IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 9, Issue 1, January 2020

Application of Data Mining in Higher Education

Abhirami V.P.[1], Amrutha A.R.[2], Neethu Kunjappan[3]

Student, Bachelor of Computer Applications, SNGIST Arts and Science College, N.Paravur, India[1,2]

Assistant Professor, Dept. of Computer Applications, SNGIST Arts and Science College, N.Paravur, India[3]

Abstract: In the last few decades there has been a rapid growth in education system. A lot of programs have been launched for improving the quality of higher education. In these years the number of enrolments for higher education has also increased. Higher education has become important to understand the requirements of students and their academic progression. Education Data Mining helps in a significant way to explain the issues of predictors and profiling of students. Algorithms like page ranker, c.4.5, apriori, expectation maximization are used to evaluating Students behaviour, performance and presentation etc. Data Mining uses a mixture of a direct knowledge base, experienced systematic ability and domain knowledge to expose secret trends and patterns. These trends and patterns form the beginning of conjecturing model that allows analysts to construct new study from existing data. This paper takes up the application of data mining tools and techniques that can be definitely used in claiming the issues of predictions of student's performance.

Keywords: Data Mining, Educational Data Mining, Application in Higher Education, Algorithms

I. INTRODUCTION

Educational System in India faces a lot of challenges in higher education. Higher education is a single phase to develop intrinsic skills and also it creates a solid foundation for erudition. Higher education is normally the second stage of formal education. Educational Data field is an emerging field exploring data in educational content by applying different data mining techniques and tools. Data mining represents study bothered with the implementation of Data mining, statistics and machine learning to data produced by educational services. The major zone of Data mining is evaluating student's enactment. Focal of Data mining consist of student enactment and schooling students erudition to propose increase in on-going instructional routine.

Higher education organizations are attentive in predicting the paths of learners, thus detecting which learners will join specific course programs and which students will need a large number of discussions. Today, one of the major challenges that educational organization's face is the explosive development of educational data and to use this data to progress the worth of managerial decisions. Data mining techniques are analytical apparatuses that can be used to extract significant knowledge from these huge data sets.

The main objective of educational organization to being the clone of higher education and figure out the attainment of learner by watching at magnate works. The academic sector has been a decisive important to the government which has been usually drafting supplies and arrangements for promoting higher education.

II. APPLICATIONS OFEDUCATIONAL DATAMINING

A. Analysis and visualization of data

It is used accentuate eloquent information and mount decision making. In the educational sector it can be facilitative for course administrative and teachers for evaluating student data and their activities during primary education to get a abrupt idea of a student's schooling. The two main methods used for this task are visualization information and statistics. Statistical analyses give us instructions like students' performance, attendance percentage and test scores. It also provides info about communique on weekly and monthly student summaries. Graphical methods help people in understanding and analysing data.[3]

B. Predicting students' performance

In the field of education the mostly predicted values are students achievement marks, test scores. Classification techniques are used for this task. In education sector student performance prediction is the very popular application of Data mining. Different techniques and models are practiced for prediction of student's performance like decision trees and rule based systems.[1]

C. Enrolment management

In higher education enrolment management intermittently used. It defines prudent methods and ways to outline the enrolment of elementary school to meet prospective targets. It is an bureaucratic approach and also a methodical set of

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 9, Issue 1, January 2020

actions device to grant academic institution to exert more control over students enrolment such forms often include marketing, financial aid awarding and reduction program.[4]

D. Grouping students

Group of students are created according to their performance, personal characteristics, etc. These groups of students can be used by the teacher to create a personalized learning system which improve effective group learning. Classification and clustering are the techniques used for this task. Clustering algorithm can be used to students. They are model-based clustering, K-means, Hierarchical agglomerative clustering. A clustering algorithm is created on big general sequences which aid to find groups of learners with alike learning characteristics like hierarchical clustering algorithm which are used in bright e-learning systems to group learners according to their specific learning style preferences discriminating features and external outlining features.[3]

Below table represents grouping of students in a class of 40 based up on their results.

	Group 0 (all pass)	Group 1 (1 or 2 failed)	Group 2 (3 or 4 failed)	Group 3 (all failed)
BCA (1st Y)	29	6	4	1
BCA (2nd Y)	30	6	4	Nil
BCA (3rd Y)	28	5	5	2

E. Predicting students profiling

Data Mining help the administration to classify the geographic, demographic and psychographic nature of students based on data equip by the students at the time of admission. Different types of students can be identified by neural networking technique.[2]

F. Planning and scheduling

To the traditional education process, planning and scheduling is used. Incommensurable Data mining techniques used for this task are estimation, categorization, classification and visualization. Decision forests, decision trees and link analysis have been used in educational planning to evaluate enrolees study preferences and elementary school completion appraise in extension learning courses. Academic schooling courses have been prepared through the use of decision trees, cluster analysis and back-propagation neural networks in order to find the analogue between the scheme classification of academic training Bayesian model and decision trees have been scheduled to help management institutes to examine the probable holdings of changes in admission and recruitments.[3]

G. User modelling

User modelling encire what a student knows, what the user action is like, what a student's behaviour and desire are and how satisfied learner are. Educational data mining can be adapted in modelling, learner's behaviour, learner's knowledge and learner's experience.

H. Organization of syllabus

Shortly, Organization of syllabus is motivated by many elements such as competing, affiliated programs of schools, availability of teachers and experience. This method of grouping may not unquestionably expedite students learning capacity optimally. Exploring subjects and their relationship can precisely boost in improved organization of syllabi and grant intuition to actual curricula of educational plan. One of the functions of Data mining is to classify linked subjects in syllabi of educational programs in a large academic institute.[2]

I. Detecting cheating in online examination

Now a day's exams are operated online remotely through the internet and if a extortion occurs then one of the keydilemma to solve is to know: who is there? Cheating is not only done by learners but the latter aspersion in business and journalism show that it has inclined a familiar method. Data mining techniques can urge models which can help organizations to identify and to avert cheats in online valuation.[6]

III. ALGORITHMS IN EDUCATIONMINING

Number of academics and learners is rising day by day; we think that Data mining technology can assist in developing the academic quality and thereupon causing high ratio of lucrative candidate, low ratio of learner's drop-out and maximizing academic structure adaptability. Some of the details of the algorithms used in education mining are given below:

A. C4.5

In C4.5, a classifier system takes input from the cases well-defined by the values and attributes and it gives a classifier output that can be precisely forecast classes of new cases. It is a descendent of CLS and IDE. It generates a decision tree

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 9, Issue 1, January 2020

and these decision trees can be used for classification. By applying this algorithm, we can generate an application program that predicates the resignation of new student candidates. Through this application we can find the probability of a prospective student will leave from the institution can be known timely. This aids the leaders in building decisions.[6]

B. Apriori

For association rule mining, apriori algorithm is the first and best one. Apriori was suggested by R.Agrawal and R.Srikant in 1994. [3] It is one of the most effective Boolean association rules mining algorithm for regular itemsets. It is an iterative algorithm to compute the exact length of item collection of given database .it cut down applicant itemsets via the principle that all nonempty subsets of frequent item sets are regular too .It basically works in two steps. In the first step applicant in itemset it produced using relating process and in next step regular itemset from those applicant itemset is found based on least support count by scanning the database.

C. Support Vector Machine (SVM)

To train data, Support Vector Machine (S.V.M) algorithm is used. It is considered as a well-organized algorithm. If offers a clear-cut methods among algorithms. It is the algorithm for teaching purposes .And a lot of analysis is still going on. S.V.M is good because of its generalization ability. SVM are narrate as a set of connected manage studying skills used for categorization and regression. They are representative of a family of derive linear categorization. SVM concurrently minimize the observed categorization mistake and maximize the geometric margin ,this is an main feature of SVM.[1]

D. Page Ranker

The Page Rank algorithm was defined by Lawrence Page and Sergey Brin. On the basis of this algorithm Google has designed the Google Search. It provides a fixed ranking of diverse web pages in sense that pager value is indomitable offline and does not depend on the online queries. Enforced page rank algorithm is against searching networks further of the internet. This can be enforced further academic papers ,by using quotation as a backup for link ,page rank can regulate the most active and referenced papers in an collegiate area.[5]

E. The Expectation Maximization Algorithm

The Expectation Maximization Algorithm offers a bendable mathematical method to modeling and clustering of data on randomly observed basis. The Expectation Maximization Algorithm can be used to cluster incessant data. It is used to model sharing of unsystematic phenomenal data.

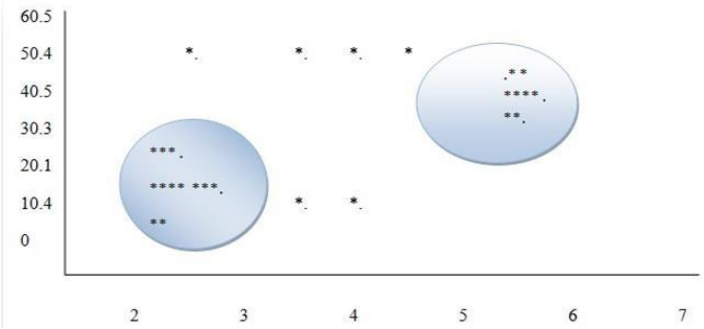

Fig. 1 Em clustering of old faithful data [6]

IV. CONCLUSION

Educational Data mining has been open up as an forthcoming inquiry area, thus number of unequivocal tools especially matured for implementing Data mining algorithms in academic data are loom day by day. Data mining techniques in academic organizations boost us to learn learners achievement, learners behaviour attentively designing course syllabus, to galvanize learners and to grow up learner depending upon discrete specification. In this paper five Data mining algorithm were applied. Data Mining in Education sector aids the institution to perceive the learners participation areas and to determine their enactments. In Higher Education, the colleges will gain more benefit, outline and relations to reach a deduction for current learner performance and activities. Above all these algorithms, some algorithms may have problems with accuracy and processing time. Some algorithm has very large processing time and minor accuracy, and it is a vast complication. With the advancement of application based on education , there is capable need to establish algorithms that have higher accuracy, minor processing time. In this field there is a lot of scopes to establish new algorithms.

ACKNOWLEDGMENT

This research was supported by our college SNGIST Arts and Science College, Manakkapady, N.Paravur. We express our deep sense of gratitude to our teachers for encouraging us to take this journal. This journal couldn't be completed without the effort and corporation of our teachers.
We also thank our department, Department of Computer Applications, SNGIST ASC, for their guidance and encouragement for finishing this journal. We are also immensely grateful to our guides, although any errors are our own and should not tarnish the reputations of these esteemed persons.

REFERENCES

[1]. Hardeep Kaur,"A Review of Applications of Data Mining in the Field of Education", International Journal of Advanced Research in Computer and Communication Engineering,vol.4,issue: 4, April 2015.
[2]. Namratha,B. and Niteesha.,sharma,"Educational Data mining-Applications and Techniques",International Journal of Latest Trends in Engineering and Technology,vol.7,issue:2 ,July 2016.
[3]. Monika,Goyal. And Rajan.,Vohra,"Applications of Data Mining in Higher Education",International Journal of Computer Science Issues,vol.9issue 2,No 1,March 2012.
[4]. Romero,c.,Ventura,s.,Pechenizkiy,M,,&Baker,RSJ,(2010).Handbook of educational data mining.
[5]. Mrs.Bharati M.Ramgeri,"Data mining techniques &application",Indian Journal of computer science &enginerring vol.1No.4,2008.
[6]. Dr.p.Nithya,B.ummamaheshwari,A.Umadevi,"A Survey On Educational Data Mining in Field of Eduacation",International Journal of Advanced Research in Computer Engineering & Technology,vol.5,issue 1,January 2016.