STUDENTS E-LEARNING PERFORMANCE USING DATA MINING-A REVIEW

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Abstract

Education Data Mining is a process of changing raw data into system education useful to information. It is used for educational software developing field, teachers, parents, students and other research in education. The Interest is increasing nowadays in educational field and data mining, data mining in education makes research growing community. This application mining provides a data to the systems in traditional, well-known learning content management systems, and particular courses in a web-based adaptive and intelligent systems**.**

Each systems have data to source differently and also knowledge in discovering object. After the pre-processing, data mining techniques are applied in visualization and Each systems have the data source differently and knowledge for objective discovering. After the pre-processing of data in each case, the data mining techniques are applied in statistical and visualization, clustering, classification and detection of outline, association rule mining and pattern mining and text mining. Many works and researchers need a specialized work in educational data mining becoming in a nature area. Weka tool and Rapid Miner used to predict the most accurate analysis.

Keywords: E-Learning, Educational Data Mining, Data Mining, Algorithm.

I INTRODUCTION

E-Learning

E-learning, also known as web-based education and E-teaching, is a modern educational setting where a wealth of data representing the continuity of teaching-learning interactions is continuously produced and widely accessible. The abundance of publicly available information that is only a click away could be viewed as a blessing. Data mining was created to address issues like these, but it may also be considered as frightening increasing in unstructured information that chokes in educational system without giving its actors any articulate understanding. It is practically contemporary with e-learning as an area of study. However, it can be challenging to define. Not because it is inherently complicated, but rather because the majority of its roots are in the dynamic commercial world. At its most intricate, it can be viewed as a data analysis process that includes everything from data comprehension, Modelling, Pre-processing through the evaluation and implementation, rather than merely a collection of data analysis techniques. However, it is common to give the Data Mining techniques themselves more focus. These frequently combine traditional statistics with machine learning, pattern recognition, and other sciences to offer analytical answers to issues in a variety of industries,

including medical, engineering, and business, to mention a few. The fact that data mining focusing on a large, complex and heterogenous databases with the special attention to the compatibility in modelling techniques with the new information technology. These databases are frequently seen in e-learning.

1.1 Data Mining

It is a method that extracts and identifies important information and subsequent knowledge from huge databases using statistical, mathematical, artificial intelligence, and machine learning techniques. Through the examination of the information present in the form of data generated by their users, data mining can be utilized to extract knowledge from e-learning systems. Finding patterns in how teachers and students use the system in this situation is the primary goal, but possibly even more crucial is learning about how students behave when they are learning. Data mining techniques can be successfully incorporated into e-learning environments, according to a number of research. Data mining methods and ideas are applied in e-learning systems to support educators in enhancing the e-learning environment. The use of associations, classifiers, clusters, pattern analyzers, and statistical tools to produce results in

LMS, particularly in Moodle, has been explored in relation to data mining approaches. Data mining's goal is to find relevant information using a range of methods, including prediction, classification, association rule mining, clustering, fuzzy logic, etc. "Data mining is the act of analyzing data to identify previously undetected patterns and relationships hidden in data and discover implicit, but possibly relevant information."
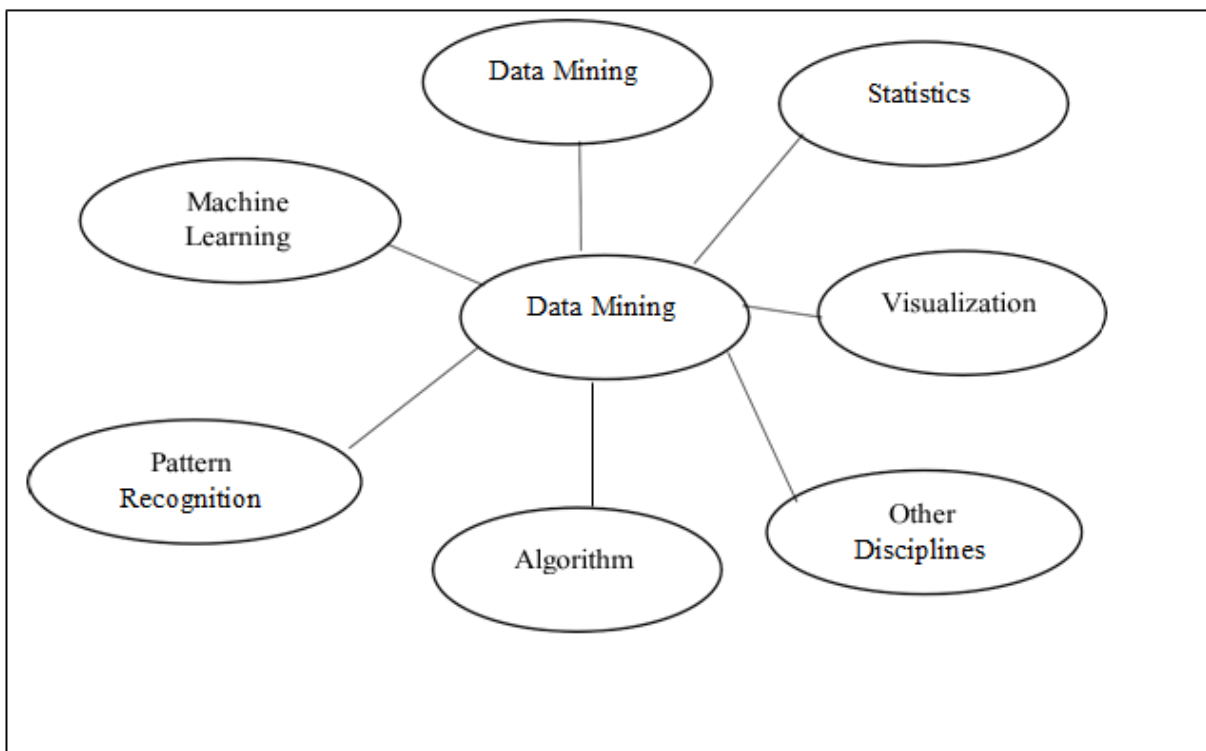

Figure 1: Data Mining Process

1.2 THE APPLICATION OF DATA MINING IN E-LEARNING SYSTEMS

It assists in resolving a variety of problems by using the different data mining techniques. Data mining can be used to address classification challenges in e-learning. The categorization difficulty in eLearning can be overcome using a small number of data mining techniques. Among the techniques are artificial neural networks, fuzzy logic methods, trees, graphs, computation, association rules and multi-agent systems. Additionally, combining clustering and artificial neural networks with data mining to solve e-learning clustering difficulties. Additional data-mining techniques that used in e-learning include prediction tactics, visualization approaches, and case-based reasoning. Data mining is used in e-learning in an iterative loop. The data that has been mined should be incorporated into the system's loop since it will help to direct, facilitate, and speed up learning overall by filtering the knowledge so that it can be used to make decisions and turning data into knowledge.
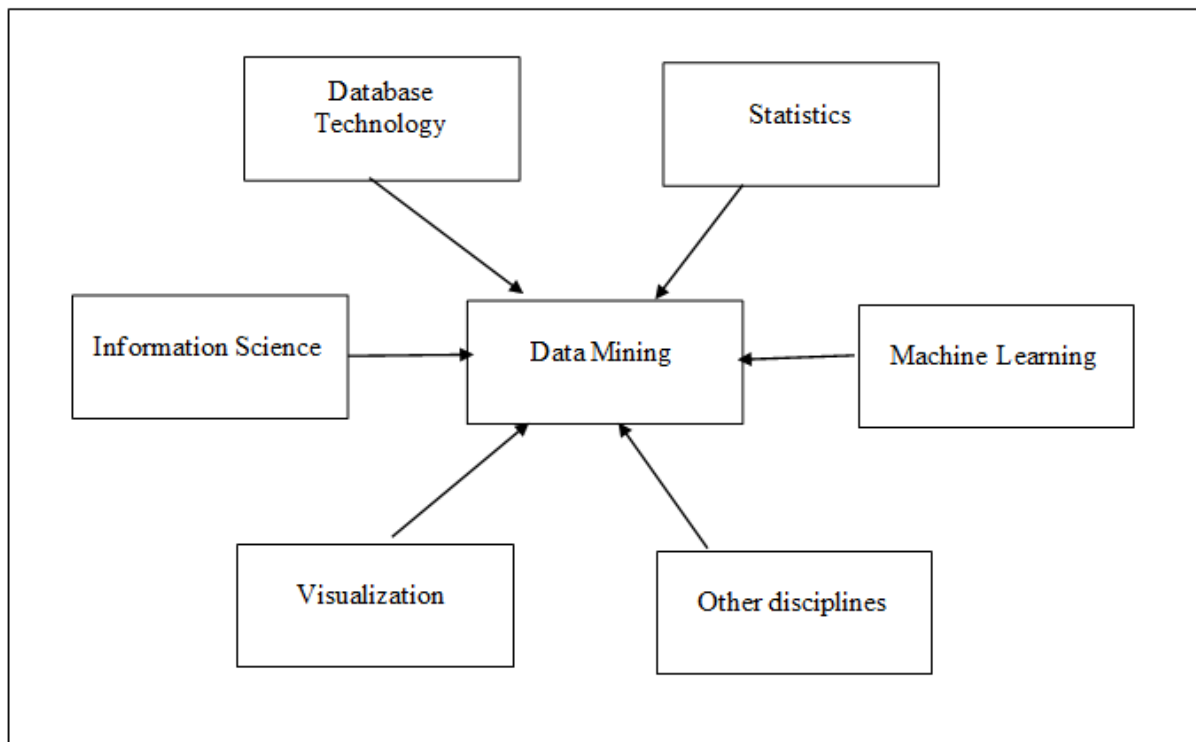

Figure 2: Data Mining System Components

1.3 The application in educational data mining systems

The use of data mining in educational systems has certain needs, most notably the necessity to consider the unique behaviours of students as well as pedagogical factors. The use of data mining in e-learning systems can be viewed as an iterative cycle where applications help to improve learning and also use the knowledge gained through mining for decision-making. The data Mining Model types are in the below figure.
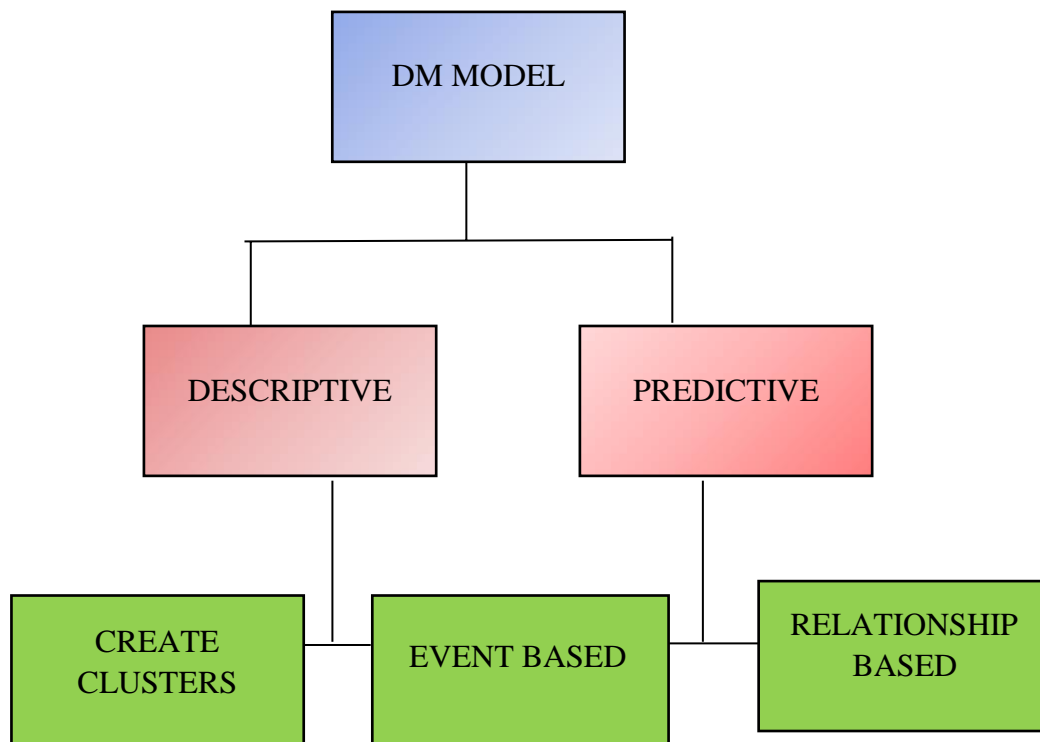
Figure 3: Data Mining Model Types

The Above Figure 3 describes the types of models in data Mining.

Data Collection: The LMS system used by the students, Usages and Interactive Information's are stored in database. In a collected data, the usage of Moodle system in e learning has been used. The Interactive Information's are stored in LMS database.

Data Pre-processing: The data has been cleaned and also transformed in a correct format. In order of pre-processing, the Moodle data can be used with the administrator tool and pre-processing tool with appropriate format.

Applying Data Mining: The algorithms are applied to build a model and execute to discover and summarize knowledge with the user's interest i.e., (Student, Teacher and Administrator, etc.). With the Commercial or free online compiler tool, the data and attributes has been applied. Those tools are applied to create and execute the discover of knowledge in an interest pattern.

Interpreting, evaluation and deployment of results:

The models and results are obtained and interpreted then used by the teacher for further actions. Teachers are used by the information discover to make decision about students Moodle activities to improve the student's learning. The educator can use a information discovered the decision making about e-learning process and systems.

1.4 Process of Data Mining in E-Learning System:

The use of data mining in educational systems has certain needs, chief among them the necessity to consider the unique behaviors of students, including pedagogical factors. The use of data mining in e-learning systems can be viewed as an iterative cycle where applications help to improve learning and also use the knowledge gained through mining for decision-making.

2. Literature Review

Sl.No	Paper and Author Details	Objective	Method
1	Romero and Ventura in 2007	different agents in educational context as educators, students, institutions, researchers and managers	EDM Techniques
2	Bujnowski	The classifier behaviour is verified while solving a real-world classification problem	fuzzy decision tree
3	Fadhilah Ahmad,et al.,	Students' academic performance of first year bachelor students in computer science course	Decision tree, Naïve Bayes, and Rule based classification techniques
4	R.R. Kabra and R. S. Bichkar	Engineering students' past performance data to generate the model and this model can be used to predict the students' performance	Decision tree algorithm

5	Sonia Joseph and Laya Devadas	Students who are probable to fail in the semester examinations and allow the teachers to provide appropriate assistance in timely manner.	classification model based on decision tree

6	Namdeo Jyoti, et al.,	Academic domain for the performance prediction of students in course works.	NB
7	Adhatrao Kalpesh,et al.,	The performance of students from their previous performances using concepts of data mining techniques under Classification	data mining techniques
8	Yongrong He, et al.,	Comprehensive quality evaluation system of college student	classification deterministic method
9	Ray et al.	Examining the learning process of students, assessing the performance to provide extensive feedback practically	EDM and LA methodologies
10	Jindal and Borah	Detection behaviours, students' performance evaluation and personalization	clustering, classification and regression.

3   CONCLUSION AND FUTURE RESEARCH

E-learning, adaptive hypermedia, intelligent tutoring systems, web mining, data mining, and other well-established fields of research are all connected to educational data mining. Data mining applications in educational systems have unique requirements not found in other fields, chief among them the necessity to consider pedagogical facets of the student and the system. Although educational data mining is a relatively young area of research, there are a significant number of publications in journals, international conferences, targeted workshops, and even ongoing books that demonstrate it is a fresh, promising field. The usage of e-learning recommendation bots is one of the most promising research areas. These recommender agents observe what a student is doing and suggest activities, shortcuts, information, etc. that they believe the student would find useful. Additionally, recommender systems can be incorporated into developing e-learning platforms where content are automatically found on the web and

added to the platform. They assist educators in identifying the best elements of existing materials from diverse sources, such as the Internet, to use for composition in this waynew courses.

In addition to recommenders, domain knowledge and ontologies can be linked with web mining and semantic web to create semantic web mining. At every level of the knowledge discovery process, ontological knowledge is successfully integrated using semantic web mining. Since educational data mining is a new field of research, it requires more specialized and focused work in the educational domain to achieve application success levels comparable to those of other fields like mining medical data, mining e-commerce data, etc.

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