the data transfer rates of wireless networks are typically lower than those of wired ones.

Recommender Systems RSs are decision support tools aimed at addressing the information overload problem, providing product and service recommendations personalized to the user’s needs and preferences at a particular request context (Resnick & Varian, 1997; Adomavicius & Tuzhilin, 2005). However, existing recommendation technologies have not been developed specifically for mobile users; and this chapter shows that recommendation techniques developed for the wired web must be adapted to the mobile environment in order to better exploit the available information, and provide software tools usable on mobile devices.

The evolution of mobile devices (e.g., PDAs and mobile phones), wireless communication technologies (e.g., wireless LAN and UMTS), and position detection techniques (e.g., RFID beacon-based and GPS), have created favorable conditions for the development and commercialization of a large number of location-based mobile services (Mohapatra & Suma, 2005; Steinfield, 2004), i.e., information services accessible by mobile devices through the mobile network, and utilizing the geographical position of the mobile device. As a consequence, many location-based mobile services have been introduced in the recent years, including emergency services, information services, navigation support services, etc.

For example, mobile travelers can access local tourist information services providing information about nearby points of interests (Pospischil et al., 2002), such as pubs and restaurants (Dunlop et al., 2004), or get routing guidance from their position to a target location (Pospischil et al., 2002). In many of these systems, maps and map-based interfaces are used to visualize points of interests (e.g., restaurants, museums, or hotels), their spatial relations, and various kinds of information related to these points (e.g., menus, opening hours, or in-room services).

However, map-based interfaces do not solve all the information access problems. In fact, a major problem in map-based visualization is the need to keep the display readable and free from irrelevant information. This is particularly true in the mobile usage environment. Because of the limitations of mobile devices, especially small screens and limited computing power, displaying on an electronic map a large number of objects and their related information is computationally expensive and usually not effective. Hence, systems providing mobile travel services should employ filtering mechanisms to reduce the amount of data (information objects) that is displayed on an electronic map.

Though the specific benefits of map-based interfaces and recommendation technologies have been demonstrated in a number of previous research projects, the integration of these two technologies and their empirical evaluation, in terms of usability and effectiveness, in mobile travel support systems have not been studied yet. In this chapter, we present an approach for integrating recommendation technologies and electronic map visualization technologies to build a map-supported travel RS that can effectively and intuitively provide personalized recommendations on mobile devices.

Our recommendation methodology integrates long-term and session-specific user preferences, uses a composite query representation, employs a case-based model of the recommendation