Customer Churn Prediction by Using Four Machine Learning Algorithms Integrating Features Selection and Normalization in the Telecom Sector

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Abstract : A crucial component of maintaining a customer-oriented business as in the telecom industry is understanding the reasons and factors that lead to customer churn. Competition between telecom companies has greatly increased in recent years. It has become more important to understand customers' needs in this strong market of telecom industries, especially for those who are looking to turn over their service providers. So, predictive churn is now a mandatory requirement for retaining those customers. Machine learning can be utilized to accomplish this. Churn Prediction has become a very important topic in terms of machine learning classification in the telecommunications industry. Understanding the factors of customer churn and how they behave is very important to building an effective churn prediction model. This paper aims to predict churn and identify factors of customers' churn based on their past service usage history. Aiming at this objective, the study makes use of feature selection, normalization, and feature engineering. Then, this study compared the performance of four different machine learning algorithms on the Orange dataset: Logistic Regression, Random Forest, Decision Tree, and Gradient Boosting. Evaluation of the performance was conducted by using the F1 score and ROC-AUC. Comparing the results of this study with existing models has proven to produce better results. The results showed the Gradients Boosting with feature selection technique outperformed in this study by achieving a 99% F1-score and 99% AUC, and all other experiments achieved good results as well.

Keywords : machine learning, gradient boosting, logistic regression, churn, random forest, decision tree, ROC, AUC, F1-score

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