**Professional Certificate in Machine Learning and Artificial Intelligence**

**Module 5 Arturo\_Noguera**

Report for analysis conducted on the provided Dataset

**Section 1**

Our initial dataset contains 12684 entries, describing the behavior of multiple customers including their acceptance of 5 different types of coupons, after cleaning the data (removed duplicates and uncomplete records, padding missing data) we kept 12610

A screenshot of a coupon code

Description automatically generated

Customers proportion accepting the received coupon is 56.76 % (7157 out of 12610), most of these during warm weather.

The breakdown for customer receiving a specific coupon type and their corresponding acceptance is depicted below as a multilevel pie and histogram charts.

A circular chart with different colored circles

Description automatically generatedA graph of a bar chart

Description automatically generated

**Section 2 Investigating the Bar Coupons**

1. 2010 customers got the Bar coupon. We did not used the entries padded with NEVER for the attendance frequency to avoid any biasing in the results, as some of these customers actually accepted the coupon.
2. out of these only 824 (40.99%) accepted the coupon.
3. From customers that received the Bar coupon, those who go to bar more than 3 times a month, have an acceptance ratio (accepted/not accepted) equals to 3.3 while customers going to a bar 3 or fewer times a month. have an acceptance ratio equals to 1.12.

That is frequent bar customers, have an acceptance ratio 3 times higher than infrequent customers.

A circular chart with numbers and letters

Description automatically generated with medium confidence

1. Customers over 25 who go to bar once or more a month have an acceptance ratio equals to 2.28, while the rest of the customers having the bar coupon have an acceptance ratio equals to 0.50. That is frequent customers over 25, have an acceptance ratio 4.5 times higher than the rest of the customers.

A graph of a number of bars

Description automatically generated with medium confidence

1. Drivers who go to bars once or more a month and had passengers that were not a kid and had occupations other than farming, fishing, or forestry have an acceptance ratio equals around 2.49, that is more than 70% of these customers accept the coupon. Acceptance RATIO for remaining customers is 0.419. Comparing both ratios, acceptance for frequent customers, no carrying kids and not in Farming Fishing & Forestry industries 6 times larger that for the rest of the customers

A graph of a number of blue and orange squares

Description automatically generated

1. The same acceptance ratio (2.49) shows up for customers that go to bar once or more a month, had passengers that were not a kid, and were not widow.

For customers that go to bars more than once a month and are under the age of 30 ,the acceptance ratio is 2.59

On the other side , customers that got the bar coupon and go to cheap restaurants more than 4 times a month and income is less than 50K, are less likely to accept the coupon, their acceptance ratio us 0.83,

**Section 3 Independent Investigation , Customer with "Coffee House" coupon**

3989 customers got the CoffeHouse coupon, 49.86 percent of CoffeHouse coupons were accepted, that is 1/1 acceptance ratio.

Customers going to the coffee shop frequently have a 2:1 acceptance ratio, however customers attending less than once a month or never have the lowest acceptance ratio (1:1 and 1:4 respectively.)

A colorful circle with black text

Description automatically generated

The weather has not direct impact on the acceptance ratio, however the coupons are accepted mostly during sunny weather

A graph of a bar

Description automatically generated with medium confidence

The occupation feature for the top categories "Student" and "Unemployed" are 1.7 and 1.1 respectively.

Travel direction has no huge impact on the acceptance rate, most customers accept the coupon if the Coffee shop is in opposite direction they are traveling (1592 vs 397) , maybe they will attend coming back to their home , however the acceptance ratio remains 1:1 regardless of the direction

Acceptance ratio for each age group remains close to the media (1:1)for most groups, except the two outliers (below21 with 2.3 and 50plus with 0.72)