

ATTEMPT TO EXAMINE THE EDUCATION DATA MINING TO OPTIMIZE THE STUDENT LEARNING AND PERFORMANCE ASSESSMENTS

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ABSTRACT

As we have broad proportion of data in the industry so examine that information and concentrate the helpful data by applying particular information mining strategies. With the help of technique like association rule mining, we can find different pattern of student performance by taking different measures of student like their course, their study of hour, monthly income of parents, and their background sources and many others. In this survey paper we have mainly two goals, the first is to advance development of education, the second is to organize the data and improve the student performance and their learning behaviour by applying different data mining techniques. It has been seen that methods of education data mining are different from standard data mining methods. In educational data mining we mainly need to focus on data that are related to student learning and their performance.

INTRODUCTION

Data Mining: It is the process of extracting previously unknown data from large databases. It is also called knowledge discovery database (KDD) or knowledge mining from data. Its main objective is to take information from a dataset and converted into understandable form. It is also used to solve problems by analysing the data which is present in the database system. And the various techniques help in decision making. Information mining is not a system, yet rather a gathering of factual methodology that, as indicated by [3], empower the client to set up how intense the separation procedure is while distinguishing factors that can anticipate execution. In easier terms, it is a technique for misusing information and removing profitable data.

Education (Information) Data Mining: As data mining is used in education research therefore it is named as “Educational Data Mining”. As there is a growth in education so we have large amount of data and therefore mining of that data is important. The mined data can help in planning, teaching, learning and etc. As Educational Data Mining is concerned with developing methods to explore the student learning behavior and their performance and also their grades in examination. Indeed, the term instructive mining (EDM) has picked up money as a worldview equipped towards information investigation in training, the point of which is to look for, break down, and extricate data to create prescient models that assistance to upgrade instructive procedures. DM might be directed or unsupervised. As per [4], in unsupervised DM the calculation consequently finds designs information, with no earlier details about the kind of information. Then again, regulated calculations work with developed models and decide the kind of information being dissected. With the help of various methods educators will predict the score of students in examination and then compared the results with their original scored obtained in examination. Along these lines we can

undoubtedly dissect the execution of week understudies and after that guide them that how they can build their execution. Educational data mining attempt to building a model of individual's objectives and their insight. In this way teachers can take input to take feedback on student learning experience with the model. For more effective learning we can apply the techniques of data mining such as decision tree, classification, association rule mining and neural networks. EDM can discover diverse examples with the help of association rule mining and anticipate the execution of understudies.

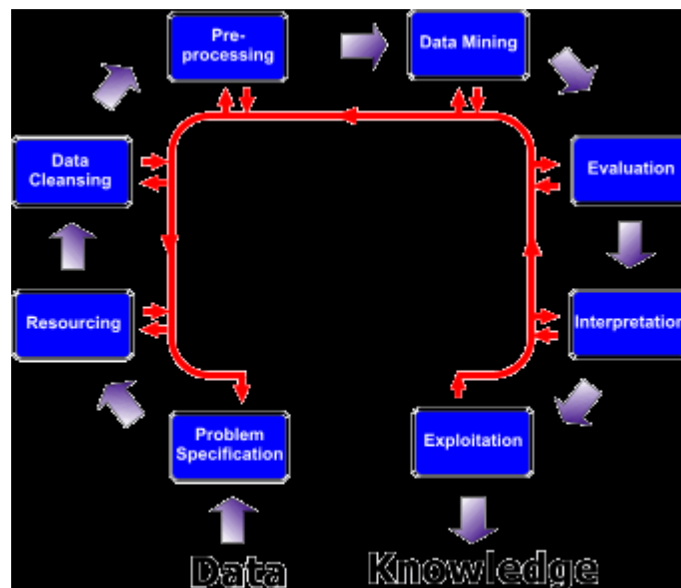


Fig 1 How data is mined?

The performance of student is very important in building their future. Our principle target is to distinguish the moderate learner execution. We will examine the performance of all types of students with the help of Clustering technique. Many creators connected a no of strategies on the information we have gathered and discover the best system which gives better outcome to dissect the attributes of understudies.

RELATED WORK

Data Mining: It is used in educational field to increase our understanding of learning process. Its main objective is to identifying, extracting and evaluating the variables related to students. It is described by Alaa el-Halees. Data Mining in educational environment is also known as Educational Data Mining.

Sr. no.	Year	Authors	Topic	Methods adopted (feature selection and classification algorithms)	Merits/limitations
1.	2014	C. Anuradha, T. Velmurugan	A Data Mining based Survey on Student Performance Evaluation System	In this, It is identified that to enhance the nature of higher education, the curriculum setup is the key point. The investigators are given new methods and patterns to maximize the student's performance through EDM techniques. Moreover classification algorithms ID3 and C4.5 are used to identify the various categories of students' performances.	The foremost intention of this research is to traverse the data mining techniques which are used for the improvement of student's performance and also identify the best suited structure of curriculum for the current environment.
2.	2015	Allan H.K. Yuen, Vincent Tam, Edmund Y. Lam, S.T. Fung and W.W.T. Fok	Enhancing Educational Data Mining Techniques on Online Educational Resources with A Semi-Supervised Learning Approach	an effective and systematic framework of a semi-supervised learning approach in which a concept-based classifier using the bag-of-word (BOW) approach is co-trained with an explicit semantic analysis (ESA) classifier to derive a common set of precedence rules based on a diverse set of online educational resources.	Their proposal of semi-supervised learning approach sheds light on many possible directions including the integration with other sophisticated optimizers such as the evolutionary algorithms to formulate more optimized learning paths for personalized learning, the pedagogical and other impacts of their proposals to sophisticated e-Learning systems for future exploration
3.	2015	Bo Guo, Rui Zhang, Guang Xu, Chuangming Shi and Li Yang	Predicting Students Performance in Educational Data Mining	In this study a prediction system, called Students Performance Prediction Network (SPPN), is proposed to predict student performance using emerging trend Deep Learning approach.	A deep learning architecture for predicting students performance for unlabeled data by automatically learning multiple levels of representation, can train model on a relatively large real world students dataset.
4.	2015	Kamaljit Kaur, Kuljit Kaur	Analyzing the Effect of Difficulty Level of a Course on Students Performance Prediction using Data Mining	The study investigates the possibility to predict the subject wise success rate of students in CBCEGS with the help of contemporary tools of data mining. Weka 3.6.12 has been used. decision tree model (CART) supplemented by ensemble classifier AdaBoost provide high accuracy in prediction of students' grades in a course. Another tree model J48, Non-linear regression model (MSP), Non-linear regression model (MSP) help management, teachers, students to take useful decisions related to learning behavior of students.	As such problems are hard to solve manually to find out hidden patterns and knowledge, Weka serves as a free and open source tool for the analysis and evaluation of small data sets to solve various problems.
5.	2015	Karnika Maharani, Teguh Bharata Adji, Noor Akhmad Setiawan, Indriana Hidayah	Comparison Analysis of Data Mining Methodology and Student Performance Improvement Influence Factors in Small Data Set	Variations of feature selections have been accomplished (Gain Ratio, Principal Component Analysis, Classifier Subset Evaluator). Each selected features are then tested by classifiers (Naive Bayes) and being validated (Cross Validation). Best accuracy and smallest variance are achieved by CSE's selected features.	Overcome the problem of small dataset by preventing imbalanced class phenomenon. Imbalanced class is usually happened in limited number of observed data. SMOTE is one of various methods for handling the fault classification of minority class.
6.	2015	Karnika Maharani, Teguh Bharata Adji, Noor Akhmad Setiawan, Indriana Hidayah	Comparison Analysis of Data Mining Methodology and Student Performance Improvement Influence Factors in Small Data Set	Variations of feature selections have been accomplished (Gain Ratio, Principal Component Analysis, Classifier Subset Evaluator). Each selected features are then tested by classifiers (Naive Bayes) and being validated (Cross Validation). Best accuracy and smallest variance are achieved by CSE's selected features.	Overcome the problem of small dataset by preventing imbalanced class phenomenon. Imbalanced class is usually happened in limited number of observed data. SMOTE is one of various methods for handling the fault classification of minority class.
7.	2015	Norlida Buniyamin, Usamah bin Mat, Pauziah Mohd Arshad	Educational Data Mining for Prediction and Classification of Engineering Students Achievement	used Neuro-Fuzzy classification for academic achievement for electrical engineering students. Classification method would allow more flexibility to judge on a single/group of student performance, and neuro-fuzzy linguistic is a value showing the probability of students to achieve excellent grade even if the student achieved weak in certain	In this, those techniques are used in which tells how to obtain knowledge from databases such as large arrays of student data from academic Institution databases.

EDUCATIONAL DATA MINING METHODS

There are such a variety of techniques for educational data mining which are:

Prediction: In predictive modelling we will investigate the current information set and frame a model of its important attributes. In this we have two phases: the first one is training phase which involves building a model utilizing a huge specimen of information as training set. The second one is testing phase, which includes trying out the model on new data. Predictive modelling is associated with the procedures of classification and value prediction. The model is developed using a supervised learning approach. Once the model is defined clearly it can be used for forecast purposes. Both training and testing of the model should be performed. Training requires vast information whereas testing is done on little information.

Clustering: Clustering is an educational data mining technique that makes significant group of items that have comparative characteristics of students. By using clustering technique in

educational data mining we can find different patterns of students and find connections between them. In this way we have a gathering of clusters like week students, normal students type and after that we can easily guide them how to enhance their learning behaviour.

Discovery with models: In this we will develop a model with the assistance of forecast, bunching and thereafter it will be utilized as a section in another examination of data in particular in expectation and relationship mining. In the forecast technique, the model was made and used to anticipate another variable and in relationship mining, the made model will assessments the new expectations which are turned out just as extra factors that are identified with our examination. The uses of this strategy incorporate finding the connections between understudy practices, their characteristics and legitimate factors in the learning condition.

Distillation of data for human judgement: Humans can make different inferences about the information. In educational data mining, information is refined for human judgement for the most part for two purposes: the first one is identification and the second one is characterization. The purpose of this method is to compress the critical information in an intuitive way and understand the large measure of data which are utilized as a part of EDM to take decisions. Therefore, we can say that this technique is very exceptionally valuable to teachers to comprehend the data.

SOME OF THE CHALLENGES OF EDUCATIONAL DATA MINING

Educational data is incremental in nature: As the information is becoming quick therefore maintain the data in the data warehouse system is getting to be distinctly troublesome. Checking the operational data sources, student interest for their specific course, and its effect in particular organisation is the principle issue. The other issue in EDM is arrangement and interpretation of the incremental data. We have to focus on time, content and their arrangement. In this HR is another issue in EDM.

Incorporation of background knowledge: The Background learning, or basic data with respect to the space under review, can be used to direct the revelation procedure and permit the found examples to be communicated in brief terms. Area learning that are identified with databases, such as integrity constraints and deduction rules and help into accelerate an information mining process.

Possibility of Uncertainty: Due to the presence of uncertain errors in the data, no construct model can foresee exact outcomes in terms of student learning and their performance or general scholarly arranging.

APPLICATIONS OF DATA MINING IN EDUCATION FIELD

Analysing and Visualising of Data: EDM is utilized to highlight imperative information and help in decision making. In the instructive division, it very well may be useful for course executives and educators for examining the essential information and understudy's exercises during their course to get a concise idea of an understudy taking in, their conduct and their presentation. Perception data is an essential technique that has been utilized for this methodology. Representation utilizes a portion of the graphical strategies to help individuals in comprehension and inspecting the assembled data. There is the number of concentrates identified with perception

and investigation of various instructive information, for example, examples of hourly worked each day and yearly customer lead online social affairs.

Predicting Student Performance: In candidate execution, we will predict the estimation of some factor that characterizes the understudy. In the instructive information mining area, the anticipated qualities are understudy's exhibition, their engravings, learning or score got in tests. Grouping method is utilized to consolidate singular information things dependent on quantitative characteristics or based in the wake of getting ready preparing a set of beforehand obscure things. Various methods of EDM and models are applied for a forecast of understudy's exhibition by using procedures, for example, choice trees, neural systems, rule-based frameworks, Bayesian systems, etc.

Enrolment Management: Enrolment management is basically utilized in higher education to clarify the very much arranged procedures and approaches to change the enrolment of student to meet arranged objectives. It is an organizational idea and also a systematic set of activities are designed to allow educational organisations to exert more influence over student's enrolments. Such practices are regularly incorporate maintenance projects, advertising, and confirmation strategies.

Grouping Students: For this situation, the social event of understudies is made by their altered highlights, their own qualities, their scores, etc. These packs/get-together of understudies can be utilized by the teacher or specialist to manufacture a learning structure that can without much of a stretch advance successful gathering in learning. A portion of the DM procedures are utilized in this errand are arrangement and bunching. Many bunching calculations are utilized to gather understudies are various levelled agglomerative grouping, K-means, and model-based bunching.

Planning and scheduling: Both Planning and booking are used to update the customary instructive information mining process by masterminding future courses, arranging of their asset allotment which aides in the affirmation and guiding techniques, etc. Various DM strategies are utilized for this undertaking are characterization, arrangement, estimation, and choice trees, interface investigation.

CONCLUSION

As Data mining is an extremely helpful tool for a wide variety of real-world problems where tremendous measure of information is put away and gathered. In Educational Data Mining we will first highlights the principle qualities that are used and the patterns found out by applying data mining techniques. When we apply association rule mining technique we will discovered many interesting relationship among data and from that we can anticipate the execution of understudy and their learning conduct. As every system of educational data mining has different focal points and impediments so it turn out to be extremely hard to discover which strategy is ideal but at the same time is rely on the reason for which instructive information is mined. In this manner we can state that this paper give a survey on procedures on instructive information mining and additionally their applications.