PREDICTING IN-VEHICLE COUPON ACCEPTANCE TO DRIVE TARGETED PROMOTIONS

Presented by: Lucy Mutua

Moringa School

Project Overview

A machine learning system that predicts whether a passenger will accept or reject a promotional coupon during a ride was built, based on real-time contextual and personal information like:

1. Who a person is traveling with
2. Time of day
3. Destination type
4. Weather conditions
5. Type of coupon offered (e.g., restaurant, bar, coffee shop)

With our system:

1. Offers can be personalized and timed better, increasing the chance that the user says ‘yes’.
2. Marketing teams can optimize campaign performance.
3. Partners like restaurants and cafes benefit from higher foot traffic and engagement.

Business and Data Understanding

- **Business Problem**: In the competitive retail and food service industries, many businesses rely on digital marketing and promotions to attract and retain customers. Businesses face the challenge of **delivering the right offer to the right person at the right time**, especially in contexts like ride-hailing or navigation apps, where offers can be embedded during a user's journey.
- **Stakeholder**: Digital marketing team at Uber, a ride-hailing company.
- **Solution**: Use passenger and trip context to predict who will accept a coupon.
- **About the Data**

1. Source: In-Vehicle Coupon Recommendation Dataset from: https://archive.ics.uci.edu/dataset/603/in+vehicle+coupon+recommendation.

2. Scenario-Based: Respondents were shown driving scenarios and asked if they would accept a coupon.

3. Features include:

- **Contextual**: Weather, time, destination, companions
- **Personal**: Age, income, education, marital status
- **Offer Info**: Type of coupon (e.g., coffee house, bar, restaurant)

Modelling

Three classification models were built and compared:

1. Logistic Regression– A simple baseline model.
2. Decision Tree – Captures decision rules based on different features.
3. Random Forest – An advanced ensemble model that combines multiple trees for better accuracy.

How the model works

1. The models **learn from past data** (e.g., user profiles, trip conditions, and coupon types).
2. They find **patterns** that help predict whether a user is likely to **accept a coupon**.

Evaluation

Random Forest Stood Out:

1. It provided the **highest accuracy and balance** across both coupon acceptors and rejectors.
2. It handled **complex interactions** between features better than other models.
3. Most importantly, it delivered more **reliable predictions** in different user scenarios.

Accuracy: 73%: The model made the right prediction almost 3 out of 4 times.

Precision (for "Yes" predictions): 73% : When the model predicted a user would accept a coupon, it was correct 73% of the time. This means fewer false offers sent to uninterested users.

Recall (for actual "Yes" users): 79%: Out of all users who actually accepted coupons, the model correctly identified 79% of them. This shows it's good at capturing real opportunities.

Recommendations

1. Focus on high-confidence predictions (e.g., users with probability > 0.7) to maximize ROI.
2. Leverage time and destination context by promoting **lunch offers around midday and using restaurant coupons** when users are heading out with friends or on errands.
3. Deploy the model in the **mobile app** to send offers only to users predicted to accept coupons.

Next Steps

1. Improve model performance overtime to achieve at least 87% accuracy.
2. Implement model monitoring to capture drift in features and performance.

THANK YOU!!