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Review

Personalizing recommendations for tourists

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ABSTRACT

Internet has significantly influenced the tourism sector providing a great variety of services and products online. However, the number of choices has increased so dramatically that is very difficult for the consumers to find what they are looking for. For this purpose, recommendation systems for tourism have attracted a lot of research energy and interest. The main characteristic of these systems is that they can personalize their recommendations to each user interacting with the system. Personalization is even more essential for tourism recommendation systems used in handheld devices where the screen is even smaller and the presentation capabilities are limited. This paper addresses these problems and provides some development steps for a tourism recommendation system by making a state of the art in personalized e-tourism services both in computers and handheld devices as well as a review of the user modeling and personalization techniques used in these systems. Furthermore, the theories used for the improvement of the personalization procedure in tourism recommendation systems; their applications and evaluation are discussed.

Contents

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1. Introduction

The tourism industry is regarded as one of the biggest sectors in the world generating an estimated 11% of the global gross domestic product (GDP) and employing 200 million people and serving 700 million tourists worldwide – a figure which is expected to double by the year 2020 (Roe and Urquhart, 2001; Maswera et al., 2009). The advances of Information Technology have affected remarkably the way that tourism services are performed. Indeed, Information and Communication Technologies (ICTs) enable tourists to access reliable and accurate information as well as to undertake reservations and plans in a fraction of time, cost and inconvenience that may be required by conventional methods (O'Connor, 1999).

These services were further influenced by the Internet and related technologies. Customers search for information about travelling, make online air-ticket bookings, online room reservations, plan trips and make other online purchases themselves instead of relying on travel agencies to undertake this process for them (Morrison et al., 2001). Indeed, as Gretzel and Yoo (2008) point out, three-quarters of travelers have considered online consumer reviews as an information source when planning their trips. However, ICTs and the Internet have increased the number of choices so dramatically that is very difficult for the consumers to find what they are looking for. The appropriate discovery of tourism services is one of the main drawbacks when people travel (Hui et al., 2007). According to Wolfe's et al. (2004) research, the reasons of consumers not purchasing travel products online are the lack of personal service, security issues, lack of experience, and time consuming.

The Internet has become so popular that not only teenagers browse information online, but also people of all different ages. Graeupl (2006) supports that flight information and accommodation are the most searched topics for the consumers aged between 50 and 60 years olds, and most of them were not interested just in package holidays. However, different users have different preferences and needs. A remedy for the negative effects of the traditional 'one-size-fits-all' approach is to develop systems with an ability to adapt their behavior to the goals, tasks, interests and other features of individual users and groups of users (Brusilovsky and Maybury, 2002; Virvou, 2001).

An effective solution for reducing complexity when searching information over the Internet has been given by recommendation systems (Adomavicius and Tuzhilin, 2005). Recommendation systems have been used for finding books (Linden et al., 2003), papers (Middleton et al., 2004), movies (Good et al., 1999; Salter and Antonopoulus, 2006; Virvou and Savvopoulos, 2005), tv-programs (Schafer et al., 1999; Griffiths, 2003; Zimmerman et al., 2004), news (Billsus and Pazzani, 2000; Paliouras et al., 2008; Das et al., 2007; Li and Kao, 2009), music (Sotiropoulos et al., 2008; Aguzzoli et al., 2002), web-pages (Lieberman et al., 2001), etc. The main characteristic of the recommender systems is that they can personalize their interaction to each individual user. Personalization involves the design of enabling systems to capture or infer the needs of each person and then to satisfy those needs in a known context (Riecken, 2000). Personalized recommendations on commercial applications have been applied on www.Amazon.com, www.ebay.com and many other web sites.

Lately personalized recommendation systems have been gaining interest in tourism to assist users with their travel plans (Ricci, 2002; Ricci and Werthner, 2002; Wallace et al., 2003; Loh et al., 2003; Rabanser and Ricci, 2005). Indeed, Maswera et al. (2009), in a review of the website for tourism in sub-Saharan Africa, propose personalization of the services in order to evolve these sites into marketing tools. As a result recommender systems have been used successfully in travel and tourism. For example, Ricci (2002) identifies TripleHops TripMatchers used by www.ski-europe.com and VacationCoachs used by Travelocity.com.

A personalization system is based one three main functionalities: content selection, user model adaptation and presentation of results (Mirazzo and Tasso, 2002; Diaz and Gervas, 2005; Diaz et al., 2008). By content selection, one may refer to selecting destination, tourist attractions, accommodations, restaurants, routes or all the above for planning a whole trip. By user model adaptation, one may refer to techniques used for maintaining updated user models. Finally the presentation of results involves the technologies used (e.g. multimedia, GIS, etc.) for improving the interactivity of the systems and, therefore, human–computer interaction. Taking into account these functionalities, this paper provides some development steps for a tourism recommendation as well as a complete review of recommendation and user modeling techniques used in such a system.

2. Development steps of a tourism recommendation system

Despite the importance of the development process of IUI for recommendations, very little information is reported in the relevant literature about it. As a matter of fact this is a problem that concerns the IUI literature in general. Delisle and Moulin (2002), after an exhaustive review of the relevant literature, have come to the conclusion that there is a shortage of guidelines available for the development of IUI applications. In the specific case of IUIs that make recommendations, there are many steps that are required for their effective development. These steps are neither trivial nor adequately described in the relevant literature.

In view of the state of the art presented in the next sections, some guidelines for the development process of a tourism recommendation system are proposed. It is not the purpose of the paper to propose a specific software life-cycle model. The developers could use any life-cycle model they wish, e.g. the waterfall model, Rational Unified Process, Staged Delivery. However, all these models have some common stages such as requirements capture and analysis, design, implementation and evaluation. Therefore, this paper refers to these development steps and not the whole life-cycle.