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Toward an improved learning process: the relevance of ethnicity to data mining prediction of students' performance

Aderibigbe Israel Adekitan[1] · **Odunayo Salau**[2]

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Abstract
The ability to predict failure is an advantageous educational tool that can be effectively used to counsel student, and this may also be used as a tool for developing, and channelling adequate academic interventions toward preventing failure and dropout tendencies. Students are generally admitted based on their evaluated academic potentials as measured using their admission criteria scores. This study seeks to identify the relationship, if any, between the admission criteria scores and the graduation grades, and to examine the influence of ethnicity using the geopolitical zone of origin of the student on the predictive accuracy of the models developed using a Nigerian University as a case study. Data mining analyses were carried out using four classifiers on the Orange Software, and the results were verified with multiple regression analysis. The maximum classification accuracy observed is 53.2% which indicates that the pre-admission scores alone are insufficient for predicting the graduation result of students but it may serve as a useful guide. By applying over-sampling technique, the accuracy increased to 79.8%. The results establish that the ethnic background of the student is statistically insignificant in predicting their graduation results. Hence, the use of ethnicity in admission processes is therefore not ideal.

Keywords Educational data mining · Nigerian university · Data mining algorithms · Performance evaluation methodologies · Knowledge discovery · Machine learning

✉ Aderibigbe Israel Adekitan, aderibigbe-israel.adekitan@tu-ilmenau.de | [1]Department of Electrical Engineering and Information Technology, Technische Universität Ilmenau, Ilmenau, Germany. [2]Department of Business Management, Covenant University, Ota, Ogun State, Nigeria.

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