

A Machine Learning Approach for Performance Prediction Based on User Behavioral Factors in E-Learning Environments

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Abstract : E-learning environments are getting more popular than any other due to the impact of COVID19. Even though e-learning is one of the best solutions for the teaching-learning process in the academic process, it's not without major challenges. Nowadays, machine learning approaches are utilized in the analysis of how behavioral factors lead to better adoption and how they related to better performance of the students in eLearning environments. During the pandemic, we realized the academic process in the eLearning approach had a major issue, especially for the performance of the students. Therefore, an approach that investigates student behaviors in eLearning environments using a data-intensive machine learning approach is appreciated. A hybrid approach was used to understand how each previously told variables are related to the other. A more quantitative approach was used referred to literature to understand the weights of each factor for adoption and in terms of performance. The data set was collected from previously done research to help the training and testing process in ML. Special attention was made to incorporating different dimensionality of the data to understand the dependency levels of each. Five independent variables out of twelve variables were chosen based on their impact on the dependent variable, and by considering the descriptive statistics, out of three models developed (Random Forest classifier, SVM, and Decision tree classifier), random forest Classifier (Accuracy - 0.8542) gave the highest value for accuracy. Overall, this work met its goals of improving student performance by identifying students who are at-risk and dropout, emphasizing the necessity of using both static and dynamic data.

Keywords : academic performance prediction, e learning, learning analytics, machine learning, predictive model

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