

# **A Compatible Architectural Approach for E-Content Generation using Multi-Agent Semantic Technology**

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## **ABSTRACT**

For the proper growth of research and development, researchers need to be fed with required information and information cost in terms of time and effort for analyzing raw data. Our proposed paper is using the Semantic Web Architecture for acquiring information by analyzing raw data in automated manner. It is an extension of our earlier work [15]. In this paper we are proposing to do some changes at Domain PA layer so that inclusion of web resources from the world of Web 2.0 into the world of Semantic Web will become quite easier. In other words we can say that proposed architecture will be a compatible architecture which can bridge the gap between Web 2.0 and Semantic Web and on that basis we can build up the building of our e-learning model.

**Keywords:** Semantic Web, Multi-Agent, e-Content, S-DB, WEB-DATA, PPMAS, XMLGen

## **1. INTRODUCTION**

Web is full of information in terms of raw data. To transform the data into information or processed data one needs to search the raw data first, of relevance. Then it should be analyzed and used as information. The whole process of acquiring data and transforming it into information is quite time taking job and also requires proper attention. But sometimes people get frustrated because of the time available to them in which one has to reach to the final destination in terms of acquiring the right information, where Semantic-Web has an important role to play. But at this point where, the importance of semantic web may get faded because of the time limit and bulkiness of its architecture. Considering it we are going to propose an architecture, which may take care of the issues suggested through other available models. This will speed up the Information search instantaneous by making changes at "Domain PA" level and it will also enable the whole architecture to be flexible enough to accommodate the web resources of Web 2.0. This inclusion process of Web 2.0 into the world of Semantic web will also become compatible among the group of XMLGen Developers. This is because programming language selection for developing XMLGen will have no restriction. The only goal will be to generate the XML file in required manner so that it can be exploited in proper manner by the PPMAS implementer. Thus it will be a great help to those who want to be information reach and may like to go for research oriented work with proper pace. This paper is an extension of our earlier work titled as ONTOLOGY BASED MULTI AGENT E-LEARNING MODEL presented in the ICNICT 2011 at Krishna Institute of Engineering and Technology, Ghaziabad, Uttar Pradesh.

## **2. RELATED WORKS**

As per the description provided with second reference,

semantic web is web of data. Generally data are described and controlled by the intended application, but semantic web suggests that the whole web can be treated as the source of data and needs to be shared and reused across application, enterprise, and community boundaries without any discrimination.

Many researchers are working towards achieving the sighted goal of the semantic web. This concept can be further fine-tuned as per the specific domain.

Usman Wajid, et. al [3] describes the interaction among the agents in protocol based environment. It also investigates the possibility of protocol free interaction for agents to enable flexible operation of agents in changing environments.

Purvis, M., et. al [4] has suggested an approach for modeling protocols for agent interaction better suited for agents of e-business operations. This has been further clarified by the example of commodities trading in the literature.

Yong-Feng Lin, et. al [5] has described the agents are interacting based on the ontological techniques and has been confined to "Foundation of Intelligent and Physical Agents" (FIPA) protocol. It can initiate the dynamic OWLS services and also improves the management of agent Program.

Peter Brusilovsky, et. al [6] has discussed an architecture that attempts to address both the component-based assembly of adaptive systems and teacher-level reusability.

Tseng, S.-S, et. al [7] has proposed a modular framework that can segment and transform teaching materials into modular learning objects based on the standard named as SCORM. It enables the formation of subject content dynamically as per the profile and portfolio of an individual student.

Ming Qu., et. al [11] has suggested the trusted ontology representation that can be used for semantic web service description, publication, discovery and composition in the distributed and computer-supported cooperative work environment.

Miklos Nagy, et. al [12] has addressed the issues related to mapping of ontology available on the web which requires to be mapped so that proper information can be generated or acquired. They have also proposed a framework to do so base on ontology.

Li Xueyong, et. al [13] have discussed ontology mapping model based experimental data to show its relevance for Semantic Web

Amit Kumar, et. al [14] have proposed a semantic web model which can use the existing web pages and can treat it as the web resource in the world of Web 3.0

We have gone through the papers suggesting the e-learning model based on the semantic web. Those models are not

specific about the knowledge acquisition system for specific domain.

In order to address issues related to knowledge acquisition system we came with the design of a model, which can serve the requirement of ontology based multi agent e-learning system based on Semantics.

Previously the architecture that we proposed is mainly based on the ontology described in next section. Then we will let you understand the proposed model of our next paper of this series. After that we will discuss our proposed model for the current article.

### 3. PPMAS WORKING ARCHITECTURE

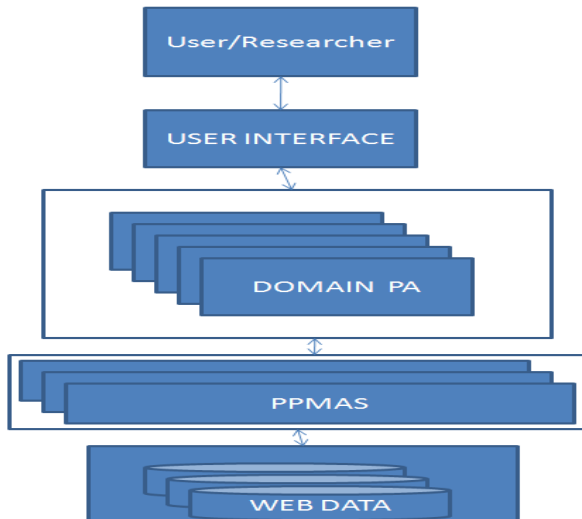


Fig 1: E-Learning system based on PPMAS

PPMAS is completely based on an innovative approach of agent organization and on a clever understanding of the SWS technology. The idea has been generated by studying the different articles focusing on the architecture of SWS by Usman Wajid, et. al [3], Peter Brusilovsky, et. al [6], Neiat, A.G. et. al [8], Yousefipour, A, et. al [9], Jyotishman, et. al [10].

In this model at interface level user will be allowed to specify the domain in which the user is having the interest. For being more specific while searching information the interface will provide a tree like structure for specifying required parameter by using the Programmed Agents or PA for specific domain in which the information or data required to be obtained.

Then these PAs will deliver it to PPMAS. PPMAS will analyze these data and will search the required information on the web based on the ontological data associated with the available data/information on the web.

The acquired information will flow back to the user through same channel where from the request will originate.

As it can be understood from the fig1 that we have proposed PA because it can interact with the user in pre defined manner as it will get programmed. PPMAS will work independently since it has to search data on the web from different data or information sources in parallel. Then obtained data/information will get delivered to requester through intended PA and will get served to user/researcher through the interface which would be used to generate the data/information request.

### 4. CHANGES SUGGESTED AT WEB DATA LEVEL AS PER THE EARLIER PROPOSED SOLUTION

After getting the knowledge of crawling we proposed the model as shown in fig 2. We have suggested GENERIC INFORMATION ACCESSING MODEL BASED ON SEMANTICS [14]. It will use the database at web data layer for storing the semantics of the URIs in ontological manner. Instead of accessing the web data directly through the specified URIs the PPMAS will first match the requirement through the available database at the server participating in the world of Web2.0 and then it will access the URI suggested through the matched record at the database level. Thus we can allow the data and information from the world of Web2.0 to participate in the world of Semantic Web.

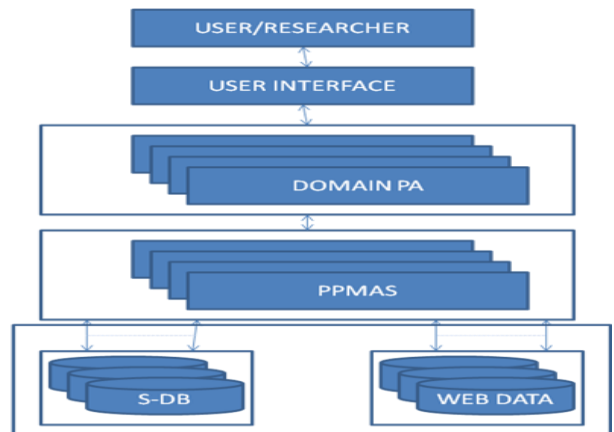


Fig. 2. Generic information accessing model based on semantics

### 5. PROPOSED CHANGES IN THE WEB DATA LEVEL

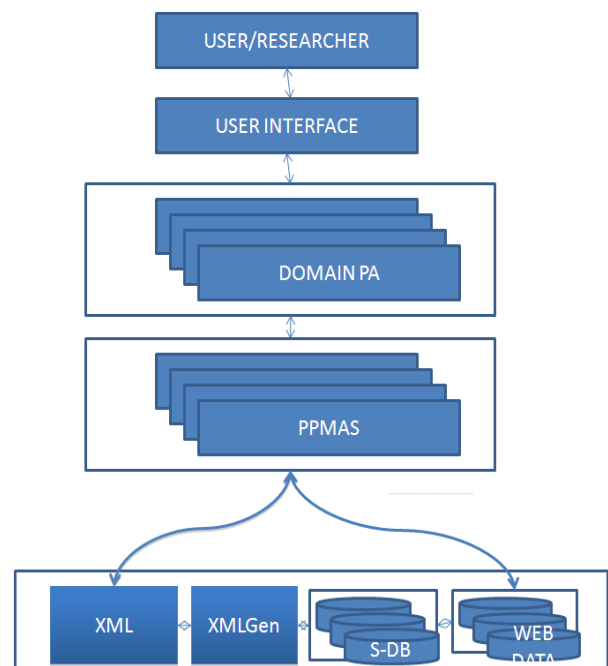


Fig. 3. Architecture for “a compatible approach for e-content generation using multi-agent semantic technology”

In earlier suggested model we have introduced the S-DB for including the resources of Web 2.0 into the world of Web 3.0 or Semantic Web. Having database among multiple PPMAS implementer will become near to impossible, because there will be multiple source of web resource provider and to convey the schema of S-DB to all PPMAS implementer is nearly impossible. Therefore we need a method by which data can be shared in portable manner into large group of PPMAS implementer. XML is a well proven and convenient method to do so. For that purpose we are proposing to use XMLGen at web-data layer which will be a program to generate the XML Data File on regular basis by using the S-DB. XMLGen will use the XML-DOM to generate the XML Data File. Proposed Semantic Web Architecture is shown in fig 3.

Earlier studies inspired us to do changes at the Web Data Layer. We are proposing to use the XML DOM of specific programming languages as per the choice of the XMLGen implementer. Therefore in order to generate XML file on the run the XML-DOM Library of intended Web Programming Language will get used. Because of regular generation of XML-File by XMLGen the newly added web resources in the world of Web 2.0 will also get reflected in the world of semantic web and thus the whole world of web will become reachable. His architecture can be further enhanced for automated or manual e-content generation for knowledge seekers.

## 6. CONCLUSION AND FUTURE SCOPE

Proposed architecture is an effective approach to be practiced for achieving the goals of semantic web in minimum time frame which can be globally portable and can maintain the compatibility among the large group of developers. This approach will enable the Semantic-Web Development compatible along with existing web resources and at the same time will reduce the complexity of the development work. Because of the extensive use XML Database produced web application will become lightweight. If proposed architecture will get followed then achieving the sighted goal of the Semantic Web will become quite easier because of the simplicity of the proposed architecture.

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