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A Comparative Study of Intelligent Online e-Learning Systems

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ABSTRACT - In recent decades there has been extremely rapid development in the area of Information Technology (IT), with different IT applications altering significantly as well. Online teaching and learning is one of the most popular IT applications. The primary objective of this essay is to examine and then compare the different e-learning designs. Some recommendations on the limits identified based on the analytical comparative analyses of these different designs have been offered as context of this research. This study highlights a number of research and design difficulties to enhance smart online learning systems to offer the cultural elements of online classrooms with a productive effect. The study also highlights the concerns that need to be addressed.

Keywords: eLearning, ICT in Education, Intelligent Agent, Online e-learning Models, Learning Management Systems

I. Introduction

The internet society's trend is information sharing and retrieving. In some ways, the web-based technology does this, but as web users grow every day and their exact use of information increases, it is very difficult for website provider to give users with precise information on demand and on demand without the need to know their web users beforehand. After investigation of the present operation of the client-serve web architecture, all information on the websites was discovered to be heterogeneous, i.e. data of a different format like audio, video, text, multimedia etc. This material is also available in other locations. Intelligence is a unique feature for a person, whereas artificial intelligence is a quality that humans from the past fifty years have tried to incorporate into their computer systems and trip continues. A new work of web technology was suggested by President W3C Mr. Tim Berners Lee in order to offer intelligent information in a semanticized manner.

The Semantic Web is a new architecture for WWW that allows both website content and related formal semantiquities. Information is provided via semanticized websites in a specified manner that allows computers and people to cooperate more closely. The concept of semantic web is that most chores and choices should be left to machines. It is a method to improve the intelligibility of web-based systems. But design has to be ontology to build an efficient semantic web system. Ontology defines a machine-understandable application-relevant portion of the world. Ontology is regarded a tool to define other meanings tagged on web pages and to make them accessible for software agents and online applications.

The tendency to modernise the online e-learning system has also been utilised by the Internet for higher education. Solely static information that is shown on the web or in standalones personal computer programmes on a CD/DVD is the conventional online e-learning which offers information only as electronic data. However, the present age of the information system may go a step further in that information is not only shown in texts and multimedia formats, it can be displayed intelligently according to the knowledge level of online students, just like human teachers.

II. E-LEARNING PROBLEMS

The authors concentrated on several e-learning issues that are categorised as path generation (LPG), object recommendation (OR), personalization of content (POC), context learning problem (CLP), IR retrieval (IR), on-line ontology design (DOC), study style categorization (CLS).

LPG aimed to provide students with a series of learning objects (Helic, Maurer and Scerbakov, 2005). The learned system selects the best appropriate learning object (Wang et al., 2007). For the courses created for a particular student, POC defines which learning objects are necessary. CLS takes place on the basis of student interest, knowledge of background, level of mind, abilities and preferences (Li and Park, 2007). CLP explains how multiple courses may be used to provide learning materials for different students

simultaneously. IR is an activity to take a course appropriate to the needs of the student from a group of various courses (Chang, 2002). Based on the hypertext structure DOC offers students with the greatest available information.

III. RELATED WORK

Evaluating the student's performance, giving feedback to the instructor and providing a trustworthy inquiry answer system using a mix of online computational intelligence and the success of an intelligent mobile agent system enhance online e-learning. Authors suggested to extract content from cognitive styles, individual preferences, and previous knowledge using the customization agent in an e-learning system. Authors developed a 3-tier architecture M-Learning System, which includes mobile devices, a base station and the content centre. A mobile agent watches learning activities continually in order to find optimum circumstances of learning and notes the poor field of knowledge of the user. The architecture enables the compilation, rapid creation and collaboration of personal content for individual mobile users. The process of developing a domain model for the intelligent online e-learning system, based on knowledge representation of educational materials via the World Wide Web, was discussed in architecture for simplifying and automating.

One of the fundamental challenges faced by scientists is to create an efficient e-learning system requiring various parameters, such as an expansion of query, the learners' profile, pre-processing of the web logs, discovery and opinion of web knowledge, self-motivated, self-discipline, communication and the ability to operate in a multi-tasking environment. A new set of applications for online e-learning is the agent-based intelligent system (ABIS). Authors have investigated different patterns and methods that express knowledge. The architecture presented is a number of methods and techniques to extract data by aggregating and adapting state-of-the-art research into online e-learning. One of the advantages of an e-learning agent is that the latest educational resources accessible for personalised learning plans for the learner may be constantly obtained. Another benefit of an online e-learning system is that it helps teachers track student progress and facilitates exchanges between teachers and learners who have difficulties with a specific subject.

A lack of customization owing to poor semantic learning resources is the issue with the online learning system on the website. Insufficient semántic components in the technology of online services make it difficult to discover adequate web services as requested by the user.

In order to resolve these problems, the web needs an intelligent system that can be used with the Semantic Web to compute information exactly like a human mind and to act as a smart agent..

IV. STANDARD ONLINE E-LEARNING MODELS

Online e-Learning is a highly difficult research platform; a) IEEE Learning Technology Systems Architecture (LTSC), (b) The Sharable Content Object Reference Model (SCORM), (c) The Blackboards and (d) The Moodle are frequently utilised in online e-Learning models.

A. IEEE Learning Technology Systems Architecture (LTSC)

In principle there are 6 components in the IEEE Learning Technology Systems Architecture (LTSC) architecture, as illustrated in the figure 1. The learner organisation is GUI for students or learners who wish to access online e-learning material. This model coach operates like a core. It offers learning resources, evaluation information, answers to questions etc. The delivery component is used with any multimedia apps to provide the study material correctly and predefine format. The component of Learning Resources contains catalogue information that determines what information a learner has received through a delivery section. A section on evaluating student conduct, progress in studies by evaluating tests, assignments or other kind of system assessment is the most essential component of this approach. The last component, i.e. the student records, maintains the profile of the learner, its current and historical data and personal and academic information.

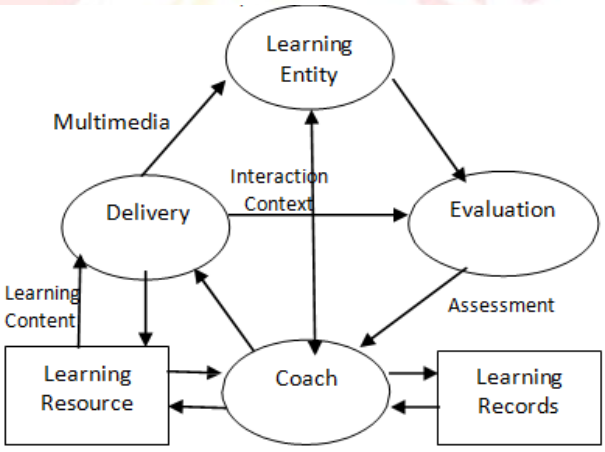

Figure 1: Learning Technology Systems Architecture

B. Sharable Content Object Reference Model (SCORM)

This architectural paradigm of Sharable Content Object Reference Model (SCORM) is extremely popular with web-based online e-learning systems. Among others, content management system is the extra service offered by this architecture. The system supplier may offer the content of the study material for each user with flexibility. It also includes a programming language-independent API adaptor for the provision of application interface. The information is solely supplied by the browser.

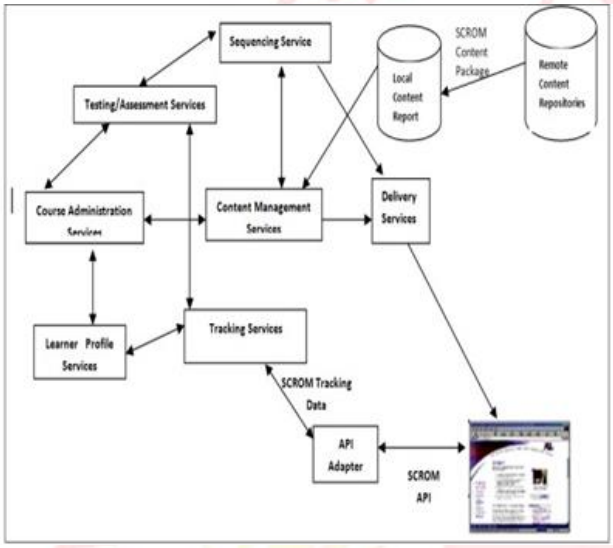

Figure 2: Sharable Content Object Reference Model

C. The blackboard

The blackboard is also an online e-learning system based on the Internet. This system has one of the benefits of using a notion of an agent. Although his notion of agent is not that successful. A fresh method is worth admiring for the addition of an intelligent idea using an agent technology. The architecture of the client-server is illustrated in fig.3 for information exchange. It allows the teacher to submit as much material as is necessary on the topic in a multimedia manner. This is a two-part architecture. The first one is the ID server that conducts login user authentication and permission. Then the approved user will be relocated to the blackboard system that offers all e-learning resources to study a certain topic.

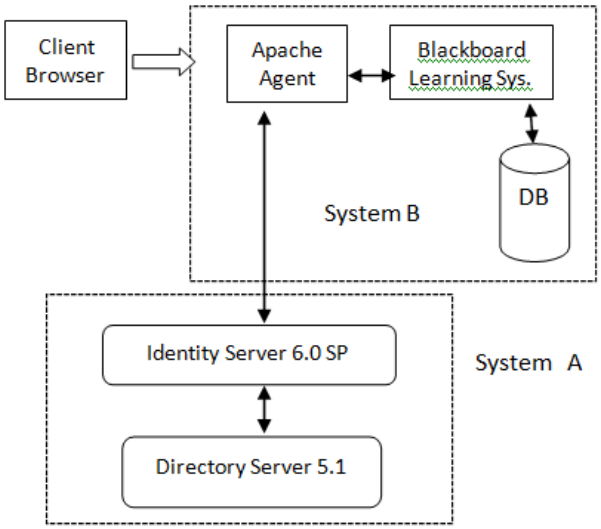

Figure 3: The Blackboard Architecture

D. The Moodle

Moodle is one of the most demanding online web-based programme for e-learning. The architecture has three levels as Fig.4 shows. The first layer is a display layer that gives users a web browser-based GUI. Depending on the specific area in which organisation want to build an e-learning system, the second class is a domain-based laye. The last and most essential data management layer that saves all information in the MySQL database is the data management layer. It has also a connection layer which is used to integrate additional apps to provide instructional content efficiently to students After analysing the various designs and services of e-learning, it was discovered that the majority of smart e-learning systems are anticipated independent from the domain and to work independently.

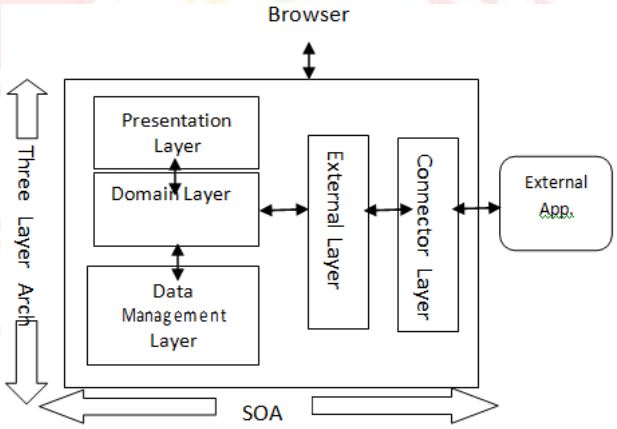

Figure 4: The Moodle Architecture

V. RESEARCH CHALLENGES AND DESIGN ISSUES

Some of the difficulties of creating a successful online learning system include the following after a large study of these different e-learning architectures:

- Develop intelligent web-based, online e-learning system mobile agent architecture.
- To put as much expertise on the mobile agent as feasible
- In order to make the use of semantic web technologies more intelligent and mobile agents.
- To create an adaptable, collaborative and standardising online e-learning system?
- Customize and smart the online e-learning system.
- To utilise the Employer to suggest the relevant material and to recommend other e-learners in the teaching process.
- Proper classification of knowledge information about the capacity to learn.
- Design Issues
- Online e-learning should offer an overview of the subjects.
- It should include statistical analysis and should also provide views about the subject before utilising this specific internet topic.
- It must be capable of collecting and innovating fresh knowledge on the subject.
- Artificial Intelligence should be used to communicate with the user via speech recognition.
- It's supposed to be able to learn.
- it ought to give replies for the prior discussion from internal database, web, wiki.
- To search for information in various internet databases, such as Google, Ask.com, Bing and others.

VI. CONCLUSION

As online e-learning research is a continuous activity and online learners' requirements vary on a daily basis. There have also been certain restrictions in any online e-learning design. The service providers and researchers have a very difficult job to satisfy the requirements of learners. One of its ideas is to combine Semantic Web technology with intelligent software agents that are customised by the learner. With their assistance, online e-learning apps may be developed effectively and in real life.

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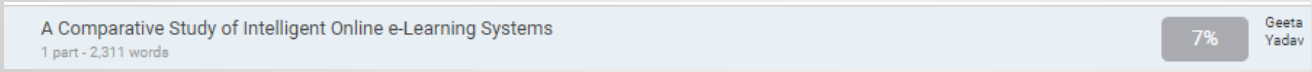

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