

CUSTOMER DEFAULT PREDICTION IN LIPA POLE POLE MODEL IN KENYAN BUSINESS ENTERPRISE

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ABSTRACT

Predicting customer churn in a pay-as-you-go (PAYG) model is crucial to identifying customers who are likely to stop using the service shortly. To make the most effective financing decision, we employ a genetic algorithm (GA) based optimization method. GA is preferred because of its convergence and adaptability when dealing with multi-objective optimization issues including credit evaluation, portfolio optimization, and bank lending decisions. To further improve the performance of the model and reduce bias, we use Synthetic Minority Over-sampling Technique (SMOTE) in the training process. This technique generates synthetic samples of the minority class, thereby increasing the number of samples in the minority class and making the model less likely to be biased. In addition, we use grid search to systematically explore the hyperparameter space, training and evaluating a model for each combination of values. This approach allows us to find the optimal combination of parameters that lead to the best performance. Based on the literature review, boosting algorithms have the highest prediction accuracy. Among the boosting algorithms, Gradient Boosting classifier performs generally better in the base model followed by Random forest (RF). RF is preferred most due to it being less prone to over-fitting than other algorithms. GA-GBC results to accuracy of 84.28% while GA-RF of 84.14%. Additionally, by relevant finetuning and parameter search during training and boosting algorithms, increases performance and accurate predictions.

Keywords: *Genetic Algorithm, Customer Churn, PAYG, Optimization.*