

# Student Performance Using Machine Learning Techniques

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**Abstract:** *The ultimate aim of any educational institution is to deliver the best learning experience and knowledge to its students. Identifying students in need of academic support early and taking timely measures to enhance their performance is critical to achieving this goal. This research utilizes four machine learning techniques—Artificial Neural Network (ANN), Naïve Bayes, Decision Tree, and Logistic Regression—to develop a classifier that predicts student performance in a Computer Science course offered by Al-Muthanna University (MU), College of Humanities. Special emphasis is placed on the impact of internet usage for academic purposes and time spent on social networks on student performance. Performance is evaluated using ROC index, classification accuracy, error rate, precision, recall, and F-measure. The dataset, comprising 161 student records collected via surveys and gradebooks, indicates that ANN outperforms other models with a ROC index of 0.807 and an accuracy of 77.04%. Decision Tree analysis identifies five key predictors of performance: early computer grades, accommodation, interest in the subject, educational environment satisfaction, and residence.*

**Keywords:** Student Performance Prediction, Artificial Neural Network, Naïve Bayes, Decision Tree, Logistic Regression, Educational Data Mining

