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ACCEPTED MANUSCRIPT

Analysis of student behavior in Learning Management Systems through a Big Data framework

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Abstract

In recent years, learning management systems (LMSs) have played a fundamental role in higher education teaching models. A new line of research has been opened relating to the analysis of student behavior within an LMS, in the search for patterns that improve the learning process. Current e-learning platforms allow for recording student activity, thereby enabling the exploration of events generated in the use of LMS tools. This paper presents a case study conducted at the Catholic University of Murcia, where student behavior in the past four academic years was analyzed according to learning modality (that is, on-campus, online, and blended), considering the number of accesses to the LMS, tools employed by students and their associated events. Given the difficulty of managing the large volume of data generated by users in the LMS (up to 70 GB in this study), statistical and association rule techniques were performed using a Big Data framework, thus speeding up the statistical analysis of the data. The obtained results are demonstrated using visual analytic techniques, and evaluated in order to detect trends and deficiencies in the use of the LMS by students.

Keywords: Learning management systems, MapReduce, Apriori algorithm, E-learning analytics, Student behavior, Big Data

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