International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 3 Issue 8, August - 2014

Textile Engineering Domain Specific Optimized Web Search System

Varsha S. Kshirsagar
Dept. of CSE, NK Orchid College of Engineering& Technology, Solapur,Solapur University, Solapur, Maharashtra State, INDIA

Prof. S. A. Khuba
Dept of CSE, NK Orchid College of Engineering& Technology, Solapur,Solapur University, Solapur, Maharashtra State, INDIA

Abstract-*The Semantic Web is next evolutionary paradigm of present web.This evolved paradigm is tagged as Web 3.0.Semantic Web is new form of web where content of the web is meaningful to computers. This will unleash a revolution of new possibilities.Ontologyis at the core of the Semantic Web. Ontologyis used to explicitly describe and represent the domain specific conceptualization.Useful information is extracted from large unstructured data source and the general-purpose as well as domain specific ontology have been developed.This paper describes system architecturefor developing ontologyin Textile engineeringdomain. Thisdomain specificontology is used for query optimization.Textileengineering domain ontology defines taxonomy. Taxonomy is publishable on internet. Definitions of basic concepts are included in Taxonomywhich is machine-interpretable.The advantageof using Textile Engineering Domain ontology is demonstrated with the strategy of query optimization.Three kinds of queryoptimization techniques are used. They arerespectively based on is-a relation, part-ofrelation, and equivalent-class relation in the domain ontology. By using this strategy, the user query is optimized by using a domain-specificontology. The optimized query is processed using GoogleAPIfor web information search.*

Keywords - *Semantic Web, Ontology, QueryOptimization, Information Retrieval and web search.*

1. INTRODUCTION

Paper focuses on the two phases that are involved in development of project:
1) Developing OWL Textile Ontology.
2) Building domain specific information searching system based upon GoogleAPI anddomain ontology, where optimized user query is processed.

Developing Owl Textile Ontology

The World Wide Web is a resource of huge information with virtually unlimited potential. However, this potential is relatively untapped as it is difficult for machines to process and integrate this information meaningfully. Therefore, researchers have begun to explore the potential of associating web content with explicit meaning, in order to create a Semantic Web [7].

So as to integrate information from different sources, there is need to have shared understanding of the domain and organizing the knowledge. Knowledge representation formalisms provide structures for organizing knowledge.

In Artificial Intelligence, the most cited definition of ontology is given by Tom Gruber: "Ontology is an explicit specification of a conceptualization" [4].Conceptualizationrefers to an abstract model of some phenomenon in the world by having identified the relevant concepts of that phenomenon. Explicitmeans that the type of concepts used, and the constraints on theiruse are explicitly defined [3].Formal refers to the fact that the ontology should be machine-readable. Sharedreflects that notion that an ontology captures consensual knowledge that is, it is not private of some individual, but acceptedby a group".

Domain Ontology is an ontology Model which provides definitions and relationships of the concepts, major theories, principles and activities in the domain. Domain ontologyprovide shared and common understanding of a specific domain [4].

Query Optimization

Whenever user submits a query to any search engine, problem occurs with retrieval system such as low precision and low recall. The reason behind the low precision of retrieval system is that users can hardly express their requirements in a formal way which is essential for the computer to understand the user'sintention. On the other hand, the low recall is because of that the search engine retrieves information mechanically with the technique of keyword matching and returns only those results fully or partiallymatching the keywords. So, in traditional information searching system,there will be no result returned for two reasons. First reasonis if none of the keywords is matched during the retrieval, and second is that the trulydesired information is listed at the far end of the result for its poor matching with the

keywords.Therefore we can improve the quality of information retrieval by optimizing the user query. And for query optimization, domain ontology is used as a middleware between people and computer.The strategy includesthree kinds of optimization based on is-a relation, part-of relation and equivalent-class relation [2].

2. RELATED WORK

Some of the existing knowledge base in textile engineering specific domain area is as follows:

1) RIKIPEDIA -The rieter textile knowledge base offers specialists, students and other interested parties a reference work with a practical focus on the technology of short staple spinning.

2) COMAPRE-Cleaner production textiles knowledge base, which is primarily aimed at the textile industry to assist in benchmarking performance through national, international and corporate norms and standards for cotton textile production.

3) FDAS-Fabric Detect Analysis System is intended to be an identification and diagnosis system for defects encountered in woven fabrics.

4) TEXMEDIN- Textile and apparel EuroMEDiterranean heritage for Innovation, is a transnational project, whose objective is to create a transnational cluster to increase the competitiveness of the partners territories in Textile and clothing sector focusing on quality, design and innovation.

Knowledge base which exists in the textile engineering domain area are all based on specific process in textiles and are not internet accessible.

Therefore aim of this project is to develop generalized knowledge base using OWL ontology language and this knowledge base will be accessible through internet. Due to inference capability provided by OWL, a new knowledge can be derived from knowledge described in OWL ontologyand use of created Textile domain ontology is demonstrated by building domain specific information searching the system based upon GoogleAPI and domain ontology, where optimized user query is processed[2].

3. BLOCK DIAGRAM

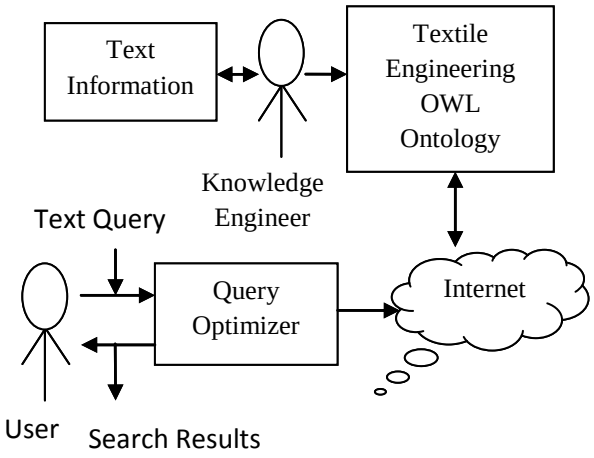

Figure 1.Architecture

As shown in Figure 1, there are three important blocks namely information in the form of text,textile engineering OWL Ontology and query optimizer.

1)Information in the form of Text: This block represents the knowledge about the Textile Engineering Domain formally .Knowledge can be obtained from different resources like Textile Engineering documents ,Textile Dictionary or you can take help of any Textile Expert to get knowledge or from internet.

2) Textile engineering OWL Ontology: An ontology "consists of concepts, hierarchical (is-a) organizations of them, relations among them, axioms to formalize the definitions and relations. The aim of this project is therefore to develop Textile knowledge base that can be shared and processed by machines as well as people.

3)Query Optimizer: By adopting Textile Domain Ontology as a semantic base, we implement an information searching system ,which firstly optimizes the users query according to the relations including is-a, part-of, and equivalent-class in the domain ontology and then process the optimized query and finally merges the searching results to the user.

4. RESULTS AND DISCUSSION

Here, Textile Engineering domain ontology is developed by using Protégé Ontology Editor. Developed Domain Ontology contains different classes, attributes, instances, relations and axiom and can be deployed on ontology repository so as to make it internet accessible.

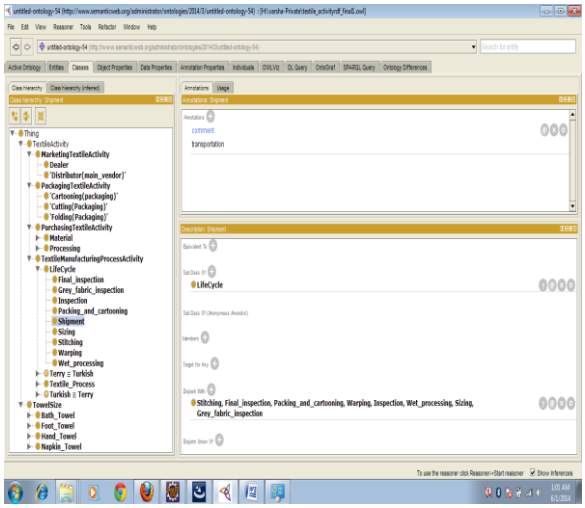

Figure 3.Textile Domain Ontology

Figure 3 showsthe snapshot of protégé editor. We have used protégé editor for building, and deploying the ontology.Developed Textile ontology as shown in above Figure 3represents Textile engineering domain knowledge about and is stored in OWLformat.

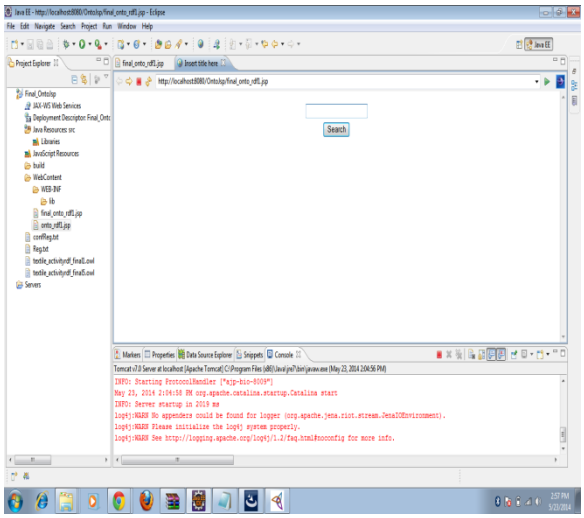

Figure 3.Query Page

The query portal provides a unified interface for the users to enter their query and to show the searching results passed from query optimizer. Figure 3 shows the query page.

5. CONCLUSION

Contemporary information searching systems have little semantic inferring ability to search the hidden information in the web. Google uses some techniques of natural language processing, for example, extension to synonyms, but does not utilize the ontological relations between concepts. This results into low precise and recall of truly required information.That's why user's search requirements are seldom satisfied. On the other hand, we have noticed that information required by users is often strongly dependent on a specific domain. Therefore,in this paper we have devised system architecture where a Textile Engineering ontology is developed and three kinds of query optimization respectively based on is-a relation, part-of relation, and equivalent-class relation in the domain ontology are investigated. By using this strategy, a domain-specificinformation searching system building upon GoogleAPI and domain ontology is built, where optimized user query is processed.

6. REFERENCES

[1] Natalya F. Noy and Deborah L. McGuiness, Ontology Development 101: "A Guide to Creating Your First Ontology", Stanford University, Stanford, CA, 94305.

[2] XU Jian-liang, XIONG Jing, LIU Yong (2010),"A Query Optimization Strategy Based on Domain Ontology",Department of Computer Sciences and Technology Ocean University of China Qingdao, China,2009 International Joint Conference on Artificial Intelligence.

[3]The Protégé Ontology Editor. Retrieved From: http://protege.stanford.edu/

[4] Thomas R. Gruber, A translation approach to portable ontology specifications. Knowledge Acquisition, 5(2):199–220, 1993

[5] KalyanpurAditya, ParsiaBijans, Hendler James. A Tool for Working with Web Ontologies. In: International Journal on Semantic Web and Information Systems. vol. 1, 2005.

[6] Thomas R. Gruber. Toward principles for the design of ontologies used for knowledge.

[7] Jeffrey Douglas Heflin, Doctor of Philosophy (2001), Towards the Semantic Web: Knowledge Representation in a Dynamic, Distributed Environment, University of Maryland, College Park.