

# STRUCTURAL VIEW ON EDUCATIONAL SYSTEM USING DATA MINING

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## ABSTRACT

Presently educational institutions compile and store huge volumes of data such as student enrolment and attendance records, as well as their examination results. Mining such data yields stimulating information that serves its handlers well. Rapid growth in educational data points to the fact that distilling massive amounts of data requires a more sophisticated set of algorithms. This issue led to the emergence of the field of Educational Data Mining (EDM). Traditional data mining algorithms cannot be directly applied to educational problems, as they may have a specific objective and function. This implies that a preprocessing algorithm has to be enforced first and only then some specific data mining methods can be applied to the problems. One such preprocessing algorithm in EDM is Clustering. Many studies on EDM have focused on the application of various data mining algorithms to educational attributes. Therefore, this paper provides over three decades long systematic literature review on clustering algorithm and its applicability and usability in the context of EDM. Future insights are outlined based on the literature reviewed, and avenues for further research are identified

## 1. INTRODUCTION

Increased use of technology in education has brought about a fundamental change in the way educational institutions operate. The increased usage of electronic based systems has amplified the amount of data available for making better decisions, and improvements in the data mining algorithms make analysis of this volume of data easier and more accessible. In recent years, there has been tremendous interest and research in the field of Educational Data Mining .The use of Learning Management Systems (LMS) is increasingly popular within e-learning environments. The offerings vary from open source solutions such as the Modular Objective Oriented Development Learning Environment (Moodle) , commercial solutions such Blackboard and software as a service systems such as Edmodo However despite their popularity and the universal desire for useful information, LMS are not designed to facilitate analysis using data mining techniques This compounded with the unique challenges of applying data mining techniques within the educational context has seen a low adoption of data mining among stakeholders This paper proposes a framework that allows developers to build a data mining environment that is flexible to the level of knowledge and skill of the educator This paper is structured as follows. Section 2 briefly explains the challenge of adoption of data mining within educational environments and describes two approaches for user interface tools catering to technical and non-technical educators. In

Section 3, the proposed framework is presented and clarified. Section 4 discusses an example of an implementation of the proposed framework while section 5 concludes the paper and provides suggestions for future works.

## 2. RELATED WORK

The EDM process converts raw data coming from educational systems into useful information that could potentially have a greater impact on educational research and practice". Traditionally, researchers applied DM methods like clustering, classification, association rule mining, and text mining to educational context. A survey conducted in 2007, provided a comprehensive resource of papers published between 1995 and 2005 on EDM by Romero & Ventura . This survey covers the application of DM from traditional educational institutions to web-based learning management system and intelligently adaptive educational hypermedia systems.

In another prominent EDM survey by Pena-Ayala , about 240 EDM sample works published between 2010 and 2013 were analyzed. One of the key findings of this survey was that most of the EDM research works focused on three kinds of educational systems, namely, educational tasks, methods, and algorithms. Application of DM techniques to study on-line courses was suggested by Zaiane & Luo. They proposed a non-parametric clustering technique to mine offline web activity data of learners. Application of association rules and clustering to support collaborative filtering for the development of more sensitive and effective e-learning systems was studied.

## 3. LITERATURE SURVEY

A. Merceron, E. Frank and J. Gosalbez comes with In proposed decision tree approach is an effective way of generating interesting classification rule. In decision tree approach an attribute which is required for analysis is taken as a starting node. The attribute is first classified in terms of groups and then next important attribute is again taken and classified under certain consideration. Here for the student dataset verbal ability, quantitative ability and MAT score all these parameters are important to predict the student placement. Data viewing operation . For example, a student data cube is proposed for three different attributes i.e. name, MAT score and verbal ability score. Aggregate details of the student are stored in the individual cell of the data cube It shows a student data cube with name, verbal ability and MAT score as attribute.

U Zhiming and WANG Xiaoli comes with Enhancing personalized teaching standard of distance learning is an important in developing modern distance education. Based on RS, web learners clustering model, attribute reduction and clustering algorithm are presented, which provides a basis of personalized teaching strategies for distance learning website. Further research is to mine and process the dynamic personality of learner's knowledge

#### 4. PROPOSED SYSTEM

This approach when applied to analyze the dataset derived from educational system is termed as Educational Data Clustering (EDC). An educational institution environment broadly involves three types of actors namely teacher, student and the environment. Interaction between these three actors generates voluminous data that can systematically be clustered to mine invaluable information. Data clustering enables academicians to predict student performance, associate learning styles of different learner types and their behaviors and collectively improve upon institutional performance. It is proposed that EDM methods must be different from the standard DM methods due to the hierarchical and non-independent nature of educational data. Educational institutions are increasingly being held accountable for the academic success of their students. Notable research in student retention and attrition rates has been conducted. For instance applied predictive modeling technique to enhance student retention efforts

#### 5. RESULT ANALYSIS

Numerous clustering algorithms have been published and new ones continue to proliferate; there has not been a single clustering algorithm till now that could dominate all others. In an education system, different users would interpret the same data differently for example, students, educators, school administrators, parents, and counsellors may hold various perspectives on examination report card data and each may be interested in generating different partitions or clusters from the same data set. Therefore, the viability of seeking a unified clustering algorithm would not be plausible. A clustering algorithm that satisfies the requirements of one user group may not satisfy the requirements of another user group. Given the inherent difficulty of understanding and applying clustering algorithm by a novice computer user, semi-supervised clustering techniques need to be developed in which the labeled data and paired constraints (user given) are applied to represent data and choose the appropriate function for educational data clustering. As shown in Table III little to almost negligible research has been conducted in areas such as learner annotation, effect of classroom decoration to augment learning and teaching, implications of education affordability, the inclusion of semantic web in education-its usability, learner motivation, timetabling, examination scheduling, student profiling and intelligent tutor systems. These are just a few of the many attributes that still require detailed research to be conducted from the computational perspective.

#### CONCLUSION

This project has presented over three decades systematic review on clustering algorithm and its applicability and usability in the context of EDM. This project has also outlined several future insights on educational data clustering based on the existing literatures reviewed, and further avenues for further research are identified. In summary, the key advantage of the application of clustering algorithm to data analysis is that it provides relatively an unambiguous schema of learning style of students given a number of variables like time spent on completing learning tasks, learning in groups, learner behavior in class, classroom decoration and student motivation towards learning. Clustering can provide pertinent insights to variables that are relevant in separating the clusters. Educational data is typically multi-level

hierarchical and non independent in nature; therefore a researcher must carefully choose the clustering algorithm that justifies the research question to obtain valid and reliable results.

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