Study on the development of convergent services for efficient medical consultation, tourism and interpretation

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Abstract

Globally, medical tourism draws attention as a national growth engine industry, and is actively expanding. Current medical tourism leans towards large hospitals making it difficult to attract new users. Users collect the information for medical tourism through various paths in order to receive medical consultations and customized tour services. To expand medical tourism to small and medium sized hospitals, it is necessary to have customized medical consultations, tours and interpreter services, which are the key elements of medical tourism. This paper suggests services that users can use to match medical consultations and find tours and interpreters they want at the same time. This paper suggests ways to provide integrated services based on the information experienced by users, combining the required items from the perspectives of each user, hospital and guide. To match the content provided by hospitals and guides with experience information from users systematically, this study suggests the convergence plan for a service model that can match the experience information between users and hospitals, between users and guides and between hospitals and guides systematically by operating the data in the universal container.

Keywords: Medical Consultation, Experience Information, Medical Tourism, Translate

1. Introduction

The influx of medical tourism into Asia is rapidly increasing and medical tourism draws attention as a growing business. The most common path used by foreign tourists to obtain the information for medical consultations and tourism include opinions from acquaintances (39.6%), Internet sites (22.9%) and travel companies (19.3%) [1]. Areas that foreign tourists were most satisfied with while traveling in Korea were public order (stability), accommodations, shopping and food, while the lowest satisfaction area was communication with doctors. According to the evaluation, there are not enough products suitable for overseas medical consultations and tourists, and there is a lack of manpower for communication. User-centered medical tourism services can be received from hospitals, guides and interpreters together.

Although these hospitals gained recognition for their medical technology, small and medium sized hospitals have a hard time supporting the language communication services when preparing for overseas medical services. According to the data from the Korea Health Industry Development Institute, there are 440 hospitals that operate the medical tourism services in Asia, and among those, plastic surgery, dermatology and rehabilitation medicine had the highest demands, securing competitiveness in terms of cost and services [2].

It is necessary to have content that makes it easier to share complex information with various attributes such as users, hospitals and guides including interpreters, translators and tour services, which are the most important elements of medical tourism. Now, medical tourism needs a platform that can match hospitals and guides systematically with each other, while still being centered on the users. This will increase the reliability of medical tourism and make obtaining the information easier by having everything in one place. This is done by connecting and sharing the necessary items through automatic matching for content based on experience information of users, hospitals, and guides and through resources from users, hospitals, and guides. In this study, in order to provide the convergence service with effective medical consultations, tours and interpreters, a connection must be established among the key elements of the service: the users, the hospitals, and the guides. Interworking with the accumulated experience information by other users can provide the services needed for each other in one convergence service. This study suggests the method to attract new users through analyzing service methods to match as a one-stop, user experience information with hospitals and guides, information experienced by guides and content information provided by hospitals and guides, choosing the best matched content and sharing it with other users.

2. Related Studies

2.1 Typical Medical Tourism

The decision-making process for medical tourism can be divided into preliminary preparation, before and after entering Korea. Before and after entering Korea for medical tourism, users can compare and analyze the cost needed for the disease to be treated in the preliminary preparation stage, check the information regarding the hospitals and specialists about the disease to be treated through Internet or acquaintances, and also check the promotional materials. After entering Korea, the reserved professional interpreter will do airport pickup service, the hospital will carry out the medical services prepared in advance, and once the treatment is completed, the user can take a tour through the reserved tourist guide and then leave the country. It is necessary to establish the foundation for users to receive the follow-up care through mail or homepage of the hospital [2].

2.2 Standard Framework

Standard framework facilitates development efficiency, ease of maintenance and scalability by providing software development tools, guidelines, and an environment that is a frame to software development. The standard framework has the advantage of facilitating the convenience of user development and applying it to each business field. For the framework-based development method, the required areas are developed by dividing into areas to be developed, areas to be set up and areas provided by Spring in the developer's point of view after classifying into the Presentation Layer, Business Layer and Data Access Layer, and the reusability is provided, helping the program quality and maintenance [3].

2.3 Responsive Web-based Platform Technology

Responsive web means to express on web pages in desktops and smart phones flexibly in response to device screens of different environments in one program depending on the type of device. It provides the web content information in optimized screen fit for the characteristic of each device, and the devices are mutually interlocking between them so the users can use the contents regardless of the device anytime and anywhere, while different devices are sharing the same content [4]. Responsive web should support the resolution regardless of various devices, and for a specific device, a limited application may be possible. On an N-Screen there should be an interface that one content is visible from all other devices [5]. The user interface is rich in color[6].

3. Implementation Plan for Convergence Service of Medical Consultations, Tours and Interpreters

3.1 Implementation Plan for Convergence Service

The convergence service used in this study suggests the method appropriate for the study based on the standard framework. Overall interface and system flowchart to be implemented in this paper is shown in Figure 1.
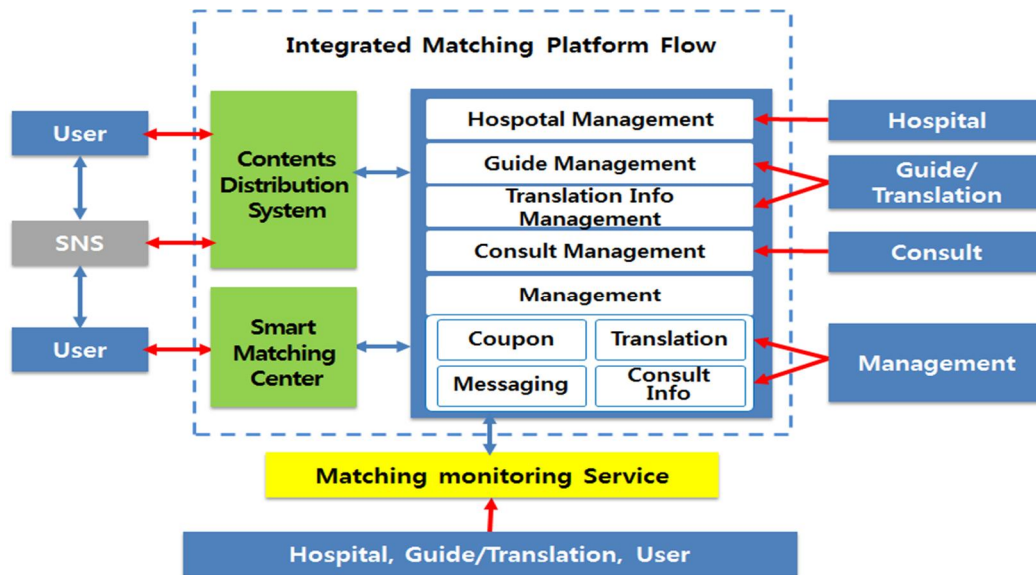

Figure 1. Integrated matching platform flow

The convergence service suggested in this paper helps other users in selecting medical consultations and customized tours by providing various information experienced by users from hospitals, guides and interpreters and satisfaction level for services to the contents distribution system of the service. The hospital generates content about its specialty areas and provides it to the user, and the user checks the experience information about interpreters in the convergence service if the interpreter service is needed for medical consultation from the hospital. A guide makes the tourism product customized for the user and provides it to the user, and the interpreter generates the content for languages available for service so that the user and the hospital can match it with their needs easily. The complex information that have various attributes including user's experience information, hospital consultation inquiries, customized content materials by users and interpreters needed for the hospital and the user, which play an important role in medical consultations and

tours in this study, will be shared. Through content matching required for each individual in one platform, it is for users to receive the complex services all in one place.

3.2 Design Plan for Standard Framework-Based Development Framework

The standard framework can minimize the development by reusing it utilizing the commonly required function. This framework excludes the dependency through the application of open source based commoditization and utilization of open technology, secures the operability by allowing it to connect with other solutions. It facilitates the reusability through program modularization by performing the national and international standardization and minimizes the changes by module based on the interface.
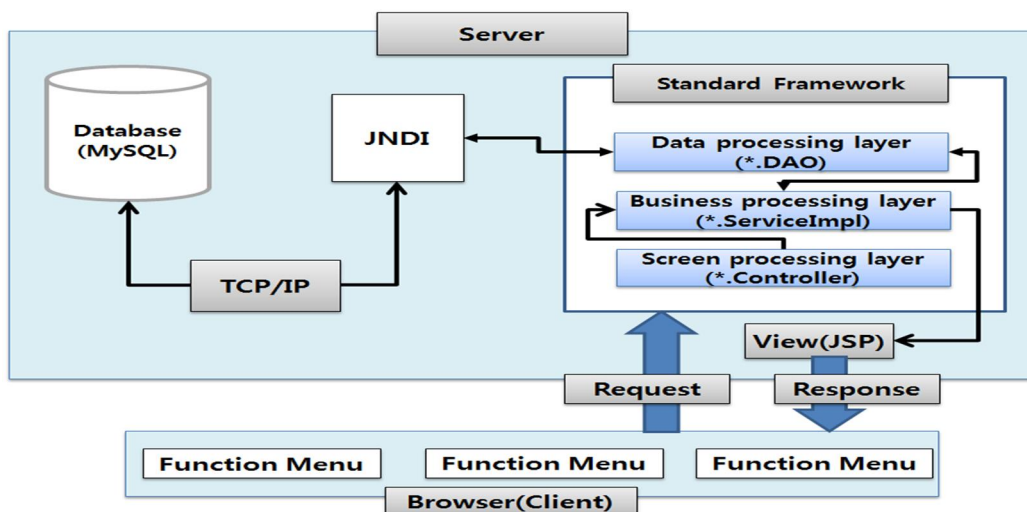
Figure 2. Framework system processing flow

J2EE environment and DBMS in the development framework in Figure 2 used in this paper suggests the way to apply with MySQL. Dispatcher Servlet is responsible for data delivery to the server from web browser and outputting the data delivered from the server. In addition, various element technologies such as AOP (Aspect Oriented Programming), View Resolver, Logging, IoC Container, and Exception Handling provided from Spring framework are used for the business logic processing within the server. The user executes the Screen Processing Layer, Business Processing Layer and Data Processing Layer. The execution results will be processed in the user's browser to see the results with Response in the View (JSP) through Business Processing Layer.

3.3 Database Design Plan

The users record and share the complex experience including acquisition of travel information and experience. To make the utilization of the standardized content (medical resources, travel resources and interpreter resources) more active, it is designed for ease of archiving and retrieving content and easy consulting. To use the experience information usefully by users through archiving and managing content, it needs to select the database appropriate for characteristics of information generated. For archiving the structured data, the data access objects is abstracted based on Spring, and it is packaged and implemented as a data model. Database design of conceptual design using ERD (Entity-Relation Diagram) in order to visually express and schematize the base model for designing the structured database. With a large module in the database, the database is designed by sorting out the common code-related database that defines codes

and languages, user-related database needed for hospitals, guides and payment by the user, guide-related database needed for interpreters, translations and tourist guides, and hospital-related database that consists of the content required for hospital information.

3.4 Design Plan for Content Distribution Matching System

Content Distribution Matching System performs the matching, sharing and searching functions in order for contents such as tourists, medical resources, travel resources, and interpreter resources to be distributed smoothly as shown in Figure 3.
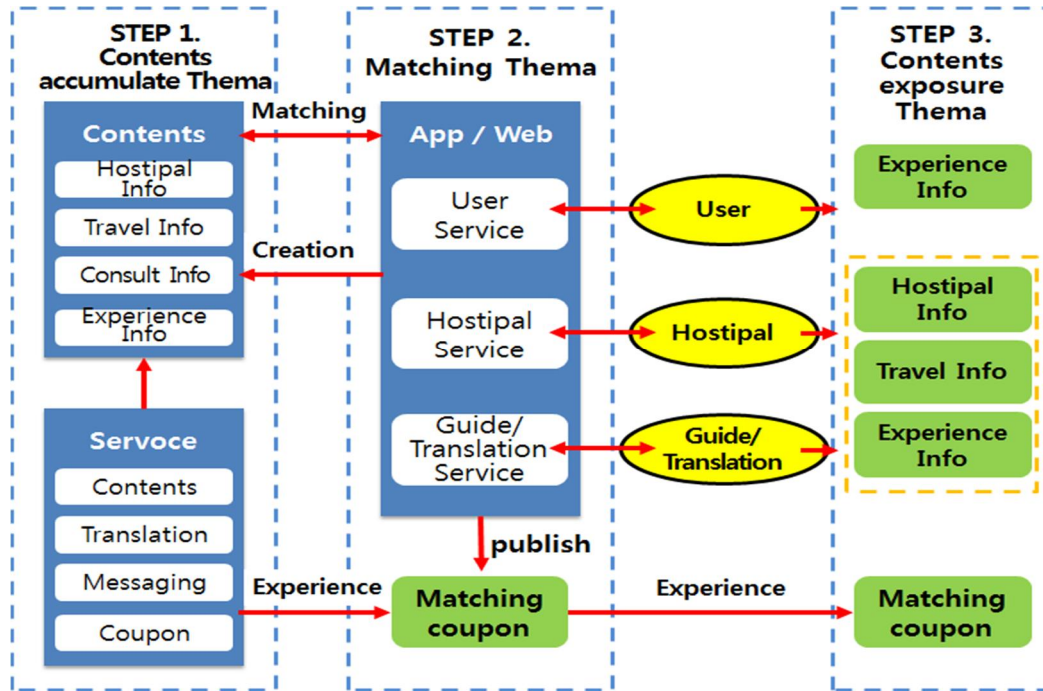

Figure 3. User, Hostipal, Guide matching flow

Coupon issuing service issues a coupon for areas of high interest to tourists based on the contents, or performs the functions of issuing and managing the event coupon. The Unified Messaging Service performs the functions of sending and managing various methods of messages for promotion and guidance. Foreign language consulting agency services and translation services perform the function to interconnect the needs by solving language barriers that block communication between hospital and tourist who want to experience medical tourism.

4. Conclusion

As medical tourism draws attention as a growing industry, the users, who are the key element, process the complex information that has various attributes such as hospital information, medical service consultation inquiries, guides, interpreters and tourist information that meet the user's needs, into the form of content that is easy to share. And it is the convergence system that is to increase the visits by connecting and sharing the appropriate resources through automatic matching to content that attracts many interests and to match the hospitals and guides systematically with their needs centered on the user.

When applying the convergence service for medical consultation, tourism, and interpreters as proposed by this study, the user can receive reliable medical consultation in a shorter time, a customized tourism product and customized interpreter service compared to the existing method, making it confident that the small and medium sized hospitals are able to expand the new customers for medical tourism. In addition, analyzing the contents provided by hospitals and guides based on accumulated data by users and applying the automatic matching technology can provide the customized information required for new users.

For future studies, it is necessary to have a practical development plan, and to have extensive studies applying the big data and AI.

References

[1]   Jong-Youel Park, Dea-woo Park, "Global O2O Matching Platform research based on Clinics", Journal of the Korea Institute of Information and Communication Engineering, Vol. 20, No. 8, pp. 1517-1523, 2016.
      DOI: https://doi.org/10.7236/IJASC.2017.6.4.4.

[2]   Dae-Han Park, Young-Kyu Kim, "A Study on the Development of Medical Tourism Service Process Model and Service Manual", Korean Academic Society of Culture and Tourism. The Journal of Culture & Tourism Research, vol. 14, no. 1, pp. 7-17, 2012.

[3]   Hyunki Park, Jaekyoung Ahn, "A Study on Demand Forecasting Module Implementation Based on the e-Government Standard Framework", Journal of Korean Institute of Information Technology, Vol. 14, No. 4, pp. 119-127, 2016.
      DOI: https://doi.org/10.14801/jkiit.2016.14.4.119.

[4]   J. J. Kim, J. M. Park, S. K. Hong, "A Study on Interface Component for the Realization of Responsive Web", KOREA SCIENCE & ART FORUM, Vol. 15, pp. 153-165, 2014.
      DOI: https://doi.org/10.17548/ksaf.2014.03.15.153.

[5]   Ko Seol, Doo Kyung Il, "A Study on Application of Modern UI for Activation of Responsive Web in N-Screen Environment", JOURNAL OF THE KOREAN SOCIETY DESIGN CULTURE, Vol. 22, No. 2, pp. 15-25. 2016.
      DOI: https://doi.org/10.18208/ksdc.2016.22.2.15.

[6]   Heon Sik JOO, "A Study on UI/UX and Understanding of Computer Major Students", International Journal of Advanced Smart Convergence, Vol. 6, No. 4, pp. 26-32. 2017.
      DOI: https://doi.org/10.7236/IJASC.2017.6.4.4.