



GLOBAL JOURNAL OF RESEARCHES IN ENGINEERING: J
GENERAL ENGINEERING

Volume 17 Issue 4 Version 1.0 Year 2017

Type: Double Blind Peer Reviewed International Research Journal

Publisher: Global Journals Inc. (USA)

Online ISSN: 2249-4596 & Print ISSN: 0975-5861

Ontology Applications that used in a Various Domains in Knowledge Engineering: Survey

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Abstract- Knowledge representation and reasoning are important component in knowledge engineering. In most information systems knowledge capture and then processed using different method like classified and compute ...etc. One of the methods for a processing knowledge is Ontology. Ontology is an organized means of representing the knowledge detailed to the domain of interest. This survey focused to get a clear understanding of what Ontology?. And how to building Ontology in various domains Like intelligent system –Elearning – software engineering and discuss new approaches for ontology in a various domains in knowledge representations . And tools that used in building ontology for example, (UML) Unified Modeling Language this is an associated languages to build ontology.

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GJRE-J Classification: FOR Code: 091599



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Abstract- Knowledge representation and reasoning are important component in knowledge engineering. In most information systems knowledge capture and then processed using different method like classified and compute ...etc. One of the methods for a processing knowledge is Ontology. Ontology is an organized means of representing the knowledge detailed to the domain of interest. This survey focused to get a clear understanding of what Ontology? . And how to building Ontology in various domains Like intelligent system –Elearning – software engineering and discuss new approaches for ontology in a various domains in knowledge representations . And tools that used in building ontology for example, (UML) Unified Modeling Language this is an associated languages to build ontology.

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I. INTRODUCTION

Applications of Ontology are ubiquitous in this world. And use for almost applications that uses for decision making and for solutions, diagnosing, interpreting, and predicting results. There are some definitions of ontology in field of computer science and environment of WWW (world wide web). Ontology is an explicit specification of a conceptualization and semantic meaning. Ontology is known to provide syntactic and semantic meanings of concepts in a concerned domain using different techniques, one of them being OWL (Ontology Web Language). In computer science Ontology researchers agree that capturing domain knowledge is the most important task to build large, powerful and complex artificial intelligence system. And also Ontology is a way to confine knowledge in a machine-understandable form. It yields and used tools for building ontology in various domains of knowledge representation and software engineering. This survey about how to used ontology in a various domains and how to build or create new method or approaches that is used for extracting knowledge for a decision making. And then show tools and software that used for ontology. This survey organized in five sections section one include brief introduction about the ontology. Section two related works in different domains

that used ontology. Section three Table of comparison that contains six related work and show some of limitations. Section four Discussion and section five conclusion and recommendation.

II. RELATED WORK

This section will discuss some issues related to ontology. Starting with the descriptions for ontology in a various domains. And survey about how to uses ontology applications in knowledge representations . And then go through some of applications for uses ontology in knowledge representations.

- 1) Rashmi S R and R Krishnan. [1] were get a clear understanding of what Ontology? And uses in various domains. And covers the reported approaches to gather and represent knowledge using Ontology and tools that supported and associated languages for build ontology. And discussed the usage of ontology for domain knowledge capture and reasoning in the area of intelligent systems.

Then conclude in two research issues:

To build Domain Ontology for the area of discourse. To try out different reasoning techniques such as causal in intelligent system. S. R they gave four questions were asked and three steps of methodologies are: How do you use Ontology in Knowledge Representation? How do you use Ontology for reasoning / inferencing? How do you build Ontology? What are the Applications of Domain Ontology?

Methodologies conducted in 3 steps as given:

Background Preparation. Setting of Survey Objectives. Conduction of the Survey.

- 2) Karmen Klarin and Stipo. [2] Deals with ontology elements modeling in design and evaluation procedure and Ontology elements such as rules, constraints and axioms and correlation between ontology elements and investigated the correlation between static elements like concepts and dynamic elements like queries and analyzed evaluation procedure Competency questions (CQs) as a technique for gathering information about ontology elements. And analyzed ontology engineering conceptualization based on two well-known

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- methodologies are Ushold & Gruninger (U&G) methodology Case (study in education domain).
- 3) Tatiana V. Avdeenko, Natalia V. Pustovalova [3] presents a knowledge - based approach to requirements engineering process. This approach used when creating system requirements-correctness, completeness, consistency, unambiguity and proposed hyper model based on ontology frame and production rules. And can be used for testing traceability, completeness and consistency properties of the requirements specification. And then used **UML** (Unified Modeling Language) object oriented analysis for modeling and annotation the process. And **Protégé** software is free and open-source supported frame-based Ontology.
 - 4) Jiayao Gao, Buyang Cao, Hongfei Fan. [4] Contribute to the novel approach for storing Points Of Interest (POIs) data by using ontology. And capable of building unified data structures and integrated data as well as providing a unified query approach. And design POIs in ontology model to demonstrate the integration of data and structures of classes and descriptions and used **Protégé software** for design ontology.
 - 5) Supavas Sitthithanasakul and Noppon Choosri. [5] Proposed new method to create the ontology applied in software requirements engineering process(SREP) in requirement elicitation, requirement analysis, requirement specification, requirement validation. Although there are already many methodologies to create the ontology, some of them are difficult to understand and apply by other people. And we have presented the ontology information extraction form this form creates for (SREP). And generate the ontology component. This form separates into four parts. Each part used different type of ontology component and considered a guideline to build ontology systematically using UML.
 - 6) Nina Stancheva Stancheva and Asya Stoyanova-Doycheva. [6] Presents test environment that is intended to support E-learning in software engineering education and contains two elements named Questioner and Operatives to support automatic generation and assessment of the test questions by using ontology. These operatives are implemented as intelligent agents that use structured educational content an ontology in the Unified Modeling Language domain to generate and assess different types of test questions using ontology as a knowledge base with the current UML ontology version. It is possible to create questions like true false, multiple choices, multiple responses, select text, drag objects, match items.
 - 7) Suma T, Kumara swamy Y S. [7] Proposed Ontology Extraction engine on the fuzzy rules and define the information and extracts based on fuzzy rules and self-clustering techniques for email classification and use the similarity and match the words. in case a word is not found to match the similarity with existing cluster than a new cluster is formed for that word and also conducted experimental result shows that classification and fuzzy rule set against ontology creation with better efficiency by using values of mean and deviation. Methodologies that used are analytical for email processing and extraction of fuzzy rules.
 - 8) Maedeh Mosharraf and Fattaneh Taghiyareh. [8] presents an automatic approach to enrich E-Learning domain in specific ontology based on two method the integration of graph and clustering techniques in addition external knowledge resources like WordNet and Wikipedia . And generated ontology as integration used model education activities. and showed experimental results that in the case of simple words the dictionary of WrodNet can add acceptable connections to the ontology. methodologies and tools that used Wikipedia and WordNet tool to specify the application domain and semantic features of the input terms.
 - 9) ABADI Asmae, SEKKAT Souhail, ZEMMOURI El Moukhtar, BENAZZA. [9] Hussein Propose a new approach for production and informatics system based on ontology and the concept of agent in software engineering to automate the development of a new product. And achievement of the interoperability requirements and informatics system using UML language and also modeled strategy of the system during the development of a new product.
 - 10) Janejira Somchart, Patitta Suksomboon Garcia and Pattara Aiyarak. [10] use N-Gram technology. NGram technology was used to increase channels and efficiency in the query. Also used ontology technique to analyze, classify, and display information according to the need of stakeholders by classifying the stakeholders into Classes and Sub-classes from 4 to 7 and showed the results through an Android-based smart phone application and measure the satisfaction of stakeholders. The result prove satisfied (mean = 4.65, standard deviation = 0.657) and then use the methodology and tool (UML) to build ontology and analysis for information. (case study) in Prince of Songkla University.

Table of Comparison

Investigator	Research	Finding	Limitations
Rashmi S R and R Krishnan	Domain Ontologies and their use in Building Intelligent Systems: A Comprehensive Survey	Two research issues:- 1- build Domain Ontology for the area of discourse 2- diffrenet reasoning techniques in intelligent system.	focus on survey and there is no example for build ontology.
Tatiana V.Avdeenko, Natalia	The Ontology-Based Approach to Support the Requirements Engineering Process	New approach for requirement engineering process and hyper model based on ontology frame	There is no example for testing the requirement engineering.
Supavas Sitthithanasakul and Noppon Choosri	Application of Software Requirement Engineering for Ontology Construction.	New method to create ontology for software requirement engineering process(SRE P)	Creative method but in a four component there is no integration to validate the requirement s and compare between requirement analysis and requirement specificatio n.
Karmen Klarin and Stipo	Modeling information resources and application using ontological engineering	Technique for gathering information about ontology elements. based on two methodologie s are Ushold & Gruninger (U&G)	There is no extracting the result in test.
Jiayao Gao, Buyang Cao, Hongfei Fan	Point of Interest Data Storage using Ontology.	Novel approach for storing Points Of Interest (POIs) data by using ontology.	Types of queries and types of data type is different
Suma T, Kumara	Email classification	proposed Ontology	Similarity is complex
Swamy Y S	using adaptive ontologies Learning	Extraction engine on the fuzzy rules	when replaced the word

III. DISCUSSION

Ontology applications are large domains so you must select and determine the requirements for ontology design and used for other domains. There several challenges in ontology design and

methodologies when we use and build ontology for specified problem one of them interoperability and integrating. In this survey all of the related work uses or build ontology in one domain While the interoperability issue is an open for research.

IV. CONCLUSION

This paper review several topic about ontology applications that uses in different domains in knowledge representation in E-learning, expert system, and how to select the tool for ontology analysis and software we use to build ontology or propose new method to build a systematic approach for ontology and modeling and extracting knowledge for decision making.

V. RECOMMENDATIONS

Through this survey I recommend for this points Integrating models for ontology to fit for all application in specific domain. Reuse the ontology model to adapt any action when the application is changing. New approaches to help the modelers to use a suited framework to design the ontology. Interoperability and matching are a challenge is open research issues in ontology processes.

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