

## IMPLEMENTATION OF WEB SEMANTIC ON KNOWLEDGE MANAGEMENT SYSTEM

Ken Ditha Tania, Ari Wedhasmara, Yadi Utama  
Faculty of Computer Science, University of Sriwijaya

**Abstract**—Hitherto, previous research of string matching techniques in knowledge sharing of explicit knowledge have shown a great success. However, their implementation in a knowledge management system is still underexplored. The aim of this paper is to propose an implementation of web semantic techniques for supporting all processes in knowledge management systems and producing a better accuracy of searching knowledge within an organization. A web-based application prototype of web semantic is built and several experiments are performed in order to prove the correctness of our implementation.. **Index Terms**— Web Semantic; knowledge management system;

### I. Introduction

The researches on the web applications for knowledge management and have been spread widely to be critical areas. Semantic web can support more effective knowledge management[1]. Semantic web will be able to address fully all the knowledge management needs, research in the area is active and making good progress.

Knowledge is not stored in a centralized knowledge base but on distributed web pages. Semantic Web technologies [2] were designed to meet the challenge of KM in a world with highly distributed resources. Semantic web technologies can externalize implicit knowledge and enable reasoning on knowledge base[3]. Recent methods have been developed by utilizing Semantic Web technologies in order to automatically discover relevant knowledge from knowledge sources[4].

Semantic Web is all about making the web meaningful, understandable, and machine-processable. It will transition people toward a knowledge-centric viewpoint of everything and using knowledge for the benefit of all. Some companies are heavily investing in semantic web technologies, and should begin to develop semantic modeling and knowledge management within their integration competence centers [5]. Semantic web facilitating knowledge sharing, such as

the use of ontologies and supporting tools offer an opportunity to significantly improve knowledge management capabilities [6]. Integration of semantic web and knowledge management, can be applied to provide automated documentation of ontologies and knowledge bases.

The purpose of this research is to collect the knowledge in the form of solutions from several sources web (stackoverflow website, and Quora website). So user can search knowledge by keyword that they input in the text box. The searching can be similar questions, to search answer for the solution, then the data that has been taken will be converted into json data to become open data so readable by the machine.

Some studies have long developed the knowledge management system on a web application. The use of the web as a medium due to easy facilities, as well as fast access to data, information, and knowledge. Examples of these studies namely, stack overflow, stack Exchange, quora, etc. Stack overflow is the largest, most trusted online community for developers to learn, share their programming knowledge.

### II. Related Work

In[3] using semantic web technologies-enabled social software to manage a specific class of implicit how to knowledge in organizations. Semantic

web to externalize implicit knowledge and enable reasoning on knowledge base, exploit reasoning in the form of a semantic recommender that is meant to enhance the ability of the users to find documented practices possibly related to the work.

In [7] using a semantic relationship management based approach to improve knowledge management and reuse in collaborative product development. In [8] to collaborate between the knowledge organization communities and the semantic technology communities. Meanwhile, researchers who are real end-users will be invaluable in such collaboration because their domain expertise, information needs, and information-seeking behaviors will lay out the questions that Knowledge Organization System (KOS) knowledge bases can aim to answer, helping the growth of the KOS user communities with a variety of new objectives

In [9] using web semantic to represent knowledge graph in data mining. Lin proposed an IT solution for sharing knowledge using the semantic web among partners in supply chain [10]. In [11] using web semantic in knowledge acquisition for Clinical Decision Support Systems.

In [12] using web semantic based Recommender System for e learning Forum. In [13] using Semantic Data Integration and Knowledge Management to Represent Biological Network Associations. In [14] using Semantic web technologies in Biological knowledge management. In [1] using Semantic Web Bases Knowledge Management for Guest Editors' Introduction. The Semantic Web promises to make Web-accessible data more amenable to machine processing. This special issue presents several proposals for the Semantic Web's strategic role in supporting more effective knowledge management at several levels.

### III. Knowledge Management Overview

As has been known, many people already use human capital as a source of knowledge. Therefore, it is necessary to develop a system that plays a role in helping the management of knowledge or better known as knowledge management system

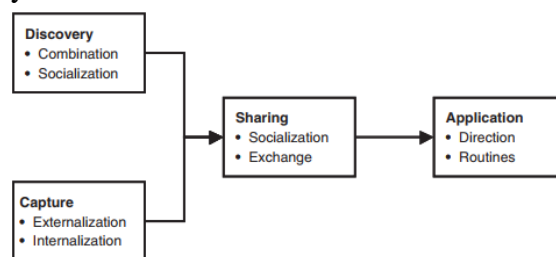


Fig. 1.

Knowledge management processes [16]

As shown in Fig. 1, knowledge management consists of four main processes, i.e. discovery, capture, sharing, and application. Discovery process is specified as the development of new tacit or explicit knowledge. It is comprised of the combination and socialization. In addition, combination process is the process of finding new explicit knowledge by synthesizing of prior knowledge. Socialization process is the process of sharing tacit knowledge through the sharing of experiences. To support the process of combination and socialization, web scrapper/semantic web can be employed to facilitate the communication of explicit knowledge among individuals, groups, or organizations [17].

Capture process consists of externalization and internalization. Externalization is the process of articulating tacit knowledge into explicit knowledge or any figurative language [18], whilst internalization is the process of embodying explicit knowledge as tacit knowledge. web scrapper/semantic web also can be used to support these two processes. Since knowledge management systems employ a wide variety of technologies and mechanisms, the

combination of multiple technologies and multiple mechanisms are more desirable. Thus, in this paper, web scrapper /semantic web is proposed to support four abovementioned knowledge management process. A web semantic utilized to organize and index the explicit knowledge that can be more easily searched and understood.

#### Web semantic

The AI research community together seeks a way to help knowledge sharing. They want a computer program to interact with and stand on information from other computer programs. Finally, in 2001 Tim Berners-Lee made the mission come true by creating a semantic web. The basic idea of the semantic web is that the web has data that is defined and interconnected so that the data can be used for the discovery, automation, integration and reuse effectively through multiple applications.

This ontology is the main idea of data processing by machine (or also called machine-readable) on semantic web [3drwebsemantic indo]. Semantic web is expressed in a formal specification, the Resource Description Framework (RDF). Some data interchange formats (eg RDF / XML, N3, Turtle, N-Triples), and notations such as RDF Schema (RDFS) and the Web Ontology Language (OWL), all display formal descriptions of concepts, terminology and relationships between domains knowledge provided

#### IV. Result and discussion

Semantic web can supports knowledge sharing and information exchanging between learners[12]. Semantic data can structure this information so that

scientists can identify relevant information, to integrate this information as specific knowledge bases, and to formalize this knowledge across multiple scientific domains to facilitate hypothesis generation and validation[13].

New knowledge is produced at continuously increasing speed, and the list of papers, databases and other knowledge sources that a researcher in the life sciences needs to cope with is actually turning into problem rather than an asset. The adequate management of knowledge is therefore becoming fundamentally important for life scientist. Some initiatives to organize knowledge sources into readily exploitable resource one are presently being carried out. Semantic web technologies revolutionize these efforts[14]

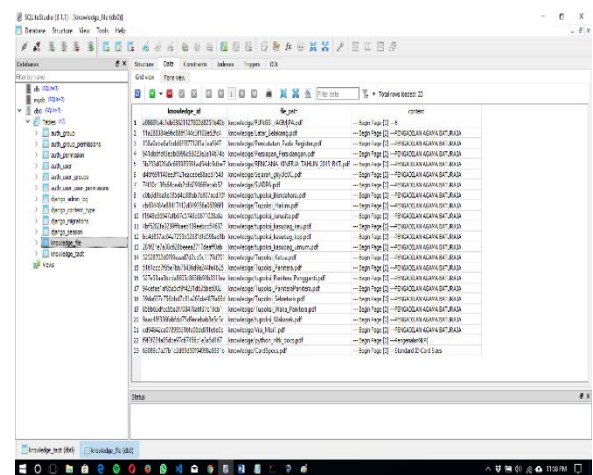
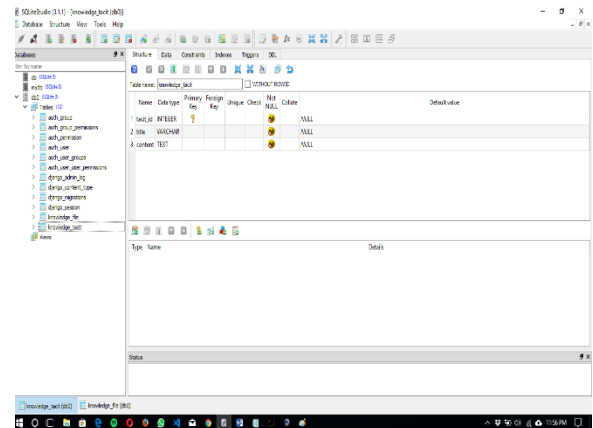
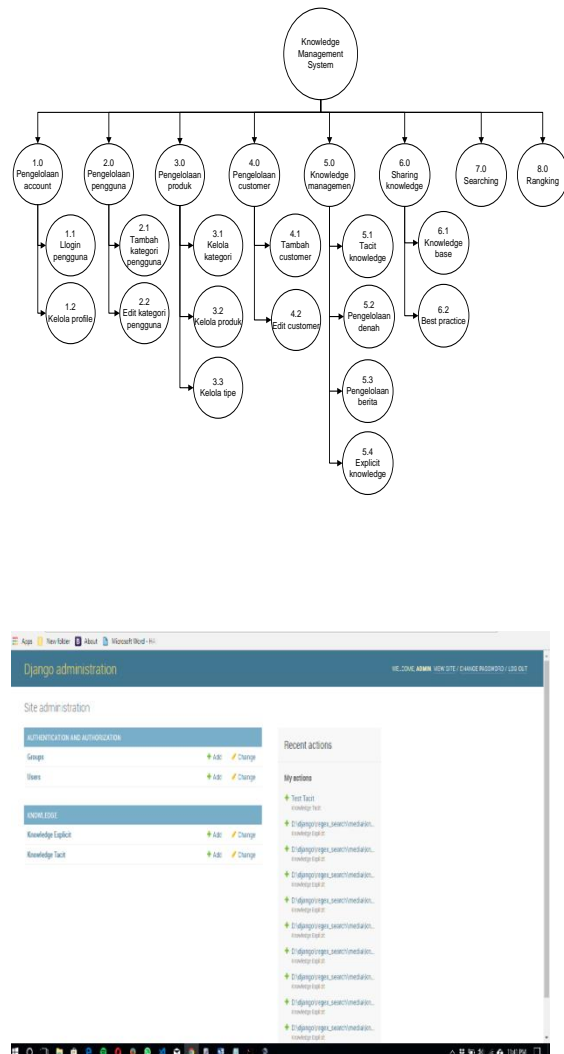
The format of open data refers to the way in how the data is structured and made available for humans and machines. JSON is our most commonly used format. JSON is a text based open standard derived from the format used to represent simple data structures in javascript. JSON is designed to be both human- and machine-readable.

Traditional word processing documents and portable document format (PDF) files are easily read by humans but typically are difficult for machines to interpret. Other formats such as extensible markup language (XML), (JSON), or spreadsheets with header columns that can be exported as comma separated values (CSV) are machine readable formats.

JavaScript Object Notation is A light-weight text-based data-interchange format sp easy for machines to parse and generate.

It is very popular for data interchange between JavaScript on webpages and web services. JavaScript has a eval() function to directly translate JSON data into a native object, and therefore prog-

rammers do not need to worry how to parse JSON data format. • For other languages, there are many JSON parsers that can be used.



## Conclusion

1. Semantic web is very helpful in finding knowledge based on certain keywords so that experiments on all possibilities do not have to be done
2. In the process of sharing knowledge, semantic web can help users to find the knowledge they want to find, then the system will generate knowledge extracted from several page sources.
3. Based on the results, using semantic web can increase the accuracy of matching in knowledge sharing.

## References

- [1] Davis JF et al. Guest  
Editors'Introduction : Semantic  
Web Bases Knowledge  
Management. IEEE Internet  
Computong (Volume: 11 Issue 5  
2007)

- [2] Lee B et al. 2001 The Semantic Web – a new form of web content that is meaningful to computers will unleash a revolution of new possibilities, *Sci Am* 2001, vol 284.
- [3] Lorio, AD and Rossi, D. Capturing and managing knowledge using social software and semantic web technologies, <https://doi.org/10.1016/j.ins.2017> Elsevier
- [4] Zolhavarieh S, et al. Issue Associated with the Use of Semantic Web Technology in Knowledge Acquisition for Clinical Decision Support Systems : Systematic Review of the Literature. *JMIR Medical Inform* 2017
- [5] Daconta MC et al. The Semantic Web : A guide to the future of XML, Web Services, and knowledge management. 2003- books.google.com
- [6] Davis JF et al. Semantic knowledge management: Integrating ontology management, knowledge discovery, and human language technologies.. 2008- books.google.com
- [7] Assouroko, I, et al. 2014 Knowledge management and reuse in collaborative product development a semantic relationship management – bases approach,. *International Journal of product lifecycle Management* 2014, Vol 7, issue 1
- [8] Zeng, ML and Mayr, Philipp. Knowledge Organization Systems(KOS) in the Semantic Web: A Multi Dimensional Review. *International Journal on Digital Libraries* Cornell University, 2018
- [9] Ristoki, P. Exploiting semantic web knowledge graphs in data mining. Doctoral dissertation University of Mannheim 2018
- [10] Huang and Lin, 2010. Sharing knowledge in a supply chain using the semantic web. *Expert Systems with Applications*, Volume 37, Issue 4, April 2010 Elsevier
- [11] Zolhavarieh S, et al. Issue Associated with the Use of Semantic Web Technology in Knowledge Acquisition for Clinical Decision Support Systems : Systematic Review of the Literature. *JMIR Medical Inform* 2017
- [12] Albatayneh, NA et al. Utilizing Learners' Negative Ratings in Semantic Content based Recommender System for e learning Forum. *Journal of Educational Technology & Society* Vol. 21 No. 1 January 2018
- [13] Losko S and Heumann K. Semantic Data Integration and Knowledge Management to Represent Biological Network Associations. S Losko, K Heumann. *Biological Networks and Path Anlysis*, 2017 Springer
- [14] Antezana E et al. Biological knowledge management : the emerging role of Semantic web technologies. *Briefings in Bioinformatics*, Volume 10 Issue 4, July 2009.
- [15] Guevera and Arevalo. Model for knowledge management with the ontological approach in social networks
- [16] I. Becerra-Fernandez and R. Sabherwal, *Knowledge management: Systems and processes*. Routledge, 2014
- [17] R. M. Grant, "Toward a knowledge-based theory of the firm," *Strategic management journal*, vol. 17, no. S2, pp. 109–122, 1996.
- [18] I. Nonaka and H. Takeuchi, *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. Oxford university press, 1995.

