Adaptive E-Learning System-A State of Art

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ABSTRACT
As the education system moves from print to digital classrooms, learning products will change rapidly, so academic institutions and policies must respond accordingly. Learning methods are shifting from instructor-oriented to learner-oriented-Learning, referring to learning via the Internet, provides learner with an efficient, flexible and personalized way to learn. It offers learning-on-fly and reduces overall learning cost. This paper describes the demands for e-Learning and related research, and presents a variety of data mining technologies that can integrate with e-learning system to explore the problems faced by Higher Education system and discovering underlying knowledge from Educational Data base. The aim of this paper is to describe how to make a system able to minimize learning gap from education system.

Keywords
Adaptive e-learning, Internet, Data miningTechniques,e-learning information system.

1. INTRODUCTION
With the increasing use of networked computers and achievement of telecommunication technology, the Internet has been widely recognized as a medium for network-enabled transfer of skills, information, and knowledge in various areas [4].E-learning (also referred to as Web-based education and e-teaching), a new context for education where large amounts of information describing the continuum of the teaching–learning interactions are endlessly generated and ubiquitously available. This could be seen as a blessing: plenty of information readily available just a click away. But it could equally be seen as an exponentially growing nightmare, in which unstructured information chokes the educational system without providing any articulate knowledge to its actors. Some e-learning problems to which Data Mining techniques have been applied, including, for instance: Students' classification based on their learning performance; detection of irregular learning behaviours; e-learning system navigation and interaction optimization; clustering according to similar e-learning system usage; and systems' adaptability to students' requirements and capacities. The assessment of students is the e-learning issue most commonly tackled by means of Data Mining methods. This is probably due to the fact that such assessment is closer to the evaluation methods available in the traditional presential education. The pervasiveness of the Internet has enabled online distance education to become far more mainstream than it used to be, and that has happened in a many new e-learning platforms and systems have been developed and implemented with varying degrees of success. These systems generate an exponenttially increasing amount of data, and much of this information has the potential to become new knowledge to improve all instances of e-learning.Data Mining processes should enable the extraction of this knowledge. Its main objective becomes finding the patterns of system usage by teachers and students and, perhaps most importantly, discovering the students' learning behavior patterns.

2. REVIEW OF RELATED WORK
2.1 E-Learning Systems
E-Learning systems are multidisciplinary by nature. Many researchers from fields such as computer science, information systems, psychology, education, and educational technology, have been trying to evaluate e-learning systems. Some have focused on technology-based components of e-learning systems [10], where others have studied only the human factor of e-learning systems considering student and instructor satisfaction [13]. Douglas and Van Der Vyver [8] dealt with the effectiveness of e-learning course materials only; where Arbaugh and Fich [3] studied the importance of participant interaction in online environments; and Gilbert[9] investigated the student experience perspective only. E-learning defines in terms of the learning process through electronic media. According to Rosenberg [16] e-Learning depends on internet technology and is typically a networked form of learning based on a more general concept of learning which transcends the traditional paradigms. We will call e-Learning all forms of electronic supported learning and teaching, which are procedural in character and aim to effect the construction of knowledge with reference to individual experience, practice and knowledge of the learner. Information and communication systems, whether networked or not, serve as specific media to implement the learning process. The weblog (blog) emerged rapidly as a popular application and has been widely adopted in use in higher education has during the past three years. Students preferred blog over the LMS where this course builds an course website and they proved to use blog in developing their e-learning experience. Blog is a very effective tool for students to directly interact with their peers. It is internationally accepted fact regarding to creation of documents of learning, sharing experience and knowledge [12].

2.2 Research area in e-learning:
2.2.1 E-learning Effectiveness:
E-learning has been grown with the help of new economic scenario and it has potential for effective learning in further in future [8].Many of the research in this area are based on web related learning and its effectiveness those have been h compared with to traditional class room learning[8].Generally, the researcher had assed effectiveness of e-learning by analyzing post course questionnaire submitted by students, observing log patterns of online actives ,specialized interview of the students and comparing their performance based on test and course grades

2.2.2 E-learning Based on Multimedia Techniques:
It has been already proved in various research that the techniques used in multimedia enhanced individuals performance in terms of problem solving, utilizing skills and seeking full attention on a given task. Because vividness of the presentation is the core value for creating more active participation and fascination [6][18][21].

2.2.3 Technological Support to E-Learning:
Multimedia technology, electronic distribution through WWW and real time online adaptive methods have paved the new way of e-learning specially during the last decade.

2.2.4 Internet / Web based E-Learning (Synchronous / Asynchronous):
The current unprecedented changes in technology have created a very wide horizon in the field of education and training.

2.2.5 Dynamic E-Learning:
Now the delivery of multimedia content to the personnel computer is smoothly supported by the wide use of internet. It has created platform for adaptive and interactive video technology in e-learning to enhance the perception between virtual instructors and learners. The visual and audio effects increase more learner engagement and hence it enhances their performance. We can compress a video file and play it while it is downloading to reduce video transmission delay. It also enhances interactive e-learning. To ensure maximum utilization of bandwidth and effective e-learning efficient video indexing, retrieval mechanism and easy to use interface can be explored for the learners.

2.2.6 Business Intelligence:
It is related to "Knowledge Management (KM)" in which optimization, control and management are the most critical production factors. It helps employees to be professionally effective for the organization in which they are working. Knowledge Management is all about collecting, managing and sharing knowledge which are much required in terms of gaining knowledge and commanding overseas acquisition and distribution of knowledge. It is biggest knowledge management challenge in e-learning to meet out individuals learner needs. It can only be provided through efficient management accessible highly distributed information and knowledge.

2.2.7 E-commerce Technologies:
The fusion of technology and commerce has created many opportunities. It is infect indispensable services that can be identified by e-learning systems.

2.2.8 collaborative E-Learning:
A virtual class in which learners and instructors are remotely placed can serve better understanding of collaborative learning. Many researchers have proved that group wise supported collaborative learning leads to better students participation, better performance and improve productivity in comparison to individual learning [15][2].Some of the widely used collaboration tools used on the Internet are –Electronic Bulletin Boards, News groups, Net meeting, Online chatrooms and web based group system Text based online collaboration tools are mostly found for supporting e-learning. But tools based on multimedia based materials are highly demanded in current e-learning systems[17].It is equally demanded in adaptive e-learning systems.

2.2.9 Digital and Telecommunication Technology:
There is a significant change on the evolution of learning in digital world. Now instructors and learners can easily access the reliable digital e-resources and they may build high quality distributed learning communities [14].With the advance of high speed networking high resolution videos are being introduced into e-learning system. Telecommunication enables learners to communicate with peers and instructors by using databases and other information sources effectively across the world.

2.2.10 Human Computer Interface:
It is true that different users located in different part of the world have different conceptions and perceptions about interactions with the computer. It may be because of the change in culture, education and access to computer and digital world. Their interface preferences may change over a period of time The most studied five aspects of human computer interface are the nature of HCI, human characteristics, the use and context of computers, computer system and interface architecture, and development process[1]. If the learner has easy access of Internet, he/she may participate in online discussion very often.

2.2.11 Evaluation of E-Learning:
It is necessary to assess learners progress during a learning process and evaluation of system performance for evaluating e-learning systems comprehensively.

2.2.12 Security and Accounting Aspect of E-Learning:
E-learning system must be ensured against the malicious access or misused of data. It must protect the privacy of learners or instructors. Ir must has support system to allow access after due verification of the authorized uses only. It must ensure the obligations in terms of worldwide copyright and license agreements about electronic learning materials. It must be made in such a way to avoid illegal uses. Although the encryption technique and digital signature method are used to protect data, but its misuses cannot be ignored. Therefore, e-learning system must have accounting records regarding online payments, charges and billing services.

2.3 Limitation of E-Learning:
Text based learning material has not enough content for good understanding in comparison to materials based on multimedia. But unstructured and isolated multimedia content also does not motivate many researchers. On examining the impacts of learner characteristics on e-learning effectiveness, powerful simulation or experimental opportunities need to be explored to enable learners to acquire new knowledge or skills. There is a lot of research on intelligent tutoring and adaptive e-learning that can be applied to this area. Study is required how to efficiently assess learners' performance and make dynamic adjustment to instructional contents. It is required to investigate the impacts of different learning contexts on e-Learning effectiveness. In other words, it is also necessary to identify what type of content is more suitable for online learning and what is not.

3. DATA MINING TECHNIQUE USED IN ELEARNING SYSTEM
Data Mining is the extraction of hidden predictive information from large database which can be used in various commercial applications like bioinformatics, E-commerce etc.[5].Many data mining techniques used are Fuzzy Logic Methods, Bayesian Network Artificial Neural Networks and Evolutionary Computation, Graphs and Trees, Association Rules ,Multiagent Systems,Clustering,Prediction Techniques, Visualization Techniques etc.

Subjects of e-learning where these techniques mostly applied are 1. Applications dealing with the assessment of students' learning performance 2. Applications that provide course adaptation and learning recommendations based on the

students' learning behavior.3. Approaches dealing with the evaluation of learning material and educational Web-based courses.4. Applications that involve feedback to both teachers and students of e-learning courses, based on the students' learning behavior.5. Developments for the detection of atypical students' learning behavior.

We can enhance the performance of interactive e-learning by using recognition algorithm and augmented reality. In this process, the learners may get realistic audio-video content and images in the textbook may be identified by the image recognition [11].

4. CONCLUSION
Several literatures proved that Adaptive e-learning have intelligence ability to understand and explore data from experience. With the advancement of information technology, this paper believes e-Learning will have a very promising future in the new era. The future e-Learning will be featured with broadband and more reliable networks and high-quality personalizes and customizes multimedia learning materials. Recent technologies will significantly boost the capacities, reliability, robustness, and speed of networks so that the transmission of multimedia-rich learning materials will be much faster than today.

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