

A Study on the Ontology-Based Regional User-centric convergence content design information retrieval

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온톨로지 기반의 사용자 중심 융합 콘텐츠 디자인 정보 검색에 관한 연구

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Abstract On a huge space of information called the Internet, users can use a smart mobile web to get information on various intellectual fields and can access to various Medias such as personal blogs and social networking sites (SNS). This is why a vast amount of information on the web has been effectively managed and researched nowadays through a technology named Semantic Web. However, it still needs for an improvement for studies on searching for intellectual information, though it is enhanced to integrate variously spread information and search for intellectual information user-oriented. Thus, this study aims to research on searching information and knowledge spread around a knowledge-filled information space, which can improve credibility according to user-oriented logic.

• **Key Words** : Semantic Web, Ontology, Knowledge and information, Integration, User-centered

요약 인터넷이라는 거대한 정보의 공간에서 스마트 모바일 웹을 통해 사용자들은 다양한 지식분야에 대한 정보를 얻을 뿐만 아니라 개인 블로그나, SNS를 비롯한 다양한 매체를 통해 접근하고 검색을 수시로 하고 있다. 이에 따라 최근에 들어서는 방대한 웹의 자료를 시맨틱 웹이라는 기술을 통해 효과적으로 관리 및 연구하고 있다. 허나, 아직도 여러 분야로 다양하게 분포되어 있는 정보들을 통합하고, 사용자 중심 지식 정보 검색은 예전에 비해 많이 향상은 되었지만, 지식 정보 검색에 대한 연구는 상대적으로 부족하다. 이에, 본 논문에서는 시맨틱 웹을 이용하여 방대하고 지식이 넘쳐나는 정보의 공간에서 분산된 정보 및 지식들을 사용자 중심에 맞게 신뢰성을 높일 수 있는 적합한 형태의 정보 검색을 연구하고자 한다.

• **주제어** : 시맨틱 웹, 온톨로지, 지식정보, 통합, 사용자 중심

1. Introduction

Due to the development of information technologies

recently, people use various methods when logging-in to the Internet. As people increasingly use mobile

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devices such as smart phones, net-books, and smart watches, there are vast amount of contents in them that can easily be gotten and accessed, and yet, it is hard to find a content a user wants. Like this, a user can find a content he wants in sea of information and knowledge and can draw a search result different than his intent such as the existing text matching methods, images, and some of drawn data. If a user exactly comprehends the meaning of a word or a question he wants to search, this can enhance the technologies and performances of Semantic Web by providing and sharing contents.

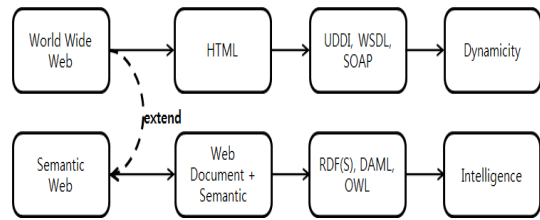
User-oriented contents information to be presented in this paper can be a role as a medium that can providing various information knowledge, and express and provide various information in a form of core information demanded by the user by suggesting data that can easily be searched through various web-accessing methods. In addition, by knowing the concept of semantic web, and specifying it through the designing of ontology structure, and drawing spread information through ontology, this paper suggests effective ways with regard to elements and technologies that can occur in a variety of ways.

2. Related research

2.1 Method of Semantic Web & Ontology

Semantic web means a web than a computer can understand, not a way of searching, seeing, and understanding information through various means such as mouse, keyboards, or touch. IN other words, it is a technology that provides "a meaning" to a document on the web, a web that can understand, process, and control the meaning of information between computers.

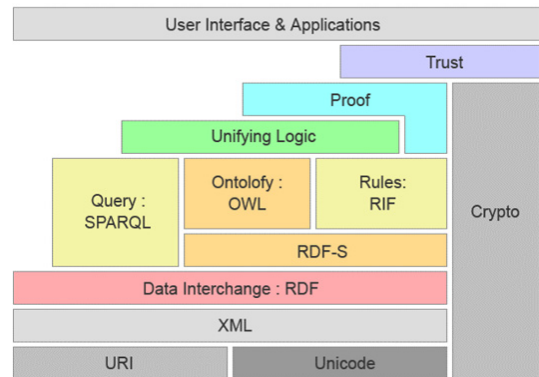
[Fig. 1] shows a semantic web service expressing technical elements comprised of semantic web in a normal web service [1].



[Fig. 1] Semantic web service

Ontology is a field of metaphysics pursuing 'the essence of objects' or 'principles' and in the computer science, the term means complements and their relationships handled in a specific system. It can also be compared to the dictionary hierarchically explaining the relationship between words in regards to a specific topic, include inference rule that can expand the relationships and hierarchies between words or concepts, and share and re-use web-based information or applications.

In addition, ontology has taken center stage through semantic web and Fig 2 is a structure of semantic web. Through technologies such as URI, RDF, and XML, an ontology that can be inferred is placed. In other words, ontology can be said as the core technology in implementing semantic web[2].



[Fig. 2] Semantic web Architecture[2]

2.2 Semantic Web & Ontology

To provide meanings to metadata and ontology data that play an important role in semantic web, there need ways to express data itself and can infer and deduce the relationships between data. The languages used for

this is XML, RDF, and OWL, and W3C also is leading the study.

XML is a markup language using tags like HTML, though it can produce footnotes for the content in the form of a tag. It can structurally build up the information on a document and scripts and programs can use such tag. However, tags and information do not explain the actual meaning of information.

RDF is a language used to express the actual meaning of information further advanced than the expression method of XML. RDF expresses sentences in a triple structure: subject, verb, and object. They are also expressed in resources, property, and value[3].

3. Design and Discussion

3.1 Needs for user-oriented convergence content design information retrieval

Users constantly search for various documents such as web, mobile, the media, newspapers, and magazines to get the exact data they are looking. Mobile web service system has been designed to organically search for keywords in such case after classifying them into two: the fact that the relationships between relevant keywords that have been inferred and web documents embedded with relevant keywords. Therefore, a log of development costs can be incurred not only in integrating information, but also in building database. To overcome this problem, inferred ontology-based database information using SPARQL which allows users to reduce costs incurred from searching.

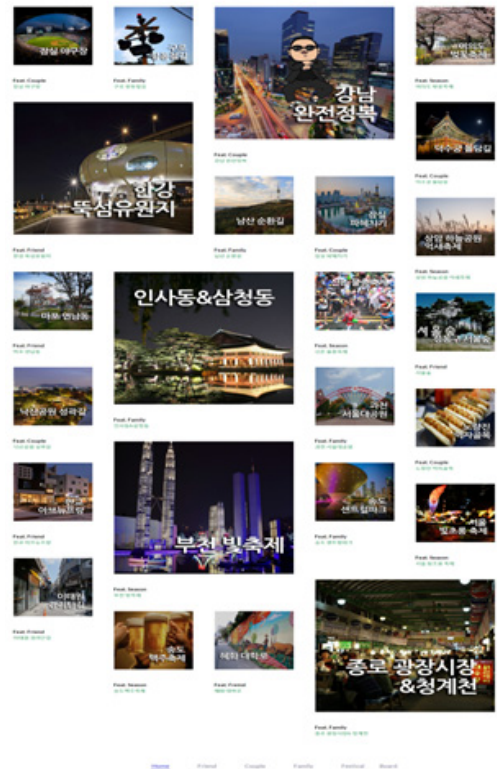
3.2 Providing service for user-oriented information search

In case of a user requests information or based on ontology utilizing semantic technology on the web, you can dynamically synthesis services or components and provide them. And by specifying them, building a knowledge base such by creating and requesting information, and building a service into domain or

ontology, you can plan services that should be executed to meet the demands of users in order. In addition, this is an effective model to draw vast web services through web service using semantic matching technology, not a simple pattern matching. And if you can OWL and web service file (OWL-S) and infer them, you can shorten the time spending on search information on the web.

3.3 Design of user-oriented convergence content design information retrieval

Feetouring is a responsive web informing the ways to walk at the place of travel. There is the logo of Feetouring on top of the main page, and if you click the logo, you can return to the home screen.

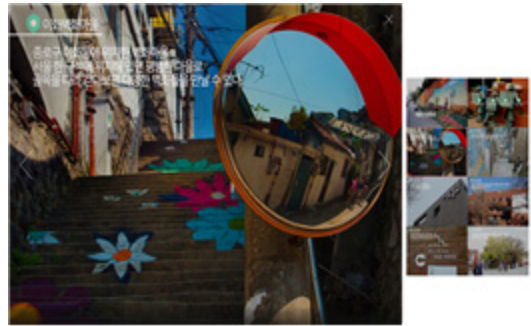
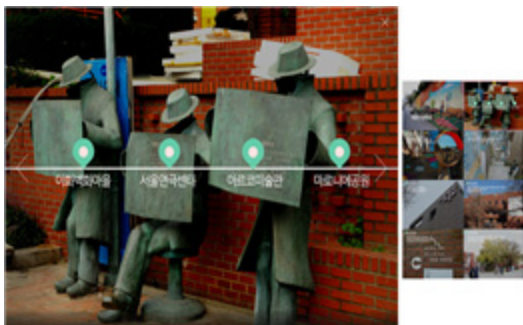


[Fig. 3] Semantic web design

under the logo, various places are presented regardless of categories. Designs are placed in a

variety of sizes so that it could give users a pleasure of seeing. It is assumed that a constant size cannot seize the attention of users, which is why the sizes are various. As for the color, white is used to give a neat feeling and the green is only applied to the names of places so that users can instantly catch them. And if you drag a div to the side on the main page, you can simply see the courses of a place, which is why images were placed in slides. Such configuration was produced trying to facilitate the convenience for mobile users.

Feetouring emphasizes the conveniences of users the most by flexibly responding to any device and by suggesting various places, various and fun places and courses are presented so that users can make a decision on where to go with options. And this gives users courses, reducing the burden of determining courses and allowing a trip off the reservation. And the photos are all high-definition which are not broken images so that users want to visit the places at one time.



[Fig. 3] Mobile web design

At the main page, you can see the whole course, which is why you can select a place you want without accompanying anyone and you can drag pictures to the size so that you can briefly see the courses. There is a menu bar at the bottom of the page allowing you to see the topic places from each category.

The subpage provides detailed information on a chosen place; if you click the image on the right, you can see the accompanying images. And there are brief phrases regarding the place on the images and the images disappear when you click the x-icon, enlarging the image. The logo button is placed on the top so that you can go back to the main page by clicking it.

4. Conclusions

This study seems to distinguish technical characteristics and objects using semantic matching technology rather than a simple matching demanded by a user and provide more information more accurately for ontology-based user-oriented information search. This can also effectively manage and search vast amount of data on the online (web) changing geometrically by providing ontology, rather than a single keyword search.

Moreover, to enhance the flexibility of users, studies on the systems expanding ontology should be continued.

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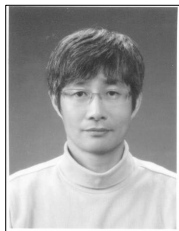


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