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Use of Semantic Web in Digital Library Services

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Abstract
This article presents an introduction to semantic web and explores basic concepts of existing Semantic Digital Libraries and briefly describes the concept, origin, goal, features, selection, services, development, components, applications, ontology, advantages, functions of semantic webs, digital libraries, etc. It is an attempt to touch base with all the areas relating to semantic web in digital library services in India in simple languages.

Key words*: Semantic Web, Digital Library, Collection Development, Cataloging, Reference,*

Introduction

In recent years access to the Internet has become a commodity. The growing number of users with access to high speed network connections is causing increased demand for high quality and accurate information. One of the sources of high quality information tends to be libraries. On the Internet, digital libraries are often islands of high quality and well organized information. Digital libraries not only make electronic information available, but also provide access to legacy information (e.g. old historic books, documents, magazines, etc.) which were previously only accessible to a restricted minority of privileged library users. To provide user with high quality searching features digital libraries tend to go beyond trivial implementations acting as brokers between users and physical library. They join peer-to-peer networks extending amount and quality of data, which can be provided to users. Digital libraries try to supply readers with searching features that would span resources across the Internet. Similar solutions have been already implemented in classical libraries. The difference is that nowadays, user expects to get results immediately (or in reasonable time) instead of waiting weeks as it was in pre-Internet times. The World Wide Web contains huge amount of information which can be easily accessed by specifying URI (Uniform Resource Identifier) addresses, search engines and following links to find other related resources. This simplicity of usage has made the web so popular but such simplicity comes with a price. The enormous amount of data has made it increasingly difficult to find, access, present and maintain the information required by a wide variety of users. It is very easy to get lost or discover irrelevant and unrelated information because information content is

presented in natural language. Search engines cannot promise precision since the indexing is based on quantity with no clue to the context in which the terms occur. For this problem, a support is essential for bringing the web to its full potential. Tim Berners-Lee, the inventor of the World Wide Web, put forward the concept of meaningful Web or semantic web. He referred to the future of the current web as the semantic web an extended web of machine-readable information and automated services that extend far beyond current capabilities.

Semantic Web Concepts

The word semantic' stands for the meaning of 'or, word web defines it as of or relating to meaning or the study of meaning. In the term semantic web also indicates that the meaning of data on the web can be discovered not just by people also by computers. According to Tim Berners-Lee (1998) the word semantic means 'machine-possible'. Tim Berners-Lee et al. (2001) describe the semantic web as: “an extension of the current web in which information is given well-defined meaning, better enabling computers and people to work in cooperation.” The key enabler of the semantic web is the need of many communities to put machine - understandable data on the web which can be shared and processed by automated tools as well as by people. Tim Berners-Lee has clearly stated the main goal of the semantic web in his statement, if html and the web made all the online documents look like one huge book, RDF; schema and inference language will make all the data in the world look like one huge database. Semantic web aims to develop such technologies that make the information more meaningful for the machines to process which in turn makes search and retrieval of information more effective. In the semantic web data itself becomes a part of the web and is able to be processed independently of application, platform, or domain. The semantic web on the other hand is about having data as well as documents on the web so that machines can process, transform, assemble and even act on the data in more useful and meaningful ways.

Origin of Semantic Web

Many cognitive scientists have worked earlier on how to structure the knowledge semantically and enable the automated agents to access the web more intelligently and perform the work of the users on their behalf. Descriptive technologies such as XML, RDF, and OWL have been developed to address the limitations in using HTML. XML (Extensible Markup Language) provides a method for transmitting structured documents. It does not impose any semantic constraints or meaning on the data it carries. RDF (Resource Descriptive Framework) is a simple framework / data model to refer the content in the object. RDF is often represented in XML format.

RSS is an RDF object. The concept of Semantic Web was first coined by Tim Berners-Lee, who had also developed Hyper Text Markup Language (HTML), Hyper Text Transfer Protocol (HTTP), Uniform Resource Identifiers (URI) and World Wide Web (WWW). He visualized Semantic Web as a platform where the intelligent software agents will analyze a particular given situation and present with the best possible alternatives to the users. In his book "Scientific American", May 2001, Tim Berners-Lee has shown how the Semantic Web would work technically and explained about ontologies and as well as their importance in constructing the Semantic Web Companion Web site. He told that Semantic Web will act as an integrator across different applications and content in publishing, blogging and other areas, information applications and systems.

What is the semantic web?

The word 'Semantics' has been derived from Greek word 'sēmantiká' (neuter plural of sēmantikós) which means the study of meaning. The study focuses on the relation between signifiers, such as words, phrases, signs, and symbols, and what they stand for, their denotation. Linguistic semantics deals with the study of meaning that is used to understand human expression through language. Other forms of semantics include the semantics of programming languages, formal logics, and semiotics. The terms semantics, metadata and ontologies are used synonymously to refer to Semantic Web. The Semantic Web provides a common framework that allows data to be shared and reused across applications, enterprise, and community boundaries. It is a collaborative effort led by W3C with participation from a large number of researchers and industrial partners. Its objective is to convert all the unstructured documents on the web into a web data. It is based on the Resource Description Framework (RDF). Tim Berners-Lee defined the Semantic Web as "a web of data that can be processed directly and indirectly by machines." W3C looks after the development of such Semantic Web standards. In their Semantic Web Activity Page W3C states: "the idea of having data on the Web defined and linked in such a way that it can be used by machines not just for display purposes, but for automation, integration and reuse of data across various applications." [http://www.w3.org/2001/sw/].

Development of a semantic in library

The Semantic Web comes in handy for the Librarians in providing effective library services. Using the experiences and knowledge of the Librarians the appropriate metadata can be embedded into the existing collections. As the Libraries are information gatekeepers they should bring information and people together. Semantic Web is a remarkable tool for Libraries where it protects proprietary information, and helps in sharing the wealth of

knowledge. The Semantic Web has emerged to address the shortcomings of HTML web pages by developing IT tools which are machine driven and required for integrated access across heterogeneous resources. The explicit meanings are given to the information which enables the machines to process without human intervention and put together it. "The Semantic Web is not a separate web but an extension of the current one, in which information is given well-defined meaning, better enabling computers and people to work in cooperation" (Berners-Lee et al., 2001).

The vision, goals, and mission of both the libraries and the Semantic web are similar. Both of these have been developed for accessing information available in abundance and discovering the knowledge through cooperation and collaboration for the advancement of society. The applicability of library functions for developing semantic library is discussed in the following sections.

Important features of semantic web

The following are the important features of semantic web:

- The semantic web comprises the standards and tools of XML (Extensible Markup Language), XML Schema, RDF (Resource Description Framework), RDF Schema and OWL (Web Ontology Language).
- Two important technologies for developing the semantic web are already in place: Extensible Markup Language (XML) and the Resource Description Framework (RDF).
- XML lets everyone create their own tags hidden labels such as <zip code> or <alma mater> that annotates web pages or sections of text on a page.
- Meaning is expressed by RDF which encodes it in sets of triples each triple being rather like the subject verb and object of an elementary sentence. These triples can be written using XML tags.
- In RDF, a document makes assertions that particular things (people, web pages or whatever) have properties (such as "is a sister of," "is the author of") with certain values (another person, another web page). This structure turns out to be a natural way to describe the vast majority of the data processed by machines.
- Subject and object are each identified by a Universal Resource Identifier (URI), just as used in a link on a web page. (URLs, Uniform Resource Locators are the most common type of URI.) The verbs are also identified by URIs which enables anyone to define a new concept, a new verb, just by defining a URI for it somewhere on the web.

Components of semantic web

The term Semantic Web is used to refer to the technologies and standards used for structuring and

linking of data by providing a proper description of concepts, terms, and their associations within a given knowledge domain. Such standards and technologies included under W3C are:

a) Resource Description Framework (RDF)

b) RDF Schema (RDFS)

c) Simple Knowledge Organization System (SKOS)

d) SPARQL, which is a RDF query language

e) Notation3 (N3)

f) N-Triples, is a format for storing and transmitting data

g) Turtle (Terse RDF Triple Language)

h) Web Ontology Language (OWL)

Semantic Web Stack & Semantic Web Technologies

The challenges in the current web are in the areas of integration, standardization, development of tools, and adoption by users. The architecture and technologies of the Semantic Web are being illustrated in Semantic Web Stack. The following definitions are given by W3C consortium.

a. HTTP

The Hypertext Transfer Protocol (HTTP) is an application protocol for distributed, collaborative, hypermedia information systems to exchange or transfer hypertext. W3C develops the standards for HTTP.

b. HTML

HTML (Hypertext Markup Language) is the standard inextensible and rigid markup language derived from SGML (standard generalized markup language) for displaying web pages and other information in a web browser. HTML consists of tags enclosed in angle brackets. The images, objects, scripts, etc., are embedded into a HTML Document for displaying via browsers. The standards for writing HTML are set by the W3C.

c. Extensible Markup Language:

XML is the extension of HTML, the popularly technology used to provide fundamental structure and syntax for the content in the web documents. XML allows for extensible data formats unlike HTML which is inextensible and rigid but does not provide semantic constraints. It has the capabilities of simplified data storage and sharing mechanisms. Own Vocabularies, Elements and Attributes can be defined by using the DTDs (Document Type Definition). XSLT (eXtensible Stylesheet Language Transformation) is a language could solve the problem of XML partially when data is shared between two applications or for interoperability. The classical problem of retro-conversion from one MARC to other MARCs can be solved

if the elements of source and target structures have one-one relation for sharing and transfer.

d. XML Schema : It is a language to describe the content structure in terms of constraints in an XML document. The Document Type Definition (DTD) is a native schema language to the XML.

e. Metadata : Metadata is a general framework which allows providing machine understandable information.

f. Logic : It is the study of the principles of reasoning. Well understood formal semantics for expressing knowledge are provided by the Logic. The meaning of sentences is defined in most logics without operationalising the knowledge.

g. Agents : The software objects developed by using object-oriented programming and component-based software that work autonomously, proactively and intelligently are called agents.

h. URI (Uniform Resource Identifier): A uniform resource identifier (URI) is a unique name given to identify a resource over a network using specific protocols. URI provides a generic syntax and consists of a generic set of schemes such as URL, URN (Uniform Resource Name), URC (Uniform Resource Characteristic), etc for identification of document/resource. Semantic Web necessitates identifying a resource on the web available in different formats uniquely and globally.

i. Resource Description Framework (RDF)

RDF is a simple language used to create standard data models to refer resources, their relationships and data interchange on the web. RDF is a fundamental standard for the Semantic Web. RDF Schema is a vocabulary extending RDF used for describing properties and classes of RDF-based resources, with semantics for generalized-hierarchies of such properties and classes.

j. Turtle: It is a widely adopted W3C standard not fully standardized, if done then it will be an alternative to RDF/XML. It will eventually lead to greater Semantic Web adoption by the developers and users.

k. SPARQL : It is a protocol and query language for semantic web data sources. SPARQL can be used to express queries across diverse data sources, whether the data is stored natively as RDF or viewed as RDF via middleware. SPARQL contains capabilities for querying required and optional graph patterns along with their conjunctions and disjunctions. SPARQL also supports extensible value testing and constraining queries by source RDF graph. The results of SPARQL queries can be results sets or RDF graphs. -

l. Notation N3 : Notation 3 (also known as N3), an assertion and logic language, is a superset of RDF. N3 extends the RDF data model by adding formulae (literals which are graphs themselves), variables, logical implication, and functional

predicates, as well as providing a textual syntax alternative to RDF/XML.

m. N-Triples : It is a line-based, plain text format for encoding an RDF graph. It was designed to be a fixed subset of N3 and hence N3 tools such as cwm, n-triples2kif, and Euler can be used to read and process it. Cwm can output this format when invoked as "cwm -ntriples".

n. Artificial Intelligence and Expert Systems

Semantic Web can be fully realized with the use of artificial intelligence. It is the study and design of intelligent agents which perceives its environment and takes actions that maximize its chances of success. John McCarthy, has coined this term in 1955, and defined it as "the science and engineering of making intelligent machines. An expert system is a computer system that has the ability to make decisions like a human expert. These are particularly designed and developed to solve complex problems by reasoning about knowledge, like human expert, and not by computer algorithms and procedures.

Web Ontologies

The term ontology is taken from philosophy which means the study of the nature of existence (the literal translation of the Greek word Οντολογία). It is the branch of metaphysics which identifies and describes the things in the most general terms. Ontology is the structural framework or pattern of knowledge representation in the form of objects / concepts within a specific domain, their definitions, properties and the associations with each other which models a domain. It is a prescribed, explicit, pattern of a shared conceptualization, metadata schemas which provide the opportunity to share controlled authoritative vocabulary and taxonomy. These Ontologies help in defining machine understandable semantics which enable easy communication between the human and machine, and also support the exchange of semantics.

Web Ontology Language (Owl)

Web Ontology Language (WOL) is a language which allows us to describe the semantics of classes and properties, add more vocabulary in the domains of internet. Web ontologies provide richer integration and interoperability of data; the applications developed using WOL are intelligent, work at the level of human conceptual level, and searches across diverse communities and integrate the information. Eg. OntoWeb project of Free University of Amsterdam. The formal ontologies are useful in structuring the content on the web to become comprehensive and machine transportable, a pre-requisite for Semantic Web.

Library-to-library communication

A recent trend in digital libraries is to connect multiple digital libraries to federations. Each digital

library, apart from delivering discovery and navigation features, provides the ability to search among other digital libraries systems. Those way readers do not have to query every single library themselves. The request is forwarded to other digital libraries and presented to the user in a compact form. At present, different digital libraries can use different metadata standards. This also implies a variety of protocols available:

a. Z39.50 is a session-oriented and stateful, network protocol. The primary goal is to provide an international standard for network information search and retrieval. The protocol allows the user to access remote database records by specifying criteria to identify appropriate records, and then requesting the transmission of some or all of the identified records.

b. DIENST is HTTP based network protocol. The HTTP GET queries are handled by specialized set of services called Verbs. The answer from the service can be provided in one of the mime types: text/plain, text/html or text/xml.

c. OAI-PMH- the Open Archives Initiative Protocol for Metadata Harvesting provides an application-independent interoperability framework based on metadata harvesting. The OAI-PMH defines two classes of participants: data providers and service providers. The OAI-PMH is based on HTTP requests and XML responses. The response utilizes Dublin Core as metadata format.

d. SDLIP-The Simple Digital Library Interoperability Protocol. The aim of the project was to simplify the implementations of distributed searching in digital libraries domains. The result documents were returned synchronously, or they were streamed from service to client as they become available.

e. ELP -The Extensible Library Protocol builds as an L2L extension for JeromeDL library. It is based on Web Services (SOAP) and utilizes Dublin Core based ontology as a base metadata for describing queries and results.

The list of protocols presented above is not complete and no final as well. No matter how many protocols will be introduced, there will always be a reason to create a new one. To provide more flexible way of connecting L2L networks based on different protocols we introduce Semantic Web Services infrastructure.

Web Services Execution Environment

Cornerstone Web Services specifications have been developed to address problems of interoperability between distributed applications build by various vendors. Existing Web Services technologies provide basic functionality for discovering (UDDI), describing interfaces (WSDL) and exchanging messages (SOAP) between heterogeneous,

autonomous and distributed systems. These technologies enable service requesters to locate and execute services described by interfaces, hiding implementations and abstracting service from concrete platform or programming language.

Semantic web services

In practical terms, existing Web Services technologies support operations limited to services where each operation remains an independent call over the network. But when we move from simplistic information lookup to complex interactions of systems build by various vendors, it occurs that current Web Services technologies remain inadequate to support definition of services, which are supposed to be processed automatically. The motivation behind the work on Semantic Web Services is to look ahead of existing efforts. Web Services standards do not provide any mechanism to specify how to include any additional semantic information which would enable processing them without human interaction. Next section introduces Web Services Modeling Ontology (WSMO) initiative built on existing efforts of standardizing of Web Services, aims to overcome limitations of existing standards enabling automatic service processing.

Digital Libraries

Digital libraries are facing challenges managing an ever increasing amount of resources caused by the increase of investment in research and development as well as the trend to produce more and more written information. Several solutions to these challenges have been developed. Classic libraries are respected for the quality of service they provide. In order to reach this status of trust and reliability, digital libraries require effective information access facilities. But digital libraries are not restricted to conventional means - e.g., information access can also benefit from the development of extensible browsing facilities based on the social connections between readers.

Applicability of Library Functions to the Semantic Web

This section discusses the goals and objectives of the four primary functions underlying the modern library. The discussion also explores the applicability of each function to the semantic web based on the above analysis of library and semantic web similarities.

a. Collection development in the library

The collection development is it to build and maintain a various collection that services a designated constant patron population. The activities of collection development policy that viewed as a contract between the library and users. Collection development policies document the library's intent to grow the collection, identify collection strengths and limitations, and guide library staff, particularly bibliographers, in their collection

development work. Guidelines also include selection criteria about preferred subjects and formats. Collection development policies are not permanent, rather they need to be reviewed and revised, as user populations' change and present new demands. Finally, collection development can help libraries with administrative activities by including procedures for acquisitions, gifts, weeding, replacing lost items and collection evaluation.

b. Semantic Web selection

The semantic web initiative, as a whole, does not identify a specific type of user, although semantic web selection policies will require review and revision for the following key reasons:

- the development of new and related projects—some of which may be competitors;
- the identification of new user agents (computer and human); and
- the development of new technologies and machine capabilities

Based on knowledge about the library community's experience developing library collection development policies, it is likely that semantic web selection policy development will require time and patience, particularly given the absence of examples specific to the semantic web. The wide availability of library collection development guidelines and resources, such as Guidelines for Writing Collection Development Policies provide a useful framework for developing Semantic Web selection polices.

c. Library cataloging

The purpose of cataloging is to make library collection materials findable and discoverable so they can be used. Charles A. Cutter's (1904) objectives for a library catalog, printed in the 4th edition of his Rules for a Dictionary Catalog, are among the most influential statements impacting cataloging. Cutter's objectives state that a library should:

- Enable a person to find a book when the author, title, or subject is known;
- Show what the library has by author, subject, and literature genre; and

Written a century before the development of the web, Cutter's objectives are still applicable to library operations today, and thus influence current cataloging activities. Jumping a century beyond Cutter to today, digital resource cataloging (metadata creation) is being guided by principles and objectives documented in a variety of metadata schemes . Under development is the Rules for Description and Access (RDA), which includes a draft statement of objectives (RDA, 2005). For example, descriptive data (metadata) created using RDA should enable a user to “identify the resource described” and

select appropriate resources "with respect to content, format, etc."

d. Library Circulation

Circulation is the last primary library function to explore in this inquiry of the applicability of library functions to Semantic Web development. Circulation policies document collection access and use procedures. These policies are created to promote healthy collection use and protect library collection holdings. Users often want access to the same collection materials, of which there may be limited copies, or rare materials that are fragile. Circulation polices identify who may use a collection and who has borrowing privileges; they define loan time periods and present renewal polices so that all interested users can have access to library materials. Circulation polices generally state fines and procedures for late returns, lost and damaged items, and other problems associated with delinquent use. Circulation policies also identify non-circulating materials, such as very costly collection holdings, resources needed daily (e.g., a reference resource), or fragile and rare materials.

e. Semantic Web "semantic" representation

Similarities between library cataloging and producing metadata for the semantic web, both are deal with representation. In fact, the boundary between the employ of representation standards in these two environments (libraries and the semantic web) is artificial. Rather the representation activity takes place along a continuum, with simple bibliographic representation for search and retrieval on one end, and the implementation of formal ontology and machine supported deductive reasoning on the other. Similar to the library's community extensive MARC documentation the semantic web provides comprehensive documentation for working with enabling technologies, such as XML, RDF, and OWL. However, the semantic web community falls short, currently, in providing documentation to guide the use of metadata standards and ontology. Plans, guidelines and policies are needed stating principles and objectives for semantic web representation to ensure good quality "semantics" (e.g., coherent, consistent, accurate semantic representation). A semantic representation policy would help to secure a robust framework for effective semantic web operations.

f. Reference and Outreach

The goal of reference is to provide the library community with effective information services. Reference services include personal interaction and dissemination of information. The library has a compulsion "to provide information service to support the educational, recreational, personal and economic endeavors of the members of their respective communities" (RUSA Access to Information Committee, 2000). An extension of reference

service is outreach. Libraries plan services that are of value to their users. Whereas conducting outreach to highlight collection resources that help with finding a first professional job. Outreach extends to community outreach, generally in public through the offering of classes and other services (e.g., English as a second language classes, story time for youngsters, reader advisory services, even cooking and art classes). These items extend beyond reference but deal with overall access and use of the library facility and often promote collection use.

g. Library Portals

The Library portals provide a gateway to information, services from multiple sources and access to the organization's resources. The use of Semantic Web technologies in developing Library portals facilitates users' search, access, and retrieval of learning resources. The portal should aim to provide access to a coalition of learning repositories with learning resources available in different formats. The implementation of Library portals with Semantic Web services will fulfill the vision of Libraries. The Semantic Library portal should have automated interaction with a search engine at the resource, combined with web ontologies, and the content is tagged with information. The adoption and implementation of technologies will enable ontology-facilitated sharing and reuse of learning resources. Such a portal will allow the library to provide best services.

h. Semantic Web resource use

The circulation policy always promotes healthy use of the collection and protects the library holdings. The arrival of digital libraries have eliminated many challenges of the circulation section such as lending the limited collection, defining loan periods and renewal policies, issue of lost and damaged items, fragile & rare materials etc. There should be Semantic Web resource use policy in the library which promote resources use, and protect the integrity of resources. The policy should clearly mention the access procedures for agents; provide them with a unique identification number, and borrowing privileges of resources. The information with regard to the availability of new resources both internally and externally shall be provided to the agents regularly. The Centralized information agents provide a cooperative approach to data sharing.

Digital libraries vs semantic digital libraries

A digital library is a library which collections are stored in digital formats and these collections are accessible by computers. Digital libraries are searchable either through their directory structure or full text search. These searching facilities provide a mechanism to answer the queries like "list all the objects contain selvam". But there is no way to answer the query" list all the subjects related to the irises. Semantic Digital Libraries integrates

information based on different metadata (e.g. resources, user profiles, bookmarks, taxonomies) and provide highly and meaningfully connected information. It is also provides interoperability with other metadata or communication level or both (RDF) as common denominator between digital libraries and other services. It is delivering more robust, user friendly and adaptable search and browsing interfaces empowered by semantics (legacy, format and social annotations).

Existing semantic digital libraries

There are several Digital Libraries cope with semantic technologies by integrating with ontologies and RDF schemas. Some of the libraries are:

BRICKS: Building Resources for Integrated Cultural Knowledge Services (BRICKS) is open source software for cultural resources. It is used to store and disseminate cultural and Heritage assets in digital form. The BRICKS software is developed in Java Server Pages web application based on the Struts framework.

SIMLE: Semantic Interoperability of Metadata and Information is a open source system digital repository for scholarly materials developed at MIT. SIMILE project is sponsored by the World Wide Web Consortium (W3C.org), MIT Libraries and Computer Science and Artificial Intelligence Laboratory (**CSAIL**) has developed open-source application s for manipulating information. Its focus on semantic technology and RDF standards.

JEROMEDL: Jeromedl is semantic Digital library open source software developed by Digital Enterprise Research Institute, Ireland. It is distributed BSD (Berkeley Software Distribution) open source license. It builds von semantic web technologies to fulfill the requirements from Librarians, Scientists and everyone. It provides a facility to store and query a rich bibliographic description of each document. Searching can be done in three ways, simple search-based on keywords, advanced search-based on Metadata (Doblin Core, MARC21, BibTex) and Semantic search-based on RDF Query or Natural Language Query.

FEDORA: Fedora is open source software which provides a core repository service with well defined API's. Fedora is integrated with Semantic Triple store technology and RDF support with Mulgara RDF database.

Fundamental advantages of the semantic web in digital environment

The Semantic web is a project aimed to make web pages understandable by computers, so that they can search websites and perform actions in a standardized way. The potential benefits are that computers can harness the enormous network of information and services on the web. The World Wide Web is the biggest repository of information ever

created, with growing content in various languages and fields of knowledge. But in long run, it is extremely difficult to make sense of this content. Search engines might help you find content containing specific words, but those contents of pages and not the semantic meaning of the pages contents or information about the page. Once the semantic web exists, it can provide the ability to tag all content on the web, describes what each piece of information is about and give semantic meaning to the content item and give be exactly what you want

Conclusion

This paper explored the applicability primary library functions to the Semantic .An exploration of similarities between the library institution and the Semantic Web served as a base. All four of the primary library functions proved applicable to the Semantic Web. Each library function translates to a Semantic Web function. We identified that use of SMX as an intermediary to enable communication between such heterogeneous digital libraries can address the problem of interoperability. The library functions can be applied for acceleration of research and development of Semantic Web. Understanding semantic technology and its applications, practicing these real time technologies to the libraries are necessary today. It will promote the library professionals to provide effective and efficient services to the users as well as it will help them to become a real-time expertise in the knowledge society.

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