Integration of Semantic Web and Knowledge Management for creating dynamic environment

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Abstract - The Semantic Web is organized in a semantic direction so that it is significant to computers as well as to humans. The principal purpose of Semantic Web is to encrypt semantic repositories in computer language framework due to obtaining or sharing knowledge anytime and anywhere. Connectivity, accountability, and liability of knowledge management systems are the main component to the future generation of web services. The challenge of semantic web is the arrangement of distributed valid information and knowledge with well-defined meaning which could be applicable for different portions. Supplying semantic Web services based on the Web service modeling and semantic web ontology which has capability to dynamically explore and invoke is one of the conventional topic in Semantic Web technology. The main purpose of this paper is to present the relatedness challenge of Semantic Web Service (SWS) technologies to Knowledge Management System (KMS) by preparing dynamic environment. Additionally we argue about how to unite Knowledge management methods to SWS in order to create dynamic architecture in web.

Keywords: Ontology modeling, Collaborative environment, Semantic Web Service (SWS), semantic gap, Content Management System, knowledge based

1 Introduction

Information retrieval (IR) has revealed several techniques to make human search easier in resources. The field of this study involved in searching for metadata in documents, observing structured storage and preparing optimized connection between various databases [9]. Additionally Semantic Web supplies collaborative environment that enlarges in frequent formats in World Wide Web. The Semantic Web disposes to convert unstructured information into a "web of data" that is constructed on the Resource Description Framework (RDF) [8].

In semantic web technology a knowledge base is a special form of database for knowledge management. A knowledge base is a basic section of each semantic web repository to collect, sorted, distributed, and search information and terms. Machine-readable knowledge bases are a term about collecting information and knowledge in a computer readable form that should be in a logical coherent structure. Some machine readable knowledge bases are exploited with artificial intelligence [3]. Combining information in the form of object attribute value is called triplets. These triplets can be semantically processed, adapted, analyzed and systematically arranged by machine agents. In addition, the agent can exploit this information with other machine agents due to create Semantic Web more real [10].

The first semantic classifier is Latent semantic analysis (LSA) that has technical method in processing and analyzing associations between repositories of information and knowledge in the web. LSA structure builds on this hypothesis that words which are close in meaning will happen close together in text documents [15]. A matrix containing word counts per paragraph (rows expresses unique words and columns expresses each paragraph) is built from a large part of text and mathematical method called Singular Value Decomposition (SVD). SDV declines the number of columns with comparable structure between rows. Words are compared by taking the cosine of the angle between the two vectors formed by any two rows. Values near to 1 express very similar word while values near to 0 show very dissimilar words in context [5].

Corporate Semantic Web (CSW) elucidates the application of Semantic Web technology and Knowledge Management methodology to unify environments. The initial framework of a Semantic Web encounters to many problems such as scalability, lack of stimulus to annotate sources, and comprehensive adoption of shared ontologies (Corby & Faron-Zucker, 2002). Moreover privacy qualification and trust issues are the other essential of a perfect Semantic Web Service (SWS) [1]. CSW regards to semantic improvement of information which is conveyed to subscribers as well as semantic applications. CSW is aimed to promote the unification of information in heterogeneous sources, improving information retrieval by reducing information overload, providing decision making support, dispersing ambiguities in terminology association, and identifying relevant information [14].
CSW is constructed based on three fundamental areas: ontology engineering, semantic applications, and collaboration. The web life cycle of Corporate Semantic is illustrated in figure 1. Ontology engineering considers efficiency and effectiveness of ontology extension toward ontology growth and maintenance. Semantic application analyzes applications to evaluate what range could attain benefit from semantic technology. Collaboration emphasizes on the human centered aspects of knowledge management in corporate concepts. Extracting explicit knowledge from the amateur user activities in building collaborative ontology could be one of the examples of collaborative environment [14].

Providing dynamic distributed semantic web that has the capability to support difference possibilities has created many issues in computer science world. In this paper we present how to unify new knowledge management method into SWS to create dynamic environment.

2 The review of Dynamic environment in SWS

The concept of Semantic web Service in Dynamic Environments pertains to exploring, arguing, classifying, executing and handling dynamically to realize development steps of workflow. Methods which are suggested in this area include in many various concepts. Dynamic Semantic Web (DSW) is based on the techniques, methods and paradigms of the emerging Semantic Web movement and its applications. DSW has the structure of reducing inter-ontological transactions (translations, mappings, navigation) among various ontologies and taxonomies. What is required to extensive and perfect framework are the ability to manage Virtual Organizations workflow processing, to change organization workflow due to collect service-oriented tasks, and alters these tasks from accessible services, manage new information and knowledge and accomplish new service [2].

2.1 Knowledge-based Dynamic Semantic Web Services Framework

Knowledge-based Dynamic Semantic Web Services (KDSWS) Framework instructs in an integrated mode. The life cycle of activities involved in preparing, creating, requesting, exploring, selecting, changing, and delivering Semantic Web Services. Figure 2 clarifies the life cycle of KDSWS framework [7].

The KDSWS Processes illustrate the steps to deliver functionality by web services and threads as global layer of functionality. KDSWS Specifications are built on two models the KDSWS Meta-Model, and the KDSWS Process Model which are based on the Knowledge/Data Model. Features Specification to increasing the semantic web services is the responsibility of this section. The KDSWS Functional Architecture presents the execution components to affirm the Framework. A central component of the KDSWS Functional Architecture is the KDSWS Functional Agent Services Architecture to manage services into specialized liabilities [7].

2.2 The importance of Dynamic Semantic Web

The most necessities to creating a system for dynamic semantic web services are:

- In wireless environments, minimizing resource such as bandwidth to prevent receiving too many responses to queries. For resolving these barriers we can have a completely decentralized topology that have the capacity to quick update without need to republish and reproduce any new services [7].
- Minimizing manual configuration to automatic registry discovery on LANs and WANs [7].
3 Semantic Web and Knowledge Management systems

For being successful in KM we require to be equipped to several techniques which are related to KM such as Groupware, expert systems, decision support systems and various forms of collaborative systems. Because this field is combined of difference professional sciences. The efficient and effective management of knowledge resources need to dynamic communication among departments and members due to quick respond to change. Capturing, sharing, supplying and managing are the factors of effective knowledge-based organization.

There are so many technologies that prepare environment for people to share information and knowledge, use them for enhancing their skills and abilities, and enrich experiences in all over the word. Hence, by Increasing advances in technologies time by time and reusing knowledge for getting high performance, people require to have up-to-date and dynamic environment in order to managing knowledge in knowledge environment. As information and knowledge needed and used continually, searching for way to supply dynamic knowledge environment required [12].

Data accuracy and up-to-date information and knowledge are unavoidable elements in each organization with dynamic infrastructure. Combining KM with SWS would supply dynamic environment to corroborate immediate situation. According to recent studies the semantic web is a web of data that is directly or indirectly adapted by agent systems. HTML technology supplies static environment in WWW, but by interfering Semantic Web technology we will be able to overwhelm these barriers. SWS is constructed on the environment with software agent to affirm fast decision making. SW technologies exploit taxonomies and ontologies to prepare web content. With SW tools such as Protégé and knowledge representation models, the development has covered sharply. SW is formed on distributed and collaborative environment that ontologies will engage. Evolution of shared inter organizational ontology is a new area in this field that has attempted to produce integrated collaborative environment [12].

4 Using CMS for KMS due to create dynamic environment

Knowledge management system is the collection of information technologies used to expedite the collection, organization, and distribution of knowledge among users and individuals. An information management system massages data to create information and knowledge. A knowledge management system is an information management system with all the tools required to help individuals turn information into knowledge which could be useful for decision making [11].

One of the main issues in some of the knowledge bases in knowledge management system is to be up-to-date. Nowadays knowledge base systems are based on the static knowledge and they should examine for updating of knowledge bases time by time. If the knowledge management system provides one collaborative environment for data and knowledge in order to distribute data dynamically, some of the barriers in up-to-dating data will be resolved. The environment which prepares collaboration between knowledge bases is called collaborative environment. We propose to apply CMS for creating dynamic knowledge bases [12].

A CMS is a computer application utilized to create, edit, supervise, and share content in a website. CMSs are frequently exploited for sharing industry-specific documentation such as operators' manuals, blogs, articles, sales guides, technical manuals, news, and marketing brochures. The content managed may contain computer files, image media, audio files, video files, electronic documents, and web content. Most of tasks that they do exist in the following [13]:

- Allow for the large number of people to contribute and share knowledge
- Control access to data, information and knowledge according to user accessibilities (defining which information and knowledge users and user groups can view, edit, publish, etc.)
- Aid in easy storage and retrieval of information
- Control of knowledge validity and compliance
- Reduce repetitive duplicate input
- Improve the ease of report writing
- Improve communication between users

Content is necessary, any type or 'unit' of digital information. It can be: text, images, graphics, video, sound, documents, records and etc. In other words anything that is probably to be managed in an electronic format. Content Management is efficient management of the
content depicted above, through combining rules, process, procedures and/or workflows in a way that its electronic storage is supposed to be 'managed' rather than 'unmanaged' [11].

5 Discussion

Staying on up-to-date and dynamic situation for knowledge bases is one of the critical issues in recent KMSs. DKMS need dynamic data, dynamic information and dynamic knowledge. Today’s KMSs are based on the static knowledge bases and they should check for updating version of knowledge bases time by time. If the knowledge management system prepares one dynamic knowledge environment or on the other meaning collaborative environment in order to share data dynamically some of the problems in up-to-dating and dynamic environment have been solved. It means when KMS create collaborating environment for share and collaborate knowledge between knowledge bases, some knowledge base collaboration produce, then dynamic environment can occur. For solving this issue, using CMS and create connection between it and KMS is offered. CMS can control version of knowledge bases and keep versions up to date dynamically rather than statically. It can prepare accessibility for each of user in different areas by producing CMS user interface.

CMS is the system which is defined as a tool or combination of tools that promote the efficient and effective production of the desired 'output' using the managed content. Additionally CMS is a tool that enables an assortment of centralized (technical) and de-centralized (non-technical) user accessibility to create, edits, manages and finally publish number of formats in different variety of content such as text, graphics, video, documents, and etc. In addition being constrained by a centralized set of rules, process and workflows that ensure coherent, validated electronic content is required for any management system.

As it is determined in figure 3, there are different files in CMS for managing and embedding in knowledge bases. In this figure, variety of sections can be structured, un-structured and semi-structured in whole of the system. For accessing to this system and managing files in dynamic environment we need to implement interface and create Application Programming Interface (API) due to help users to extract new knowledge. CMS supplies versioning and prepares up-to-date knowledge and information and also it provides the ability to its users due to use new knowledge anywhere and anytime. In addition, extra new knowledge can be added to this dynamic architecture.

Joomla (with php programming language) and Plone (with Python programming language) are two types of content management system that works with different programming languages. Plone has higher security in compare of Joomla, because Plone utilizes Python. Python is management programming language with high security, while Joomla is more popular content management system which is written by php that is web base language. By creating connection between CMS and KMS, dynamic knowledge management system can appear.

6 Conclusion

Rapid growth in web size and quick change in its application has been appeared in different layers of web. In complicated and dynamic web environment, SWS of information becomes critical issue due to search, share, manage knowledge, and also automatically communicate among software agents, web services and human. The semantic web and automatic processing of semantic information has defined as a controversial issue. In this paper we mention to CMS method as a way to improve dynamic environment in semantic web technology.

7 References


