Prediction of Customer Churn for an E-Commerce Company Using Machine Learning

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Abstract: *An E-commerce/DTH service provider is facing significant competitive pressure, necessitating a proactive strategy for account churn prediction to retain high-value customers. This study addresses the unique business challenge where the churn of a single account can result in the loss of multiple associated customers. We developed a robust churn prediction framework using a dataset of 11,260 accounts and 19 features, including account demographics, service engagement metrics, and financial indicators such as Tenure, Service Scores, and revenue growth (rev_growth_yoy). Data preprocessing involved comprehensive cleaning, standardization of categorical features (e.g., 'F' to 'Female'), and imputation of missing values. Multiple machine learning models, spanning linear, instance-based, tree-based, and ensemble methods, were implemented and rigorously evaluated. The Bagging Classifier with Logistic Regression as the base estimator demonstrated the optimal performance on the held-out test data, achieving a high-precision score of 0.77 for the churn class and an AUC-ROC of 0.675. This high precision minimizes the misclassification of low-risk accounts, directly supporting the project's constraint of satisfying the revenue assurance team. Based on the model's output, a fiscally responsible, segmented retention campaign focused on conditional, value-added service upgrades (e.g., Priority Support or Loyalty Accelerators) is proposed to maximize retention while adhering to strict profitability guidelines.*

Keywords: Customer Churn Prediction, Ensemble Machine Learning, Logistic Regression, Segmented Retention Strategy, Revenue Assurance, E-commerce/DTH

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DOI: 10.48175/IJARSCT-29879

ISSN
2581-9429
IJARSCT

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