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Customer Churn Prediction System

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Abstract: Customer churn is a critical issue faced by businesses across various industries, as it directly impacts profitability and long-term growth. This project focuses on developing a robust predictive model for customer churn using advanced machine learning techniques. The primary objective is to identify customers at risk of leaving, enabling businesses to implement targeted retention strategies effectively. The project begins with a comprehensive literature review that highlights the importance of customer retention and the role of predictive analytics in mitigating churn. Various machine learning algorithms, including Random Forest, Gradient Boosting, and Logistic Regression, are explored for their effectiveness in predicting customer behavior. Data preprocessing techniques, such as handling missing values and data normalization, are employed to ensure high- quality input for model training. The analysis is conducted on a dataset sourced from [specify dataset source], which includes demographic information, transaction history, and customer interactions. Feature selection techniques are applied to identify the most significant variables influencing churn, thus enhancing model accuracy and interpretability. The performance of different algorithms is evaluated using metrics such as accuracy, precision, recall, and the F1-score. The results indicate that Random Forest and Gradient Boosting outperform other models in terms of predictive accuracy, achieving an F1-score of [insert F1 score] and accuracy of [insert accuracy percentage] respectively. Moreover, the project emphasizes the significance of balancing datasets using techniques like SMOTE to address class imbalance, further enhancing model performance. Ultimately, the findings of this project provide valuable insights for businesses aiming to improve customer retention. By leveraging predictive analytics, organizations can proactively identify at risk customers and implement effective retention strategies, thus minimizing churn and maximizing customer lifetime value. The project underscores the growing relevance of data-driven decision-making in today's competitive landscape.

Keywords: Customer Churn Prediction, Predictive Analytics, Machine Learning, Data-Driven Decision Making

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