**CUSTOMER CHURN PREDICTION**

**Abstract:**

Customer churn prediction is a critical task for businesses aiming to retain their customer base and sustain growth. In this study, we present a comprehensive Python-based module for predicting customer churn using various machine learning techniques. The proposed module encapsulates distinct components, including data preprocessing, feature engineering, model selection, and evaluation, allowing for a flexible and customizable churn prediction framework.

The data preprocessing module involves techniques such as data cleaning, transformation, and handling missing values. Feature engineering encompasses the creation of relevant features to enhance the predictive power of the models. We employ popular machine learning libraries like scikit-learn, pandas, and NumPy for model selection, including algorithms such as Logistic Regression, Random Forest, and Gradient Boosting.

Furthermore, we implement cross-validation and hyperparameter tuning modules for robust model evaluation and optimization. The module also includes visualization components to provide insights into the model's performance and feature importance, aiding in decision-making.

By employing this modular approach, businesses can efficiently identify potential churners and tailor strategies for customer retention. The flexibility of this module ensures adaptability across various industry domains, making it a valuable tool for organizations striving to reduce churn and enhance customer satisfaction.