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Student Dropout Prediction

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Abstract: *Student dropout poses a major challenge to educational institutions, affecting academic performance and institutional reputation. This study applies machine learning techniques to predict at-risk students using data from the Department of Computer Science, University of Benin (2016–2020), with 906 records analyzed. Six classifiers—Naive Bayes, Logistic Regression, SVM, Decision Tree, KNN, and ANN—were evaluated. Logistic Regression achieved the highest performance (98.9% accuracy) and was selected for deployment due to its superior recall and F1-score.Advanced pre-processing, including SMOTE for handling imbalanced data and feature standardization, improved model accuracy. Explainable AI techniques (SHAP) provided transparency in prediction, helping educators understand key dropout factors. The system enables early interventions, improves student retention, and offers personalized support. Future work may include real-time monitoring, cross-institutional data, and NLP for deeper behavioral insights.*

Keywords: Student dropout

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