Processing of Distributed Query for Web Based Tourism Agent

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Abstract

A multi-agent system is a collection of software agents that work in conjunction with each other. This thesis emphasizes the personalization Agent for Tourism Advisor system. The Personalization Agent retrieves the user profile based on that user's choices and behaviors by explicitly. Personalization is a very hot topic in internet development these days. The focus of personalization of this system is to give a user more effective and efficient tourism information of travel schedule. Personalization can be performed implicitly or explicitly. In general, an implicit personalization of this system process requires a component in the system that monitors use behavior and makes changes to the profiles according to their behavior. This system illustrates the technique in the tourism domain (Myanmar). In a distributed database system, the global database is partitioned into a collection of local databases stored at different sites. The Travel Service Advisor (TSA) uses Agent System. The TSA's main purpose is to help clients by providing up-to-date information about travel companies' performance and help them choose the right company according to their requirements and preferences.

Keywords: Tourism, Semantic Web, Software agents, Smart Travel Service Advisor

1. Introduction

The tourism industry has become a competitive business all over the world, and travel companies are trying their best to take full advantage of this opportunity. Today, the internet is both a vehicle for advertising and a global market place of goods and services, ranging from electronic publications to traditional books, from financial services to travel planning and the online monitoring of traditional logistics and physical distribution of goods. In the tourism domain, there is a vast amount of information available about accommodation, transportation, restaurants, sightseeing and so on. Intelligent software programs are being used to help users with personalized information. Multi-Agent System is contributing most in the field of intelligent software. The agents can respond individually, pro-actively and reactively, the changes in their environment. A distributed database (DDB) is a collection of multiple, logically interrelated databases distributed over a computer network. Data retrieval from different sites in a DDB is known as distributed query processing (DQP). The goal of DQP is to execute such queries as efficiently as possible in order to minimize the response time that users must wait for answers or the time application programs are delayed.

2. Related works

Ting Li et al. [10] talk about the need to spread the concentration of peak period travel. The method used to reduce the peak travel requirement and increase capacity utilization, is "dynamic pricing" [9], which is the most popular revenue management method. Kruszyk et al. [5] introduce the concept of collaborative content filtering. Their work focuses on the development of an agent-based travel support system, in which personalized information is delivered to the user. Baladarshan and Enkhsaikhan [1] present the use of a multi-agent system for the travel industry. Travel agents do not share information about their clients with other agencies, as this information is critical to their business policies, but may be made accessible to a limited number of companies, not the whole industry. Yeuh et al. [12] discuss the problem faced by the client while planning a tourist search for information from different sources like web sites, knowledge bases, etc. The issues are related to customer service and planning management. The local tour planning process helps the tourist when he reaches his destination. Repo et al [7] examine the development of the business-to-business mobile service (B2B) into the business-to-consumer service (B2C). The mobile service selected for testing purposes was designed in a business tour context, but they transferred the service into the leisure context.

The objective of the study of Horan et al. [2] is the delivery of information by the government to the citizen through electronic means, based on user satisfaction. The Advanced Traveler Information System is a service offered by the government to its citizens. The goal is to evaluate the satisfaction level of citizens, utilizing the

services offered by the government for trip planning. Huang and Lin [3] propose a system that effectively and quickly calculates the approximate shortest distance route. There are N! routes for a tourist to visit N cities. This Approximate Shortest Distance Route Intelligent System for Traveling integrates the Hungarian Method and the Branch-and-Bound Method in Operations Research, and Nearest Neighbor in Data Mining. Park et al. [6] discuss the context-aware tourist guide. Li et al. [10] talk about the traveler behavioral model in railway simulation. Kruszyk et al. [5] focus on personalized content delivery for travelers.

3. System overview

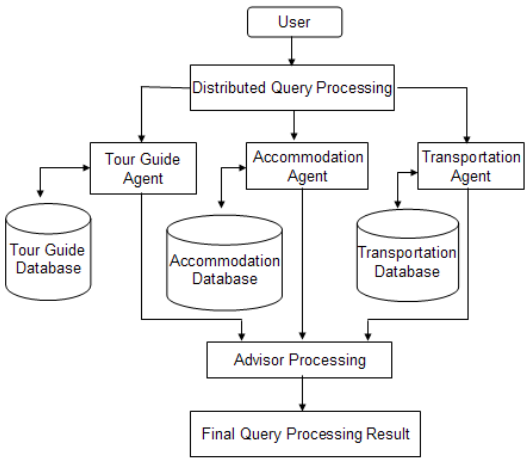

Figure 1: Architecture of Distributed Query system

Step1: The user requests for a travel service from the Interface.
Step2: In the Distributed Query process, Agent can manage the explosive growth of information. It can collate information from distributed sources.
Step3: Tourism information involves places of interests and they can be classified according to different criteria: eg. The type of place (eg, pagodas, beach, site seeing, etc.).

Accommodation database maintains information about hotels in Myanmar. For each hotel, maintain information about its category, price, the services available (types of rooms, availability of bar or restaurant, swimming pool, gym, parking, etc.,), and information about its location (close to places of tourist interest, close to industrial sites, etc.).

Transportation database includes information about car rental and other transportation information. All of the information is stored in corresponding databases.
Step 4: For the advisor processing step, agents retrieve Tourism, Accommodation and Transportation information from the corresponding databases.
Step 5: In the final query processing result, possible states are 'request', 'query processing' and give the 'result' to the user. In the 'request' State, if the user profile found, take the 'submit-form' Action. In 'perform querying' State, take the 'matching' Action and after finished 'matching' gives the result in the 'result' State.

3.1. Agent based Distributed Query System (ADQS)

In Distributed Databases, query processing is mostly based on formalisms that assume a closed world and use the principle of negation as failure. Distributed systems can be taught of as a partnership among independent cooperating centralized systems. Data retrieval from different sites in a DDB is known as distributed query processing (DQP). In a relational database all information can be found in a series of tables. A query therefore consists of operations on tables. The most common queries are Select-Project-Join queries. This proposed system is an agent-based solution for searching requirements based travel companies, and it is focused on the User Satisfaction Level (USL). The final result depends on the USL provided by the users about the companies. ADQS is a search and analysis process in which different companies are searched by the agent, according to the user's requirements, and analyzed based on their USL, as shown in Figure 2.

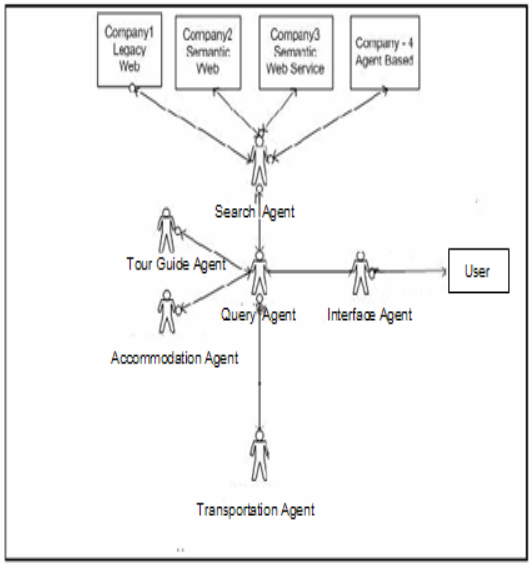

Figure 2: System Architecture

3.1.1. System Implementation. The system is divided in two phases. In this section, elaborate the core of the system design and show the different agents and processes involved, will be stored in the knowledge database.

User Assessment and Requirement Process. This process assesses the user's personal characteristics and travel requirements, and is divided into two steps.

Step 1 analyzes the personal disposition, which plays a major role in the decision-making. Information will be securely stored in the knowledge database, with the client's permission.

In step 2, the user provides his/her travel preferences such as: type of tour (economy or luxury), class of hotel and requirements such as: budget, duration and destination. This information will be stored in the knowledge database.

3.2. Smart Travel Service Adviser (STSA)

The Smart Travel Service Adviser (STSA) is an agent-based solution for searching requirements based travel companies, and it is focused on the User Satisfaction Level (USL). The final result depends on the USL provided by the users about the companies. STSA is a search and analysis process in which different companies are searched by the agent, according to the user's requirements, and analyzed based on their USL, as shown in Fig. 2. A Model View Controller (MVC) design pattern is applied for structuring the application. The view is completely separated from the model, using a Controller as an intermediary. If we separate the different parts of the MVC, we will find a structured and organized mechanism for routing different requests to their respective destinations. Separation of responsibilities helps the Application Programmer (AP) and Designer directly. The AP can code his logic while at the same time the Designer can use his creativity on new designs and make them available for the AP to show his desired results. The Java Jena Framework is used for persistence and to retrieve the data ontologically. This enables Semantic Web applications to be written.

3.3. Distributed Query Processing in a Database System

Distributed processing of aggregates is considered based on the functional dependency among the fragment attribute, the aggregate attribute, and the group-by attribute. We also apply semantic information for efficiency query processing. Distributed aggregate processing is based on the fact that after the join clauses are processed at each processing site, we have a joined relation which is fragmented by the fragment attribute of the fragmented relation we chose by select-and-move. Semantic information can be used for efficient query processing.

The process of the final query processing result is as follows:

Let E_{req} be the set of all possible States,
$E_{req} = \{e_0, e1, e2\}$
Where, e_0 = request
e_1= perform querying
e_2= give-result
A_{req} be the set of all possible Actions,
$A_{req} = \{a_0, a1\}$
Where, a0= submit-form
a_1=finish-matching
Example run for Request query is as follows:
R_{req}: $e_0 \xrightarrow{a_0} e_1 \xrightarrow{a_1} e_2$

4. Use of Information Technology in Tourism

Tourism as an activity requires planning and so do tourists. Since planning is a science of social intervention, it follows that this area is also concerned with how to best use Information Technology (IT) to improve planning processes and institutions, and what kind of IT, and IT development research strategies, best serves planning processes and institutions. In the travel and tourism domain, different systems have been developed to support the users to plan long trips involving flight scheduling and hotel reservations or even to select a set of tourist activities.

Organizing a tourist program is a task that people are quite used to deal with. STAR (Smart Tourist Agenda Recommender) has been sighted. As an example used to automate the tasks of organizing a tourist agenda. STAR's reasoning engine takes as input both the knowledge base and the input constraints (representing the user requirements) in order to configure a suitable agenda to suggest to the tourist (i.e. the final user of the system).

5. Experimental results

This system has five databases. There are User, Tour Guide, Transportation, accommodation database. The user can enquiry with the money that have enough for traveling the trip. Then the system will result the travel schedule using the travel advisor. So the user can choose the schedule that will be convenient. In the schedule include tour guide, accommodation, and transportation agenda. The system messages the user who will not have enough money to travel.

Table 1: User

Key	Name	Phone Number	Address	Source	Destination	Budget
1	U Mya	098556734	Yangon	Yangon	Bagan	150

Table 2: TourGuide Table

Key	Source	Destination	Budget	T-key
1	Yangon	Bagan	150	1
2	Mandalay	Yangon	100	2

Table 3: Transportation Table

Key	Transportation Type	Budget	T-key
1	Air-con Express	50	1
2	Ordinal Express	75	1

Table 4: Accommodation Table

Key	T-key	Hotel-name	Double-room Charge	Single-room Charge
1	1	Royal	50	25
2	1	Shwe Yaing	40	20

Example Query - A person lives in Yangon. He has the budget of $150 budget. He wants to go bagan and know travel information.

The system will generate the advising query information.

Let user input budget be Bug. User table and TourGuid table join source field.

(AcommonationX.Hotel-name, AcommonationX. Double-room Charge, AcommonationX.Single room Charge, TransportationX.TransportationType)

WHERE EXISTS TourGuideX (EXISTS AccommodationX (TransportationX.T-Key = TourGuideX.T-key AND TourGuideX.T-key = Accommodation.T-key AND TourGuideX.Budget >= Bug))

Query result show in Figure 5.

Figure 4 shows the user submission form. The submission form include user name, address, phone no, source, destination and budget.

Figure 4: User submission form

Then, the system produces the traveling advisor report. It is shown in figure 5.

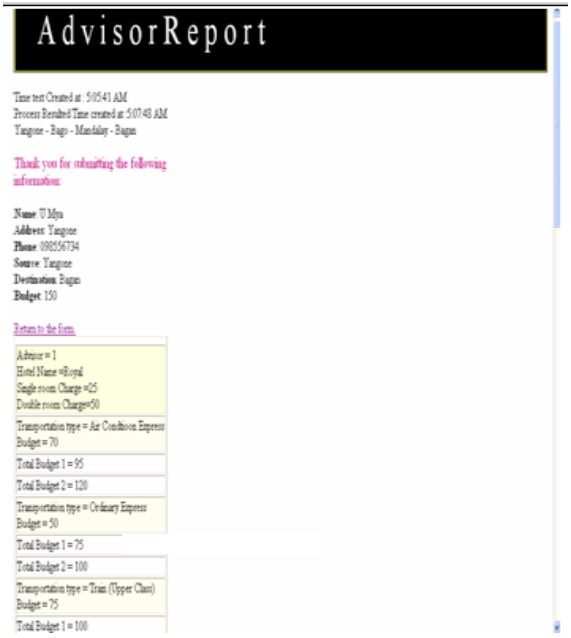

Figure 5: Result of Traveling Advisor

For the system have database security login, the user can know up-to-date information about travel schedule. Figure 6 shows database security login.

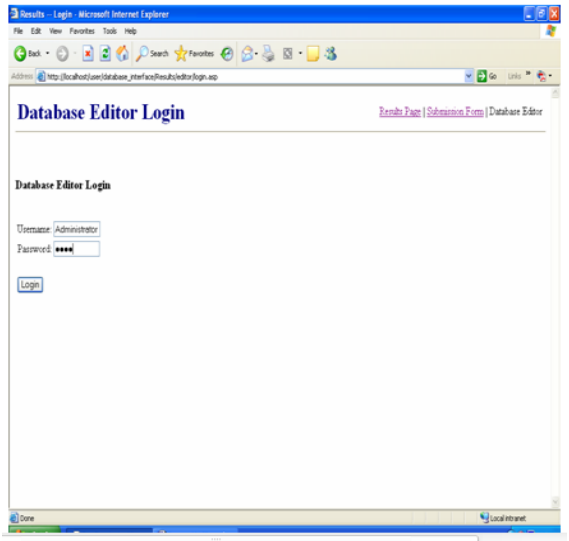

Figure 6: Database security login for edition

The user can also know the detail of travel schedule form. It is shown in figure 7.

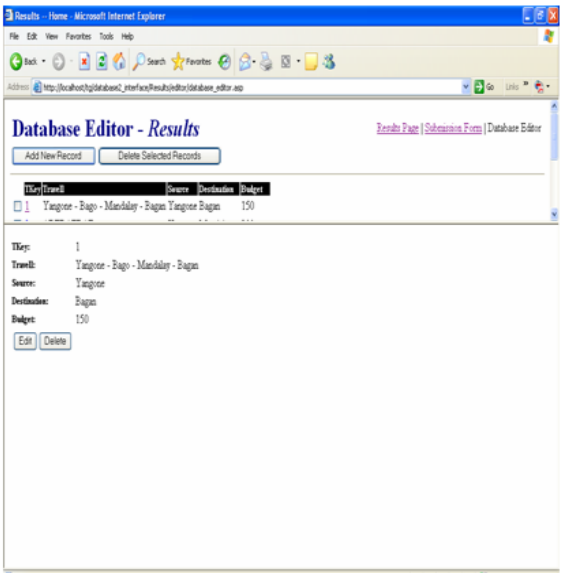

Figure 7: Travel schedule edition form

6. Advantages of the system

The system introduces the Personalization Agent, which is a part of Multi-Agent Tourism system. Personal agent provides a graphical interface to the user that facilitates the access to the services offered by the system. The user can make individual choice for traveling to different destinations. Distributed query processing related to the performance of the system with the distributed database. The fragment attribute, the aggregate attribute and group-by attribute to possibly preprocess aggregates in parallel. Distributed query processing is that query results are collected quickly. The distributed arrangement combines efficiency of processing with increased accessibility. The system show user travel advisor information. Semantic information can be used for efficient query processing.

7. Conclusion

In conclusion, present Agent based solution, which helps its users in the decision-making process before finalizing a service provider. The ability of agents to acquire information and to behave like the user, shows their strength, and helps the user since the agent acts on behalf the user in order to bring about optimal results. The system focus on recommendation, customization, and querying and agent communication. New services will be incorporated such as financial and self-trip planning. Financial services will be helpful for tourists who have a limited budget and want to explore different finance options available. Self-trip planning provides the facility for tourists to plan their own trip as they wish. Complete information will be provided to the users to plan their tour.

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Figure 6 Continued Itinerary

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