# Leveraging Power BI to Explore Restaurant Data and Consumer Feedback

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# WHAT IS BUSINESS INTELLIGENCE?

- Business Intelligence, or BI, refers to the collection of technologies, tools, and processes that help organizations analyze and make sense of their data.
- BI helps organizations make data-driven decisions by providing insights into business operations and performance.
- The goal of BI is to transform raw data into valuable information that can be used for analysis and decision-making.
- BI is used in a variety of industries, including finance, healthcare, retail, and manufacturing, to name a few.
- BI tools and techniques include data warehousing, data mining, reporting and analysis, and business performance management.
- Benefits of BI include improved decision-making, increased efficiency, and a competitive advantage in the market.

# Dataset Overview

- This dataset was downloaded from Kaggle, a popular platform for data science competitions and datasets. “Restaurant Data with Consumer Ratings” dataset is a collection of information related to restaurants, including their names, locations, types of cuisine served, price range, and customer ratings. The dataset also includes demographic information about the customers who provided the ratings, such as their occupation, marital status, height, and weight. The ratings themselves range from 0 to 2 stars, with 0 being the lowest rating and 2 being the highest.
- This dataset can be used to analyze customer preferences and behavior in the restaurant industry, such as which types of cuisine are most popular, which restaurants have the highest customer satisfaction ratings, and which factors are most important in influencing customer ratings, such as wait time, food quality, and service quality. The dataset can also be used to identify areas for improvement for restaurants, as well as to provide recommendations for restaurant owners and managers to improve their performance and customer satisfaction.

# OBJECTIVE

The objective of this analysis is to gain insights into customer preferences and behavior in the restaurant industry, as well as identify areas for improvement for restaurants based on consumer feedback.

# REQUIREMENTS

1) What is the overall rating distribution of restaurants in the dataset?
2) What is the average rating for restaurants in each city represented in the dataset?
3) What is the general opinion of the service among social drinkers?
4) Which is the most popular cuisine among students?
5) Which is the most common type of cuisine served by the restaurants?
6) What is the average rating given by customers of different religious groups, and are there any notable differences in satisfaction levels between these groups?

7) How does the availability of different modes of payment (e.g., cash, credit, mobile payments) impact a restaurant's overall rating or consumer satisfaction?
8) Are there differences in the amount of money spent by smokers vs. non-smokers at restaurants?
9) Do customers tend to give higher ratings to restaurants that offer lower-priced food?
10) What is the age distribution of customers who visit restaurants?
11) Are customers more likely to visit restaurants with a certain type of ambience?

# REQUIREMENT 1: What is the overall rating distribution of restaurants in the dataset?

- Using the DAX code below, a new column named "Overall Rating" was added to the "Final Rating" table,

*Overall Rating = ('Final Rating'[rating] + 'Final Rating'[food_rating] + 'Final Rating'[service_rating]) / 3*

- Included an additional column called "Remark on Overall Rating" where the overall ratings of 0 are marked as "Outstanding," 1 as "Satisfactory," and 3 as "Poor.“ using the following DAX function,

*Remark on Overall Rating = IF('Final Rating'[Overall Rating] = 2, "Outstanding", IF('Final Rating'[Overall Rating] = 1, "Satisfactory", IF('Final Rating'[Overall Rating] = 0, "Poor")))*

MID-SEM_PROJECT_RESTAURANT ANALYTICS - Power BI Desktop

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Name: Overall Rating | Data type: Whole number | Format: General | Auto | Summarization: Sum | Data category: Uncategorized

Structure | Formatting | Properties | Sort by column | Data groups | Manage relationships | New column | Sort | Groups | Relationships | Calculations

```
1 Overall Rating = ('Final Rating'[rating] + 'Final Rating'[food_rating] + 'Final Rating'[service_rating]) / 3
```

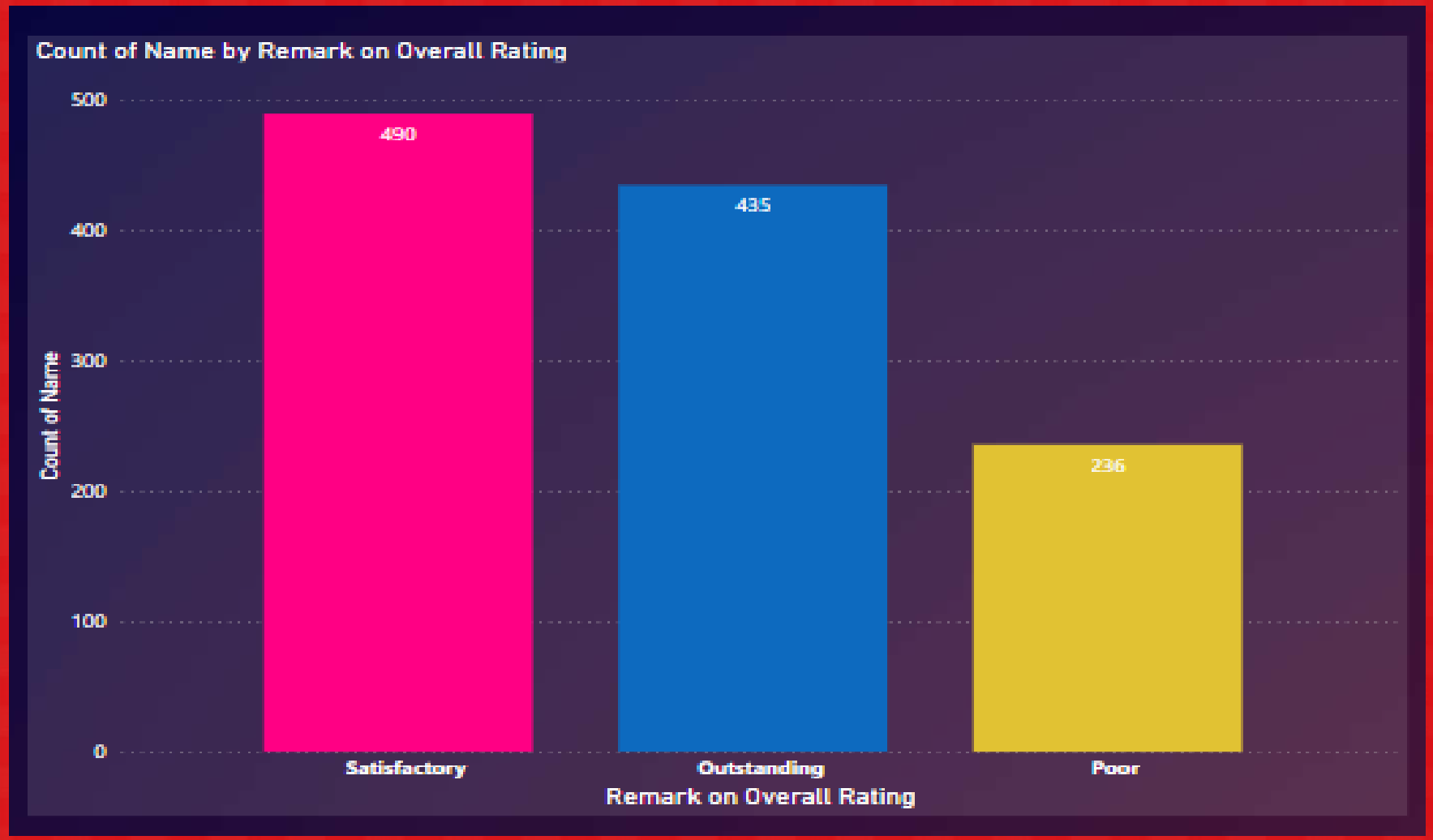
| userID | placeID | rating | food_rating | service_rating | Overall Rating | Name | Remark on Rating | Religion | Drink Level |
|---|---|---|---|---|---|---|---|---|---|
| U1077 | 135085 | 2 | 2 | 2 | 2 | Tortas Locas Hipocampo | Highest | Catholic | social drink |
| U1077 | 132825 | 2 | 2 | 2 | 2 | puesto de tacos | Highest | Catholic | social drink |
| U1067 | 132584 | 2 | 2 | 2 | 2 | Gorditas Dona Tota | Highest | Christian | abstemious |
| U1103 | 132613 | 2 | 2 | 2 | 2 | carnitas_mata | Highest | Jewish | abstemious |
| U1103 | 132733 | 2 | 2 | 2 | 2 | Little Cesarz | Highest | Jewish | abstemious |
| U1107 | 132584 | 2 | 2 | 2 | 2 | Gorditas Dona Tota | Highest | Catholic | abstemious |
| U1107 | 132733 | 2 | 2 | 2 | 2 | Little Cesarz | Highest | Catholic | abstemious |
| U1044 | 135088 | 2 | 2 | 2 | 2 | Cafeteria cenidet | Highest | Catholic | social drink |
| U1060 | 132564 | 2 | 2 | 2 | 2 | churchs | Highest | Catholic | casual drink |
| U1060 | 132717 | 2 | 2 | 2 | 2 | tortas hawai | Highest | Catholic | casual drink |
| U1123 | 135104 | 2 | 2 | 2 | 2 | Vips | Highest | Catholic | abstemious |
| U1026 | 132626 | 2 | 2 | 2 | 2 | la perica hamburguesa | Highest | Catholic | abstemious |
| U1021 | 132668 | 2 | 2 | 2 | 2 | TACOS EL GUERO | Highest | Catholic | social drink |

Data

Search

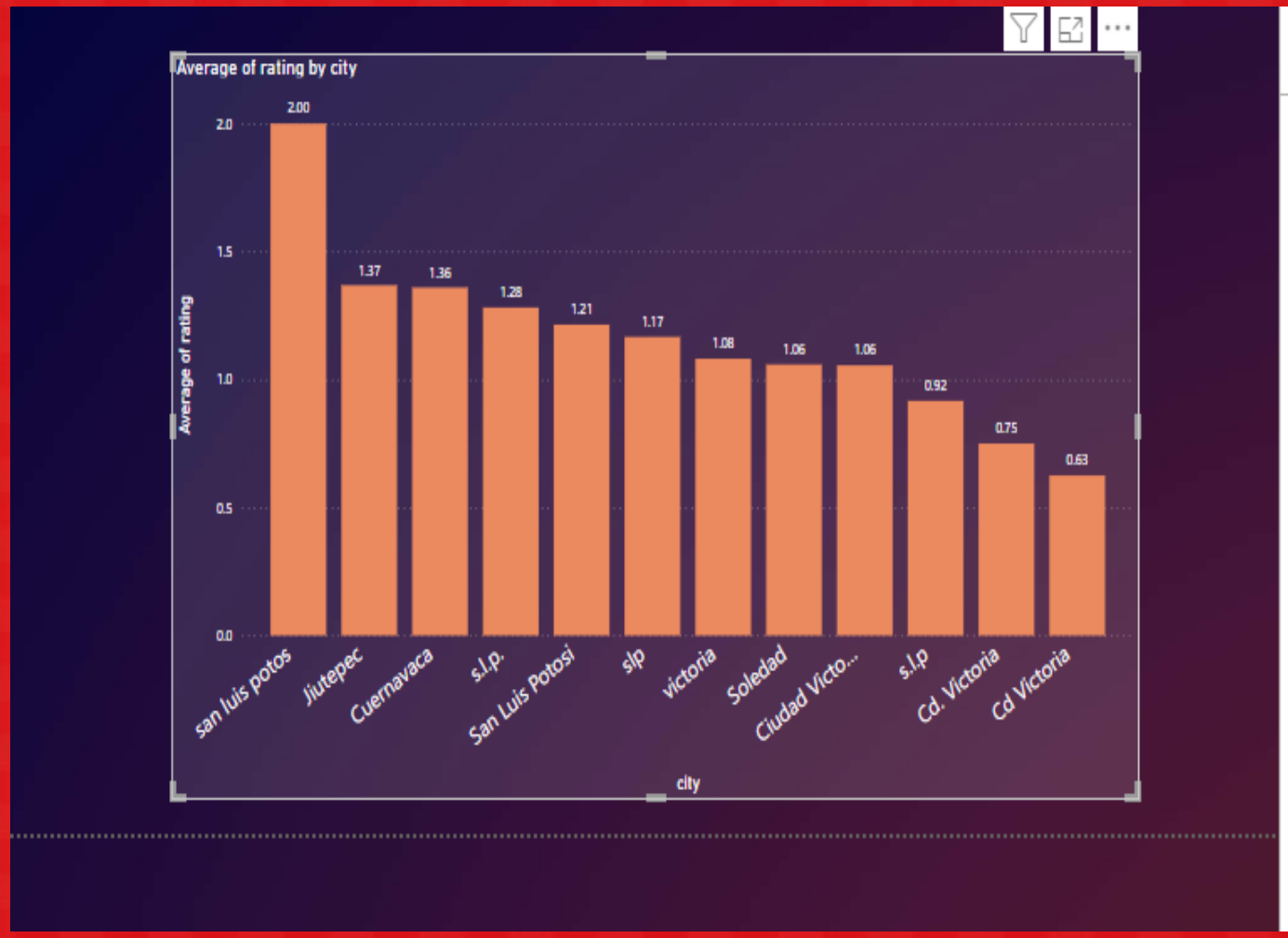
price
Rambience
smoking_area
state
the_geom_meter
url
zip
User Cuisine
User Payment
User Profile
activity

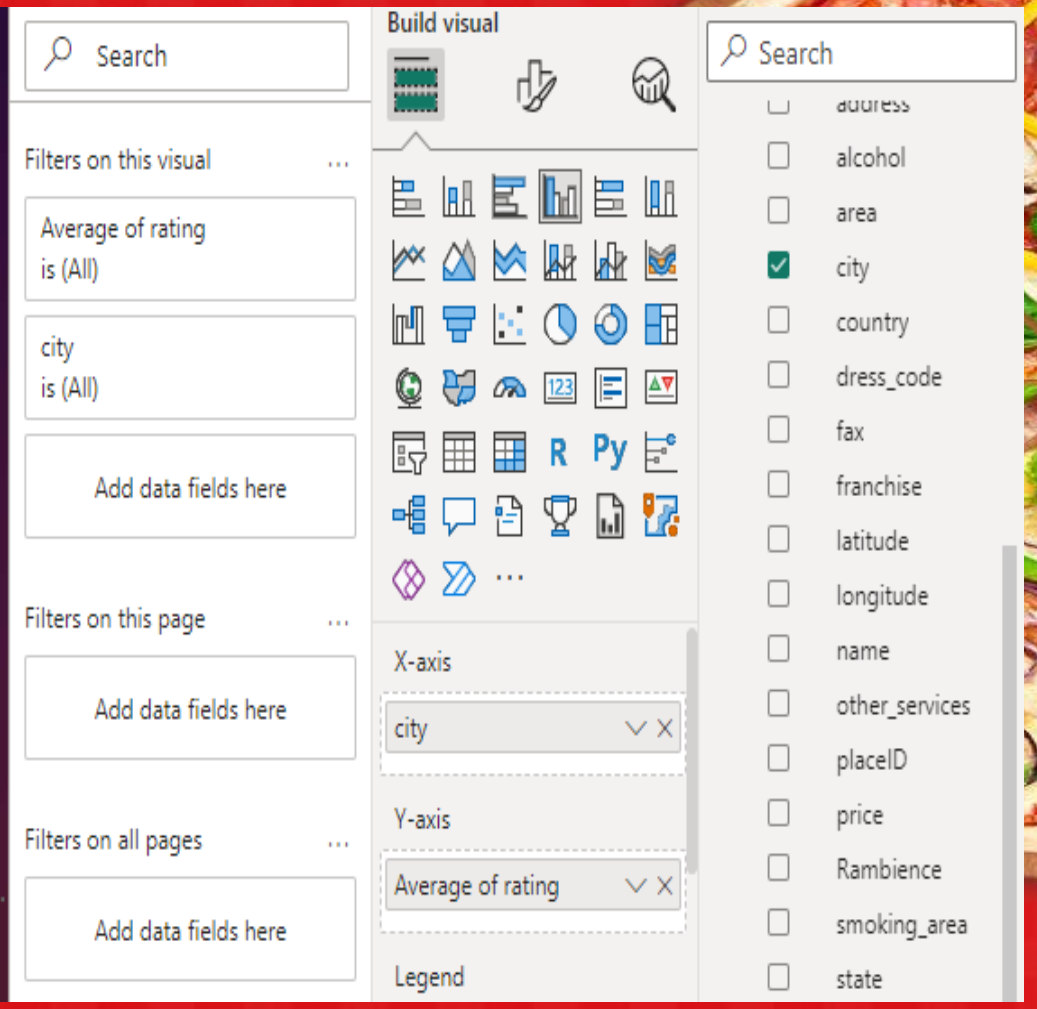
- 490 restaurants obtained "Satisfactory" reviews, 435 received "Outstanding" ratings, and 236 received "Poor" ratings, according to the Stacked Column Chart.



# REQUIREMENT 2: What is the average rating for restaurants in each city represented in the dataset?

- The highest average rating is received by the city “San Luis Potos”.



# REQUIREMENT 3: What is the general opinion of the service among social drinkers?

- Created a new measure in Final Rating table using the following DAX function,

```
Service Rating for Social Drinkers =
CALCULATE(
    AVERAGE('Final Rating'[service_rating]),
    'User Profile'[drink_level] = "Social Drinker"
)
```

- From this, we discovered that the average service rating given by social drinkers is 1.

1

Service Rating for Social Drinkers

# REQUIREMENT 4: Which is the most popular cuisine among students?

- Firstly, I added a new column “Activity” from the “User Profile” table in the “User Cuisine” table using the following DAX function,

*Activity = RELATED('User Profile'[activity])*

```
1 Activity = RELATED('User Profile'[activity])
```

| userID | Rcuisine | Activity |
|---|---|---|
| U1135 | Organic-Healthy | student |
| U1135 | Steaks | student |
| U1135 | Middle_Eastern | student |
| U1135 | Mediterranean | student |
| U1135 | British | student |
| U1135 | Austrian | student |
| U1135 | Israeli | student |
| U1135 | Doughnuts | student |
| U1135 | Pizzeria | student |
| U1135 | Seafood | student |
| U1135 | Fast_Food | student |
| U1135 | Moroccan | student |
| U1135 | Hot_Dogs | student |

Data

Search

- Rambience
- smoking_area
- state
- the_geom_meter
- url
- zip
- User Cuisine
  - Activity
  - Rcuisine
  - userID
- User Payment

- Created a new measure by using the following DAX function,

```
Students Choice = CALCULATE (
    MAXX (
        TOPN (
            1,
            SUMMARIZE (
                FILTER ( 'User Cuisine', 'User Cuisine'[Activity] = "Student" ),
                'User Cuisine'[Rcuisine],
                "Total", COUNTROWS ('User Cuisine')
            ),
            [Total], DESC
        ),
        [Rcuisine]
    )
)
```

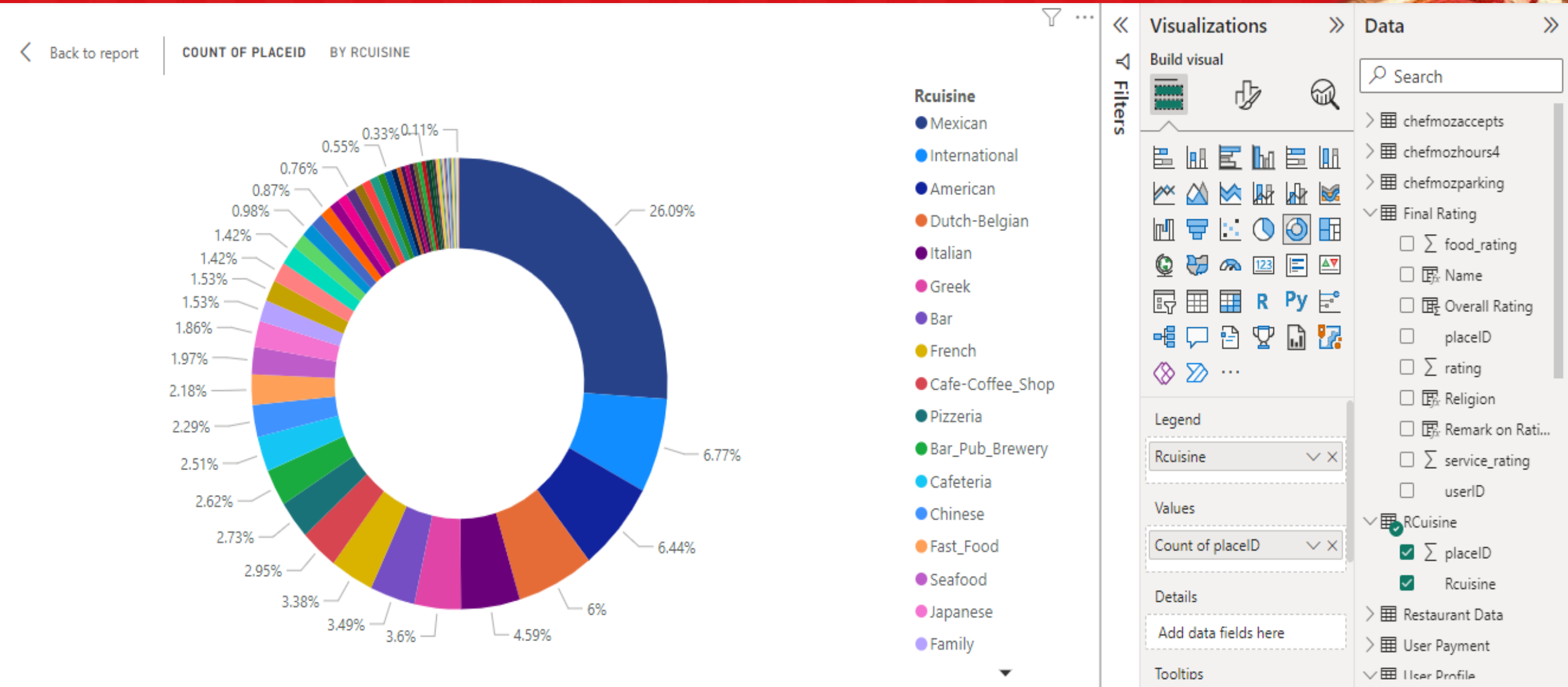
Mexican

Students Choice

- From this, we discovered that Mexican cuisine is the most popular among students.

# REQUIREMENT 5: Which is the most common type of cuisine served by the restaurants?

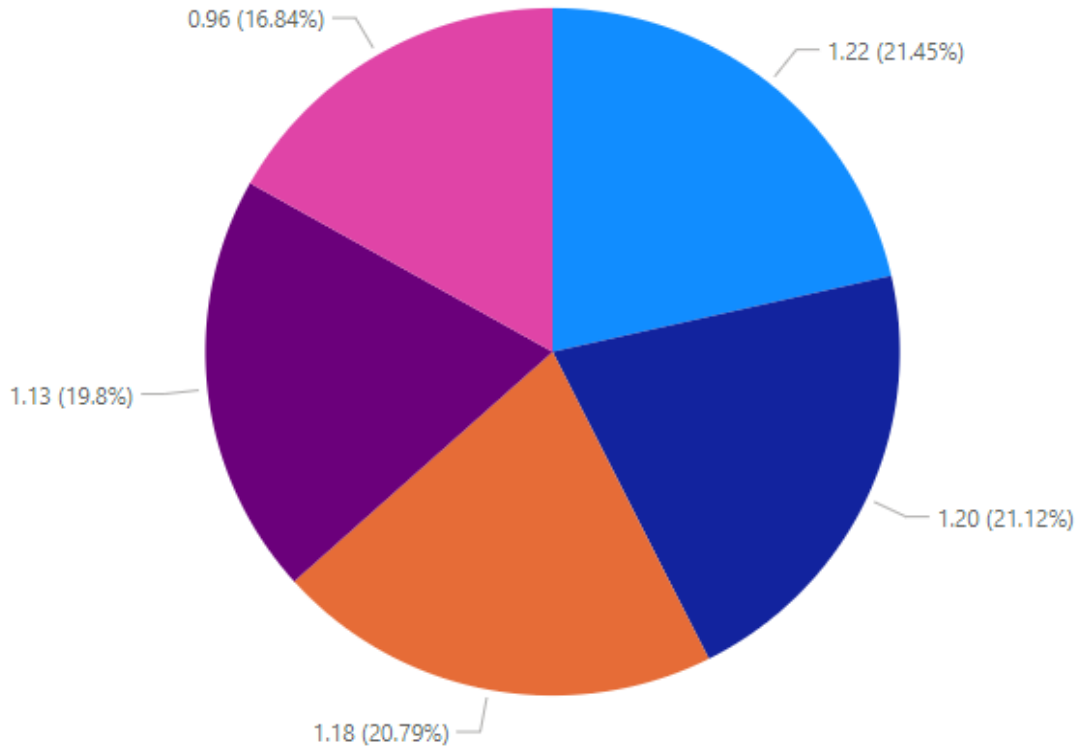
- We can infer from the donut chart that Mexican food is the restaurant's most popular cuisine. Mexican food is offered in about 26% of restaurants in Mexico's various cities.



# REQUIREMENT 6: What is the average rating given by customers of different religious groups, and are there any notable differences in satisfaction levels between these groups?

- The pie chart below allows us to quickly see the average rating provided by customers from various religious groups. We can observe that there are no significant variations in the ratings across different religious groups, such as Catholic, Mormon, Jewish, and Christian, and also those people who don't belong to any group. In other words, they all have an average rating of 1.

Back to report | AVERAGE OF RATING BY RELIGION




Filters

Visualizations

Build visual

Legend
Religion

Values
Average of rating

Details
Add data fields here

Data

Search

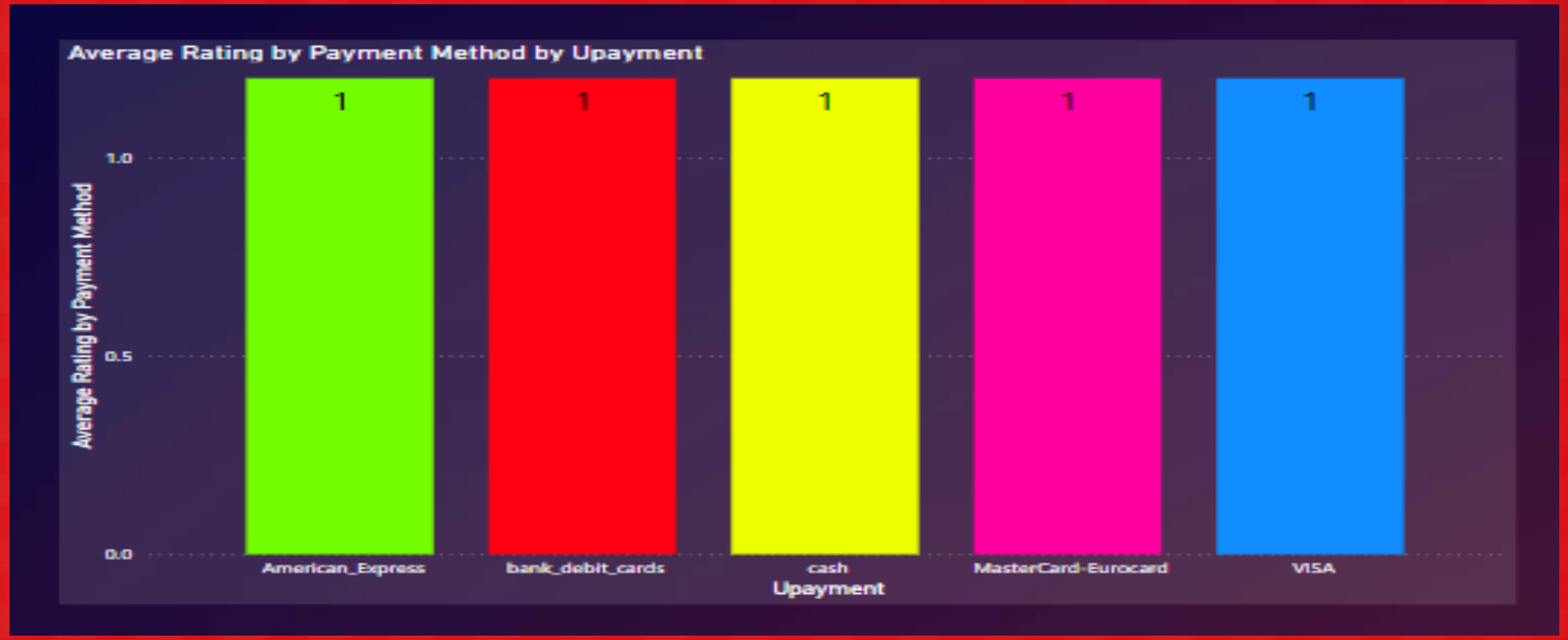
- chefmozaccepts
- chefmozhours4
- chefmozparking
- Final Rating
  - food_rating
  - Name
  - Overall Rating
  - placeID
  - rating
  - Religion
  - Remark on Rati...
  - service_rating
  - userID
- RCuisine
- Restaurant Data
- User Payment
- User Profile
  - activity

# REQUIREMENT 7: How does the availability of different modes of payment (e.g., cash, credit, mobile payments) impact a restaurant's overall rating or consumer satisfaction?

- Create a new measure that calculates the average rating for each mode of payment. Use the following DAX function,

*Average Rating by Payment Method = AVERAGE('Final Rating'[rating])*

- So the customers have given the same rating for all different types of payment modes, it can be inferred that the restaurant has done a good job of providing a consistent and reliable payment experience across different modes, thereby reducing the impact of payment options on the overall rating.



# REQUIREMENT 8: Are there differences in the amount of money spent by smokers vs. non-smokers at restaurants?

- Created a new measure using the following DAX function which extracts all the customers who actually do smoke,

*Smoker Count = CALCULATE(COUNT('User Profile'[smoker]), 'User Profile'[smoker] = "true")*

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Name: Smoker Count
Home table: User Profile
Structure

Format: Whole number
$ % , 0
Formatting

Data category: Uncategorized
Properties

New measure
Quick measure
Calculations

```
1 Smoker Count = CALCULATE(COUNT('User Profile'[smoker]), 'User Profile'[smoker] = "true")
```

| userID | latitude | longitude | smoker | drink_level | dress_preference | ambience | transport | marital_status | hijos | birth_year | interest | personality |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U1002 | 22.150087 | -100.983325 | false | abstemious | informal | family | public | single | independent | 1990 | technology | hunter-os |
| U1003 | 22.119847 | -100.946527 | false | social drinker | formal | family | public | single | independent | 1989 | none | hard-worl |
| U1005 | 22.183477 | -100.959891 | false | abstemious | no preference | family | public | single | independent | 1992 | none | thrifty-pro |
| U1007 | 22.118464 | -100.938256 | false | casual drinker | informal | solitary | public | single | independent | 1989 | variety | thrifty-pro |
| U1008 | 22.122989 | -100.923811 | false | social drinker | formal | solitary | public | single | independent | 1989 | technology | hard-worl |
| U1011 | 23.724972 | -99.152856 | false | abstemious | no preference | family | public | single | independent | 1989 | variety | hard-worl |
| U1012 | 18.813348 | -99.243697 | false | casual drinker | formal | family | public | single | independent | 1988 | technology | hard-worl |
| U1014 | 23.751607 | -99.170108 | false | abstemious | ? | friends | public | single | independent | 1990 | none | hard-worl |
| U1015 | 22.12676 | -100.905209 | true | social drinker | informal | family | public | single | independent | 1989 | technology | thrifty-pro |
| U1016 | 22.156247 | -100.977402 | false | casual drinker | informal | friends | on foot | single | independent | 1991 | eco-friendly | thrifty-pro |
| U1019 | 22.153385 | -100.975294 | false | casual drinker | no preference | family | public | single | independent | 1989 | variety | thrifty-pro |
| U1022 | 22.146708 | -100.964355 | false | casual drinker | formal | family | car owner | single | independent | 1990 | variety | hard-worl |
| U1023 | 23.752943 | -99.166589 | false | casual drinker | informal | friends | car owner | single | independent | 1988 | none | hard-worl |
| U1026 | 23.733 | -99.133 | false | abstemious | formal | family | public | single | independent | 1989 | technology | hunter-os |
| U1027 | 22.16515 | -100.987015 | true | social drinker | no preference | ? | public | single | independent | 1989 | retro | thrifty-pro |
| U1029 | 22.151796 | -100.989075 | true | casual drinker | formal | family | public | single | independent | 1990 | variety | conformis |
| U1030 | 18.844818 | -99.182758 | false | casual drinker | formal | family | on foot | single | independent | 1991 | eco-friendly | hard-worl |
| U1032 | 22.169184 | -100.986843 | false | abstemious | formal | family | public | single | independent | 1989 | variety | hard-worl |
| U1034 | 22.137178 | -101.013169 | false | casual drinker | informal | family | public | single | independent | 1990 | technology | thrifty-pro |
| U1036 | 22.160572 | -100.989418 | false | social drinker | informal | family | public | single | independent | 1991 | none | hard-worl |

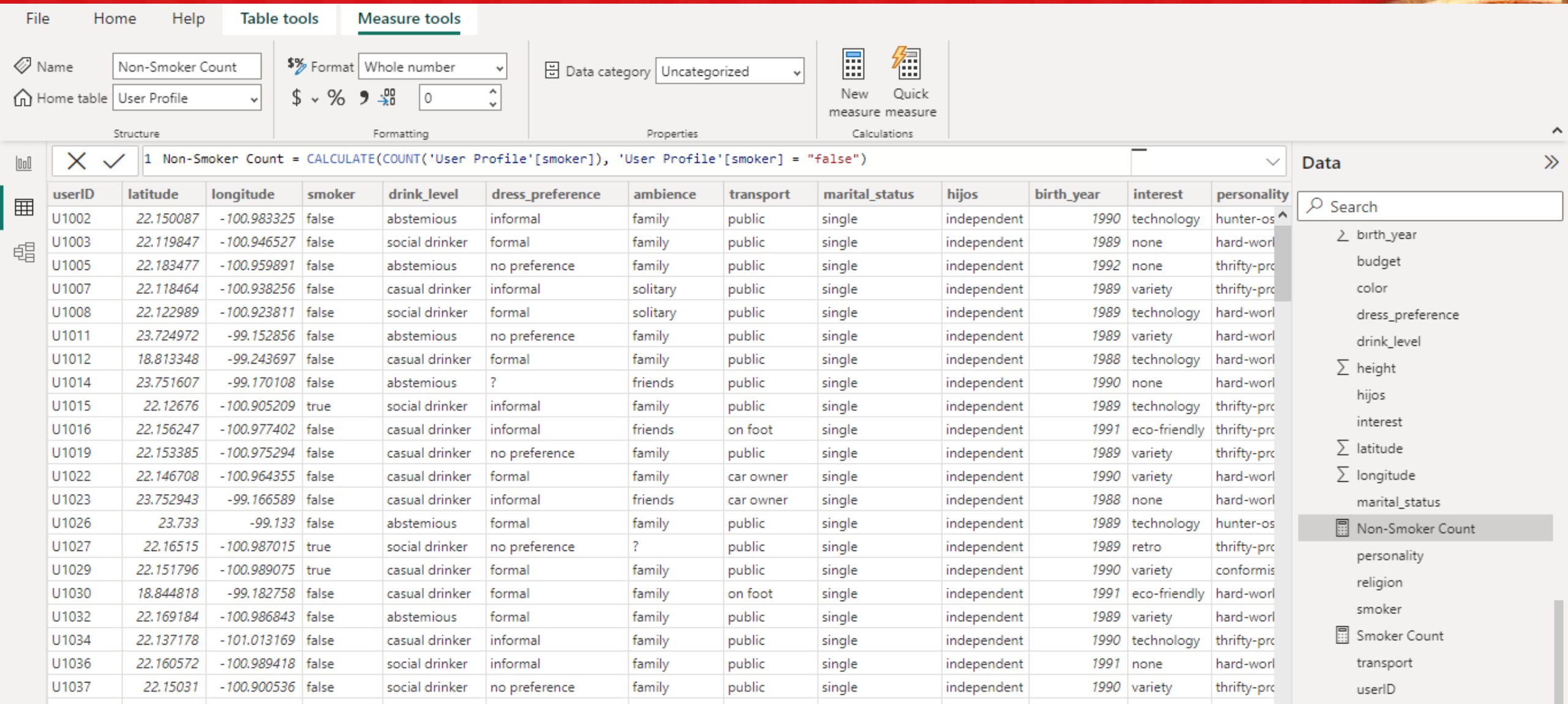
Data

Search

- ambience
- birth_year
- budget
- color
- dress_preference
- drink_level
- height
- hijos
- interest
- latitude
- longitude
- marital_status
- personality
- religion
- smoker
- Smoker Count
- transport

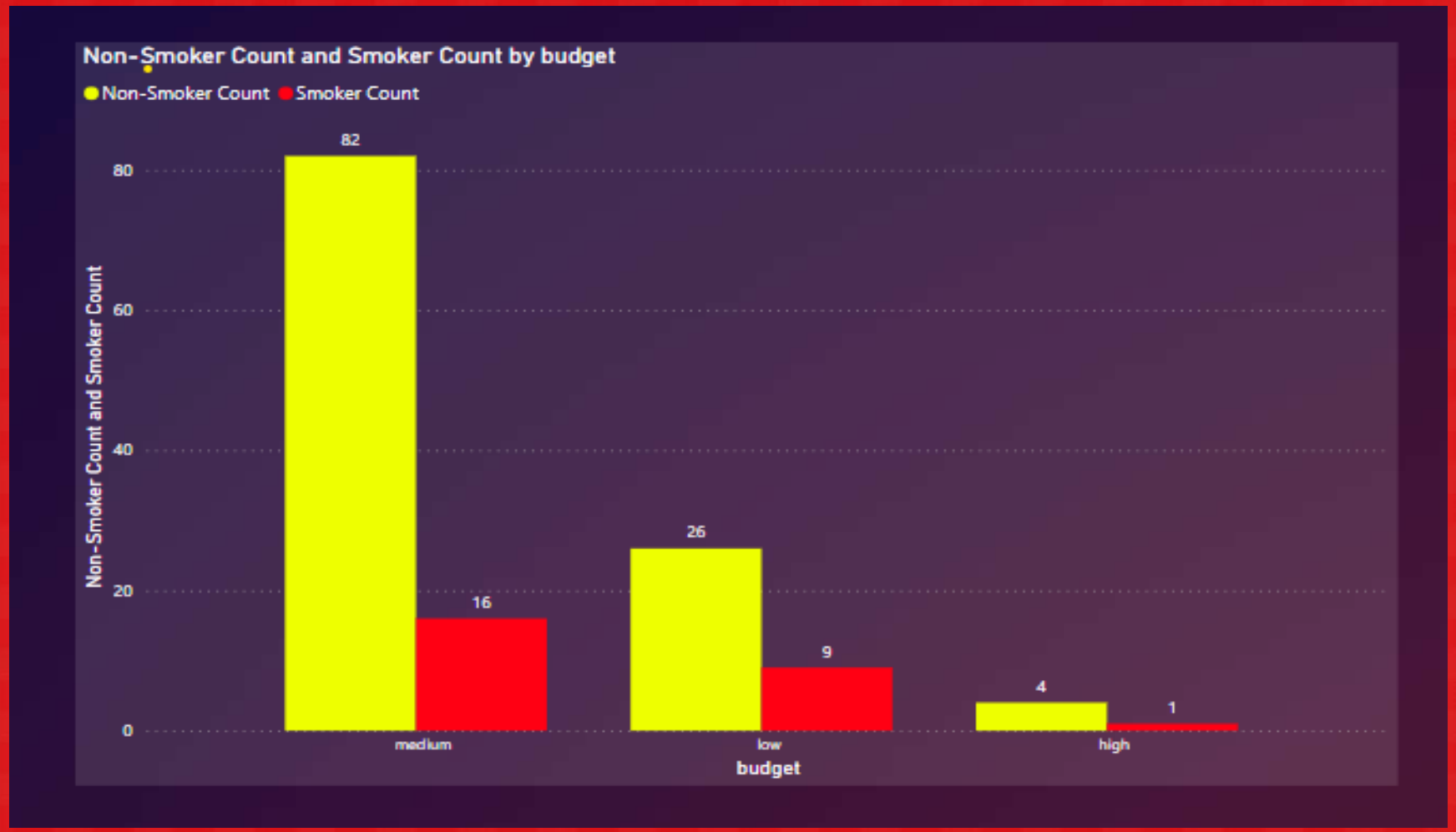
- Created a new measure using the following DAX function which extracts all the customers who don’t smoke,

*Non-Smoker Count = CALCULATE(COUNT('User Profile'[smoker]), 'User Profile'[smoker] = "false")*




| userID | latitude | longitude | smoker | drink_level | dress_preference | ambience | transport | marital_status | hijos | birth_year | interest | personality |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U1002 | 22.150087 | -100.983325 | false | abstemious | informal | family | public | single | independent | 1990 | technology | hunter-os |
| U1003 | 22.119847 | -100.946527 | false | social drinker | formal | family | public | single | independent | 1989 | none | hard-worl |
| U1005 | 22.183477 | -100.959891 | false | abstemious | no preference | family | public | single | independent | 1992 | none | thrifty-pr |
| U1007 | 22.118464 | -100.938256 | false | casual drinker | informal | solitary | public | single | independent | 1989 | variety | thrifty-pr |
| U1008 | 22.122989 | -100.923811 | false | social drinker | formal | solitary | public | single | independent | 1989 | technology | hard-worl |
| U1011 | 23.724972 | -99.152856 | false | abstemious | no preference | family | public | single | independent | 1989 | variety | hard-worl |
| U1012 | 18.813348 | -99.243697 | false | casual drinker | formal | family | public | single | independent | 1988 | technology | hard-worl |
| U1014 | 23.751607 | -99.170108 | false | abstemious | ? | friends | public | single | independent | 1990 | none | hard-worl |
| U1015 | 22.12676 | -100.905209 | true | social drinker | informal | family | public | single | independent | 1989 | technology | thrifty-pr |
| U1016 | 22.156247 | -100.977402 | false | casual drinker | informal | friends | on foot | single | independent | 1991 | eco-friendly | thrifty-pr |
| U1019 | 22.153385 | -100.975294 | false | casual drinker | no preference | family | public | single | independent | 1989 | variety | thrifty-pr |
| U1022 | 22.146708 | -100.964355 | false | casual drinker | formal | family | car owner | single | independent | 1990 | variety | hard-worl |
| U1023 | 23.752943 | -99.166589 | false | casual drinker | informal | friends | car owner | single | independent | 1988 | none | hard-worl |
| U1026 | 23.733 | -99.133 | false | abstemious | formal | family | public | single | independent | 1989 | technology | hunter-os |
| U1027 | 22.16515 | -100.987015 | true | social drinker | no preference | ? | public | single | independent | 1989 | retro | thrifty-pr |
| U1029 | 22.151796 | -100.989075 | true | casual drinker | formal | family | public | single | independent | 1990 | variety | conformis |
| U1030 | 18.844818 | -99.182758 | false | casual drinker | formal | family | on foot | single | independent | 1991 | eco-friendly | hard-worl |
| U1032 | 22.169184 | -100.986843 | false | abstemious | formal | family | public | single | independent | 1989 | variety | hard-worl |
| U1034 | 22.137178 | -101.013169 | false | casual drinker | informal | family | public | single | independent | 1990 | technology | thrifty-pr |
| U1036 | 22.160572 | -100.989418 | false | social drinker | informal | family | public | single | independent | 1991 | none | hard-worl |
| U1037 | 22.15031 | -100.900536 | false | social drinker | no preference | family | public | single | independent | 1990 | variety | thrifty-pr |

- From the data, we can infer that the majority of the customers are non-smokers with a medium budget. Non-smokers with medium budget constitute 59.4% of the total customers. On the other hand, customers who are smokers have a lower presence, with only 9.4% of the total customers being smokers. Out of the smokers, customers with a medium budget are the most frequent.



# REQUIREMENT 9: Do customers tend to give higher ratings to restaurants that offer lower-priced food?

- The conclusion that can be made is that customers are rating restaurants equally in all three price categories, i.e., high, medium, and low. This indicates that price may not be the only crucial factor in determining a customer's rating of a restaurant. Other aspects, such as food quality, service, ambiance, location, and individual preferences, may also affect the customer's perception of the restaurant and their overall satisfaction.

# REQUIREMENT 10: What is the age distribution of customers who visit restaurants?

- First we will calculate the exact age of the customer using “birth_year” column by creating a new column using the following DAX function,

*Age = YEAR(TODAY()) - 'User Profile'[birth_year]*

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Name: Age | Data type: Whole number | Format: Whole number | Summarization: Sum | Data category: Uncategorized

Structure | Formatting | Properties | Sort | Groups | Relationships | Calculations

Sort by column | Data groups | Manage relationships | New column

```
1 Age = YEAR(TODAY()) - 'User Profile'[birth_year]
```

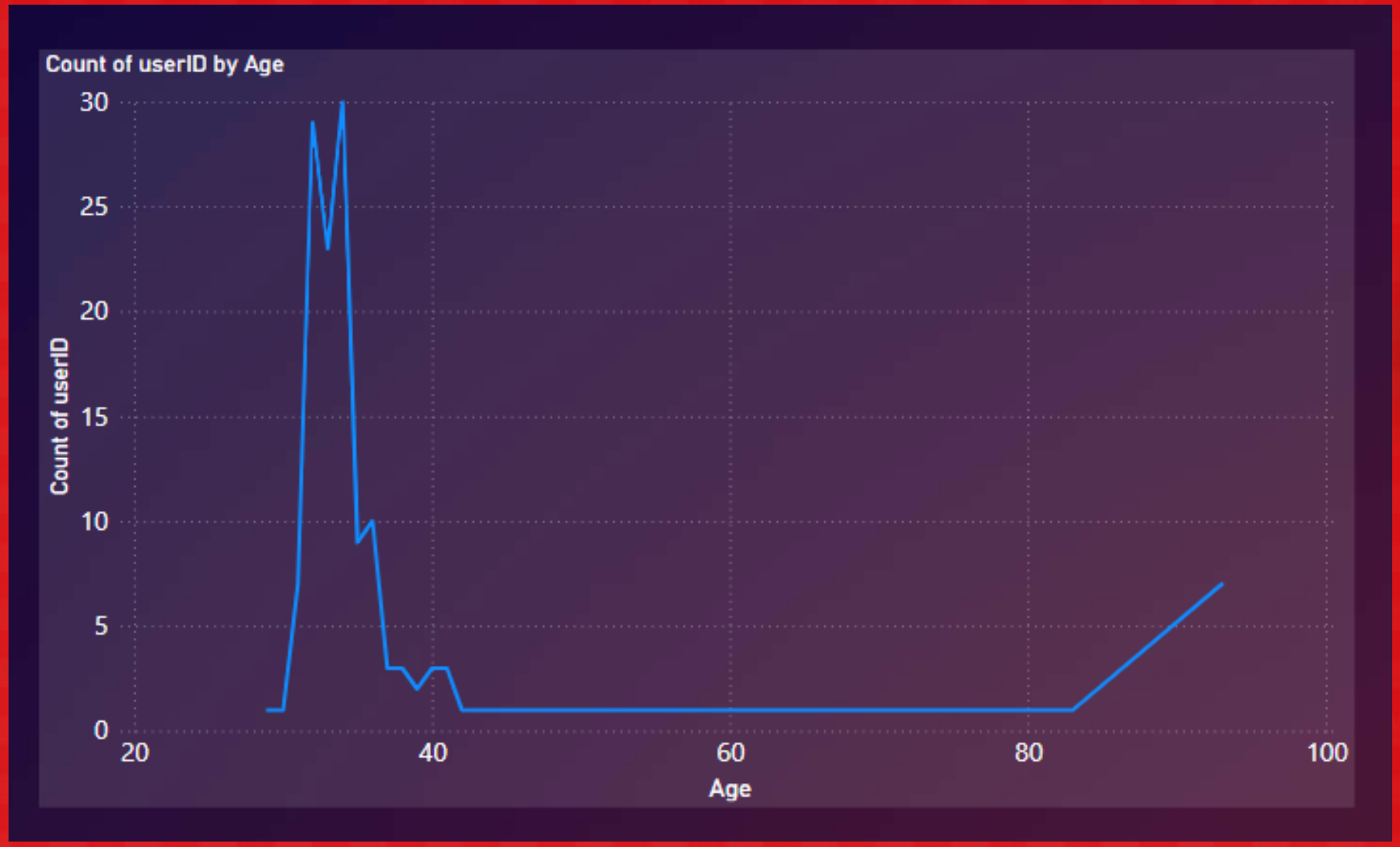
| ambience | transport | marital_status | hijos | birth_year | interest | personality | religion | activity | color | weight | budget | height | Age |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| family | public | single | independent | 1990 | technology | hunter-ostentatious | Catholic | student | red | 40 | low | 1.87 | 33 |
| family | public | single | independent | 1989 | none | hard-worker | Catholic | student | blue | 60 | low | 1.69 | 34 |
| family | public | single | independent | 1992 | none | thrifty-protector | Catholic | student | black | 65 | medium | 1.69 | 31 |
| solitary | public | single | independent | 1989 | variety | thrifty-protector | Catholic | student | purple | 60 | low | 1.59 | 34 |
| solitary | public | single | independent | 1989 | technology | hard-worker | Catholic | student | green | 68 | low | 1.72 | 34 |
| family | public | single | independent | 1989 | variety | hard-worker | Catholic | student | purple | 68 | medium | 1.78 | 34 |
| family | public | single | independent | 1988 | technology | hard-worker | Catholic | student | red | 98 | medium | 1.84 | 35 |
| friends | public | single | independent | 1990 | none | hard-worker | Catholic | student | blue | 53 | medium | 1.69 | 33 |
| family | public | single | independent | 1989 | technology | thrifty-protector | Catholic | student | black | 87 | medium | 1.67 | 34 |
| friends | on foot | single | independent | 1991 | eco-friendly | thrifty-protector | Catholic | student | green | 70 | medium | 1.67 | 32 |
| family | public | single | independent | 1989 | variety | thrifty-protector | Catholic | student | purple | 59 | medium | 1.6 | 34 |
| family | car owner | single | independent | 1990 | variety | hard-worker | Catholic | student | purple | 46 | medium | 1.54 | 33 |
| friends | car owner | single | independent | 1988 | none | hard-worker | Catholic | student | blue | 103 | low | 1.79 | 35 |
| family | public | single | independent | 1989 | technology | hunter-ostentatious | Catholic | student | red | 49 | medium | 1.55 | 34 |
| ? | public | single | independent | 1989 | retro | thrifty-protector | Catholic | student | purple | 60 | low | 1.65 | 34 |
| family | public | single | independent | 1990 | variety | conformist | Catholic | student | white | 58 | low | 1.6 | 33 |
| family | on foot | single | independent | 1991 | eco-friendly | hard-worker | Catholic | student | black | 64 | medium | 1.75 | 32 |
| family | public | single | independent | 1989 | variety | hard-worker | Catholic | student | blue | 40 | medium | 1.75 | 34 |
| family | public | single | independent | 1990 | technology | thrifty-protector | Catholic | student | yellow | 50 | medium | 1.58 | 33 |

Data

Search

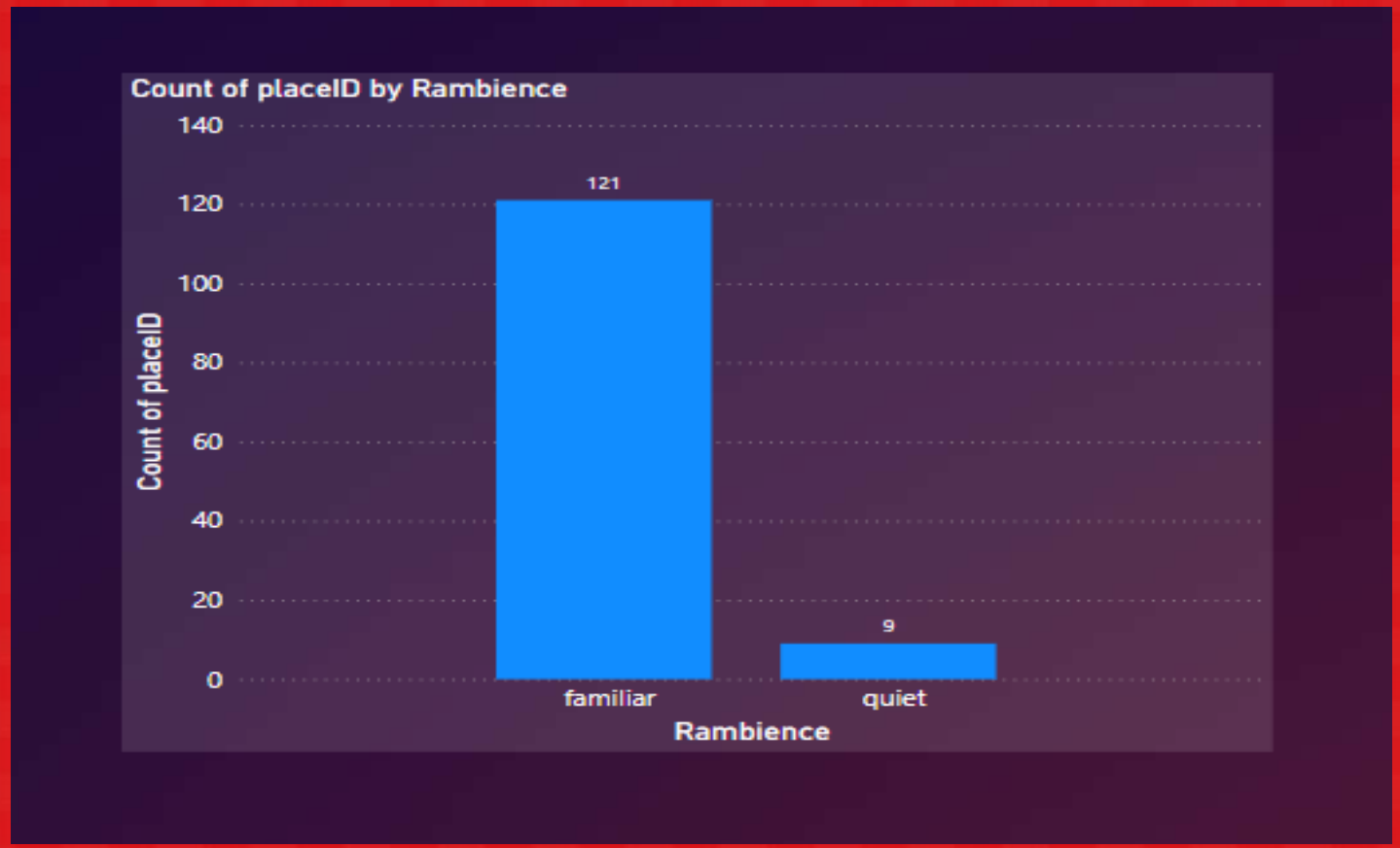
User Cuisine
Activity
Marital Status
Rcuisine
Students Choice
userID
User Payment
Upayment
userID
User Profile
activity
Age
ambience
birth_year
budget
color
dress_preference

- According to the line chart, customers between the ages of 20 and 40 are more likely to visit the restaurant.



# REQUIREMENT 11: Are customers more likely to visit restaurants with a certain type of ambience?

- The inference that can be drawn from this is that among the 130 restaurants, the ambience that is most preferred by the customers is the familiar ambience. It implies that customers tend to prefer restaurants that have a warm and comfortable ambience, which makes them feel at home. It could also mean that customers prefer restaurants that have a traditional and welcoming feel, rather than those that have a modern or upscale ambience.



# DAX FUNCTION USED IN THIS DATA ANALYSIS

- ✓ IF FUNCTION
- ✓ CALCULATE FUNCTION
- ✓ AVERAGE FUNCTION
- ✓ RELATED FUNCTION
- ✓ MAXX FUNCTION
- ✓ TOPN FUNCTION
- ✓ SUMMARIZE FUNCTION
- ✓ FILTER FUNCTION
- ✓ AVERAGE FUNCTION
- ✓ COUNT FUNCTION
- ✓ YEAR FUNCTION
- ✓ TODAY FUNCTION

# KEY INSIGHTS AND RECOMMENDATIONS

- Majority of the restaurants received satisfactory or outstanding ratings, with a relatively small proportion of restaurants receiving poor ratings. This insight would be useful to explore why some restaurants received poor ratings and identify any common themes or issues that need to be addressed.
- The highest average rating is received by the city 'San Luis Potos. This analysis can help identify what makes the restaurants in San Luis Potosi successful and help other cities replicate this success. Additionally, the restaurants in this city can use this information to further improve and differentiate themselves from their competitors.
- As the statement suggests that the average service rating given by social drinkers is medium, it can be inferred that social drinkers are not extremely satisfied with the service provided by the restaurants they visited, but they are also not completely dissatisfied.
- Mexican cuisine is the most popular among students
- Mexican food is the restaurant's most popular cuisine. Mexican food is offered in about 26% of restaurants in Mexico's various cities.
- We can observe that non-smokers tend to have higher budgets compared to smokers.
- Customers between the ages of 20 and 40 are more likely to visit the restaurant.
- The popularity of the familiar ambience could be an important factor for restaurants to consider when trying to attract and retain customers.

# CONCLUSION

Overall, this analysis provides valuable insights into consumer preferences and behavior in the restaurant industry. By identifying key factors that impact customer satisfaction and highlighting areas for improvement, this analysis can help restaurants make data-driven decisions to improve their performance and better meet the needs of their customers.

# REFERENCES

- For downloading the dataset, https://www.kaggle.com/datasets/uciml/restaurant-data-with-consumer-ratings

THANKS FOR
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