ONTOLOGY BASED E-LEARNING SYSTEM FOR A UNIVERSITY ON SEMANTIC WEB

R. Ambikapathy, MCA.,Mphil.,
Lecturer, Department of Computer Applications, E.S College of Engineering
and Technology,Villupuram-605 602.
Email:ambi0707@gmail.com, Cell No.9789253043

ABSTRACT

E-learning is the use of technology to enable to learn anywhere and anytime. The e-learning is fast, relevant and just-in-time learning grows from the learning requirement. In WWW for more improvement in e-learning the concept of the semantic web is used for developing e-learning.

Semantic web is mesh information linked up in such away to easily process able by the machine on global scale. The Semantic web relies heavily on the formal ontology that structure underling data from the purposes of comprehensive and transportable machine understanding. The success of the semantic web strongly depends upon the ontology.

This paper presents an approach for developing ontology based e-learning system for an Indian university.

KEYWORDS: E-Learning, Ontology, Semantic web.

INTRODUCTION

Learning process faces many difficulties because of information need and communication teaching in education many problem are the technology and the educational requirements. As today increases the WWW is **used to support and facilitate the delivery of teaching and learning material. This has changed**

current learning process into e-learning process. The distance education provides the base of the e-learning development.

E-learning is defined as the effective learning process created by combining digitally delivered content with support and services.

The e-learning are categories into four levels

KNOWLEDGE DATABASE

Knowledge database are the basic for of e-learning software site offering Indexed explanation and guidance for software questions along step by step Instructions.

ONLINE SUPPORT

Online supports are similar to knowledge database online support come in the form of forums, chat, e-mail and instant message.

ASYNCHRONOUS TRAINING

Self learning is essential in this level either it is CD ROM based, network based, internet based or intranet based. It is known as most traditional way of E-learning. Materials in place of live instructor.

SYNCHRONOUS TRAINING

This type of learning is done in real time with a live instructor facilitating the training. Every one login on same time and can communicate directly with instructor with each other.

`Moreover there are teaching and learning materials available. It is difficult for all participants to effectively search and share valuable teaching knowledge to satisfy the teaching and learning requirements in e-learning .so finding the specific and relevant information is very difficult because of the lack of semantic

description of learning resources. The term semantic web is used for developing e-learning process.

The semantic web is not a separate web but an extension of the current one in which information is given well-defined meaning better enabling computer and people to work in co-operation. The current web or syntactic web are build for human consumption although everything on the web are machine readily not machine understandable .To make machine understandable process semantic web is started to developed
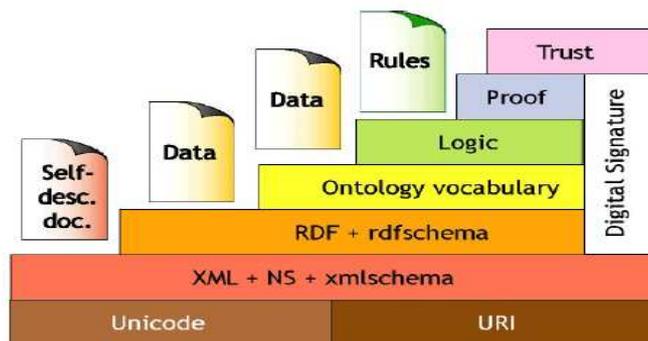
SEMANTICWEB OVERVIEW

Figure 1 : A sematic seb structure

URI

URI stands for Uniform Resource Identifier (URI) provides a simple and extensible way for identifying resources. A resource can be anything that has an identity such as a web site, a document, an image and a person.

UNICODE

Unicode is considering as the universal standard encoding system for computer character representation.

XML AND XML SCHEMA

XML is a language used to represent data in a structural way. It describes what is in the document, not what the documents looks like, while XML Schema provides grammars for legal XML documents

RDF AND RFS

RDF is a way for representing, exchanging and reusing of metadata. RDF uses URIs to identify web resources and uses a graph model for the purpose of describing the relationship between different resources.RDF schema is a simple modeling language introducing classes of resources, properties and relations between them.

ONTOLOGY

Ontology is considered the backbone for the semantic web architecture provides a machine-processable semantics and a sharable domain which can facilitate communication between people and different applications.

LOGIC

There is no specific definition for the Logic layer in the semantic web, not only the Logic layer, but for Trust and Proof layers. There are attempts to reach to their full meaning, status and functions of these layers, because Tim Berners Lee propositions and presentations did not describe these layers in details

ONTOLOGY OVERVIEW

Ontology is considered as back bone for the semantic web architecture provides a machine process able semantic and shareable domain which can facilitate communicate between people and different application.

Ontology technology is used describe the explicit concept of the data and information. Data is defined as sequence of symbols such as picture, figures,

records and text. Information consists of a serial of data. It defined as abstraction about the certain subject and relationship through thoughts.

Recently ontology's have been proposed as an enabling technology for the semantic web. On the semantic web, software agents would be able to deal with more complex queries, filtering and extracting meaning on behalf of the user, and returning a direct response. Some believe that such reasoning services will becomes so integrated into everyday life that they will be "necessary to us as access to electric power"
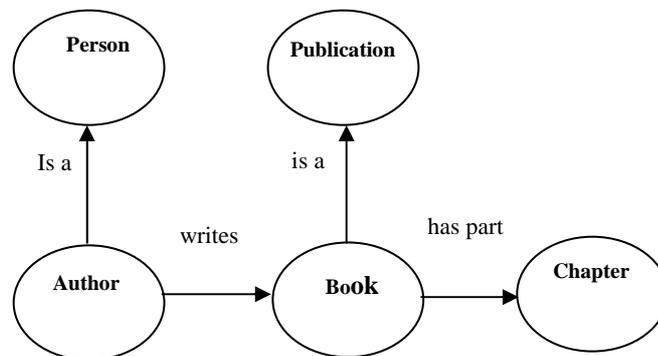

Figure 2 : A simple Example for ontology

A small example for ontology is shown in figure in which it is specified not only that an author is a person and that a book is a publication, but also that an author writes a book that a book has chapters.

RELATED WORKS

Fayed Ghaleb has propos an approach for developing a semantic web-based e-learning system, which focus on the on the RDF data model and owl ontology language .In which the web-Based service s provided main agent used between the student and instructor.

MS.B.sallena has construct a knowledge portal for e-learning using ontology .which focus on thematic knowledge is retrieved from the portal by investing the topic and tracking the content based   on semantic context.

Marian bucos has developed semantic web ontology for e-learning in high education .In this paper the ontology offers the possibility to describe the characteristics of an e-learning system through it components. It contains are need concept and requirement that form the basis of a web –based e-learning.

From the existing system of the semantic web based e-learning .There certain problem they are

1. The amount of the time waste for searching the right content because of lack of semantic links.

2. The absence of the personalization in the conventional e-learning system.

3. Lack of the reusability, auto-correction, and ontology evolution consistence verification.

4. Lack of Meta data.

So we are going to develop a system to solve the above problem by using the ontology because the ontology that are avail now can enable the reusable and sharing due to structure of nature.

ARCHITECTURE OF ONTOLOGY BASED E-LEARNING SYSTEM

The main objective of our ontology based e-learning architecture is to identify the user requirement, student's preferences and characteristic to adapt the course for each single student.

The ontology based e-learning architecture system can classified into three layer.

They are

1. Knowledge base
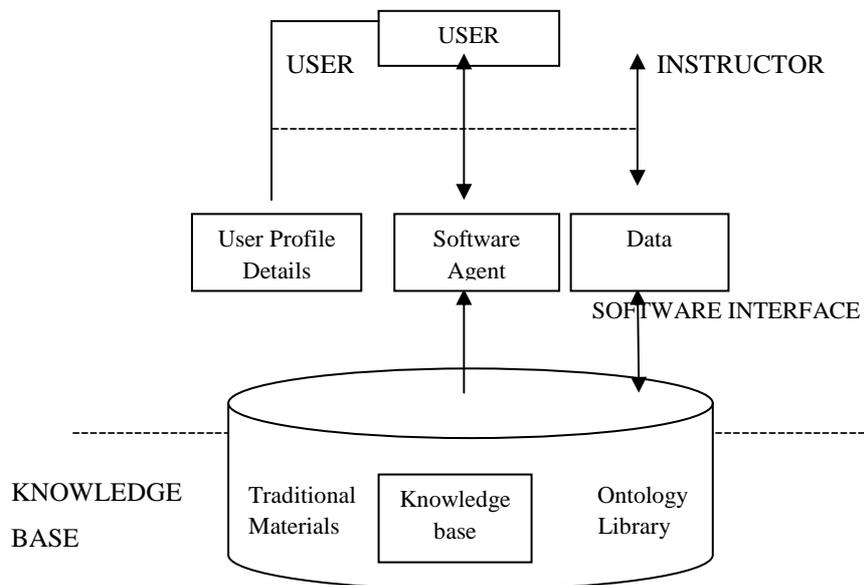
2. Software interface

3. Application layer (user)

Figure 3 : A new architecture for e-learning system

KNOWLEDGE BASE

This layer includes profile database, ontology library and traditional material.

The profiles of the date base consist of the leaner data that include the user ID, Authority information. The ontology library gathers the various description information in which, the ontology resources have various description methods such as RDF file ect and it has grammar semantic function .The ontology are mainly built for share and reuse of the knowledge

The traditional material include various teaching material which a certain course needs including teaching content in the class and excise behind .The material are gathered based on the student profile in the database and based on the query of the learner.

INTERFACE LAYER

In this layer we are using a software agent that communicates with the knowledge base and learner.

The software agent will collect the information based on the learner predicate .this help the learner to easily get the information for what the user searching.

USER LAYER

A browser –based Interface is provided through the web portal only legitimate user can logon in our e-learning systems.

DEVELOPMENT PROCESS

The main agents used in our System are the user and the Instructor both of them are implemented as PHP Classes.

The user are served by the appropriate agents which parse the metadata and tailoring the user Interface to satisfy the user's needs whether student (or) instructor.

The agent interacts and communicates between each other are done by means of PHP, MY SQL database and using the Apache web server.

The e-learning ontology is developed using the protégé ontology editor.

When the user add the data via the RDF learning resources repository through dynamic PHP WebPages after the user submit the form the application will automatically converts this additionally information to set of RDF

statements using RAP API and then add them to existing RDF statements for this document in the repository.

We are using a Semantic web toolkit called RAP for developing our application.

RAP (RDF API FOR PHP)

It is a Semantic web toolkit for PHP developer's .It offers the features for parsing, manipulating, storing, querying, serving and serializing RDF graphs. There are various tool component of the RAP package we are using RAP –RDF API for PHP version 0.9. The RAP features are a resource –centric API, a ontology –centric API, Inference support for RDFS and some OWL constructs and a database administration tools for database –backed RDF model

CONCLUSION

Science web-based learning are becoming popular today .The problem in the e-learning are such as search the right content and the personalization learning. We had discussed about the overview of the semantic, ontology and discuss the developing of the ontology using ontology developing tool protégé 4.0.

In this paper we have present the new framework for developing the ontology based semantic web for e-learning system for a university. The future plan is to create a prototype for the e-learning System for Indian university.

REFERENCES

1. Adis Medic,Adis Golubovic "Making secure Semantic Web"Universal Journal of Computer Science and Engineering Technology 1 (2), 99-104, Nov. 2010.

2. Fayed Ghaleb1, Sameh Daoud1, Ahmad Hasna "E-Learning Model Based On Semantic Web Technology"- International Journal of Computing & Information Sciences 2006-IEEE 2006.

3. Jamuna Rani S , Marie Stanislas Ashok, Palanivel K "Adaptive content for personalized E-lerning using web service and semantic web"–2009 IEEE

4. Mihaela Brut,florence sedes "Ontology –Based solution for personalized Recommend it in e-learning"- 2010 IEEE

5. Ms.B.SaleenaJ, Ms.M.G.Salini , Dr.Siva Venkateswaran-" A Semantic Approach to Construct a Knowledge Portal for E-Learning Using Ontology", 2010 4th International Conference on Distance Learning and Education (ICDLE)

6. Said Ghoniemy., Ashraf Fahmy., & Sultan Aljahdali. "A Dedicated Web-Based Learning System:" Universal Journal of Computer Science and Engineering Technology 1 (2), 84-92, Nov.2010. © 2010 UniCSE, ISSN: 2219-2158.

7. Saman Shishehchi, Seyed Yashar Banihashem, Nor Azan Mat Zin "A proposed Semantic Recommendation system for E-learning" 2010 IEEE.

8. S.Muthu Lakshmi "Semantic web based E-learning system for Sports Domain" International journals of computer Application.