Customer Repurchase Analysis

2023 Aggie Hacks x Z by HP x Google Cloud Hackathon

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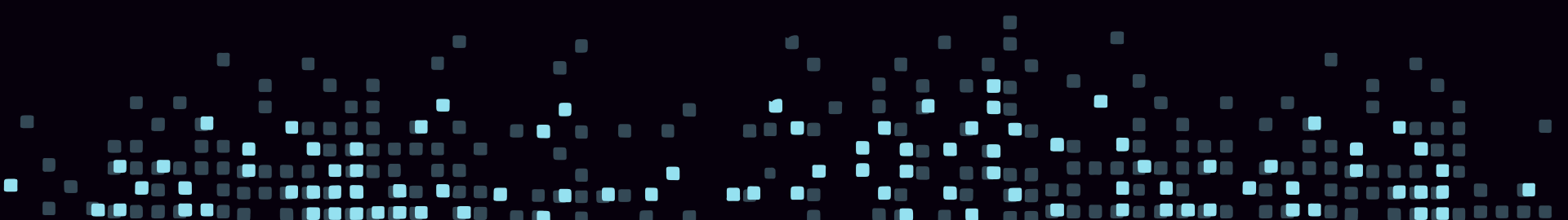
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TABLE OF CONTENTS

01

Problem Definition

Context & Problem

Context:

- Third-party data has been a key component of HP's digital marketing campaigns in the past.
- However, Google's plan to drop support for third-party cookies has led HP to rely more on its own first-party data to develop effective digital marketing campaigns.

Problem:

- Make prediction of customers **repurchase propensity data**
- Use this data to drive market strategies accordingly

HP Officejet, HP Envy and HP Deskjet are top star product series with *significantly higher* lifetime value and popularity of usage.
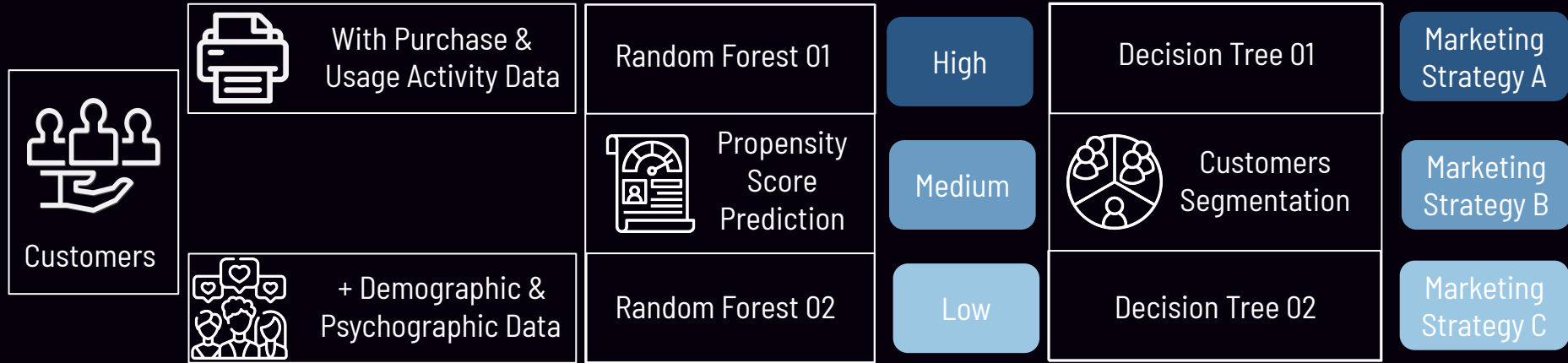

Top 10 Products by Lifetime Value

Top 10 Products by Usage of Black Ink
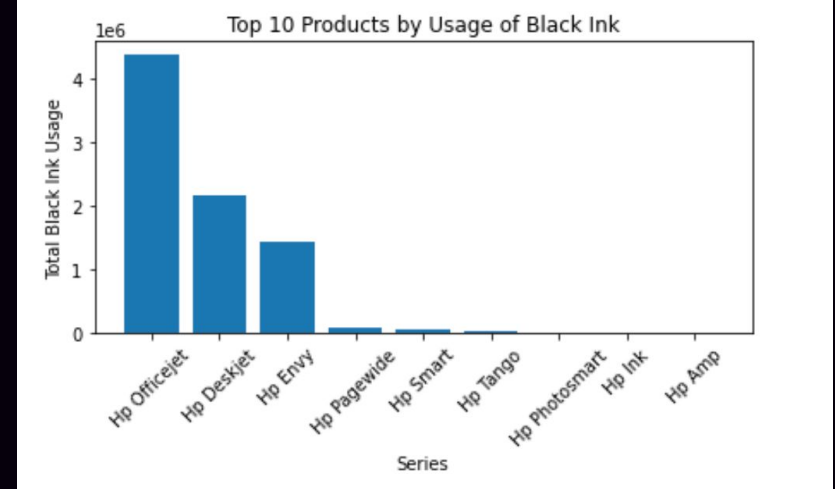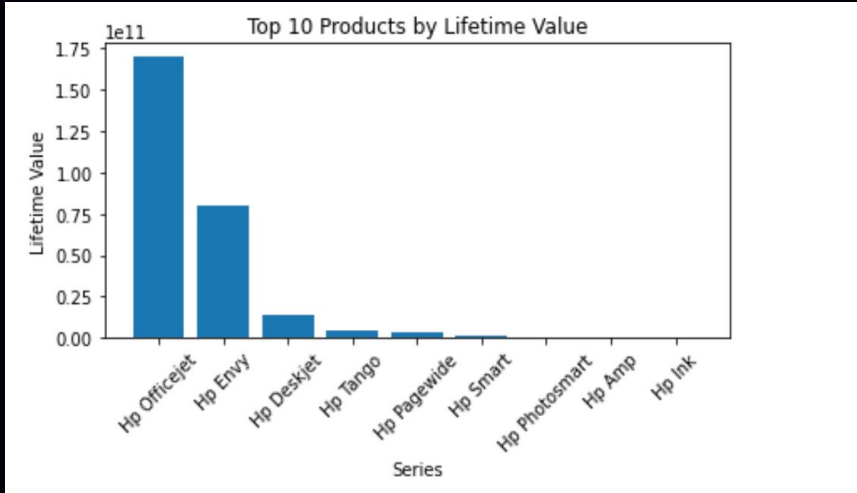
Note : Customer Lifetime Value = Revenue * Lifetime

02

Overview of the Data and Solutions

Solution Overview

Customers	With Purchase & Usage Activity Data	Random Forest 01	High	Decision Tree 01	Marketing Strategy A
		Propensity Score Prediction	Medium	Customers Segmentation	Marketing Strategy B
	+ Demographic & Psychographic Data	Random Forest 02	Low	Decision Tree 02	Marketing Strategy C

03

Model Exploration & Results

Random Forest 01 with Undersampling

Top 10 Feature Importance (W/ Demographic & Psychographic Data)
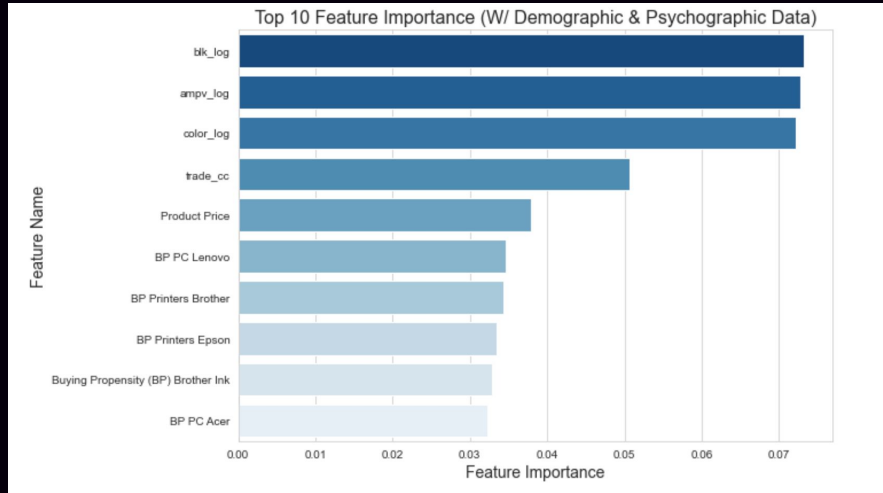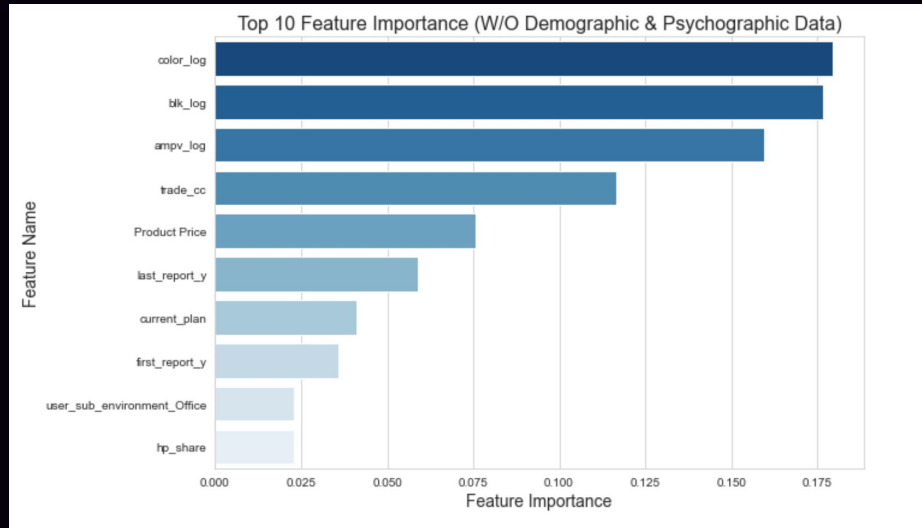
W/ Demopgraphic & Psychographic Data :
- *Customer Usage Frequency*
- Product Price
- BP scores for Other Products

Random Forest with Undersampling

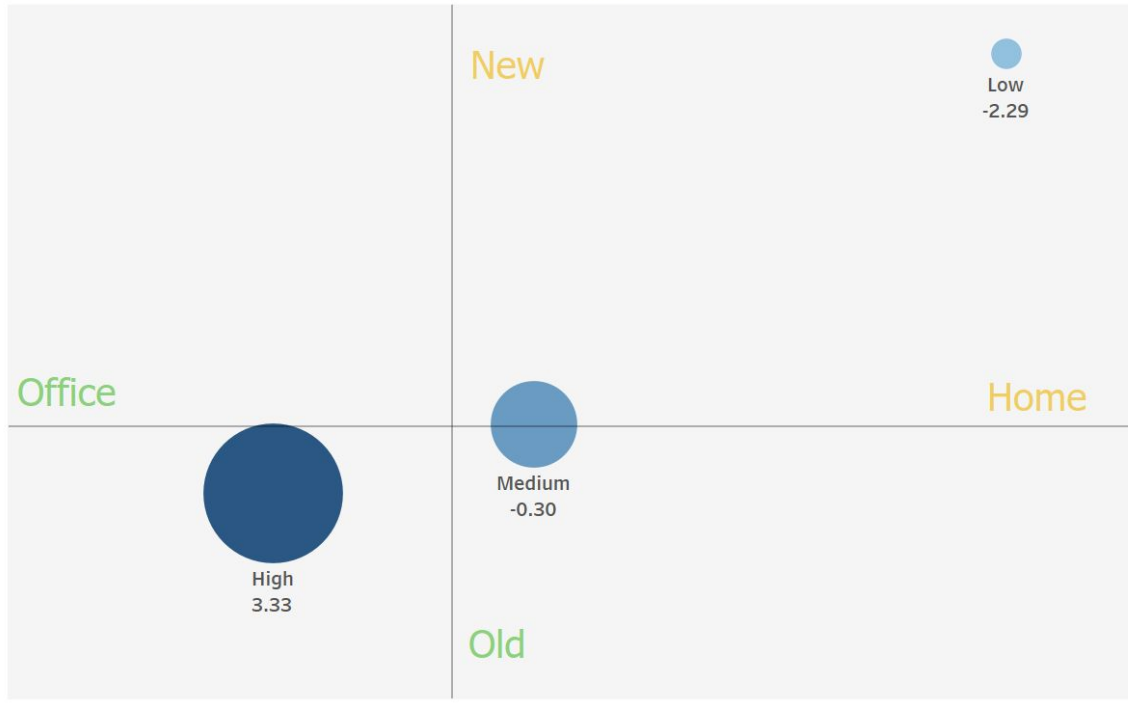Top 10 Feature Importance (W/O Demographic & Psychographic Data)

W/O Demopgraphic & Psychographic Data :
- *Customer Usage Frequency & Time*
- Product Price
- User Usage Environment

Target at Customer with higher Engagement Score

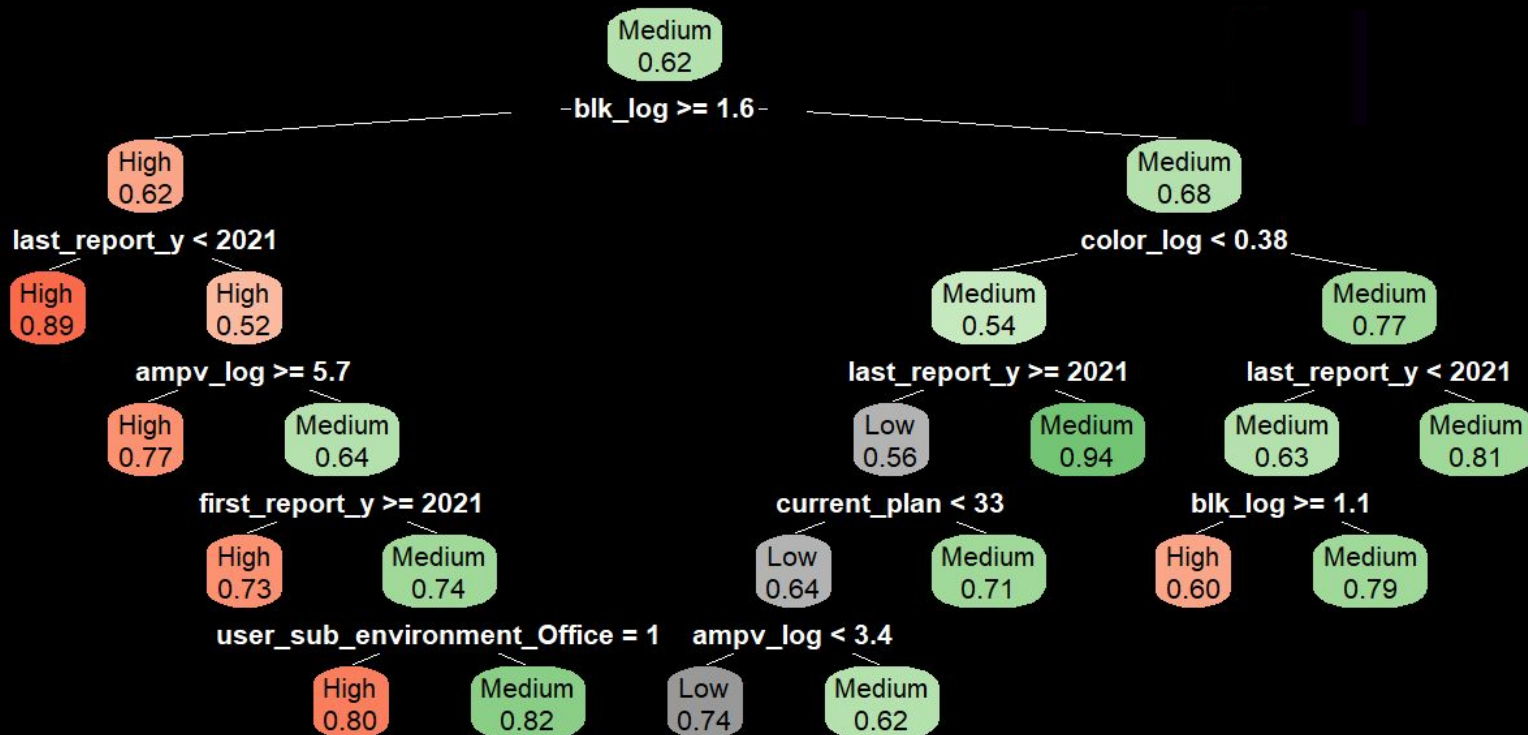## Customer Segment Quadrant Plot Based on Decision Tree

New

Low
-2.29

Office

Home

Medium
-0.30

High
3.33

Old

Customer Engagement Score (CES) is a strong indicator of high end customers

CES = avg (black ink usage + color ink usage + page usge)

Office intended printers is another indicator of target customers for promotion

# Result of the Decision Tree

04

Business Insights & Recommendations

Strategy 01 : Develop targeted marketing campaigns for different segments of customers

- High-Likely-Repurchase : Offer ***marketing promotions of crucial complementary products*** to boost customer engagement .

- Low & Medium-Likely-Repurchase :
    - Offer more marketing promotions of complementary products to boost engagement.
    - Develop targeted social media campaigns and advertisements to induce repurchase.

Strategy 02: Constant measure and adjust of marketing campaign performance

- **_Refresh and update the user data_** regularly to keep feeding the model and generate more

  accurate outcomes over time

- Analyze **_campaign data and customer feedback_**, adding them as input to train the model with

  information from more aspects
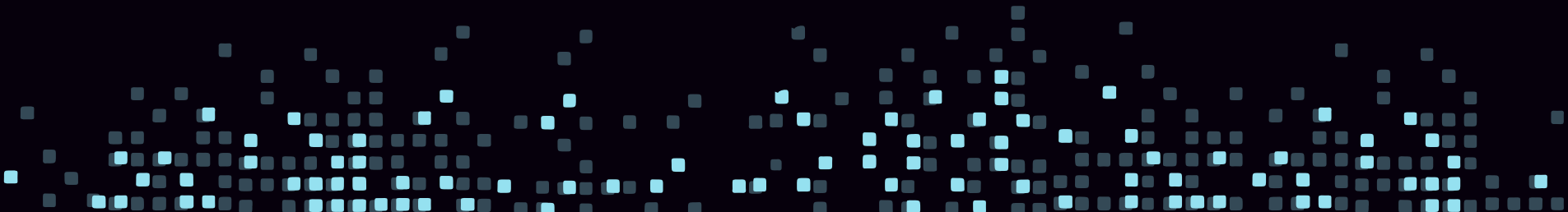
Strategy 03 : Establish a feedback loop for continuous improvement

- When targeting customers through different channels, customers may select if

  they like the Adds, or find the promotion helpful. The user response will then be

  integrated into our model as a new variable.

- Periodically re-segment customers and adjust marketing campaigns based on

  current customer behavior, market trends, business objective ... etc.
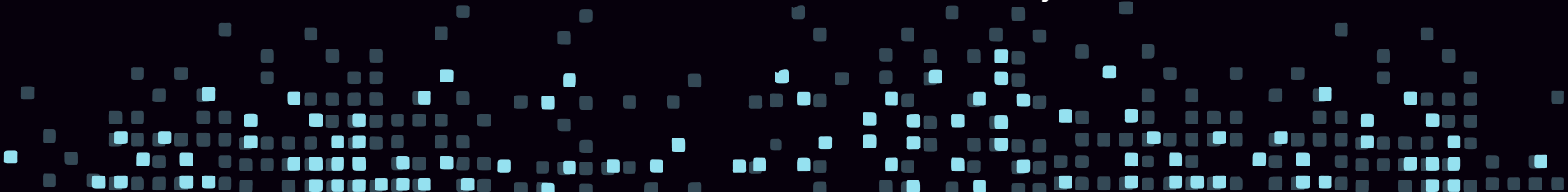
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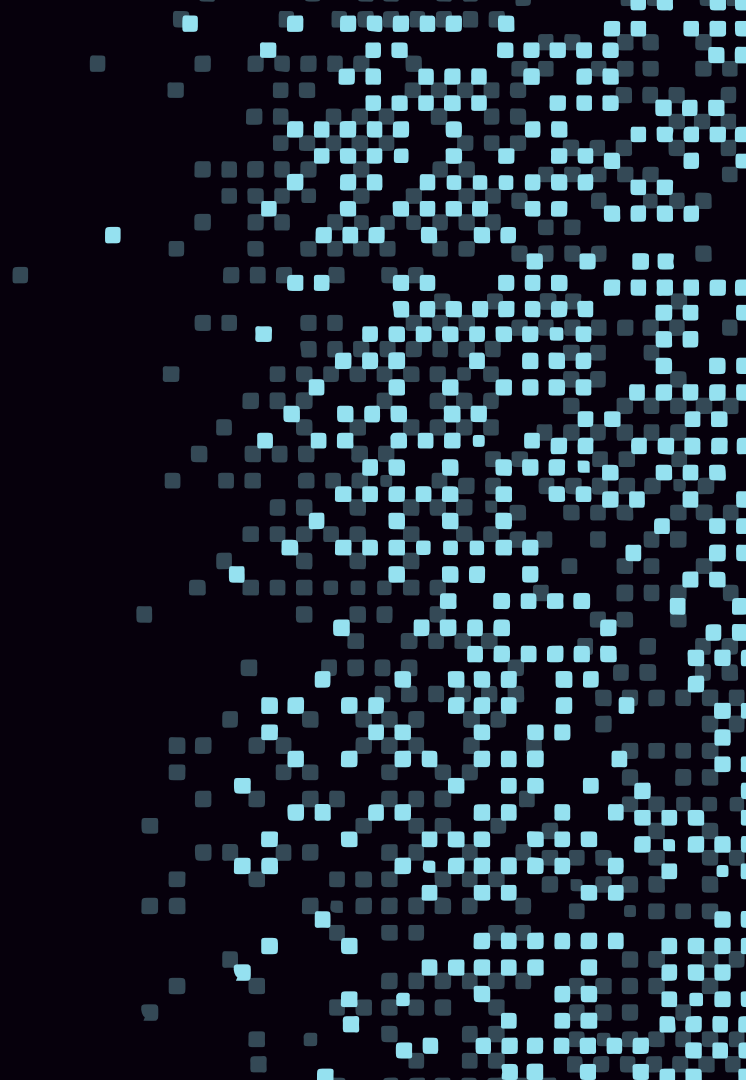
Appendix: Result of the Decision Tree of the Demographics Data