Grading System Prediction of Educational Performance Analysis using Data Mining Approach

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ABSTRACT

In the neoteric century, education holds the key to bringing tremendous upgradation to the world. In most Asian countries, it is very challenging to apply education data mining techniques due to the variety of institutional data categories. In this research, an efficient data collection technique has been designed to gather institutional data, analyse and pre-process the data and apply specific data mining methods to estimate students' progress. A real-time dataset has been designed from student transcript data, which helps to analyse the prediction of student quality. In our research, six traditional classification algorithms and a deep neural network (DNN) model is applied to perform prediction efficiency. Different classification models perform an accuracy of 90% ~ 94%. Our research predicts student education efficiency, analyses student patterns and introduces a generalized framework for an advanced level of study.

1. INTRODUCTION

The primary concern of an institution is to provide a quality education that helps to improve student performance. Researchers are constantly on the verge of exploring the factors that emphasize educational growth. They are working on increasing the quality of education, bringing positive changes to the educational system, and enhancing student performance. Recently, educational institutions attempt to find the factors that have a significant impact on gathering the latest technological wisdom for their students. Researchers are constantly bringing up techniques such as data mining to deal with large-scale data generated by educational institutions quickly. Data Mining is a technique that analyzes and extracts information that identifies concealed patterns in the data [1]. It analyses large datasets and discovers patterns and relationships, then used to identify a possible solution. Nowadays, educational institutions have used higher-quality data mining methods that provide quality education. Education performance prediction research is based on data mining skills and strategies that properly collect the high potential data and help predict academic outcomes accurately [2]. When we use actual data to perform the data mining process, it ensures generate accurate results for predicting institutional performance. So educational data mining plays an essential role in developing a nation's potential in the educational sector.

The progressive emphasis on the education data mining system has formerly made a modern experimental method called Educational Data Mining (EDM), which is outbound and concerned with thriving methods for analyzing educational data to understand learners better [3-4]. It is attached to various techniques like decision trees, k-nearest neighbors, association rules, neural networks, genetic algorithms, exploratory factor analysis, and step-wise regression. In the majority of the countries in Asia, various rhythms are noticeable to a student when their performance is slow or down into their undergrad stage [5]. As a result, it generates a massive problem for both faculties and learners to improve institutional performance and take fundamental moves to eliminate the awful outcomes. Predicting academic outcomes and identifying patterns of failure assist teachers in effectively guiding their energetic students by providing upgrade-level instruction and providing extra attention to those who fall below the average line.