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Research on Semantic Web-Based Custom Travel Model

Ki-Hwan Ryu*

[*]Department of Tourism Management, Institute Information Technology, Kwangwoon University, Kwangwoon-ro, Nowon-gu, Seoul 01897, Korea.

**Corresponding author: Ki-Hwan Ryu, Ph.D.*

Abstract

Recent advances in semantic web technology havened to the development of systems in which computers understand and respond to human requests. In addition, software developers have introduced semantic web technology for use in the tourism sector. In this paper, we apply a semantic web search-based system that plans customized itineraries using the Android smartphone. This system is built to provide all travel-related information, such as information pertaining to airlines, tourist attractions, restaurants, and hotels, to its user. We propose a customized travel model that allows more efficient searches and reservations by automatically displaying all relevant information needed for travel in an appropriate order, starting from the planning stage .

KeywWords: Semantic Web services, Recommendation System, Intelligent Service, Travel Planning

INTRODUCTION

As computers are more capable of understanding semantics of information resources, and as machines learn to communicate with each other, a wide variety of autonomous, next-generation intelligent web services are[1] being applied to the tourism sector. In the tourism sector, reservation systems based on volatility have been transformed into reverse-auction systems, and the tourism industry with its typical feature of intangibility now provides tangible evidence in various ways through information technology. [2] The technology has convenient mobility and network accessibility, which enable tourists to receive support at many stages of travel via smartphone applications. [3] In addition, it can analyze tourists' opinions obtained from social networking service (SNS)big data to provide travel information.[4] Former studies include research on providing travel information [5], ubiquitous environments [6], and applications of location-based services [7]. Furthermore, cities are working on creating smart-tourism environments [8] that utilize virtual reality (VR), augmented reality (AR), and global positioning system (GPS) technologies to offer map and other tourism-related applications. By applying such research, semantic web-powered travel information services have become higher-level custom travel systems, and have developed into convenient systems in which all necessary reservations can be booked by notifying an agent of an approximate schedule and personal preferences[9]. Recently, travel information systems are required to provide travel-related products including entities such as hotels, airlines, car rentals, tourist attractions, restaurants, and business trips, and recent changes in tourism trends and demands have led to the need for research on intelligent travel optimization to configure package products[10]. By employing local ontological information, travel systems will be able to analyze types, classes, and relationships of and between terms. This will enable them to overcome the limitations of case-based inferences and generate more meaningfully precise case expressions and search results. Furthermore, it will be applicable to the next-generation semantic web. [11] The significance of this paper is the development of a travel system that can automatically provide relevant information, starting from the planning stage, to users via smartphones. The paper is structured as follows. In Section 2, we explain the components of the proposed system and present its model. Then, in Section 3, we describe the implementation environment and research results. Finally, in Section 4,we conclude the paper and propose future research directions.

SYSTEM MODEL

The flow diagram of this system is shown in Figure 1. A smartphone application can be used to access its Service.

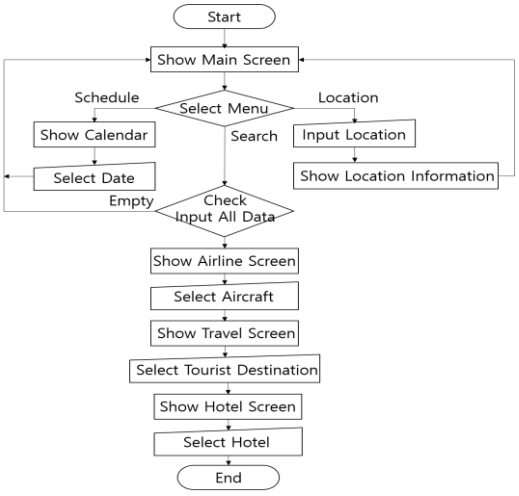

Figure 1. System Model

* The Present Research has been conducted by the Research of Kwangwoon University in 2017.

RESEARCH RESULT

In this study, we developed an Android smartphone-based, travel-focused semantic search engine. The engine provides relevant information, such as information on airlines, tourist attractions, restaurants, and lodging, to its users.

Figure 2. Destination search page

► Semantic Travel Search

Figure 2 shows the main page of the semantic search engine. Upon tapping on "travel dates," a calendar pops up and the user is conveniently prompted to select desired travel dates, after which the user enters the desired destination. Once a destination is entered, corresponding pictures and weather information are displayed at the bottom of the screen so that the user does not have to search for the weather information separately.

Figure 3. Airline search page

► Semantic Airline Search

Figure 3 shows the airline search page, which is applicable to the destination entered in the previous step. The departure airport is entered based on the data about the country and the nearest airport as obtained from the smartphone's internal GPS for the present location, while the destination airport is automatically determined as an airport in the country of the previously entered destination. The dates correspond to those selected on the calendar in Figure 2, and airline tickets can be selected from a dialog box, which is provided by the system based on the entered airport and date information.

Figure 4. Suggested attractions page

► Semantic Travel Select

Figure 4 shows a page suggesting tourist attractions near the user's destination. If the use has no prior knowledge about the destination, the system suggests attractions based on other users' experiences. On the top of the list are the most visited and best rated, and below are other attractions located near the top attraction. Shopping venues and restaurants are automatically displayed as well, thus preventing first-time travelers from having to plan from scratch.

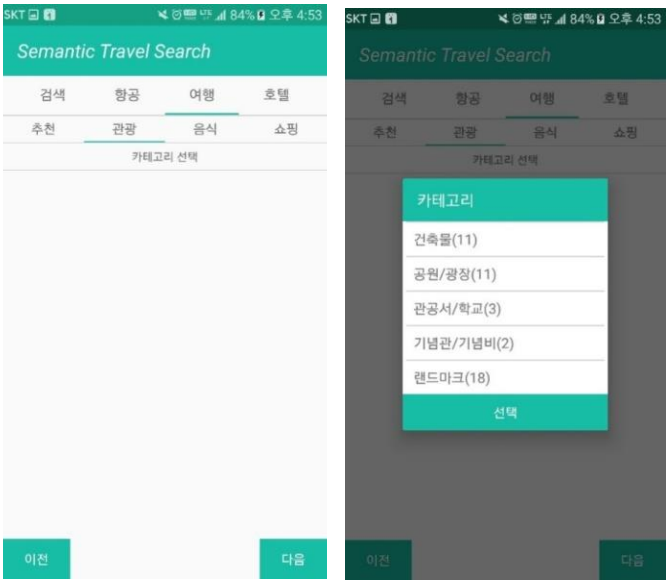

Figure 5. Attractions selection page

Figure 5 shows a page where the user selects attractions that he/she desires to visit. Users can select their attractions by setting subcategories under the main categories: tourist site, food, and shopping. Before selection, the page is blank. When the user selects a subcategory, the name, hours of operation, and ratings of the selected attraction are displayed, as shown in Figure 5.The user is then prompted to select attractions to visit. Upon completion of the selection process and pressing the "next" button, the page shown in Figure 6 is then displayed.

Figure 6. Trip schedule page

Figure 6 shows a page that configures the overall theme of the trip, analyzes efficient transportation schedules, and calculates

the cost to travel between the attractions. This page eliminates the need for users to plan the trip manually, and considers transportation options.

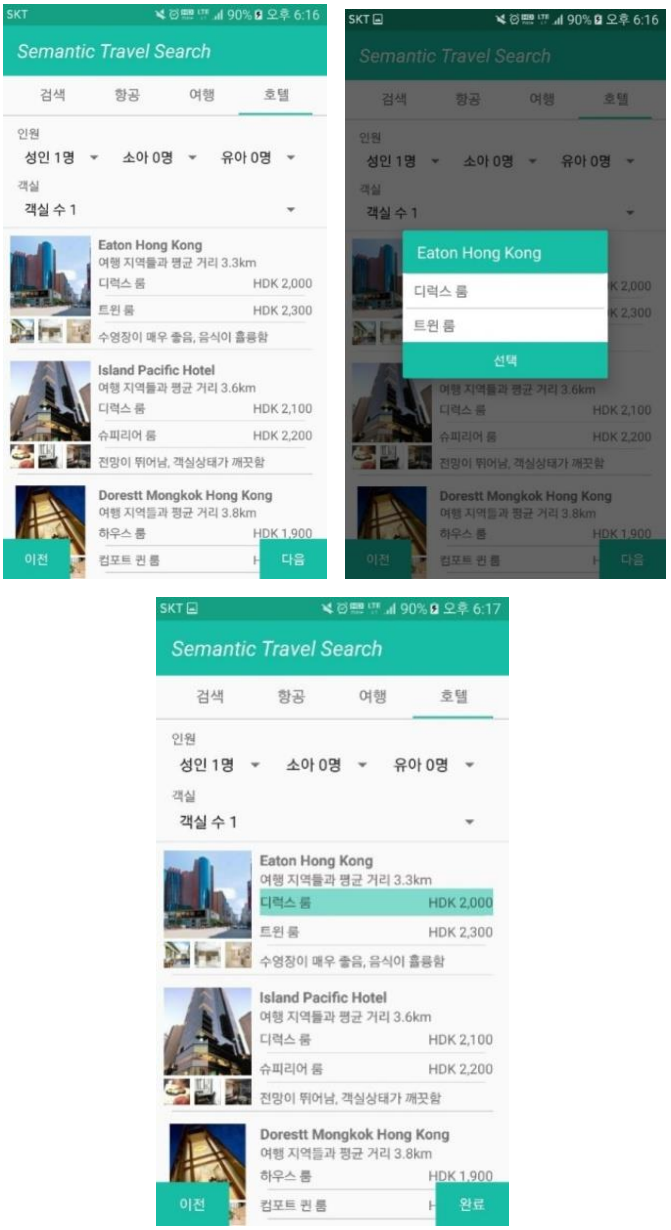

Figure 7. Accommodation selection page

►Semantic Hotel Select

Figure 7 shows a system that suggests available accommodations to users based on the configured trip schedule. The default value for the number of guests is obtained from the number of airline tickets reserved, but this value can be modified in the case where there are additional party members. The number of rooms can also be modified by the user to allow any appropriate number of guests per room. Only venues with corresponding availability are displayed, and they are arranged in order of average distance to the selected attractions.

CONCLUSION

In this paper, we present a semantic web-based system that provides travel-related information pertaining to destinations, flights, restaurants, and hotels via a smartphone. First, the user enters a preferred destination. Departure airport information is obtained by using the GPS information to find the nearest airport to the present position. Information on the destination, food, and shopping is provided by a suggestion system. The system is an improvement to simple applications that provide only travel information, in that it offers a full range of information from departure to accommodations, based on the number of airline reservations. The system's significance is related to its autonomous nature in that a smartphone can create a travel schedule on its own. Applications of this study use properties of semantic web to provide tourism information, and will be more helpful to individual travelers than to groups of travelers. The proposed system will be further developed into a more automated system that can plan an itinerary and make relevant reservations based on the user's interest. Furthermore, this study will serve as the basis for developing an intelligent travel information system based on semantic web service.

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* Corresponding author: Ki-Hwan Ryu, Ph.D.
Department of Tourism Management,
Institute of Information Technology, Kwangwoon University,
20 Kwangwoon-ro, Nowon-gu, Seoul, 01897, Korea
E-mail: allryu@kw.ac.kr