Interactive Itinerary Planning with Trip@dvice

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Abstract: This paper describes a Interactive Itinerary Planning web system that supports travellers in the selection and comparison and bundling of travel products. In addition to traditional information search and filtering, the system supports interactive query management to help its users to plan a leisure trip. Case Base Reasoning and similarity base retrieval techniques are used for selecting and ranking suggested travel services (e.g., accommodations or sport activities) as well as innovative advanced techniques to help the user to refine the query in the case it fails to satisfy the user's information needs.

Keywords: Recommendation System, Case-Based Reasoning, Trip Planning

1   Itinerary Planning

This abstract describes Trip@dvice, an innovative tool to support conversational human-computer interaction in recommender systems. Trip@dvice has been applied to travel planning to help the user to build a personalized itinerary, i.e., a collection of tourism products selected from electronic catalogues. To demonstrate this tool, we have developed a WEB application, called NutKing that enables the user to plan a vacation in Trentino (Italy).

eCommerce tourist web sites allow the user to search in catalogues for those products that match the user's preferences and constraints. This simple approach has some limitations when applied to the tourism domain. In fact, tourism products have a complex structure, the definitions of which have not been standardized (Werthner and Klein, 1999). Moreover, the tourist decision process is more complex than that typically required for selecting a CD or a movie (Fesenmaier and Jeng, 2000). Basically, the user's preferences cannot be easily translated into product features and finally into recommendations.

To overcome these limitations, tourist web sites are incorporating recommender systems, i.e. applications that provide advice to their users about products they might be interested in. Collaborative-based and Content-based filtering are the two prevalent approaches used in recommender systems (Burke, 2000). Collaborative Filtering (CF) techniques exploit the other users' choices to provide recommendations. The main disadvantage of CF is that it does not consider the users' explicit constraints concerning the product features. Furthermore, it needs a large set of feedback from the users in order to provide good recommendations. Content-based filtering exploits a set of preferences elicited from the user to select products from an electronic catalogue. In this case, the user's preferences are considered as constraints on the product features. Therefore other user's experiences are not taken into account.

The solution we propose combines content-based and collaborative-based filtering to build the recommendation. In the content-based filtering stage, Trip@dvice supports the user in building the logical filter to be applied to the product catalogues. When a catalogue is searched for those products that satisfy the given logical filter, two limit (failure) situations could happen: there could be too many results or, none. In these cases, Trip@dvice helps the user to find a suitable number of products providing some suggestions about how to reformulate the query. Finally, in the collaborative-based stage, the result set is ranked according to the choices made by other users in previous similar recommendation sessions. A full description of the tool can be found in (Ricci et al., 2002). In the

following section, we describe a typical user's interaction with the system.

2 Human-Computer Interaction

Trip@dvice supports the interaction mimicking a typical counselling session in a real travel agency. The user initially defines the major trip goals and constraints entering some preferences as shown in Figure 1. These are general features of the proposed trip, including travel companions, budget and means of transportation. These wishes are used both to recommend products, exploiting other users' trips, and to set some default constraints in successive query forms.

After this initial step, the user can start building his itinerary by searching for travel products, as required. This could be a destination, an accommodation, an event or an attraction (available catalogues).
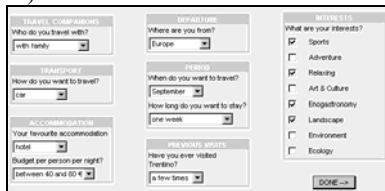

Figure 1: Setting general travel wishes.

Let's assume the user is looking for an accommodation; the system offers the user a classical Query-By-Example interface (left side of Figure 2), where he can set constraints on the product features. If the query fails because no products satisfy the query, the system proposes some alternative query's relaxations that, if applied, would provide the user with a suitable result set (Figure 2).
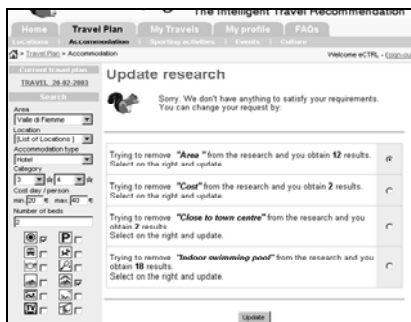

Figure 2: Suggesting query relaxations.

Another possible situation may occur when the user selects too few constraints and the query retrieves too many products to be examined. In this case, Trip@dvice asks the user to provide some additional (alternative) constraints (Figure 3).

At the end of this interaction a list of recommended products is shown. All of these satisfy the (explicit) user constraints, but furthermore the products most similar to those selected by other users with similar general wishes, are ranked first.

By clicking on the small trees icon on the right side of the product, the user can obtain an explanation of the recommendation (Figure 4). Then the user can add the selected product to his travel bag and proceed by adding other items to his trip.
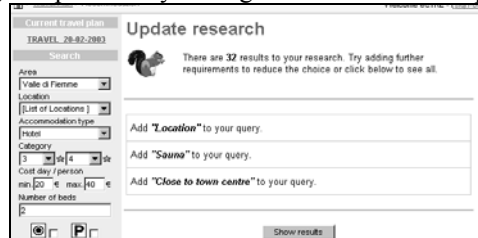

Figure 3: Suggesting query tightening.

Finally, the user can print the complete itinerary in a brochure-like style.

Figure 4: Showing the final recommendation.

References

Werthner, H. and Klein, S. (1999), *Information Technology and Tourism - A Challenging Relationship*, Springer.

Fesenmaier, D. and Jeng, J. (2000), Assessing structure in the pleasure trip planning process, *Tourism Analysis*, 5, pp.13-17

Burke, R. (2000), Knowledge-based recommender systems, *In J.E. Daily, A.Kent, and H.Lancour, editors, Encyclopedia of Library and Information Science*, volume 69. Marcel Dekker.

Ricci, F., Arslan, B., Mirzadeh, N. & Venturini, A. (2002), ITR: a case-based travel advisory system, in S. Craw and A. Preece (eds), *6th European Conference on Case Based Reasoning, ECCBR 2002*, Springer Verlag, pp 613–627.