

A REVIEW: DATA MINING TECHNIQUES IN EDUCATION ACADEMIA

Nandita Priyadarshini
Department of Computer Science & Engineering, Siksha 'O' Anusandhan University, Bhubaneswar, Odisha, INDIA.
Ph : +91-7205346960
92nandita.priyadarshini@gmail.com

Mitrabinda Ray
Department of Computer Science & Engineering, Siksha 'O' Anusandhan University, Bhubaneswar, Odisha, INDIA.
Ph : +91-9861039342
mitrabindaray@soauniversity.ac.in

ABSTRACT

One of the main objectives of Indian educational system is evaluating or enhancing the educational organization. Data Mining (DM) is the process of searching the concealed information from a large quantity of data set. It analyzes the data from different source and it converts into meaningful information. There are a lot of advantages of data mining technique in education sector. Utilization of DM techniques in education sector is a developing and new growing research area. It is also known as Educational Data Mining. The Educational Data Mining is involved with developing the methods that helps to search specific types of data sets that come from education surroundings. Its main objective is to get the new learning techniques and upgrade academic result. The use of DM techniques are discussed to increase the performance of the process of higher education system. Various types of *classification, clustering and association* techniques are used, Which enhance the student performance, their life process management, selection of courses, to measure their reservation rate and allow the fund management of the organization.

Keywords

Educational Data Mining (EDM), Classification, Clustering, Association.

1. INTRODUCTION

The major goal of any academic institution is to bring the quality of education and increase the total work of an institution by looking at individual works [7]. Education system in India suffers from some serious lacunae and one of the lacunae is in rural India, there is no teaching activity on about 50% of the working days in the primary schools.

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The available resources and infrastructure are not sufficient for a student to being knowledgeable [8].

DM is a process that is helpful for searching the concealed information from a large amount of data. It describes the data from different origin and it converts into meaningful information. If we will implement massive technology infrastructure for our education system then, it must motivate students to go for a better education. Before utilization of DM process, Pre-processing is most needed method to describe the data sets. Pre-processing methods remove the extraneous information from the collected data and keep the relevant information. It converts all the attributes to its category. Figure1 shows the architecture of DM technique :-

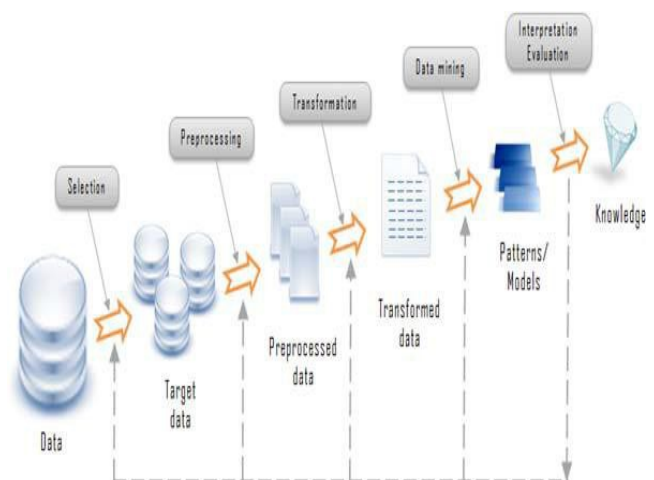


Fig.1 Architecture of Data Mining [1]

In this process, data is assembled from different origin and associated the assembled data in a place. Those collected data are termed as data set or target data. Then the target data is processed in advance and converted into the appropriate format. The data mining methods are tested on the converted data. Finally the result is presented in forms of tables and graph, and termed as the knowledge.

2. DATA MINING IN EDUCATION SECTOR

Utilization of the DM techniques in education sector is a developing area for research and also it is termed as Educational Data Mining (EDM). The EDM involves with developing the methods that are helpful for searching a specific type of data that comes from the academic sectors. The EDM has given the advice for improved decision making process and will increase better instructions for the organization. There are a lot of advantages of DM technique in education sector. Some advantages of DM in education sectors as follows:

DM helps to anticipate the final result of students.

It helps to detect student involvement area and determine student's performance in various fields.

It is used to maintain the records of students in education sector in a productive way and used to classify the organization.

DM operation in education sector is described in figure2 .

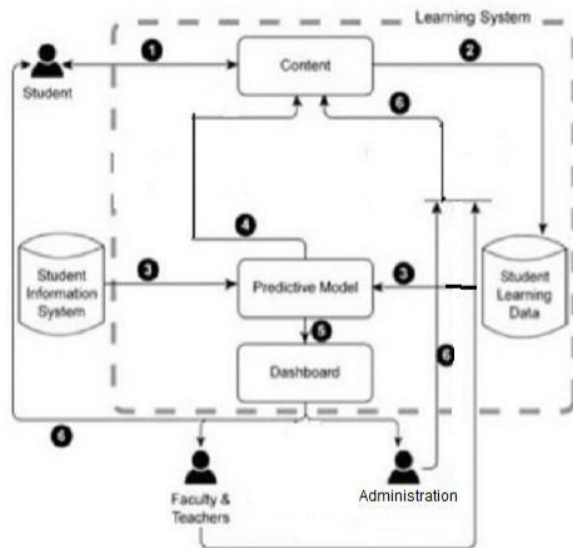


Fig.2 Application of DM in Education Sector [1]

In the figure, student gives information to the content. Then the content forwards the information to student learning data. It creates a new database of the student. Student information system is the existing database which contains all the information detail about the student. The predictive model checks the information from student learning data with student information system. If some information is not perfect in both the data base, then the predictive model sends it to the content to rectify it. If the information is perfect, then it sends it to the dashboard. Dashboard is a combination of faculty and administration. It sends the relevant information about student to faculty or administration. If some particular information likes permanent address is required by the faculty, then it sends a request to content or it sends directly to student. Again the process continues as follows.

There are various types of *classification, clustering, association* techniques of DM methods that has been used to improving the process education sector.

2.1 CLASSIFICATION

The classification technique involves learning and classification of the data. It is the most frequently used DM method, which is used to develop the classes and assign data set to the respective classes [1]. The target data are evaluated by classification algorithm in learning process. In classification method, the test data are utilized to evaluate the efficiency of the classification rules [9]. If the efficiency of rules is acceptable, then rules can be utilized to new sets of data. Classification techniques used in education sector such as:

Bayesian Classification is used classify the persons into various classes depend on different attributes regarding to their educational qualification [10].

Decision Tree is used to predicting the student's academic performance.

Random Forest is used to predict the change in behavior on student database [11].

2.2 CLUSTERING

Clustering is the most frequently used techniques of DM which is used in different areas like, it retrieve the information from a large database, in bioinformatics, to recognize the patterns and, for image analysis [2]. Clustering methods are tried to find out the approximate solution of a problem. It is an iterative process of discover the knowledge that involves the trial and failure methods. It will be absolutely necessary to change the parameters of the model and data pre-processing to achieve the desire results [3]. This technique also finds the classes and assigns the particular object to a desire class. It helps to record the academic dataset of a student from the database that contains basic student data like name, age, gender, origin, student category academic program, and academic achievements data. Cluster analysis is not different technique but it can be accomplished by various algorithms Clustering techniques used in education sector such as:

Partitioning Methods is divided the students in to different sections according to their academic performances.

Hierarchical clustering is used for extract the commonly used items from a large database.

2.3 ASSOCIATION

The main goal of the association technique is to search the most impressive association and interrelationship between a huge data set. Association technique is used to search the most regularly available data element in a huge data set. Now a day's by help of association rule many corporate companies are increase their profits. In education sector, it helps the student to searching useful patterns that are helpful in their education, guiding the student to find out the best fit changing model for student learning. [1]

3. BENEFITS OF DATA MINING IN EDUCATION

The use of DM techniques for students is to get better opportunities for their carrier counseling. The educational data mining can support both the student and the management to developing their quality of education. DM with student that means it contains the related information about the student like name, age, gender, course, address etc. It also helps the student in their better development and to enhance better educational process [6]. The DM technique can help in improvements of the student academic performance. It also improve the web based educational systems

4. CONCLUSION

Currently, the education system faces a number of issues. To give a solution for those issues, we use different DM techniques with our education system. It gives a set of methods, which can help our educational system process to defeat from those problems and increase the quality of education system. It will empower the organization in a proper manner that will helpful a student to being knowledgeable and also helps the teachers to provide a quality of education and the management in increasing the performance of the organization.

5. REFERENCES

[1] V. Kamra, Johina, "A Review: Data Mining Technique Used In Education Sector", International Journal of Computer Science and Information Technologies, Vol. 6, pp. 2928-2930, 2015.

[2] P. Veeramuthu, R. Periyasamy, V. Sugasini, "Analysis of Student Result Using Clustering Techniques", International Journal of Computer Science and Information Technologies, Vol. 5, pp. 5092-5094, 2014.

[3] A. Dutt, S. Aghabozrgi, M. A. B. Ismail, and H. Mahrooian, "Clustering Algorithms Applied in Educational Data Mining", in International Journal of Information and Electronics Engineering, Vol. 5, pp. 105-108, 2015.

[4] M. Goyal and R. Vohra, "Applications of Data Mining in Higher Education", International Journal of Computer Science Issues, Vol. 9, pp. 114-120, 2012

[5] C. Romero, S. Ventura, "Data mining in education", WIREs Data Mining Knowl Discov, Vol. 3, pp. 12-27, 2013.

[6] P. Gulati, A. Sharma, "Educational Data Mining For Improving Educational Quality", International Journal of Computer Science and Information Technology and Security, Vol. 2, pp. 648-650, 2012.

[7] <http://startup.nujs.edu/blog/indian-education-system-what-needs-to-change/>

[8] <https://www.linkedin.com/pulse/indian-education-system-good-bad-arunesh-goyal>

[9] S. K. Yadav , S. Pal," Data Mining: A Prediction for Performance Improvement of Engineering Students using Classification", World of Computer Science and Information Technology Journal, Vol. 2, pp. 51-56, 2012.

[10] S. Karthika, N. Sairam, "A Naïve Bayesian Classifier for Educational Qualification", Indian Journal of Science and Technology, Vol. 8, pp. 1-5, 2015.

[11] K. Prasada Rao, M.V.P. Chandra Sekhara Rao, B. Ramesh, " Predicting Learning Behavior of Students using Classification Techniques", International Journal of Computer Applications, Vol. 139, pp. 15-19, 2016.

