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An Intelligent Information System based on Ontology (IISO)

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Abstract*— New inventions in technology are changing to computer field with an interlinked to World Wide Web (WWW). The key issue in the current computer technology is, to provide environment to exchange of information and knowledge. There is need to a shared and common understanding of a domain that can be communicated between people and application systems both. This paper represents semantics based information system, it provide effective searching environment that gives more accurate result for distributed query.

***Keywords*— Semantic web, SPARQL, Ontograf, RDF, OWL.**

I. INTRODUCTION

At the end of the 20th century and the beginning of the 21st, ontologies have emerged as an important research area in Computer Science. Ontology is a formal framework for knowledge representation. It defines the types, properties, and interrelationships of the entities in a domain using RDF (Resource Description Framework) or OWL (Web Ontology Language). It provides platform to communicate between people and application systems that provide the appearance of a domain shared and common understanding. Therefore, the different areas of information exchange processes may play a major role in supporting [1]. In the modern era, ontologies have been created to share and reuse knowledge across domains and tasks. Currently, they are widely used in knowledge engineering, artificial intelligence and computer science, in applications related to knowledge management, natural language processing, e-commerce, intelligent integration information, information retrieval, database design and integration, bio-informatics, education, etc. The reason ontologies are becoming so popular is in large part due to what they promise: a shared and common understanding of some domain that can be communicated between people and application systems.

Main purpose of paper is to impart information retrieval, and analysis the performance of ontology based applications for domain users to predict their query evaluated performance. The remaining part of this paper is organized as follows: Section 2 specify why we need a new information approach. Section 3 review of related works is furnished to specify the background of work. The detailed framework of domain ontology and development tool describes in the Section 4. Section 5 concluded with future work.

II. WHY WE NEED A NEW INFORMATION SYSTEM

In the last few years, with the enormous growth of the Information Society, the Web has become a valuable source of information for almost every possible domain of knowledge. In current information system if we search on any topic then it will provide much more irrelevant information because they work on keyword-based search so it selects documents based on the similarity of terms that appear in query and documents. The order in which documents are represented is determined by their quotation index. Imagine that if we want to find out about the research subjects of a researcher named "john", who lives in "New York" , a search engine will result with a huge set of pages containing the key words "john" and "New York". All pages containing the string "john" and "New York" are returned and many of these pages are completely irrelevant.This shows clearly that the current information access not work properly for distributed information. Therefore there is need to develop a common representation of information which is based on semantics not only syntax. Ontology is good solution for this major problem. The main purpose of the Semantic Web is driving the evolution of the current Web by enabling users to find, share, and combine information more easily.

The ontology based search engine generates a text summary of multiple web pages on the topic of your query. It uses text mining and multidocument summarization to extract sense from web pages and present it to the user in a coherent manner. It provides an effective and useful way to realize the individuation information search for different user information preference. It improves search accuracy by understanding searcher intent and contextual meaning of terms as they appear in the searchable dataspace. In which a search query aims to not only find keywords, but to determine the intent and contextual meaning of the words a person is using for search. The proposed system is being to be developed to overcome the following problems for current web.

- The web content lacks a proper structure regarding the representation of information.
- Ambiguity of information resulting from poor interconnection of information.
- Automatic information transfer is lacking.
- Usability to deal with enormous number of users and content ensuring trust at all levels.
- Incapability of machines to understand the provided information due to lack of a universal format.

III. RELATED WORKS AND BACKGROUND OF RESEARCH

Currently, a couple of Intelligent search engines are designed and implemented for different working environments, and the mechanisms that realize these search engine are distinct.

Fu-Ming Hung and Jenn-Hwa Yang present an intelligent search engine with semantic technologies. This research has combine description logic inference system and digital library ontology to complete intelligent search engine [3]. According to search engine mechanism, presenting demands and a formula evaluating present related technology of that can solve and promote the efficiency of search engine, and formulating the demands of wisdom search engine. If uses Description Logic Inference System to integrate the digital library ontology to proceed with the inference of user requirement, and combines the content search mechanism and knowledge inference to accomplish the study of intelligent search engine.

Inamdar and Shinde [5] discussed agent based intelligent search engine system for web mining. Most of the web search engines make use of the text only on a web page. Agents are used to perform some action or activity on behalf of a user of a computer system. Each user is assisted by his/her own personal agent to search the web. The major goal of each personal agent is to propose to its user and to other agent's links to web pages that are considered relevant for their search. Personal agents can use different internal and external sources of information. The personal agents are software agents running on the server.

Patrick Lambrix and Nahid Shahmehri and Niclas Wahllof [6] presents a search engine is described as one that tackles the problem of enhancing the precision and recall for retrieval of documents. The main techniques that they apply here are the use of subsumption information and the use of default information. The use of subsumption information allows for the retrieval of documents that include information about the desired topic as well as information about more specific topics. The use of default information allows for retrieving of documents that include typical content information about a topic. The strict and default information are represented in an extension of description logics that can deal with defaults. There have been tested the system on small-scale databases with promising results.

Satya Sai Prakash et al [10], present architecture and design specifications for new generation search engines highlighting the need for intelligence in search engines and give a knowledge framework to capture intuition. Simulation methodology to study the search engine behavior and performance is described. Simulation studies are conducted using fuzzy satisfaction function and heuristic search criterion after modeling client behavior and web dynamics.

Dan Meng, Xu Huang discussed an interactive intelligent search engine model based on user information preference [8]. This model can be an effective and useful way to realize the individuation information search for different user information preference. This model frame work, used some artificial intelligent methods and technologies to improve the quality and effectiveness of information retrieval.

Xiajiong Shen Yan Xu Junyang Yu Ke Zhang [12] forward an intelligent search engine where Information Retrieval model is found on formal context of FCA (formal concept analysis) and incorporates with a browsing mechanism for such a system based on the concept lattice. Test data validates its feasibility, and implement of the FCA-search engine indicates that the concept lattice of FCA is a useful way of supporting the flexible management of documents according to conceptual relation .

IV. ONTOLOGY FRAMEWORK AND DEVELOPMENT TOOLS

A. Architecture of Proposed Ontology

In this section we introduced architecture of proposed ontology which includes four basic aspects-

1. The **SPARQL query engine** receives queries and answers them by checking the content of the databases. It extract sense from web pages and present it to the user in a coherent manner.
2. The **WEB dealing part** is responsible for collecting factual knowledge from the Web using various types of meta annotations. It summarization to extract sense from web pages
3. The **inference part** uses facts and ontologies to derive additional factual knowledge that is only provided implicitly.
4. The **database manager** is the backbone of the entire system. It receives facts, exchanges facts as input and provides facts to the query engine.

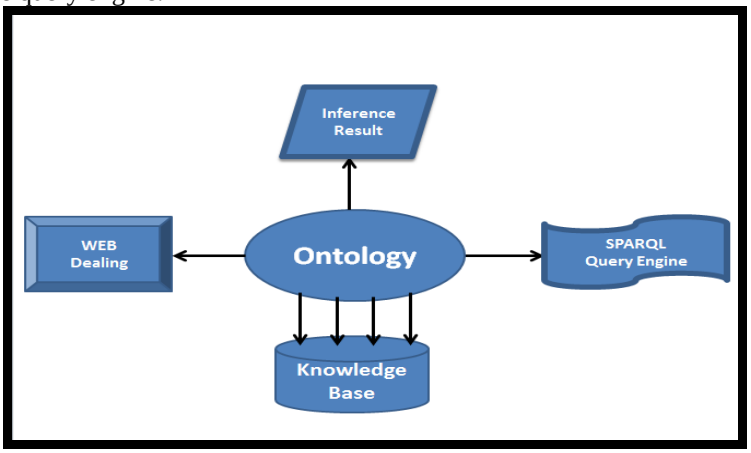

Fig. 1 The stucture of proposed ontology based information system

B. Ontology Development Tools

Sir Jorge Cardoso (2007) carried a survey on most widely used ontology editors and most widely used domain for ontology development and found that Protégé tool had a market share of 68.2% followed by Swoop, OntoEdit, Texteditor, Altova Semantic Works and OilED. Ontologies were mostly developed in the field of education (31%). Therefore, in this paper, the Protégé tool is used for ontology developing. Protégé is most suitable as it provides better flexibility for metamodeling and enables construction of domain ontologies without any syntactic information. Protégé helped in modeling of ontology of classes to describe a particular subject, for entering specific instances and knowledge base details and for execution of applications. With the following advantages over other ontology tools I have uses Protégé tools for developing ontology for new intelligent information system.

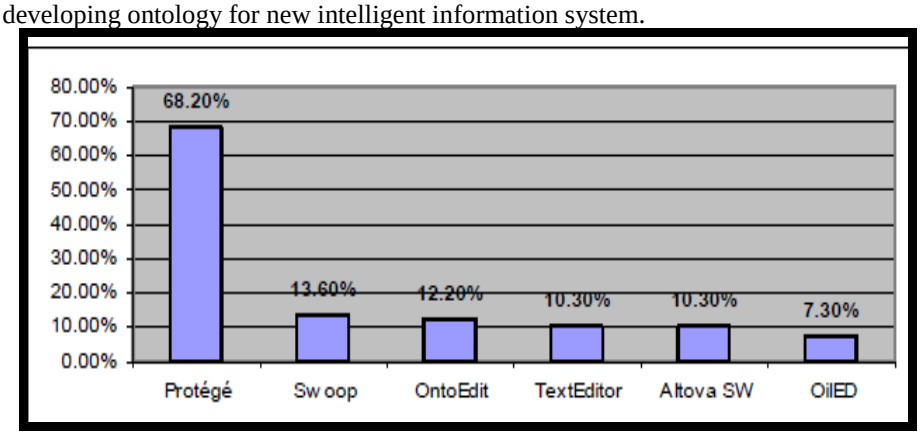

Fig.2 Ontology editors used by respondents (researcher, professional, programmer, etc.) domains
[Source: Jorge Cardoso, "The Semantic Web Vision: Where are We?" IEEE Intelligent Systems, pp.22-26, 2007.].

V. CONCLUSIONS

In this paper, we describe limitation of syntax based information system and specify the methodology to improve our information system by using ontology. This model can be an effective and useful way to realize the individuation information search for different user information preference. We review their characteristics respectively. In addition, the issues within the reviewed intelligent semantic search methods and engines are concluded based on four perspectives differentiations between designers and users' perceptions, static knowledge structure, low precision and high recall and lack of experimental tests. In the future, our work will focus on the deeper and broader research in the field of intelligent semantic search, with the purpose of concluding the current situation of the field and promote the further development of intelligent semantic search engine technologies.

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