A Secure E-Learning using Data Mining Techniques and Concepts

S Sreeja & Ankita Sharma

Assistant Professor, St. Martin's Engineering College.

Abstract:

Data Mining is an essential concept to retrieve the accurate data with the help of correct queries related to database environment. The methodology of data mining separates the retrieval data and irretrievable data based on user requirements. The secure E-Learning is a platform provides the just-in-time learning it fulfills the requirements of learners. This paper describes the secure e-learning in data mining by using techniques, Concepts and interactive media.

Keywords: E-learning, Effective communication, secure learning data.

1. Introduction

We are in an age often referred to as the information age. In this information age, because we believe that information leads to power and success, and thanks to sophisticated technologies such as computers, satellites, etc., we have been collecting tremendous amounts of information. Initially, with the advent of computers and means for mass digital storage, we started collecting and storing all sorts of data, counting on the power of computers to help sort through this amalgam of information. Unfortunately, these massive collections of data stored on disparate structures very rapidly became overwhelming.

This initial chaos has led to the creation of structured databases and database management systems (DBMS). The efficient database management systems have been very important assets for management of a large corpus of data and especially for effective and efficient retrieval of particular information from a large collection whenever needed. The proliferation of database management systems has also contributed to recent massive gathering of all sorts of information.

Today, we have far more information than we can handle: from business transactions and scientific data, to satellite pictures, text reports and military intelligence. Information retrieval is simply not enough anymore for decision-making. Confronted with huge collections of data, we have now created new needs to help us make better managerial choices. These needs are automatic summarization of data, extraction of the "essence" of information stored, and the discovery of patterns in raw data.

Data Mining, also popularly known as Knowledge Discovery in Databases (KDD), refers to the nontrivial extraction of implicit, previously unknown and potentially useful information from data in databases. While data mining and knowledge discovery in databases (or KDD) are frequently treated as synonyms, data mining is actually part of the knowledge discovery process.

Learning is based on information or knowledge and communication technologies. The E-learning is the latest technology of learning which is getting much more popular in academicians. E-learning technology has multiple data formats which make fluent and flexible learning to learner. Today's word there is no end for learning either it may for academicians or professionals at this situation E-learning may play effective role for just in time learning.

This E-learning platform comes up with huge data as student records, learning courses record, course materials. Course material are having in the form of textual data like journals, books etc and in the form of visualizations like mp4 videos. To make more convenient to learner it has communication media with the respective course guide, or faculty, due to commutation between learner and faculty E-learning platform provides virtual classroom to each individual learner at his own place, on his own convenient time. E-learning can able to reduce learning costs, motivate employees, improve flexibility of course delivery, it expands the capabilities of the business and it makes learning available anytime, anywhere.
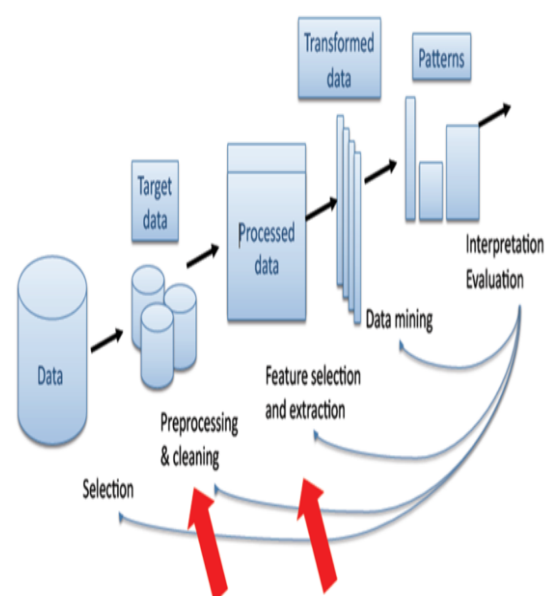
Figure 1: Data Mining Process.

2. Literature Study

In recent generations there are multiple learning platforms available on internet. This paper has been included reviews on previously published papers, journals, sites etc. The review has given idea of skeleton to improve e-learning platform.

In [1] Francesco Maiorana, Angelo Mongioj, and Marco Vaccalluzo published A data mining E-learning Tool: Description and case study which has included report on four year teaching experience in an information system course for students in management engineering. In that courses data mining techniques were taught as part of course. This paper introduces tool for learning the analysis of data using data mining techniques. It also included a case study which presented in the field of customer switching prediction.

In [2] Dr. P. Nagarajan, Dr.G. Wiselin Jiji proposed technology is implemented for Online Educational System (E- Learning). They introduced educational system which lies within three principal activities: Design, Implementation and proper post- implementation assessment. They had proposed a general formulation of model as well as a framework for finding patterns, which improves the online education system for both learner and teacher or faculty.

In [3] Devaji Mahanta, Majidul Ahmed published paper "E- learning Objectives, Methodologies, Tools and its Limitations". This paper discusses on various ELearning objectives, methodologies and limitations of E-learning tool. They have been focused mainly on both synchronous and asynchronous methodology. This paper has mentioned limitations in particular traditional campus learning, design issues and other communication issues. Finally the paper suggests that synchronous tool should be integrated into asynchronous environment to allow for anytime, any- where learning model and also remarked that E-learning need to improve from various barriers.

In [4] Felix Castro, Alfredo Veligo, Angelo Nebot, Francisco Mugica published journal on applying data mining techniques to e-learning problems. This paper aims to provide snapshot of current position of research and applications of data mining methods in E-learning System. Firm the standpoint of the E-learning practitioner they provide taxonomy of E-learning problems to which data mining techniques have been applied system's adaptability to student's requirement and capacities.

In [5] Baker M published journal the roles of models in artificial intelligence and education research. In that author establishes the research opportunities in AI an education on the basis of education process: models as scientific tools, are used as means of understanding and forecasting sum respect of educational solution.

In [6] Chu K, Chang M, Hsia Y proposed about association rules for classification they applied to E-learning have been investigated in the area of learning recommendation system, learning material organization, student learning assessment.

In [7] Margo H, Tang T.Y., their paper describes about studies on how data mining technique could successfully be incorporated to E-learning environment and how they could improve the learning tasks were carried out.

In [8] Tavagrian D, Laypold M, Nolting K, Roser M, published journal which describes that Learning is social. They discussed about is e-learning the solution for individual learning? The frequent challenges which are battled with in our business milieu are sophisticated and unstable. Therefore people dialogue with other members of same organization or network globally to other organization. Community strongly contributes to the flow of tact knowledge.

In [9] Ajayi L.A according to that paper the use of facilities involves various methods which includes systemized feedback system, computer based operation network, video conferencing, internet world wide website and computer assisted instruction. This delivery method increases the possibilities for how, where and when employees can engage lifelong learning.

3. Proposed Work

E-learning systems are an electronic platform between students and teachers and they seems to be an important alternative for overloaded classes or/and the interesting option of study for people that cannot attend to classes (e.g. due to localization limits or disability). The teacher prepares and publishes didactic contents once, and students can use these materials many times. But classical E-learning systems treat each student in the same way (learning path is non adaptive) no matter of their wisdom, predispositions, goals etc. It makes situation uncomfortable for cleverer students who can find learning without any challenge and in their subjective opinions just boring. A less capable student can find these same materials very difficult to learn. A lack of adaptive learning path strategy is an evident disadvantage, but in e-learning systems we can also find some positive aspects, e.g. a system interacts with each student individually and each interaction mark is stored in databases.
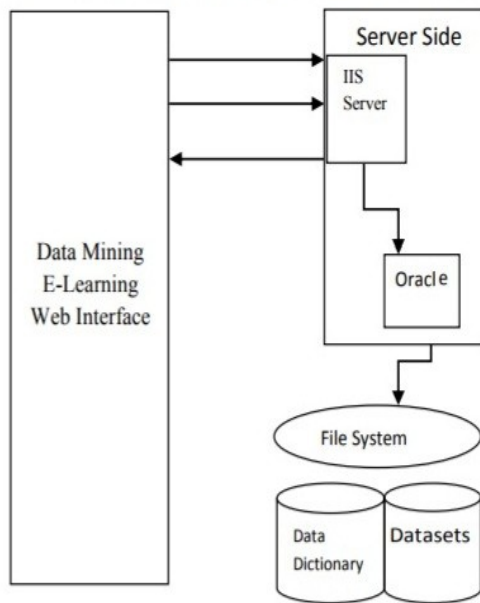
Figure2: Architecture of Data Mining Secure E-Learning

This situation gives us not only very useful opportunity of statistics building but also we can apply data mining techniques to gain additional functionalities in the e-learning system. In classical e-learning system (e.g. Moodle) there are such basic functionalities that allow us to do statistics (summaries or reports) for a given student activity or a didactic content usage but it is useful only for a teacher in limited way. These functionalities cannot give students any automatic suggestion that is connected to them e.g. tests results. More effective learning process is a direct benefit for students (less consuming time process) but also an indirect benefit for E-learning systems, especially for system resource management issues: student who learns faster uses less server resources and the server can work with more students without any additional costs. Also additional system functionality of didactic content usage report is required for its author (see Figure 1.). It is useful source of information how students use the didactics contents. It is very difficult (or even impossible) to monitor each student's activity because of a large size of students groups. That is why so important are profiles (or patterns) of students activity. The author of didactic content that receives the current feedback about the content usage can analyze it and update given content removing possible dimness or add a new example.

The third type of a user (administrator) can also use extended E-learning functionalities. On the basis of users activities data (logs) stored in a system we can generate patterns of standard and nonstandard activities treated as suspicious sequence of actions. With the aid of such sets of patterns we can build an intrusion detection system (IDS, see Figure 1.) as the second line of the system defense. Data mining techniques can be successfully applied also in other E-learning tasks e.g. detect plagiarism in student's homework.

4. Conclusion

Each E-learning system stores a large amount of data based on history of user's interactions with the system. Such dataset is rarely used and it is especially unintelligible as we find such dataset as a source of very useful knowledge. With the aid of data mining techniques we can analyze data and create patterns, data groups or profiles that cannot be seen easily with the naked eye. Such obtained models can be successfully applied to make learning process in the e-learning system more effective by additional functionalities of the E-learning system, e.g. personalization of learning process (recommendation system), source of feedback for content author or intrusion detection tools. An E-learning system is mostly a source of unlabeled data but it is no problem for the active learning paradigm, which extends machine learning usage and makes model building process more effective. In this paradigm model is created interactively and with the user interaction to label only selected problematic data.

5. References

[1] Francesco Maiorana, Angelo Mongioj, and Marco Vaccalluzzo(2012). Proceedings of the World Congress on Engineering 2012 Vol I WCE 2012, July 4 - 6, 2012, London , U.K.

[2] Dr.P.Nagarajan1 . Dr.G.Wiselin Jiji(2010): Online Educational System (E–learning), International Journal of u- and e- Service, Science and Technology Vol. 3, No. 4, December, 2010.

[3] Devaji Mahanta , Majidul Ahmed published paper "E-learning Objectives , Methodologies, Tools and its Limitations" , ISSN: 2278-3075,Volume-2, Issue-1, December 2012.

[4] Felix Castro, Alfredo Veligo, Angelo Nebot, Francisco Mugica Felix Castro., Alfredo Velido., Angeloa Nebot., Francisco Mugia., "Applying Data Mining Techniques to e-Learning Problems" sci2u.ugr.es/keel/pdf/specific/capitol/Applying Data Mining Techniques.pdf.

[5] Baker M.: The Roles of Models in Artificial Intelligence and Education Research: A Prospective View, International Journal of Artificial Intelligence in Education 11(2000) 122- 143.

[6] Chu K., Chang M., Hsia, Y.: Designing a Course Recommendation System On Web Based On The Students Course Selection Records. In: World

Conference on Educational Multimedia, Hypermedia and Telecommunications (2003) 14-21.

 [7] Margo H.: Data Mining in the E-Learning Domain. Computers & Education 42(3) (2004) 267-287.

[8] Tavagrian D., Laypold M., Nolting K., Roser M., (2014). Is e-Learning the solution for individual learning? Journal of E-Learning, 2004.

[9] Ajayi L.A. (2008), Towards effective use of information and communication technology for teaching in Nigerian colleges of education, Asian J. Inf. Technology 7(5):210-214.

[1] Authors Biography

Mrs. S Sreeja, Post Graduated in Computer Science and Engineering (M. Tech) from JNTUH in 2014 and graduated in Computer Science and Engineering (B.Tech) from JNTUH in 2012. Having 3 years of experience as Assistant Professor. She is presently working as Assistant Professor in Computer Science and Engineering department in St. Martin's Engineering College, Hyderabad. Area of interest in Computer Networks , Data Mining, Information Security.

Mrs. Ankita Sharma, Post Graduated in Computer Science Engineering (M.Tech) from KSOU in 2011 and graduated in Computer Science Engineering (B.Tech) from PTU in 2006.Having 7 years of experience as Assistant Professor. She is presently working as Assistant Professor in Computer Science and Engineering department in St. Martin's Engineering College, Hyderabad. Area of interest in Big Data, Database Management systems, Cloud Computing, Information Security.