A Novel Predictive Modeling System to Analyze Students at Risk of Academic Failure

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Abstract

Supporting academic success is a central focus of higher education institutions. To address this challenge, predictive techniques could be applied in order to build models that predict academic performance such as student retention and graduation. This paper presents a predictive system for modeling and scoring students' achievements. Based on student historical data, predictive models are developed to classify students who are at risk of dropping out and not graduating, by examining CART and random forest as an ensemble method. Generated models are then applied on freshman student's data to predict their academic behavior. The examination of the CART and Random forest algorithms on student data resulted in tree-based models with accuracy of 88%. The result of this work was an interactive system implemented using R language and shiny framework, including data preparation, model building and scoring engine. The predictive system, which is present in this paper, might help decision makers gaining a deeper insight in students' academic achievements and optimize their human and financial resources toward effective student support services.
References


Index Terms

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Educational Data Mining, Predictive modeling, Random Forest, Ensemble learning