Ontology: An emerging trend in Engineering

Ankita Mishra[1]

Abstract:

Ontology is based on the knowledge management application for the enterprises with the focused on Knowledge process and management process. The present study is much more specific towards the ontology engineering and how they are related with the overall process. This paper also cover the model for the software engineering that means the diversion of the ontology in different field. Ontology basically changes the management that incorporates the numerous areas like ontology engineering, integration, maintenance, merging etc. The paper involves the emerging trend of the engineering consisting the logical-philosophical principles in the ontology development. The new methodology is useful for the information scientists creating new ontological representations.

Keywords: *Ontology, logical-philosophical, Merging, Integration*

Authors:

1.   *R. R. Institute of Modern Technology, UP technical university, Lucknow, Uttar Pradesh INDIA.*

Introduction

Ontological Engineering consist of set of activities that concern the relevant ontology development process, life cycle of ontology, the methodologies, tools and languages required for building ontologies. The main goal is to provide the technologies and guidelines for effective and efficient ontology, management, network development and its uses.

According to Gruber's and Borst's, ontology is formal specification of shared conceptualization. It refers to an abstract model of same phenomenon by the identification of the relevant concepts of the phenomenon.

Following are the seven relevant definition given by Guarinoa and Giaretta in 1995

• It is a philosophical discipline.

• It is considered as an informal conceptual system.

• Ontolology is known for semantic account.

• It is used as a vocabulary used by the logical theory.

Classification of Ontology

1. **Classification on the basis on Language Expressivity and Formality** – With the help of UML class diagram, this classification is helpful to define the language expressivity.
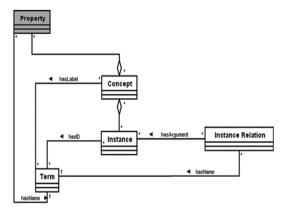

Figure 1. UML Class Diagram for ontology components and its relationship

• **Information Ontologies –** It is easily scalable and modifiable. This classification is considered as the as synthetic and schematic.
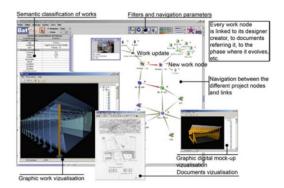

Figure 2. Information Ontology

• **Linguistic/Terminological-** It is define as the collection of dictionaries, controlled, glossaries, controlled vocabularies, lexical databases, folksonomies etc. Hence UML diagram is again used for the linguistic ontology.
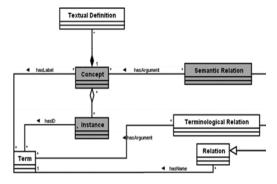

Figure 3. Linguistic Ontology

• **Software Ontologies –** This classification is basically focus on data storage and data manipulation and are useful for the software development activities with the goal of complete data consistency.
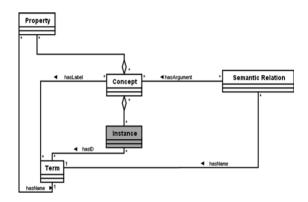
Figure 4. Software Ontology

• **Formal Ontologies –** It basically requires a clear semantics for the language which is used to describe the clear motivation and concept for adopted distinctions as well as the rules on the basis of formal logic i.e. first order or description logic.
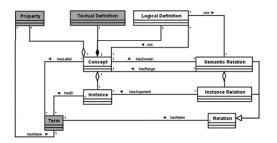

Figure 5. Formal Ontologies

2. **Classification on the basis of Scope and Domain Granularity –** This classification is on the basis of scope of the objects discussed by ontology. The local ontology is narrower as compare with the scope of a domain ontology as domain ontology have more specific concepts.

• **Local Ontologies or Application Ontologies -** they are basically specialized of the domain ontologies where there is no consensus or knowledge sharing. This represent the particular model of domain with the user or developer.

• **Domain Ontologies** – It is only applicable to domain with the specific view point. This linked to specific applications like electric network management system
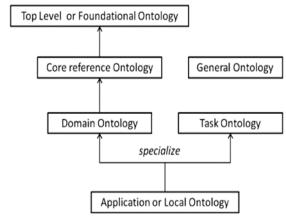

Figure 6. Classification of Ontology on the basis on domain scope

Review of Literature

Happel and Seedorf (2006) stated about the emerging field of the semantic web technologies as a new inducement for software engineering research. The purpose of the ontologies are very difficult to grasp without any proper framework. The benefits discussed are considered as the core part of the better appreciative of ontologies in Software Engineering.

Wongthongtham et al. (2009) discussed about the ontology model for the software engineering. The paper focused on the analysis of description of the software engineering ontology. This basically deals with the detailing of information for the exchange of semantic project information and its use as communication framework. They also discussed about the future implementation through the evolution of software engineering ontology.

Beckers et al. (2012) described the structuring possibilities of ontologies to make the interaction between the publications, knowledge objects with their methods, tools, notation and the knowledge areas explicit. The paper is benefited in various factors like systematic execution of maping and problem gap studies, to analyze a research area consisting a structured approach, analysis of search domain and many more. The main focus of the paper is to provide the support for the new ontologies.

Khattak et al. (2013) stated about information semantic and semantic interoperability among the application system as well as the services are

completely dependent on the ontology. This paper familiarize some of the outspread challenges in the evolution of ontology. The evolution of ontology is **a** collective process and it includes the stages related with ontology matching, integration, merging etc. Conclusively the present paper works for improving the performance of re-establishment of ontology mapping technique.

Patil and Uddin (2015) stated about the ontology as in different field i.e. in the research paper selection as an important decision making task for the Government Funding Agency, research Institutes, Universities. In this paper ontology is defined as a knowledge Repository where the concepts and terms defined as a relationship between their concepts. It make the tasks of searching of similar patterns of text which is more effective. This paper basically focused on the framework on ontology on the basis of grouping of research paper and systematically assigning the grouped paper to reviewers systematically.

Mendonco and Almeida (2016) listed the term ontologies as an instrument used for the knowledge organization that can be used and developed by the help of several methodologies. This require the only knowledge of engineer with a more of computer science to develop the step required in ontologies. This paper also cover the methodology consisting each and every step of ontology development cycle. The aim of the used methodology is known as OntoForInfoScience Hence so as to create and test the OntoInfoScience, they developed a part on ontology in the hematology and the blood diffusion domain. Conclusively the partial result of Hemonto development is provided by them**.**

Conclusion

The present study deals with oriented methodology for the maintaining and introduction of ontology based knowledge system. The paper deals with the several knowledge of the various type of ontologies, their role and importance in engineering as making it the emerging trend. The evolution of the ontology is a collaborative process and incorporates numerous work related to it. The future implementation of these ontologies is more in use for the better development of these use in the engineering field.

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