Higher Education Recommendation System Using XG-Boost Algorithm

Y Chethan Reddy, D Jagadish, Mmuthu Selvam

Dhanalakshmi College of Engineering, Chennai

Abstract: *Educational institutions have a huge burden when dealing with students with low academic performance (at-risk students). Many approaches support this group of students, such as psychological therapy, proper scheduling for at-risk students, appeals, personal training, mock tests, direct private education, or success centres. However, these methods are not enough to solve the problem, because other factors affect the student's success, which can be his family difficulties, cognitive style, previous performance and level of education. This paper explores machine learning models to predict at-risk students and then builds a recommendation platform to provide such students with direct systemic coaching to remediate the fragmentation of their knowledge and skills. We use a dataset of 554 students from a computer program; the study aims to break down the curriculum into a set of chunks of knowledge and skills used to measure students' progress throughout their studies. We used different machine learning algorithms, a decision tree with an accuracy of 82.68% (Positive class: Good condition) and a high coverage of 87.69% (Positive class: Good condition). We completed model optimization and used ROC comparison to compare classifier models. A remediation algorithm is used to support high-risk cases, which leads to a sharp decrease in the risk level. The study found that current applied approaches to dealing with at-risk students exaggerate the problem and students should not be treated en masse. Keywords: Machine learning, Coaching education, Pre-admission assessment, Personalized education recommendation system, Educational disparities, At-risk students, Student retention*

Keywords: *Educational institutions.*

REFERENCES

[1] U. Cakiroglu, "An analysis of the influence of learning styles and study habits of distance learners on academic performance: the case of an introductory programming course", International Review of Research in Open and Distance Learning, vol. 15, No. 4, pp. 161–184, 2014.

[2] M. Robert, W.W. Gagne, W. Xiaoming, P. Weiguo, C. Baohua, and L. Yali, (Transl.). Principle of Instructional Design, The Fifth Edition Normal University Press, East China, 2007.

[3] C. Liu and C. Li, "Toward an Analysis of the Learning Situation in Junior High School Physics Teaching According to the New Curriculum Concept [J]", Basic Education Courses, Vol. 11, pp. 11–15, 2014.

[4] Fox, "From MOOCs to SPOCs," Communications of the ACM, vol. 56, no. 12, pp. 38–40, 2013.

[5] W. Di, Research on the Application of Mixed Learning Model Based on SPOC [D], Chongqing normal university, 2017.

[6] Y. Sun, Design Research and Practice at SPOC CollegeBasic Computer Courses in Post MOOC, Hebei Normal University, 2015.

[7] X. He, Flip the Classroom Interaction Based on SPOC Decay Course Design and Development, Hebei Normal University, 2015.

[8] I.H. Witten, E. Frank, and M.A. Hall, Data Mining: PracticalMachine Learning Tools and Techniques, (4th ed.), Morgan Kaufmann Publishing, San Francisco, 2016.

[9] P. Ayala, "Learning Analytics: A View of Development, Status, and Trends According to a Proposed Taxonomy," Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery, vol. 8, No. 3, pp. 1–29, 2018.

[10] T. Zipei, The Big Data Revolution, Guangxi Normal University Press, 2012.

[11] E. Fernandes, M. Holanda, M. Victorino, V. Borges, R. Carvalho, and G. V. Erven, "Data mining: a predictive analysis of academic performance of public school students in the capital city of Brazil," Journal of Business Research, vol. 94, no. 34, pp. 335–343, 2019.

[12] L. Qiang, Z. H. A. O. Chenjie, and L. U. O. Xianlu, "Analysis and design of an academic analytics system based on big data application technology," Software Engineering, vol. 21, No. 5, pp. 34–37, 2018.

[13] S. F. Tseng, Y. W. Tsao, L. C. Yu, C. L. Chan, and K. R. Lai, "Who will pass? An analysis of learner behavior in MOOCs," Research and Practice in Technology Enhanced Learning, vol. 11, No. 1, pp. 1–11, 2016.

[14] S. B. Asher and L. M. R. J. Lobo, "Combination of Machine Learning Algorithms for Historical Data-Based Course Recommendation in an E-Learning System," Knowledge-Based Systems, vol. 51, no. 1, pp. 1–14, 2013.

[15] R. Gawande, "Evaluation of Automotive Data Mining and Pattern Recognition Techniques for Error Analysis," Journal of Neural Engineering, vol. 9, No. 2, pp. 26008–26021, 2016.

[16] C. Zhang, Design and Implementation of Learning Early Warning System Based on Teaching Data Analysis, Shandong Normal University, 2018.

[17] F. Dalipi, S. Y. Yayilgan, A. S. Imran, and Z. Kastrati, "Towards Understanding the MOOC Trend: Pedagogical Challenges and Business Opportunities," International Conference on Learning and Collaboration Technologies, Vol. 9753, no. 1, pp. 281–291, 2016.

[18] L. Lu, Learning State Analysis of Students Based on Outlier Detection, Huazhong University of Science and Technology, 2016.

[19] H.J. Chen, Y.H. Dai, Y.J. Feng, B. Jiang, J. Xiao, and B. You, "Constructing affective learning in mobile learning: a study based on learner interest and emotion recognition," Computer Science and Information Systems , vol. 14, No. 3, pp. 685–702, 2017.

[20] Y. Zhang and W. Jiang, "A neural network-based MOOC student score prediction model," International Journal of Emerging Technologies in Learning, vol. 13, No. 10, pp. 171–182, 2018.

[21] J. Wang and W. Zhang, Support Vector Machine and its Intelligent Optimization, Tsinghua Press, Beijing, 2015.

[22] J. Liang, Application of Support Vector Machine Algorithms in Large-Scale Sample Data, China petrochemical Press, Beijing, 2017.

Copyright to IJARSCT
www.ijarsct.co.in

DOI: 10.48175/568

ISSN
2581-9429
IJARSCT

142