ScienceDirect®

Materials Today: Proceedings

Investigation of factors affecting student performance evaluation using education materials data mining technique

J. Malini, Y. Kalpana

Show more ⌄

⤬ Share   🙶 Cite

Get rights and content ↗

Abstract

Every year students success rate was analysed by the Educational Institutions to develop their Academic standard. To identify the success rate many kinds of techniques are used such as statistics, physical examination and currently ongoing data mining techniques. Data mining Techniques was widely used in many fields, it is also used in the Educational environment known as Educational Data Mining (EDM). Educational data mining generate prototype in solving the research problems in students data and used to locate the unseen patterns in the students detailed dateset. This paper uses the EDM to characterize the distinct factors affecting the students performance by making predictions with efficient algorithms. Educational professionals have to identify the causes for the student failure in academic performance and the students not succeed in completing their education which becomes a social problem these days. The machine learning techniques help the researchers to analyse the student's learning habits and their performance in academic. This paper would discuss different kinds of algorithms to analyse the economic background of the students which mainly affects the students performance. The dataset was utilized from the UCI Repository of secondary school students performance and analysed using the Weka tool for the data mining process.

Introduction

The most challenging part of higher education is to ensure that most of the students who come into the education complete their required courses. This is because many get affected in various factors one of the factor discussed in this paper was economic background of students, which act as a important attribute in the students data. Currently many [1] researchers have executed to work on educational datasets to analyse those factors which are the intention for creating issues in student's performance [2]. The core objective is to dig out useful data about students from databases and after deriving the features, find out those attributes that are disturbing the student's behaviour. Educational Data Mining was applied while using it in developing a model of user thought, work and trial. Fig. 1 depicts the Educational data mining system. Mining data or knowledge detection has acquired the fame that it has become the emerging technology as it was very helpful in developing different data models and reduce it into purposeful data [3]. EDM uses many Machine learning techniques like, decision trees, neural networks, k-NN, SVM, naive bayes, and many more. Many open source tools are available for analysing the datasets using Machine learning algorithms such as knime, rapid miner, weka, orange, SSDt (SQL Server data Tools) developed for patterns exploration and to get logical

arrangement for later use. In this research paper, WEKA (Waikato Environment for Knowledge Analysis) tool was used for the investigation of data and to create data models to obtain analytical results. To bring the objective, this paper uses a standard dataset from UCI repository of secondary school students.

Section snippets

Literature survey

Big data in Education and Educational analytics methods are used in merge Calculus course for early evaluation of students' academic performance by Lu et al. [4]. The results show that seven main factors are affecting the students' performance. From which three were traditional attributes and four of them are online features that disturbs the students' performance. Suhem Parack et al. [5] used Education data mining in his work to group students data and profiling to predict student performance. …

Research methodology

After investigating the data and formulating the objectives of the study, this paper specifies the tools and data cleaning methods, techniques used in this research. This study explains the dataset in the expression of source, type of data and techniques used in that dataset. Moreover, techniques that were applied to the data to prepare it are also described with limitations.…

Design of the proposed edm for student performance evaluation

The proposed study would find the hidden knowledge in the datasets for the objectives that are expected in this research [12]. The student economic background attributes that affects the student performance was analysed using the Machine learning algorithms to obtain good result. Then the ML algorithms choosed was combination of traditional and strong in order gain a proper model. The design of the proposed work is mentioned in the Fig. 2 This proposed design have used a dataset with…

Experiments and results

Moreover, EDM utilizes broadvariety of techniques to examine datasetwiththe Supervised and Unsupervised representationgeneration, factorassessment, association Mining, and other techniques. This paper explains in detail the procedureused to achieve dissimilaranalytical models of students' academic performance. More intentionally, the steps and output of the following important DM techniques will be explained: Bagging, Artificial Neural Networks (ANN) and Boosting.…

Conclusion

In this paper the UCI student performance dataset was analysed to detect the various element which affects the student performance. The dataset contains many attributes but only highly ranked attributes were used to reduce the dimensionality as well as the unwanted features. The economic background plays a important role in the student life which affects them in various ways are discussed. Thus the results show that only economic attributes affects the students performance. MLP gives 72%…

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.…

Special issue articles   Recommended articles

References (20)

C. Romero *et al.*
[Predicting students' final performance from participation in online discussion forums](#)
Comput. Educ. (2013)

Y.-H. Hu *et al.*
[Developing early warning systems to predict students' online learning performance](#)
Comput. Hum. Behav. (2014)

O.H. Lu *et al.*
Applying learning analytics for the early prediction of students' academic performance in blended learning
J. Educ. Technol. Soc. (2018)

P. Suhem, Z. Zain, M. Fatima, Application of data mining in educational databases for predicting academic trends and...

...

R. Asif *et al.*
Predicting student academic performance at degree level: a case study
Int. J. Intell. Syst.s Applications (2014)

Y. Meier *et al.*
Predicting grades
IEEE Trans. Sign. Process. (2016)

L.C. Yu *et al.*
Improving early prediction of academic failure using sentiment analysis on self_evaluated comments
J. Comput. Assisted Learn. (2018)

V. Murugananthan *et al.*
An adaptive educational data mining technique for mining educational data models in elearning systems
Indian J. Sci. Technol. (2016)

E.A. Amrieh, T. Hamtini, I. Aljarah, Preprocessing and analyzing educational data set using X–API for improving...

There are more references available in the full text version of this article.

Cited by (7)

[Classification Technique and its Combination with Clustering and Association Rule Mining in Educational Data Mining — A survey](#)
2023, Engineering Applications of Artificial Intelligence
Show abstract ⌄

[Case Study: Using Data Mining to Predict Student Performance Based on Demographic Attributes](#) ↗
2023, International Journal on Informatics Visualization

[Research on the application of MOSL information retrieval method in educational resource management](#) ↗

2023, International Journal of Knowledge-Based Development

[A Review of Data Mining in Education Sector](↗) ↗

2022, Journal of Engineering Education Transformations

[Prediction of Students Final Project Values Based on Errors in Scientific Writing Using Data Mining Classification Algorithms](↗) ↗

2022, 2022 4th International Conference on Cybernetics and Intelligent System, ICORIS 2022

[A Conceptual Predictive Analytics Model for the Identification of at-risk students in VLE using Machine Learning Techniques](↗) ↗

2022, 14th International Conference on Mathematics, Actuarial Science, Computer Science and Statistics, MACS 2022

> ❭   View all citing articles on Scopus ↗

View full text

ELSEVIER

RELX™