**Data analysis of coupon usage under different conditions**

**--Thomas Gillespie, thom.gillespie@gmail.com**

The dataset under discussion is sourced from the UCI Machine Learning Repository, having been compiled through a survey conducted on Amazon Mechanical Turk (MTurk). MTurk serves as a crowdsourcing platform, effectively facilitating the delegation of tasks and processes by individuals and businesses to a globally distributed workforce capable of executing these tasks online. This innovative marketplace simplifies accessing human intelligence for tasks that require judgment and nuanced understanding, thereby bridging the gap between automated processes and the need for human oversight , it is virtualized data for research (Amazon, n.d.).

Reference: Amazon. (n.d.). Amazon Mechanical Turk. Retrieved March 5, 2024, from <https://www.mturk.com/>

This is the structure in the data:set

0 destination 12684 non-null object

1 passanger 12684 non-null object

2 weather 12684 non-null object

3 temperature 12684 non-null int64

4 time 12684 non-null object

5 coupon 12684 non-null object

6 expiration 12684 non-null object

7 gender 12684 non-null object

8 age 12684 non-null object

9 maritalStatus 12684 non-null object

10 has\_children 12684 non-null int64

11 education 12684 non-null object

12 occupation 12684 non-null object

13 income 12684 non-null object

14 car 12684 non-null object

15 Bar 12684 non-null object

16 CoffeeHouse 12684 non-null object

17 CarryAway 12684 non-null object

18 RestaurantLessThan20 12684 non-null object

19 Restaurant20To50 12684 non-null object

20 toCoupon\_GEQ5min 12684 non-null int64

21 toCoupon\_GEQ15min 12684 non-null int64

22 toCoupon\_GEQ25min 12684 non-null int64

23 direction\_same 12684 non-null int64

24 direction\_opp 12684 non-null int64

25 Y 12684 non-null int64

26 age\_numeric 10349 non-null float64

The first steps was to deal with missing data:

car 12576

Bar 107

CoffeeHouse 217

CarryAway 151

RestaurantLessThan20 130

Restaurant20To50 189

In every instance where data was absent, we maintained the integrity of the dataset by employing placeholders, exemplified by assigning "Unknown" to the 'car' attribute when information was missing.

The analysis revealed that the overall rate of coupon acceptance stands at 57%. This significant finding is further illustrated through the creation of a bar chart, which visually represents the distribution and acceptance rates of various coupons. This approach not only quantifies the acceptance ratio but also provides a clear, visual insight into coupon utilization patterns among the participants.

A graph of bar graph

Description automatically generated with medium confidence

Then I created a histogram to visualize the temperature columns

A graph with blue bars

Description automatically generated

I determined the acceptance rate for bar coupons, which was found to be 40%.

To delve deeper, I analyzed the acceptance rates based on the frequency of bar visits, comparing individuals who visit a bar three times a month or less with those who visit more frequently:

* The acceptance rate among individuals visiting a bar three times a month or less was 20%.
* Conversely, for those frequenting a bar more than three times a month, the acceptance rate significantly increased to 60%.

Further analysis explored the acceptance rates among two specific groups: drivers over the age of 25 who visit a bar more than once a month, versus all other participants. The findings were as follows:

* Drivers over the age of 25 who frequent a bar more than once a month exhibited a slightly higher acceptance rate of 63%.
* The acceptance rate for all other participants was slightly lower, at 56%.

These results indicate a modest variation in coupon acceptance rates based on bar visitation frequency and age criteria.

I applied the same analytical method to assess the coupon acceptance rate among drivers who frequented bars more than once a month, were accompanied by passengers other than children, and engaged in professions outside of farming, fishing, or forestry. The results showed:

* Acceptance rate for this specific demographic: 57%
* General population acceptance rate: 57%
* Acceptance rate for the complementary demographic: 57%

This analysis revealed no discernible difference in coupon acceptance rates within these parameters.

Further examination focused on comparing coupon acceptance rates across three distinct groups of drivers who:

1. Visited bars more than once a month, were accompanied by adult passengers, and were not widowed,
2. Frequented bars more than once a month and were younger than 30 years old,
3. Dined at inexpensive restaurants more than four times a month and had an annual income below $50K.

The findings indicated the following acceptance rates:

* Group 1 (Frequent Bar Goers, Adult Passengers, Not Widowed): 57%
* Group 2 (Frequent Bar Goers, Under 30): 60%
* Group 3 (Frequent Diners at Inexpensive Restaurants, Income < $50K): 70%

The data suggest that financial considerations play a significant role, with economic constraints correlating with a higher likelihood of coupon usage.

Observation:

Social Habits and Lifestyle Influences: Drivers who frequently visit bars (more than once a month) likely possess a vibrant social life or show a preference for engaging in social activities. This behavior could predispose them towards a higher acceptance of bar-related coupons.

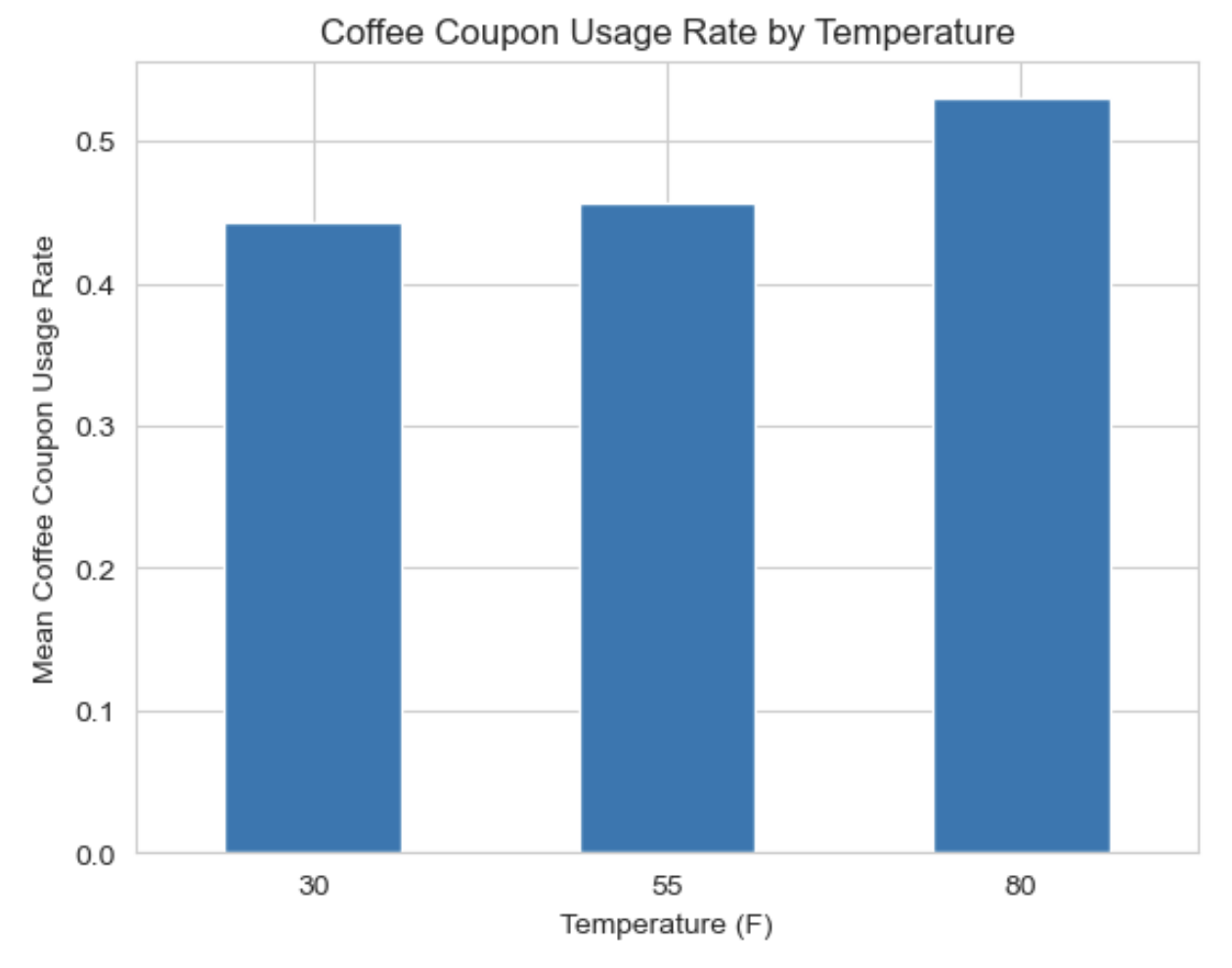
Impact of Age: Younger drivers, particularly those under the age of 30 who often frequent bars, appear more predisposed to utilizing bar coupons. This trend highlights a correlation between age and the likelihood of engaging with bar-centric promotions.

Marital Status Considerations: Individuals who are single or currently without child-care obligations seem to exhibit a greater openness to bar coupons. This suggests that marital status and parental responsibilities may significantly influence responsiveness to certain types of promotional offers.

Income Level and Dining Preferences: For individuals earning less than $50K annually, the appeal of cost-saving opportunities, such as bar coupons, is markedly higher. This indicates that lower disposable income levels may drive interest in discounts and savings on dining and entertainment options.

Widows: Interestingly, widows stand out regarding their interaction with coupons and alcohol consumption more broadly, suggesting unique behavioral patterns within this demographic.

Influence of Weather and Temperature on Coffee Coupon Use: Upon examining the potential impact of weather conditions on the utilization of coffee coupons, the findings contradicted initial hypotheses. Contrary to the assumption that warmer and sunnier weather would reduce coffee coupon use, the data revealed an opposite effect. Both warmer temperatures and sunny conditions were associated with an increase in the redemption of coffee coupons, challenging prior expectations.



A graph of a number of blue bars

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