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Exploring The Role of Learning Analytics In Educational Data Mining

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Abstract

Learning analytics is getting increased consideration, because it supports the academic institutes in improving their student retention and success rate by early detection of parameters affecting the academic performance of students.Use of learning analytics for predicting student academic performance in higher education to make decision about the educational growth which helps in the identification of probable issues affecting student's performance.Finally this paper portrays The various challenges in the implementation of learning analytics in higher education.

Keywords: Learning Analytics,prediction,educational data mining,pre-processing ,post-processing

Learning analytics is an evolving field which is used to improve education and learning by using learning analytics tools. Learning analytics is used for prediction , action on predictions ,get the results and then feed those results back to the process as they are related to learning and teaching so that strategies can be framed to improve the existing pedagogies . [1]

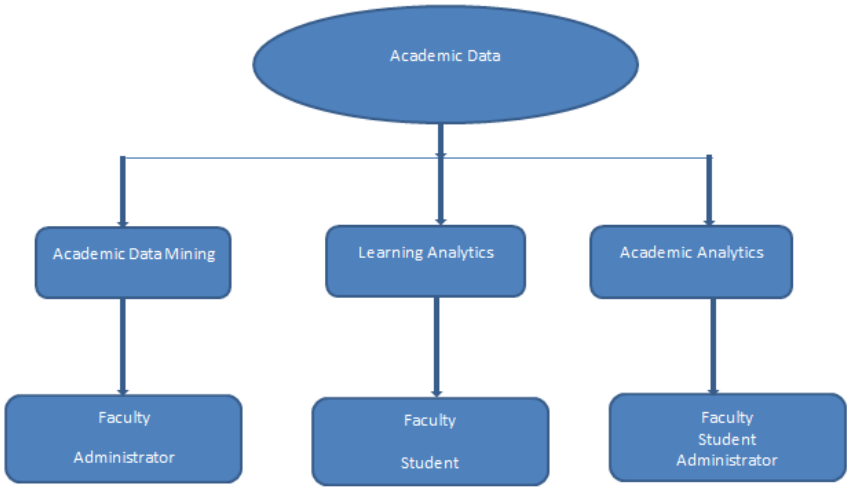

Figure1 Learning Analytics Stakeholders

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The main aim of learning analytics is to capture the data from different sources . The collected data is then used to develop model used for predicting the student academic performance. Prediction is used to identify the various attributes which affects the student performance. Decision makers used this information so that they make corrective decision about the courses their content as well as their allocation. [11]

Literature Review

Authors discussed that course signals offers the prospectto instructors to provide real-time feedback to the students using learning analytics. The various parameters used by the course signals to predict the student academic performance was previous academic records, grades in each subject and its demographic characteristics also. The performance was send to individual students on their registered email-id's using different colors where each color has its own significance about how a student is performing. The use of learning analytics has presentedabundant potential with regard to the student success in different years. [3]

This paper presented a case study for predicting the student of degree program at an early stage which help the universities to identify the slow performers and find out different strategies to help them. The author was able to identify the courses contributing more on degrading the student's performance. The author has used Naïve Bayes model to predict the student performance with 83.65 accuracy. The results shows that it is possible to predict the academic performance of graduation student by using their previous semesters marks along with socio-economic features. The study suggested that for obtaining the reasonable performance prediction accuracy more weightage is given to previous years marks as compared to socio-economic features. [4]

Student's previous academic background, learning behavior, institute environment are the factors which play an important role in predicting the student academic performance. Some researchers considered learning behavior and academic background plays an important role in prediction and for some previous academic records were important for prediction. The review showed that majority of the researchers used questionnaire for the collection of data. Measure of central tendency,dispersion,regression and correlations were used by the author for statistical analysis. [5]

After collecting data from different sources the author used predictive learning analytics for the identification of slow learners who are not able to complete their course on time. The study aimed to check providing predictive learning analytics to teachers in higher education helps to predict student academic performance and allow the faculty to identify and assist slow learners by developing new strategies. The study suggested certain suggestions about how to use

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predictive learning analytics in teaching so that the faculty get an alert about the students who require special support for performance improvement.[7]

Class status is one of the top academic predictors of success in both face-to-face and online courses. The longer a student has been in school, the more likely he or she is to complete a degree (Hart, 2012; Levy, 2007; Moore & Kearsley, 2005; Wang & Newlin, 2002). Several studies found grade point average (GPA) to be positively correlated with success in individual courses (Aragon & Johnson, 2008; Campbell, DeBlois, & Oblinger, 2007

Learning analytic process

The following figure shows the learning analytic process

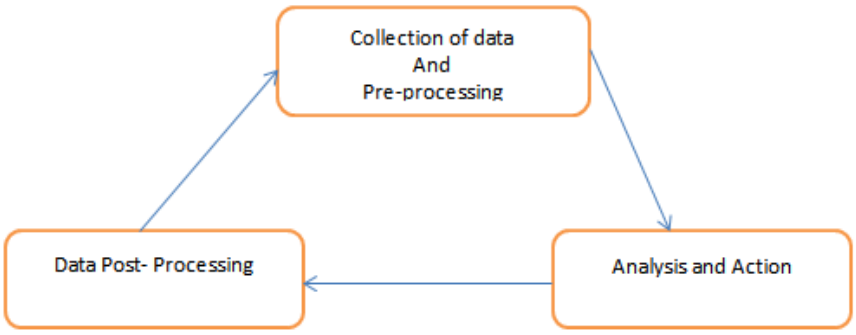

Figure2 LA Process

Data collection is the first and foremost step towards learning analytics process.Tha data is collected from different educational institutes which is the used for discovering useful patterns used for the decision making. The collected data include many irrelevant attributes which we need to remove so that we can get the correct analysis. Using pre-processing the irrelevant attributes are removed and the data is transformed into the format which is acceptable by learning analytic method.

On preprocessed data different learning methods can be applied that helps us to provide different factors affecting the student academic performance. After detecting the dominant factors necessary action needs to be taken like monitoring, assessment, recommendation so that the student at risk can get appropriate counselling sessions so that their performance can be enhanced.

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Post processing of data is required for the continues improvement in the student's performance. It also includes addition of new attributes, identification of new factors and based upon that selection of new analytic methods.

Challenges of Learning Analytics in Higher Education

The major challenge in implementing Learning analytics methologies is the lack of theoretical and practical knowledge of using the required tool which includes understanding of generated output ,depiction of correct conclusions and based upon the conclusions which action to take place. [10]Another significant challenge is associated with the privacy of personal information and ethics. In all stages from data collection , till decision making ethics should be taken into account in order to avoid any biasness. The challenge elated to the owner ship of data needs to be considered because we need to get the permission from the institute from where we are getting the data so that we can have the authenticity of data.

Conclusion

This paper explores the role of learning analytics in educational data mining. Learning Analytics in the education sector is highly advantageous for the instructors as well as students.For the instructors, it helps in the identification and classification of slow learners from fast learners. This classification helps the instructors to take appropriate actions, either motivating or adding enhanced learning abilities in weak or slow learners. Additionally, upon identifying slow students, the instructor can frame new strategies to assist the student in completing their degree while accomplishing program outcomeson time and with better results. The learning analytics is beneficial for students as well. The specialized and extra attention fostered upon them by the instructors aids them in improving their skills, doubt clearance, performance and learning capabilities. Using the past academic information we can predict the students overall grade in the current term. Various issues needs to be addressed before the academic data can be used.

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