

Report

Description of the Business Problem

Commuters regularly receive digital coupons and location-based promotional offers, but most of these go unnoticed or unused. Businesses lose marketing potential, and users are overwhelmed with irrelevant deals. The core challenge is to identify **which offers are most likely to be redeemed**, given a user's travel context, demographic profile, and lifestyle habits. Solving this allows businesses to **target offers more intelligently**, improving engagement and conversion rates.

Methodology

1. Data Understanding & Cleaning:

- Explored data containing user demographics, travel patterns, lifestyle behavior, and past coupon interactions.
- Handled missing values, outliers (using IQR capping), and one-hot encoded categorical variables for modeling.

2. Feature Engineering & Selection:

Created and scaled numerical features like `ambient_temp` and `min_gap_to_offer_25`.

Applied feature selection using Random Forest feature importance and removed uninformative columns.

3. Modeling & Evaluation:

Trained several classifiers including Logistic Regression, Random Forest, Passive-Aggressive, and XGBoost.

Tuned hyperparameters and evaluated models using accuracy, precision, recall, and F1-score.

Addressed class imbalance using either `class_weight='balanced'` or SMOTE (if needed).

Insights

Features like **time of day**, **trip purpose**, **vehicle type**, and **offer type** had strong influence on redemption behavior.

Random Forest and **XGBoost** models provided the best accuracy (74–76%) and highlighted key patterns in feature importance.

Lifestyle habits (e.g., **visit_cafe_freq**, **visit_restaurant_low**) provided significant predictive value, suggesting that users with specific routines are more likely to redeem certain offers.