

Assessing Online Learning Paths in an Learning Management Systems Using a Data Mining and Machine Learning Approach

Authors : Alvaro Figueira, Bruno Cabral

Abstract : Nowadays, students are used to be assessed through an online platform. Educators have stepped up from a period in which they endured the transition from paper to digital. The use of a diversified set of question types that range from quizzes to open questions is currently common in most university courses. In many courses, today, the evaluation methodology also fosters the students' online participation in forums, the download, and upload of modified files, or even the participation in group activities. At the same time, new pedagogy theories that promote the active participation of students in the learning process, and the systematic use of problem-based learning, are being adopted using an eLearning system for that purpose. However, although there can be a lot of feedback from these activities to student's, usually it is restricted to the assessments of online well-defined tasks. In this article, we propose an automatic system that informs students of abnormal deviations of a 'correct' learning path in the course. Our approach is based on the fact that by obtaining this information earlier in the semester, may provide students and educators an opportunity to resolve an eventual problem regarding the student's current online actions towards the course. Our goal is to prevent situations that have a significant probability to lead to a poor grade and, eventually, to failing. In the major learning management systems (LMS) currently available, the interaction between the students and the system itself is registered in log files in the form of registers that mark beginning of actions performed by the user. Our proposed system uses that logged information to derive new one: the time each student spends on each activity, the time and order of the resources used by the student and, finally, the online resource usage pattern. Then, using the grades assigned to the students in previous years, we built a learning dataset that is used to feed a machine learning meta classifier. The produced classification model is then used to predict the grades a learning path is heading to, in the current year. Not only this approach serves the teacher, but also the student to receive automatic feedback on her current situation, having past years as a perspective. Our system can be applied to online courses that integrate the use of an online platform that stores user actions in a log file, and that has access to other student's evaluations. The system is based on a data mining process on the log files and on a self-feedback machine learning algorithm that works paired with the Moodle LMS.

Keywords : data mining, e-learning, grade prediction, machine learning, student learning path

Conference Title : ICALT 2019 : International Conference on Advanced Learning Technologies

Conference Location : Paris, France

Conference Dates : July 18-19, 2019