Flexible Rule-based Web Services System for users’ preferences

Okkyung Choi, Sangyong Han
Department of Computer Science & Engineering, Chung Ang Univ. Seoul, Korea
okchoi20@gmail.com, hansy@cau.ac.kr

Abstract

Users want to receive their personalized requirements directly. Personalization is the way to receive personalized services directly to the immediate requirements of the user. However, the current web services system does not provide any references towards sufficient processing capacity such as consideration of personalization of services and intelligent matchmaking. This research proposes a flexible personalized Rule-based Web Services System to address these problems and to enable efficient search, discovery and construction in web services system across general web documents and semantic web documents.

1. Introduction

This study suggests a Rule-based Web Services System to solve some of the above problems and enable efficient Web Services search and construction. The proposed framework is capable of searching for general Web documents and Semantic Web documents. The system was developed along with step-by-step designing method for efficient Web Services search and composition. Its efficiency and accuracy are verified by comparing with the existing systems.

The study of this study enables efficient search in Web Services and the construction of Web Services by designing and implementing the system using QoS Matching algorithm and Rule-based search technique. The detailed functions of these core algorithms, which supplement the problematic points of existing studies, are given below.

A Matchmaking Engine, for which QoS technique is applied, is proposed in this study. The matchmaking algorithm is introduced in order to enhance the matching rate between service providers and service requesters so that the latter might select better qualitative service(s). In addition, this study resolves the problematic points of existing UDDI by providing an extended UDDI search module made by mapping between DAML-S profile and UDDI data model.

Second, a Rule-based Search technique in which users’ preference is reflected is proposed. In contrast to the existing search methods of Web Services, in which the arrangement of search results according to the consideration of users’ preference is unavailable, this study enables reflecting the preference of a service requester in the Web Services, using a personalized agent which exploits rule-based search technique, which provides a more credible Web service.

2. Related Work

Personalized Web Services are a very important area of research. However, to our knowledge few of the research projects have aimed at personalized services using Rule-based search method. So we present the following some of the researches that supported context-based personalization of Web Services.

In [3] the idea of personalized preference is applied to a Web environment. It discusses the way context is used for Web Services personalization. Context is the information that characterizes the interactions between humans, applications, and the surrounding environment. It emphasized that the resource on which the Web Services are performed have an impact on Web Services personalization. Figure 1 illustrates the approach backing Web Services personalization. In this approach, the core concept is context from which three sub-contexts are obtained: U-context, W-context, and R-context.

The research reported in [16] addressed the main aspects of a Semantic Web information retrieval system architecture trying to answer the requirements of the next-generation Semantic Web user. It proposes a conceptual architecture for a personal Semantic Web information retrieval system. It incorporates Semantic Web, Web Services and multi-agent technologies to enable not only precise location of Web resources but also the automatic or semi-automatic integration of hybrid Web contents and Web Services. However, the superiority of the system in this work is not assured in that system development situation, real applied
examples and research techniques are not referred to, and only the system design method is described.

This study suggests a Rule-based search method in which ontology and rules are combined to supplement the faults of the existing research, design a search engine using the suggested method and established an operation system for the search engine. By doing this, our study intends to solve the problem that the existing Web Services models are inclined toward theoretical aspect and the research is conducted mainly on this segment. In addition to it, the suggested method can provide more exact and credible information to the users, as it actively reflects personalized preference in Web Services results by performing an analysis of various possible situations and searching with inference and service extraction rules.

3. Flexible Rule-based Web Services System

3.1 System Architecture

The Rule-based Web Services System proposed in this study makes an automated framework by supplementing the disadvantages of existing information search systems and existing Web Services systems, as it gives ranks to search results using detailed subdivided Matchmaking Services and Rule-based Search Services. The structure of the Web Services System proposed in this study, is as in [Figure 1], and the range of research for the proposed system is as below.

![Figure 1. System Architecture](image)

The most critical matter in the phase of input is to find out the exact result for a user query by repeating the user query even through the synonyms of the original user query terms, on top of the original terms. First, for this purpose, the proposed system uses the ontology composed of concept of knowledge of specific sphere. In the ontology server, the definition of the meta-data of specific sphere is preserved, and the definitions of data classification principle and data correlation are also preserved.

Second, the proposed system provides more exact search result to users through the Matchmaking Engine. The proposed Matchmaking Engine is designed to be able to provide more exact and efficient search result, using Matchmaking algorithm by which more exact examination and reflection of search query can be conducted according to the user request, as a new QoS technique to execute quality estimation, is applied for the engine.

Third, the proposed system executes inference and examination for the user query on the extracted results by rules through the Rule-based Search Engine. The proposed system, in addition, can provide more credible Web Services to the users as the system provides customized service in which an individual user’s preference is reflected using the personalization agent.

3.2 Implementation

[Figure 2] is the contrast of the retrieved screen images of the Rule-based Search Engine and a common Web search engine, by entering search terms for query. It shows that the Rule-based Search Engine in which users’ preference and rule-based search technique is applied, provides a differentiated screen image from that of the existing common Web search systems.

The information in the search here are ones taken from the real data of four internet portal sites in Korea (Empas, Yahoo Korea, Naver, Daum) and processed, mainly on the basis of keywords, ranking results, price information, demand frequencies and QoS information. The screen image is the result that the key words entered by the user, are applied to the Rule-based Search Engine utilizing the criteria of price information among QoS information, system response time, maximum information treat quantity, availability, credibility, and accessibility. Screen images show up differently according to users’ preference.
4. Conclusions and Future Studies

This study implemented an integrated Rule-based Web Services System based on the differentiated technologies, in order to supplement the defective point of the previous studies that they could not suggest an integrated Web Services System from the overall standpoint of view, as they lay too much stresses on methodological aspect. This system may provide an automated framework fundamental for application integration and process integration, not only for large enterprises which are now leading business model integration but also for small and medium enterprises, research institutes, and other institutions which have development potential in the future.

In the previous studies, the treatment for quality element of a service is insufficient, and the search for a service by mirroring a user’s preference is not realized. This study enhances the matching rate between service providers and service demanders, hence enables the service demanders opt services of fine quality, to supplement the defective point of the previous studies.

This study also enables a more credible service providing by mirroring the personal preference of a service demander to the Web Services through the result generated from the Rule-based search engine in which a user’s preference is mirrored.

However, this study has some weak points as below. First, the proposed system has a little complexity due to too many algorithms activation, which might cause search time to become long. This problem is yet to be solved.

Second, an accurate and objective estimation for the proposed method by the criteria of verified test mark was not yet performed, but the estimation was done only by correspondence elements so far.

Lastly, For the establishment of the proposed system, diverse external technologies are mobilized, and differentiated major techniques for the proposed system of it’s own, has not been concentrically developed, which may be the most critical fault of this study.

As future research task to complement this study, the development of a real Web Services System in which the Rule-based search method proposed in this study, is applied, is necessary prior to anything else. Additionally the development of real-time search technique by which users’ demand can be reflected while moving seems also necessary.

5. Acknowledgement

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6. References