

## ***ABSTRACT***

*Improving the quality of education and learning outcomes is the main goal of the education system, including identifying students' academic performance early on. The university entrance selection process has been shown to influence differences in academic achievement and can be used as a factor in monitoring students' academic performance. This study uses the Decision Tree algorithm to predict the academic performance of students in the Information Systems undergraduate program at Telkom University, based on historical academic data from the 2017-2019 cohort, collected through the official academic information system, iGRACIAS. The data processing includes stages of data preparation, training, and testing, with handling of data imbalance using the Synthetic Minority Oversampling Technique (SMOTE). Model performance evaluation is conducted using a confusion matrix to measure accuracy, precision, recall, and F1-score. From the confusion matrix calculation, the results of the study show that both the model with and without SMOTE handling achieve an accuracy of 66%, but there was a difference in the metrics for the "Satisfactory" class, with recall increasing from 50% to 67%. Additionally, evaluation using k-fold cross-validation showed a significant difference, with accuracy before SMOTE being 66%, and after SMOTE, accuracy increased to 84%. This study also involved deployment by creating a simple input system using Streamlit to facilitate users in predicting students' academic performance. This research contributes to supporting academic decision-making to improve understanding of students' performance.*

*Keywords— Academic Performance, Decision Tree, Data Mining*