ISSN:0975-9646

Sudha J Vishwakarma/ (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 6 (5) , 2015, 4582-4586

Performance Analysis Of Ontology Processing System Using Information Filter and Knowledge Repository for Semantic Web

Sudha J Vishwakarma

Department of Information Technology
Patel College of Science & Technology (PCST), Indore (M.P),India

***Abstract*— In current era of world fundamentally we live behind the data arranged mechanism. It points towards processing of information and knowledge exchanges between the heterogeneous parties in a successful manner. It coordinates the searching gave the nominal related key values and the results must be having higher accuracy and relativity. For accomplishing its point the ontologies give a typical comprehension of a domain that can be communicated in the middle of people and distinctive application systems and will assume a noteworthy part in supporting information exchange processes in different areas. The utilization of a single ontology for all application will never be conceivable. Ontology will never be helpful for all subjects and domains or for a huge furthermore, differed community, for example, the Web community. our paper[15] proposed an new mechanism of ontologies processing using semantic web, information filters. We did several investigations and analysed that our approach is serving all its goals up to maximum extend and giving the better results at initial phases of research. The futuristic implementation in correct direction will definitely improves the ontologies processing and will serve uncertain and dynamic information processing's.**

***Keywords*— Semantic Web, Ontology, RDF, XML, Knowledge Repository, Information Filter, Logics Representation;**

I. INTRODUCTION

In today's reality the information and knowledge is the best resource of the user. The data which is constantly streaming on the internet is mostly dwells behind the World Wide Web. It serves the generally known standards which guarantees the interoperability between the different levels of the information exchanges. It holds the data of diverse sorts which is having some structure or connection between the fields. This is known as structured data. Another is of unstructured sort which can't be prepared specifically. For the most part the data on the internet is unstructured which superfluous expend the resources. The cutting edge web must be planned in such a way which gives the machine processible information. That is the thing that the fundamental objective behind the semantic web. It empowers the intelligent administrations over the information handling or knowledge extraction mediums. Some of those administrations are information brokers, seek agents, and information filters. All they give the robust and interoperable framework. Development of Semantic Web is just conceivable when the framework is been set up with high interoperability. It is the new generation of online network utilized for viably speaking to the knowledge stuffed as object attributes called triplets [1].

Internet holds the data for web content onto a few servers which specifies the searches include in the knowledge mapping. In any case, in future the data access patterns must be modified in a manner that the knowledge can be conveyed as a service utilizing web 2.0. The Semantic Web was rolled out through incremental improvements, by conveying machine-readable descriptions to the data and documents as of now on the Web. In this manner by utilizing semantic web the information can be defined in a manner that it can be utilized for PC as a part of making the web content interoperable and integrated. One approach to empower machine-to-machine trade and automated handling is to give the information in a manner that computers can comprehend it. The Semantic Web is not a different Web but rather an extension of the present one, in which information is given well defined meaning, better enabling computers and people to work in cooperation [2].

Understanding Semantics

Semantics is the field of study for inferring the meaning and knowledge utilizing signs, words or terms. Here the level of semantic can be differed by substance relativity or terms utilized for portraying the word meanings. While building up the operational levels of semantics it could be isolated into four areas: Controlled Vocabulary, Taxonomy, Thesaurus and Ontology. Here the controlled vocabulary is a rundown of term which is enumerated explicitly with an unambiguous definition. Scientific classification is a subject based classification of controlled vocabulary. A thesaurus is a networked collection of controlled vocabulary terms with calculated connections between terms. A thesaurus is an expansion of scientific classification by permitting terms to be organized in a chain of command furthermore permitting different articulations and connections to be made about the terms. Last and the most essential is Ontologies. They are like taxonomies however utilize richer semantic connections among terms and attributes, and also strict rules about how to determine terms and connections. Ontologies have by and large been associated with logical inferencing and as of late have started to be connected to the Semantic Web [3]. Ontologies comprise of definitional aspects, for example, high-level schemas and assertion aspects, for example, elements, attributes, interrelationships between elements, space vocabulary and factual knowledge which are associated in a semantic manner.

In our work[15], we have studied various aspects of ontology and presented some of the work related with the knowledge management using ontologies for semantic web. Finally a improved solution to the given problem is given with benefits, results factors and conclusion.

II. BACKGROUND

Semantic web must be defined along with the knowledge management which is a big challenge for organizations. Information is processed to extract the knowledge which could be resides in many forms of World Wide Web. Knowledge management is a strategic task for the organization which involves the rules of extraction. This process is performed in five phases [15]:

(i) Acquisition
(ii) Creation,
(iii) Storage,
(iv) Validation, and
(v) Utilization

Here the semantic web offers more intelligent service of machine understandability of content. Ontologies serve the basic building block of Semantic Web. They provide a common platform

for analysing the knowledge resides behind the applications and people's communications. Ontologies themselves can be classified into the different groups: Knowledge Representation ontologies, General/Common ontologies, Meta-ontologies, also called Generic Ontologies or Core Ontologies, Domain ontologies, Task ontologies. In Semantic Web the tools used for understanding the human vocabulary is provides by Ontologies. Mainly it starts with getting the web syntax knowledge and the schematic mapping behind them. The basic tools for providing the above facilities are eXtensible Markup Language (XML) and Resource Description Framework (RDF). XML is having a wide tag library for describing the data and are invisible to peoples who read the documents but are accessible to the web which provides the searches for them. RDF does exactly what its name indicates -- using XML tags, it provides a framework to describe resources [15]. A web resource is simply any identifiable information on the web. Uniform Resource Identifiers (URIs) uniquely identify resources of any kind. They are also known as Uniform Resource Locaters (URLs). RDF uniquely identifies the web resources and their location from where the content is initiated. To do this, RDF uses triples written as XML tags to express this information as a graph. These triples consist of a subject, predicate and object, which are like the subject, verb and direct object of a sentence. In order to understand what words mean and what the relationships between words are, the computer has to have documents that describe all the words and logic to make the necessary connections. In the Semantic Web, this comes from schemata and ontologies - tools for helping a computer understand human vocabulary. Ontologies are made working with the help of schematic definition given with the knowledge representation systems. They organize the information with the RDF tags and XML. They process the metadata related with the descriptor for the document or content. The trouble with ontologies is that they are very difficult to create, implement and maintain. Depending on their scope, they can be enormous, defining a wide range of concepts and relationships. During the last few years various tools is came in the market which provides ontologies of various systems. Each tool represents certain functionalities. The layering allows for a modular design of applications that bundle some or all of the functionalities provided [15].

Some of them are covered here as given below:

- RDF Vocabulary Description Language schema (RDFS) - RDFS adds classes, subclasses and properties to resources, creating a basic language framework.
- Simple Knowledge Organization System (SKOS) - SKOS classifies resources in terms of broader or narrower, allows designation of preferred and alternate labels and can let people quickly port thesauri and glossaries to the Web.
- Web Ontology Language (OWL) - OWL, the most complex layer, formalizes ontologies, describes relationships between classes and uses logic to make deductions. It can also construct new classes based on existing information. OWL is available in three levels of complexity -- Lite, Description Language (DL) and Full.

Some specified product based ontologies tools are RDFferret, OntoShare, Spectacle and OntoEdit.[15]

III. LITERATURE SURVEY

During the last few years various researches had been suggested towards improving the ontologies processing structures. Ontologies serve the logical relation of deriving the knowledge from the given inputs. Some of the respective work is given below as surveyed literature[15].

In the paper [7], ontology alignment is performed using multiple ontologies using semantic web based RDF documents in a heterogeneous manner. Mainly it allows the different ontologies to operate interdependently. It derives the knowledge form the relation using more than one set of rules. For getting the work in right direction, the queries must return some values of knowledge, dataset terminologies and their alignment information. This alignment matching involves uncertainties of knowledge rule and their interpretations. This paper serves the objective using distributed inference and probabilistic reasoning to allow efficient ontology alignment.

In the paper [8] ontologies are used for knowledge integration for the different organization using their rule base repository. Here the representation of knowledge structure must follows the standardization rules of semantic web. Mainly the knowledge extraction matches certain section rules from which the relativity is measured. Thus such system is known as knowledge management system. The KMS system deploys the networked knowledge workers which work towards processing the entire information throughout the lifecycle of knowledge. It serves the dynamic requirements of the organizational learning and other assets using semantic web ontologies. But there is a limitation with ontologies that it can't be used for all the web domains.

In the paper [9] some of the artificial intelligence based ontologies are developed for high end software reusability and knowledge sharing. The paper discusses some of the well known tools in the field of ontologies and knowledge extraction. The paper also describes the military ontology operations using a novel tool COMO (Comprehensive OWL Military Ontology). An application proof of concept is also implemented using the above tool. These applications are Planning for Urban Terrain Operations (PLUTO) system and Military Analogical Reasoning System (MARS). Ontology-based applications increase knowledge sharing by combining machine learning, knowledge extraction, and linguistic techniques. Today's AI technologies and tools facilitate effective real time knowledge management by allowing large-scale machine mediated web-enabled knowledge sharing and reuse.

The paper [10] gives another ontology based system Customer Knowledge Management (CKM). It deals with customer record managements and their behaviour analysis towards a particular system. Here the system automatically processes the users record and derive the relation between them. The system uses Ontology Web Language (OWL) over the source code analysis for showing the semantic relation of ontologies.

The paper [11] a new model RDFKB (Resource Description Knowledge Base) is proposed which is a complete semantic web knowledge case. It solves the problem for managing and querying the knowledge sets. It provides various benefits over the other tools such as performance, uncertain information processing, inferred triples, probability information, and lineage information. RDFKB provides a complete and efficient RDF data repository and knowledge base.

The paper [12] work towards making an standard ontology process as a basic building block of semantic web. The creation of ontologies involves various complexities such as their integration, mapping, translation, reuse and consistency checks. As there is not any standard process of ontologies development, heterogeneous mixing and extraction is not possible with traditional systems. Moreover, the issues of duplicate information across documents and redundant annotations are major challenges of automatic ontology creation as the automatically populating ontology from diverse and distributed web resources poses significant challenges. Thus after studying the various works related to ontology construction, there are so many possibilities with ontology development for semantic web for knowledge management systems[15].

IV.PROBLEM STATEMENT

After studying the different research articles related to Ontologies for effective Semantic Web knowledge management there are some of the problems identified which needs to be resolved for further improvement. First of all the evolving Semantic Web must support the knowledge management with model based application supports. Thus it processes the information having relation between the objects and their attributes. The knowledge is presented from the different sources and the processed values are served to some third party as a service. Though there are some of the problem associated with such functionalities are[15]:

(i) Ontologies creation from heterogeneous sources is very tedious process due to lack of predefined rules for extraction. There must be some mechanism which verifies the rules for knowledge representation [13].

(ii) Types of tagging is insufficient, it must be according to the schematic categories of knowledge sources. Here the query optimization might be used with dynamic tags.

(iii) Change management with ontologies structure s not covered with RDF and OWL. During the dynamic updates the changes must be processed in such a way so as the accuracy of the analyzed content is improved [14].

Thus the ontologies categorization, their formation and dynamic nature must be handled with effective tagging schemes for further improving the above problems. It could be made feasible by using a meta data model, relation management and transformation of Ontologies[15].

V. PROPOSED WORK

This paper proposes a novel ontologies for representing the knowledge based systems in Semantic Web. Mainly it works towards improving the traditional web and forming it in such a way that it supports the recent Web 2.0. It provides the context oriented web data similarities based on object constructions. It focuses on the search meaning rather that the keyword mapping. The most related sentences with similar terminologies or meaning is separated out and processed according to the given ontologies. Once the mapping is performed the knowledge can be easily derived. It can be associated with the domain with a given standard. The work also develops the ontologies which could be further shared and reused. It saves the resources and provides additional search capabilities. While making the ontologies which can be shared the common vocabulary have to be developed along with the relation between them. The ontologies developed with the system define the structure of the knowledge and the associated assumptions which is commonly accessible to all the resources[15].

The process starts with generating the interface based request from the client machine or some server. The server after getting the search request tries to access the predefined ontologies which can match the most relativity rules. These rules are used for showing the relation between the terms of given ontologies. Here the designed Semantic Web built along the syntax which is defined by the URL or URI for giving the data rules. Syntax is given with the Resource Descriptor Framework (RDF). Here the combination of RDF and XML can be used for defining the logical schema of the ontology. The RDF manages the meta-data repository and let their exchanges open between the communicating parties. Mainly the proposed work provides the improved RDF mapping using the discrete model which supports the Meta data changes. It also holds the conceptual relationship between the various ontologies and handles their transformation according to the requirements of resources[15].

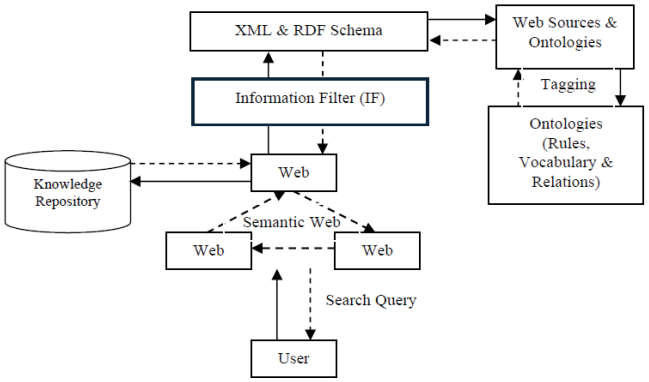


FIGURE 1: PROPOSED ONTOLOGY MECHANISM

The data model used with RDF will captures the knowledge about the resources and their predicates or relationships. The suggested mechanism uses the triples data model with a dynamic combination of the subject, their relationship and the object.

The suggested system works on making the dynamic query updates using knowledge source modifications. As the source or its knowledge base changes the way ontology deals with the query is also changed. The users request is passed on to the Semantic Web network which separates the query according to their URI's. Mainly the separation involves partition of the data for forming the triples which contains the information o the subject, their relationships and the objects which is a data values. The segregated information is stored in the knowledge repository from where it is further processed. Now if the information which is passed for comparing and mapping with the ontologies doest matched with the required formats the processing systems the request for processing. It removes the problems associated with uncertain information and legacy ontologies processing's. The meta-data model and logics data is defined in the hierarchies given with the RDF and XML schemas. They are further used for holding the various types of user's oriented models. The rules defined for the ontologies formation is based on the domain knowledge and the logics. The rules can be dynamically updated by the ontology editor which later on be guided by the previously assigned logics. Knowledge repository is a relational database organized in a way that enables efficient storing and access to RDF metadata. This repository can be seen as a RDF repository. Knowledge processing component enables efficient manipulation with the stored knowledge, especially graphbased processing for the knowledge represented in the form of rules, e.g. deriving dependency graph or consistency checking Knowledge sharing is realized by searching for rules that satisfy the query conditions. In the RDF repository rules are represented as reified RDF statements and while in RDF any statement is considered to be an assertion, we can view an RDF repository as a set of ground assertions in the form (subject, predicate, and object). Rules are also related to domain ontology, which contains domain axioms used for deriving new assertions. Therefore the searching is realized as an inferencing process[15].

After analysing the complete process it seems that the suggested solution will met all its requirements and goals after the implementation or the proof of concepts. Still we are having a strong proof which shows the suggested approach is effective that its competitors.

Expected Benefits Of Work

- It provides effective processing of uncertain data which can't be processed form the previous ontologies.
- Semantic web is used for further exploring the knowledge base solutions.
- It shares the common understanding of the structure of information between the multiple software agents.
- It enables the reusability of the ontologies developed for the similar domains.
- It also allows the assumption to derive the explicit knowledge.
- It increases the operational and analysis capabilities of the system
- Annotation or Tagging improves the search accuracy, precision and recall.

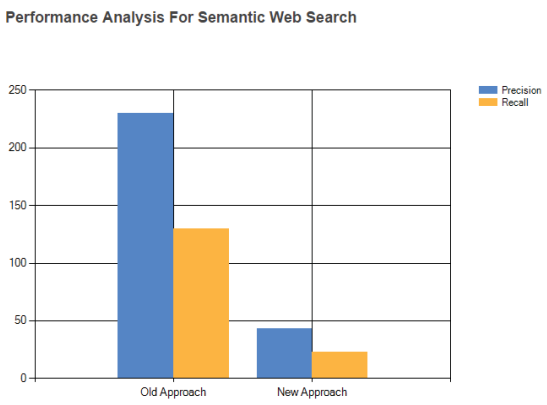
VI. EVALUATION AND PERFORMANCE

With this work the aim is to perform binary classification to predict ontologies based data files. For evaluating the ontologies based search queries classification models, the work uses recall, precision, inspection rate, and vulnerability rate.[15]

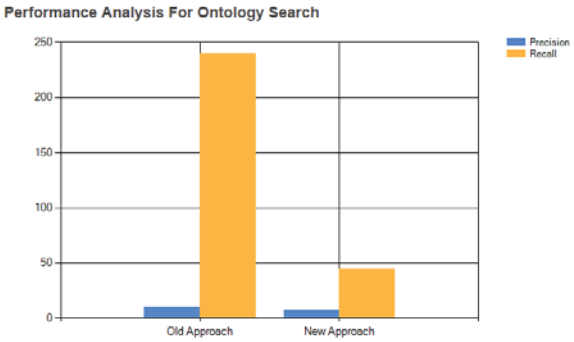
- **Recall (R)** is defined as the percentage of files found: R=TP*100/(TP+FN).
- **Precision (P)** is defined as the percentage of correctly predicted files: P=TP*100/(TP+FP).

We have observed experimental results and found that the performance analysis parameters mentioned above that is Recall(R) and Precision(P) are comparatively better as far as older approaches concern. We investigated comparison of our and older approach for semantic we search. we compared the approaches on the basis of above mentioned factors.

- **Result set 01**: In this set of result we found that older approach has got higher Precision(P) and Recall(R) values and less in the case of newer approach in semantic web search as shown in the graph below.



- **Result set 02:** In this set of results we are analyzing about ontology search older and newer approach. We found that Precision (P) values are almost same but much difference in Recall(R) factor. Our new approach we found has minimal Recall(R) as compared to older approach has very high Recall factor.



We found that our experimental results shows the justification of the proposed approach in our work[15].Performance parameters were found satisfactory and newer approach can be used for Ontology and semantic web search.

VII. CONCLUSION AND FUTURE APPROCAH

Web based information preparing systems had exponentially develops because of their technological advancements. It is having billions of web pages which store various information which can be retrieved by a basic user queries. Now and then these queries rely on upon the content relativity and produce the responses as per the web network. Such network is goes under the semantic web. Here the web process the queries and taking into account the relative pages holding the comparative sort of data. The data mapping rules and the relationships are characterized utilizing web ontologies. Ontologies expands the relevance of the information which is sought by the user. They basically make a meta-data model utilizing schema planning with RDF and XML. Both uses tagging procedure to isolates the data. In some cases the outcome produced is not identified with requested queries.

This is on account of the information is uncertain and unstructured. There must be some mechanism which can even process the raw data as embedded by the user. For serving this control with traditional ontologies there will be information filter and rules repository for knowledge management. Our work[15] presents an novel mechanism of ontologies processing using semantic web, RDF, XML schema and information filters. We studied several aspects of semantic web search and ontologies and experimental results shows that our new approach is reasonably better than older approaches in web search area. Although there is always a scope of improvement so as to this work, we studied several aspects but still there are other aspects which also should be incorporated to get better results like network latency and query optimization. Network latency may affect the approach and queries by the users may be optimized so that web search results in specified and accurate results in searching web.

REFERENCES

[1] Stefan Decker And Sergey Melnik, Frank Van Harmelen, Dieter Fensel, Michel Klein,Jeen Broekstra,Michael Erdmann,Ian Horrocks, "The Semantic Web" The Roles of XML and RDF",IEEE Internet Computing, October 2000, vol. IS, nr. 3, pages. 63-74.

[2] " Semantic web Technology, Layered Architecture, RDF and OWL representation"

[3] Asta back, sari vainikainen, caj Si)dergard and helene juhola,"Semantic web technologies in knowledge Management",

[4] York Sureet. al, "On-To-Knowledge: Semantic Web Enabled Knowledge Management", Institute AIFB, University of Karlsruhe

[5] Nenad Stojanovic, Siegfried Handschuh,"A Framework for Knowledge Management on the Semantic Web", ACM Press, pages498- 99,ISBN:IS81139128, 2002.

[6] Zeeshan Ahmed & Detlef Gerhard, "Web to Semantic Web & Role of Ontology", in Mechanical Engineering Informatics and Virtual Product Development Division, Vienna University of Technology, Getreidemarkt, Austria.

[7] James P. McGlothlin and Latifur Khan, "A Semantic Web Repository for Managing and Querying Aligned Knowledge", in The University of Texas at Dallas Richardson, TX USA

[8] Napoleon Alexandru & Constantin Florin Sîrbu, "Semantic Integration of Knowledge Management Systems", Communications of the IBIMA Volume 3, 2008

[9] Kamal Gella et. al., Effective Knowledge Management Using An Ontology Based Approach", Issues in Information Systems, Volume X, No. 2, 2009

[10] Yalan Yan & Xianjin Zha, "Applying OWL to Build Ontology for Customer Knowledge Management", in Academy Publisher, doi:10.4304/jcp.5.11.1693-1699, VOL. 5, NO. 11, 2010.

[11] James P. McGlothlin, Latifur Khan & Bhavani Thuraisingham, "RDFKB: A Semantic Web Knowledge Base", in Proceedings of the Twenty-Second International Joint Conference on Artificial Intelligence, 2011.

[12] Imran Sarwar Bajwa, "A Framework for Ontology Creation and Management for Semantic Web", in International Journal of Innovation, Management and Technology, Vol. 2, No. 2, April 2011.

[13] A.Rabiyathul basariya & O.S.Jannath Nisha, "Semantic Based Query Optimization using Ontology for Knowledge Management", in IEEE-International Conference On Advances In Engineering, Science And Management (ICAESM -2012), ISBN: 978-81-909042- 2-3, March, 2012.

[14] Kaushik Manavadhariya et. al., "An Architecture for Efficient Data Retrival Through Semantic Web", in Indian Journal of Applied Research, Vol 3, Issue 4, 2013.

[15] Sudha J Vishwakarma, "A Novel Ontology Processing System Using Information Filter and Knowledge Repository for Semantic Web", (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 6 (2) , 2015, 1460-1464