

Using Data Mining for Predicting Relationships between Online Question Theme and Final Grade

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ABSTRACT

As higher education diversifies its delivery modes, our ability to use the predictive and analytical power of educational data mining (EDM) to understand students' learning experiences is a critical step forward. The adoption of EDM by higher education as an analytical and decision making tool is offering new opportunities to exploit the untapped data generated by various student information systems (SIS) and learning management systems (LMS). This paper describes a hybrid approach which uses EDM and regression analysis to analyse live video streaming (LVS) students' online learning behaviours and their performance in their courses. Students' participation and login frequency, as well as the number of chat messages and questions that they submit to their instructors, were analysed, along with students' final grades. Results of the study show a considerable variability in students' questions and chat messages. Unlike previous studies, this study suggests no correlation between students' number of questions / chat messages / login times and students' success. However, our case study reveals that combining EDM with traditional statistical analysis provides a strong and coherent analytical framework capable of enabling a deeper and richer understanding of students' learning behaviours and experiences.

Keywords

Educational data mining, Data mining, Live video streaming, Clustering analysis

Introduction

According to a recent survey conducted by Campus Computing (campuscomputing.net) and WCET (wcet.info), almost 88% of the surveyed institutions reported having used an LMS (Learning Management System) as a medium for course delivery for both on-campus and online offerings. In addition to various student information management systems (SISs), LMSs are providing the educational community with a goldmine of unexploited data about students' learning characteristics, behaviours, and patterns. The turning of such raw data into useful information and knowledge will enable institutes of higher education (HEIs) to rethink and improve students' learning experiences by using the data to streamline their teaching and learning processes, to extract and analyse students' learning and navigation patterns and behaviours, to analyse threaded discussion and interaction logs, and to provide feedback to students and to faculty about the unfolding of their students' learning experiences (Hung & Crooks, 2009; Garcia, Romero, Ventura, & de Castro, 2011). To this end, data mining has emerged as a powerful analytical and exploratory tool supported by faster multi-core 64 CPUs with larger memories, and by powerful database reporting tools. Originating in corporate business practices, data mining is multidisciplinary by nature and springs from several different disciplines including computer science, artificial intelligence, statistics, and biometrics. Using various approaches (such as classification, clustering, association rules, and visualization), data mining has been gaining momentum in higher education, which is now using a variety of applications, most notably in enrolment, learning patterns, personalization, and threaded discussion analysis. By discovering hidden relationships, patterns, and interdependencies, and by correlating raw/unstructured institutional data, data mining is beginning to facilitate the decision-making process in higher educational institutions.

This interest in data mining is timely and critical, particularly as universities are diversifying their delivery modes to include more online and mobile learning environments. EDM has the potential to help HEIs understand the dynamics and patterns of a variety of learning environments and to provide insightful data for rethinking and improving students' learning experiences.

This paper is focused on understanding live video streaming (LVS) students' learning behaviours, their interactions, and their learning outcomes. More specifically, this study explores how the interaction of students with each other and with their instructors predicts their learning outcomes (as measured by their final grades). By investigating these

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**Xin Ning,Imr Fattah,Praveen Kumar
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Data Mining: Concepts and Techniques Jiawei Han, Micheline Kamber, Jian Pei, 2011-06-09 Data Mining Concepts and Techniques provides the concepts and techniques in processing gathered data or information which will be used in various applications Specifically it explains data mining and the tools used in discovering knowledge from the collected data This book is referred as the knowledge discovery from data KDD It focuses on the feasibility usefulness effectiveness and scalability of techniques of large data sets After describing data mining this edition explains the methods of knowing preprocessing processing and warehousing data It then presents information about data warehouses online analytical processing OLAP and data cube technology Then the methods involved in mining frequent patterns associations and correlations for large data sets are described The book details the methods for data classification and introduces the concepts and methods for data clustering The remaining chapters discuss the outlier detection and the trends applications and research frontiers in data mining This book is intended for Computer Science students application developers business professionals and researchers who seek information on data mining Presents dozens of algorithms and implementation examples all in pseudo code and suitable for use in real world large scale data mining projects Addresses advanced topics such as mining object relational databases spatial databases multimedia databases time series databases text databases the World Wide Web and applications in several fields Provides a comprehensive practical look at the concepts and techniques you need to get the most out of your data **Data Mining: Concepts, Methodologies, Tools, and Applications**

Management Association, Information Resources, 2012-11-30 Data mining continues to be an emerging interdisciplinary field that offers the ability to extract information from an existing data set and translate that knowledge for end users into an understandable way Data Mining Concepts Methodologies Tools and Applications is a comprehensive collection of research on the latest advancements and developments of data mining and how it fits into the current technological world **Data Mining, Southeast Asia Edition** Jiawei Han, Jian Pei, Micheline Kamber, 2006-04-06 Our ability to generate and collect data has been increasing rapidly Not only are all of our business scientific and government transactions now computerized but the widespread use of digital cameras publication tools and bar codes also generate data On the collection side scanned text and image platforms satellite remote sensing systems and the World Wide Web have flooded us with a tremendous amount of data This explosive growth has generated an even more urgent need for new techniques and automated tools that can help us transform this data into useful information and knowledge Like the first edition voted the most popular data mining book by KD Nuggets readers this book explores concepts and techniques for the discovery of patterns hidden in large data sets focusing on issues relating to their feasibility usefulness effectiveness and scalability However since the publication of the first edition great progress has been made in the development of new data mining methods systems and applications This new edition substantially enhances the first edition and new chapters have been added to address recent developments on

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Intelligent Systems Design and Applications Ajith Abraham, Aswani Kumar Cherukuri, Patricia Melin, Niketa Gandhi, 2019-04-13 This book highlights recent research on Intelligent Systems and Nature Inspired Computing It presents 212 selected papers from the 18th International Conference on Intelligent Systems Design and Applications ISDA 2018 and the 10th World Congress on Nature and Biologically Inspired Computing NaBIC which was held at VIT University India ISDA NaBIC 2018 was a premier conference in the field of Computational Intelligence and brought together researchers engineers and practitioners whose work involved intelligent systems and their applications in industry and the real world Including contributions by authors from over 40 countries the book offers a valuable reference guide for all researchers students and practitioners in the fields of Computer Science and Engineering

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are now being generated at a rapid pace increasing the opportunities and challenges associated with the ability to effectively analyze this data *Introduction to Biomedical Data Science* Robert Hoyt, Robert Muenchen, 2019-11-24 Overview of biomedical data science Spreadsheet tools and tips Biostatistics primer Data visualization Introduction to databases Big data Bioinformatics and precision medicine Programming languages for data analysis Machine learning Artificial intelligence Biomedical data science resources Appendix A Glossary Appendix B Using data world Appendix C Chapter exercises

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