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A New Data Mining Model Adopted for Higher Institutions

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Abstract

In the current times, one of the biggest challenges that educational institutions face in both the developing and developed nations is the explosive growth of educational data and to use this data to improve the quality of managerial decisions. Data mining techniques are considered as an analytical tool can be used to extract meaningful knowledge from these large data sets. The quality of higher education institutions implies providing the services, which most likely meet the needs of students, academic staff, and other participants in the education system. This paper proposes a new Data Mining model to be applied in higher education institutions. The suggested model assists in decision making process in the strategic levels of higher institutions as well as regulates the disciplines of students' admission.

Key Words: Data Models, Data Preprocessing, Higher Education Institution (HEI), Data Mining, Admission System, Educational Data Mining

1.INTRODUCTION

For higher education institutions whose goal is to contribute to the improvement of quality of higher education, the success of creation of human capital is the subject of a continuous analysis. Therefore, the prediction of students' success is crucial for higher education institutions, because the quality of teaching process is the ability to meet students' needs. In this sense important data and information are gathered on a regular basis, and they are considered at the appropriate authorities, and standards in order to maintain the quality are set. One of the biggest challenges that higher institutions face today is how to improve the quality of managerial decisions [1-3]. The managerial decision making process becomes more complex as the complexity of educational entities increase. Educational institute seeks more efficient technology to better manage and support decision making procedures or assist them to set new strategies and plan for a better management of the current processes. Business intelligence has tremendous potential to help admissions and Admission management professionals make decisions in areas other than the applicants' potential success [4-6]. The amount of data stored in educational databases is increasing rapidly. These databases contain hidden information for improvement of students' performance. Data Mining can help institutions of higher education to make more effective decisions as to improve the quality of instruction and services. Many applications areas such as banking, retail industry and marketing, fraud detection, computer auditing, biomedical and DNA analysis, telecommunications, financial industry have already been advanced through the sturdy techniques of DM [7-11]. Another application domain that can take advantage of DM techniques is higher learning institution. So, the major objective of this paper is to propose a DM model for filtering out students satisfying all eligibility criteria that satisfy the admission methods. Also, the suggested model could predict the best admission methodology to which a student can be applied to the King Abdul-Aziz University in Saudi Arabia.

2. LITERATURE REVIEW

Data mining in higher education is a recent research field and this area of research is gaining popularity because of its potentials to educational institutes.

o   [25] Gave case study of using educational data mining in Moodle course management system. They have described how different data mining techniques can be used in order to improve the course and the students' learning. All these techniques can be applied separately in a same system or together in a hybrid system.

o   [26] Have a survey on educational data mining between1995 and 2005. They have compared the Traditional Classroom teaching with the Web based Educational System. Also they have discussed the use of Web Mining techniques in Education systems.

o   [27] Have a described the use of k-means clustering algorithm to predict student's learning activities. The information generated after the implementation of data mining technique may be helpful for instructor as well as for students.

o   [28] Discuss how data mining can help to improve an education system by enabling better understanding of the students. The extra information can help the teachers to manage their classes better and to provide proactive feedback to the students.

o   [29] Have described the use of data mining techniques to predict the strongly related subject in course curricula. This information can further be used to improve the syllabi of any course in any educational institute.

o   [30] Describes how data mining techniques can be used to determine The student learning result evaluation system is an essential tool and approach for monitoring and controlling the learning quality.

3. RESEARCH OJECTS

Universities are interested in predicting the paths of students, thus identifying which students will join particular faculty and which students will require a large number of debates. For Universities whose goal is to contribute to the improvement of educational quality process, the success of selection of the student best fit path is the subject of a continuous analysis. Therefore, the prediction of students' path is crucial for Universities, because the best fit path that match with the ability of students' needs. All participants in the educational process could benefit by applying data mining on the data from the higher education system (Fig.1). Since data mining represents the computational data process from different perspectives, with the goal of extracting implicit and interesting samples, trends and information from the data, it can greatly help every participant in the educational process in order to improve the understanding of the teaching process, and it centres on discovering, detecting and explaining educational phenomenon's [23].
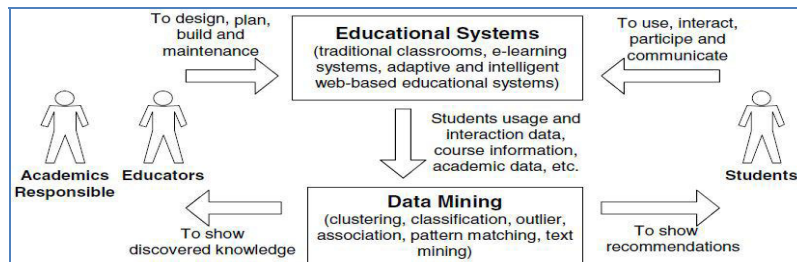

Fig. 1 The cycle of Applying Data Mining in Educational Institutions [24]

So, with data mining techniques, the cycle is built in educational system which consists of forming hypotheses, testing and training, i.e. its utilization can be directed to the various acts of the educational process in accordance with specific needs:-

•   Of students
•   Professors and