

Educational Data Analytics: A Review

Bharati Kawade #1, Dr. Aruna Deoskar *2

¹Assistant Professor, Modern College of Engineering, Pune

¹Research Scholar, IICMR, Pune

² Principal ATSS CBSCA College, Pune, India

Abstract

Educational data analytics is used to improve student academic performance. Predictive analytics can help in improving the quality of education by providing right information for decision makers to take better decisions. The data mining classification techniques such as decision tree are used to predict academic performance of the students. Mining data from educational dataset helps to extract useful information for enhancing the teaching and learning process. This paper focuses on the overview of various Data Mining Techniques through reviews of different research papers.

Keywords- Educational data mining, Classification, Prediction

I. INTRODUCTION

The primary objective of every higher educational institute is to offer quality education to the students. The volume of data in education field is growing fast. It is very difficult to find relevant and interesting patterns from the vast data. Data Mining is a process of discovering, analyzing, and interpreting meaningful patterns from large amounts of data. Educational data mining is used to study the data available in the educational field and bring out the hidden knowledge from it. It is a powerful technology with great potential to help educational institutions in decision making.

II. LITERATURE REVIEW

Data mining is a powerful tool for academic intervention. EDM techniques can reveal useful information to educators to help them design or modify the structure of courses. Students can also facilitate their studies using the discovered knowledge. Nowadays, the researchers utilize EDM techniques mostly to guide student learning efforts, develop or refine student models, measure effects of individual interventions, improve teaching support or predict student performance and behavior.

Bharadwaj and Pal [1] conducted study on the student performance based by selecting 300 students from 5 different degree college conducting BCA (Bachelor of Computer Application) course of Dr. R. M. L. Awadh University, Faizabad, India. By means of Bayesian classification method on 17 attributes, it was found that the factors like students' grade in senior secondary exam, living location, medium of teaching, mother's

qualification, students other habit, family annual income and student's family status were highly correlated with the student academic performance.

Pandey and Pal [2] conducted study on the student performance based by selecting 600 students from different colleges of Dr. R. M. L. Awadh University, Faizabad, India. By means of Bayes Classification on category, language and background qualification, it was found that whether new comer students will performer or not. Bharadwaj and Pal [3] obtained the university students data like attendance, class

test, seminar and assignment marks from the students' previous database, to predict the performance at the end of the semester.

Yadav, Bharadwaj and Pal [4] obtained the university students data like attendance, class test, seminar and assignment marks from the students' previous database, to predict the performance at the end of the semester with the help of three decision trees. It was observed that C4.5 is the best algorithm.

Samrat Singh and Dr. Vikesh Kumar [5] concluded in their research that the data can be collected from historical and operational data reside in the databases of educational institutes. The student data can be personal or academic. The discovered knowledge can be used to better understand students' behavior, to assist instructors, to improve teaching, to evaluate and improve e-learning systems, to improve curriculums and many other benefits.

Ritika Saxena [6] applied data mining techniques on the marks of the student. The student data is retrieved from the database of the university. The students' grades are predicted based on their performance.

Jai Ruby and Dr. K. David proposed a data mining model for analysing the prediction accuracy of the academic performance of the students. The proposed model uses influencing factors by Multi-Layer Perception algorithm [7].

Ankita Singh Tomar, Rajendra Kumar Gupta, Khushboo Agarwal [8] stated the review of data mining approaches for predicting student performance. The review presents the overview of various data mining techniques used in education field.

Pooja M .Dhekankar and Dinesh S mentioned that in their research they have categorized the student data into grades to predict improvement in their academic performance. They have applied different data mining techniques classification technique. The authors used Rule Induction and Naïve Bayesian classification algorithms [9].

III. NEED AND IMPORTANCE OF DATA ANALYTICS IN EDUCATION

The current education system does not involve any prediction about fail or pass percentage based on the performance. It doesn't identify the weak student and inform the teacher in early stage. Another common problem in larger colleges and universities, some students may feel lost in the crowd. They may be struggling to find help or having difficulty choosing the courses they need. Different data mining techniques can be used to identify the weak students so that the faculty members can provide academic help for them in early stage.

It will also help the faculty members to act before a student drops or plan for drop from knowing how many students are likely to pass or fail.

IV. CONCLUSION

Data analytics is widely adopted worldwide in many areas. Data analytics is one of the outcomes of changing technology and its benefits are influencing too many educational institutes. Educational data analytics is becoming an emerging trend nowadays. Educational Data analytics can be used to predict the academic performance of the students in early stage. The perception of its need and importance by all stakeholders of an educational institute is very essential to obtain maximum benefits. The literature review indicates that data analytics adoption in education field is significantly beneficial in terms of prediction.

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