An Expert System for Tourist Information Management

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ABSTRACT

In this paper I describe the design and development of an expert system for tourist information management. The expert system was built to recommend a suitable travel schedule that satisfies user input constraints such as time period, budget and preferences. Tourist center managers need to answer similar set of queries in their day-to-day work which could be replaced by an expert system for tourist information management. There are many different tourist information such as activities and places which can be stored as similar data structure. The proposed knowledge structure would be flexible enough to cope with high volatility in some tourist information such as transportation routes.

Keywords: Expert System, Travel Router, Inference Engine, Tourist, Learner

1. INTRODUCTION

The application of expert systems in tourism industry is no exception and they play a vital role in accumulation, synthesis and dissemination of knowledge. Many earlier researchers have mentioned wide use of software tools in the tourism industry. Expert systems are typically knowledge-based system to embody expertise in a particular domain. The mere process of building a knowledge base in a particular domain may help relieve man power and experts from answering routine questions which a computer based expert system can easily handle. Expert systems are extremely productive, but a pure expert system approach is limited by the skill of experts and the expert's ability to articulate knowledge which will again limit the range of available knowledge bases. The literature has enumerated the characteristics which make the problem domain an ideal candidate for expert system application (Crouch, 1991). Expert systems are the most prominent product of Artificial Intelligence technology and they appear particularly suited for service industries such as tourism.

This expert system includes the features of both the travel router: An intelligent routing module for the tourism and personalization travel support agent. Travel Router is an intelligent routing module designed for assisting the tourist in finding the shortest possible land route to reach the intended destination assisting the tourist in finding the shortest possible land route to reach the intended destination. By combining the features of both the travel router: An intelligent routing module for the tourism and personalization travel support system, we can give a more effective approach for the management of various tourist information.

2. THE EXPERT SYSTEM (PERSONALIZATION TRAVEL SUPPORT ENGINE WITH TRAVEL ROUTER)
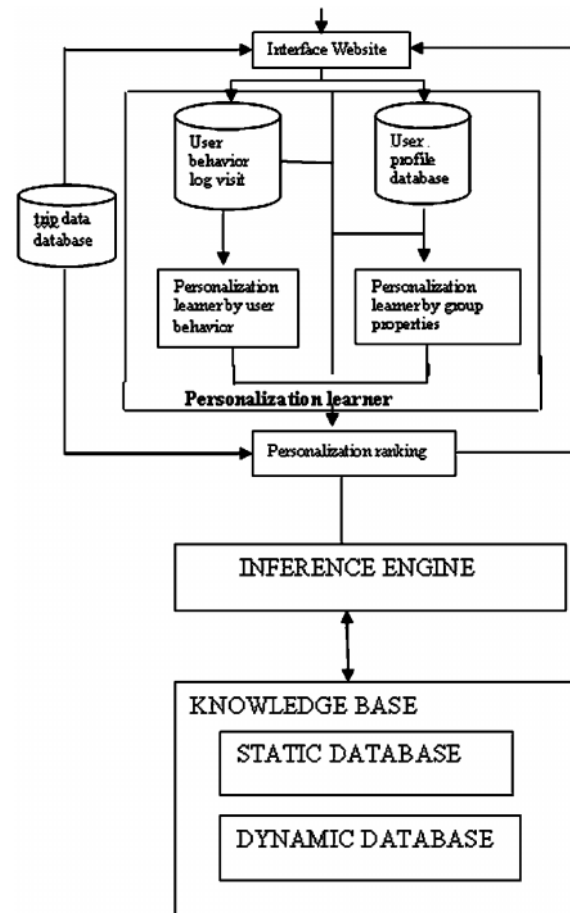
The Personalization Travel Support System

Fig. 1: Expert System Architecture

Structure includes the followings:

1. *Personalization Learner*: Is the process of learning and analyzing of website usage behavior to understand user's interest.

2. *Personalization Ranking*: Its function is to rank the trip information for the web users. The work process is based on the initial weight of learning and the user's interests on each trip.

3. *User Profile Database:* This is the database of web users, which is operated for travel management depending on the user's behaviors, the database will be processed in mapping the trip list to the user's requirements. Profile database is categorized into two types: User's properties data and User's behavior.

3. PERSONALIZATION LEARNER

To perceive individual user's interests, one has to study user's behaviors by means of the information from the Interface Web Site that records two categories of data:

1. Web user profile includes user name, age and sex.

2. Traveling Information includes identification number, duration, categories, trip lowest price, trip highest price and destination country.

There are two learning approaches using in this study: personalization learner by group properties and by user behavior.

Personalization Learner by Group Properties:

System learns from all users in one group to find the group interests of travel information by using given data on user ages and genders.

Personalization Learner by User Behavior

Recorded data is analyzed with user behaviors and the travel information in order to find the unique interest of each web user. Reinforcement learning algorithm, called Q Learning is applied at this stage. Q Learning is used to maximize a reward to the item on the list which is clicked and award a penalty to the item that is not clicked.

5. TRIP FEATURES

Trip features associate to user interests in tourist programs, they are as follows:

1. Trip Duration is numbers of days offering by each trip.

2. Trip Categories is type of trip including shopping, eco tour, and scuba diving and trekking.

3. Trip Lowest Price is the lowest prices for trip expenses.

4. Trip Highest Price is the lowest prices for trip expenses. and

5. Trip Destination is the country of visitation.

5. PERSONALIZATION RANKING

The display area for Personalization Ranking was divided into two parts. Part one is the main box. When a user explores a website to find any travel information, the engine will rank the trip by using reinforcement theory and given data from group properties, fundamental data that the all user registers such as ages and genders and historical data when visiting the websites.

Part two is the Recommend Box. When a user explores a website to find any travel information, the engine will display trip information randomly at the first visit. After that it will display travel information which has been analyzed, and learned from historical user transactions, and trip database. The travel information which is top five ranking will be offered on the web page.

6. TRAVEL ROUTER

As shown in the expert system architecture. Inference engine has the required rules to conclude about scenario at hand. Static database has distance database, towns and the corresponding distances between them, as input by the programmer as clauses in the system and are permanent to the system unless changed by the programmer. Dynamic database comes out with solutions about possible routes and their corresponding distances between them for any query session and is held only temporarily for the current session. The system provides the tourist with the option to enter two towns. Thus, whenever a route is concluded by the system for the input parameters, backtracking is permitted to output other possible routes, if any. The dynamic database asks the user to input two parameters for a particular session. The parameters are the town of origin and town of destination for the travel.

The user input for the above parameters are stored in the dynamic database of the Travel Router. Travel Router requests the user to enter the choice of his towns. Accordingly, the user enters the name of town of origin and town of destination and hits return. Travel Router provides the users with information regarding the existing routes and distances between these two towns. It also provides the user with the information regarding the shortest route between the two towns and the corresponding shortest distance.

7. CONCLUSION

The personalized support system with Travel Router recommends trips for tourists based on user behaviors and group properties has been proposed. The system starts learning from user profile, trip database and user historical transactions. The learning process is using a Q-learning technique. The main concept of the system is that users can surf on the PTS web site to find out interesting trips. Then the top five trips are suggested for users after all candidate trips are ranked in terms of multiple criteria, these trips may be dynamically changed according to user behavior. Travel Router can provide tourists with information on the route and the distance between any two towns in the region without consulting a travel agent. Travel Router can be made to execute on the Internet browser using special Visual Prolog features and this makes it more useful in the e-business era.

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