project-1

October 17, 2024

0.1 Project 1 - Consumer Sentiment Analysis

0.2 Problem Statement - McDonald's Customer Sentiment Analysis

McDonald's, as a global fast-food chain, continuously receives feedback from customers through reviews, social media comments, and surveys. Customer sentiment analysis involves extracting emotions, opinions, and attitudes expressed in this feedback to understand customer satisfaction, predict behavior, and identify areas for improvement.

In this project, we aim to:

Analyze customer feedback related to McDonald's food, service, and experience to determine whether the sentiment is positive, negative, or neutral.

Use natural language processing (NLP) techniques and machine learning models to classify customer sentiments.

Identify key drivers for satisfaction or dissatisfaction, such as menu items, delivery speed, service quality, or pricing.

```
<img src="https://upload.wikimedia.org/wikipedia/commons/thumb/4/4b/McDonald%27s_logo.svg/2560p
     alt="McDonald's Fast Food Sign" style="max-width: 75%; height: auto;" />
```

[4]:
```
import pandas as pd
import numpy as np
import json
import requests

# Basic setup
# pd.set_option('display.max_rows', None)  # None means no limit
# pd.set_option('display.max_columns', None)  # None means no limit

# Reading the data from csv file
mcReviews = pd.read_csv('McDonald_s_Reviews.csv', encoding_errors="ignore")
mcReviews
```

[4]:

	reviewer_id	store_name	category	\
0	1	McDonald's	Fast food restaurant	
1	1	McDonald's	Fast food restaurant	
2	1	McDonald's	Fast food restaurant	
3	1	McDonald's	Fast food restaurant	

```
4              2  McDonald's  Fast food restaurant
..           …         …                   …
883          881  McDonald's  Fast food restaurant
884          882  McDonald's  Fast food restaurant
885          883  McDonald's  Fast food restaurant
886          884  McDonald's  Fast food restaurant
887          885  McDonald's  Fast food restaurant

                                          store_address  latitude   longitude  \
0    13749 US-183 Hwy, Austin, TX 78750, United States  30.460718 -97.792874
1    13749 US-183 Hwy, Austin, TX 78750, United States  30.460718 -97.792874
2    13749 US-183 Hwy, Austin, TX 78750, United States  30.460718 -97.792874
3    13749 US-183 Hwy, Austin, TX 78750, United States  30.460718 -97.792874
4    13749 US-183 Hwy, Austin, TX 78750, United States  30.460718 -97.792874
..                                                 …         …         …
883  1698 US-209, Brodheadsville, PA 18322, United …  32.778889 -91.919243
884  1698 US-209, Brodheadsville, PA 18322, United …  32.778889 -91.919243
885  1698 US-209, Brodheadsville, PA 18322, United …  32.778889 -91.919243
886  1698 US-209, Brodheadsville, PA 18322, United …  32.778889 -91.919243
887  1698 US-209, Brodheadsville, PA 18322, United …  32.778889 -91.919243

    rating_count   review_time  \
0          1,240  3 months ago
1          1,240  3 months ago
2          1,240  3 months ago
3          1,240  3 months ago
4          1,240    5 days ago
..           …           …
883        1,028   4 years ago
884        1,028    a year ago
885        1,028   4 years ago
886        1,028   2 years ago
887        1,028    a year ago

                                                 review   rating
0    Why does it look like someone spit on my food?…   1 star
1    Why does it look like someone spit on my food?…   1 star
2    Why does it look like someone spit on my food?…   1 star
3    Why does it look like someone spit on my food?…   1 star
4    It'd McDonalds. It is what it is as far as the…  4 stars
..                                                 …      …
883  I like McDonald              s, j…   1 star
884  Slow service inside take out.for breakfast.. w…  3 stars
885  I eat fast food maybe once a month. Have been …   1 star
886  Wind Gap, PA location was surprisingly better …  4 stars
887  I don't believe they were busy when we came in…  3 stars
```

```
[888 rows x 10 columns]
```

Adding city name to the table from `bigdatacloud` api by passing latitude and lingitude from the table

[5]:
```
def getCity(row):
    lat = row[2]
    lng = row[3]
    res = requests.get('https://api.bigdatacloud.net/data/
 ↪reverse-geocode-client?latitude=${lat}&longitude=${lng}')
    return res.json()['city']

mcReviews['city'] = mcReviews.apply(lambda row: getCity(row), axis=1)
mcReviews
```

```
C:\Users\HP\AppData\Local\Temp\ipykernel_2208\1233662463.py:2: FutureWarning:
Series.__getitem__ treating keys as positions is deprecated. In a future
version, integer keys will always be treated as labels (consistent with
DataFrame behavior). To access a value by position, use `ser.iloc[pos]`
  lat = row[2]
C:\Users\HP\AppData\Local\Temp\ipykernel_2208\1233662463.py:3: FutureWarning:
Series.__getitem__ treating keys as positions is deprecated. In a future
version, integer keys will always be treated as labels (consistent with
DataFrame behavior). To access a value by position, use `ser.iloc[pos]`
  lng = row[3]
```

[5]:

	reviewer_id	store_name	category	store_address	latitude	longitude
0	1	McDonald's	Fast food restaurant	13749 US-183 Hwy, Austin, TX 78750, United States	30.460718	-97.792874
1	1	McDonald's	Fast food restaurant	13749 US-183 Hwy, Austin, TX 78750, United States	30.460718	-97.792874
2	1	McDonald's	Fast food restaurant	13749 US-183 Hwy, Austin, TX 78750, United States	30.460718	-97.792874
3	1	McDonald's	Fast food restaurant	13749 US-183 Hwy, Austin, TX 78750, United States	30.460718	-97.792874
4	2	McDonald's	Fast food restaurant	13749 US-183 Hwy, Austin, TX 78750, United States	30.460718	-97.792874
..	…	…	…	…	…	…
883	881	McDonald's	Fast food restaurant	1698 US-209, Brodheadsville, PA 18322, United …	32.778889	-91.919243
884	882	McDonald's	Fast food restaurant	1698 US-209, Brodheadsville, PA 18322, United …	32.778889	-91.919243
885	883	McDonald's	Fast food restaurant			
886	884	McDonald's	Fast food restaurant			
887	885	McDonald's	Fast food restaurant			

```
885  1698 US-209, Brodheadsville, PA 18322, United …  32.778889 -91.919243
886  1698 US-209, Brodheadsville, PA 18322, United …  32.778889 -91.919243
887  1698 US-209, Brodheadsville, PA 18322, United …  32.778889 -91.919243

    rating_count   review_time  \
0          1,240  3 months ago
1          1,240  3 months ago
2          1,240  3 months ago
3          1,240  3 months ago
4          1,240    5 days ago
..           …           …
883        1,028   4 years ago
884        1,028    a year ago
885        1,028   4 years ago
886        1,028   2 years ago
887        1,028    a year ago

                                                 review   rating    city
0    Why does it look like someone spit on my food?…   1 star  Mulshi
1    Why does it look like someone spit on my food?…   1 star  Mulshi
2    Why does it look like someone spit on my food?…   1 star  Mulshi
3    Why does it look like someone spit on my food?…   1 star  Mulshi
4    It'd McDonalds. It is what it is as far as the…  4 stars  Mulshi
..                                                 …       …     …
883  I like McDonald              s, j…   1 star  Mulshi
884  Slow service inside take out.for breakfast.. w…  3 stars  Mulshi
885  I eat fast food maybe once a month. Have been …   1 star  Mulshi
886  Wind Gap, PA location was surprisingly better …  4 stars  Mulshi
887  I don't believe they were busy when we came in…  3 stars  Mulshi

[888 rows x 11 columns]
```

Dropping unnessary columns from the table

[6]:
```
mcReviews = mcReviews.drop(['store_name', 'category', 'latitude', 'longitude'],␣
 ↪axis=1, errors='ignore')
mcReviews
```

[6]:
```
     reviewer_id                                      store_address  \
0              1  13749 US-183 Hwy, Austin, TX 78750, United States
1              1  13749 US-183 Hwy, Austin, TX 78750, United States
2              1  13749 US-183 Hwy, Austin, TX 78750, United States
3              1  13749 US-183 Hwy, Austin, TX 78750, United States
4              2  13749 US-183 Hwy, Austin, TX 78750, United States
..           …                                                   …
883          881  1698 US-209, Brodheadsville, PA 18322, United …
884          882  1698 US-209, Brodheadsville, PA 18322, United …
```

```
885          883  1698 US-209, Brodheadsville, PA 18322, United …
886          884  1698 US-209, Brodheadsville, PA 18322, United …
887          885  1698 US-209, Brodheadsville, PA 18322, United …

     latitude  rating_count   review_time  \
0    30.460718        1,240  3 months ago
1    30.460718        1,240  3 months ago
2    30.460718        1,240  3 months ago
3    30.460718        1,240  3 months ago
4    30.460718        1,240    5 days ago
..         …            …            …
883  32.778889        1,028   4 years ago
884  32.778889        1,028    a year ago
885  32.778889        1,028   4 years ago
886  32.778889        1,028   2 years ago
887  32.778889        1,028    a year ago

                                                 review   rating    city
0    Why does it look like someone spit on my food?…   1 star  Mulshi
1    Why does it look like someone spit on my food?…   1 star  Mulshi
2    Why does it look like someone spit on my food?…   1 star  Mulshi
3    Why does it look like someone spit on my food?…   1 star  Mulshi
4    It'd McDonalds. It is what it is as far as the…  4 stars  Mulshi
..                                                 …       …     …
883  I like McDonald              s, j…   1 star  Mulshi
884  Slow service inside take out.for breakfast.. w…  3 stars  Mulshi
885  I eat fast food maybe once a month. Have been …   1 star  Mulshi
886  Wind Gap, PA location was surprisingly better …  4 stars  Mulshi
887  I don't believe they were busy when we came in…  3 stars  Mulshi

[888 rows x 8 columns]
```

1. Handlling missing values and duplicates

[8]:
```
# 1.1 Missing Values
missingValues = mcReviews.isnull().sum()
missingValues
```

[8]:
```
reviewer_id      0
store_address    0
latitude         0
rating_count     0
review_time      0
review           0
rating           0
city             0
dtype: int64
```

[9]:
```
# 1.2 Drop rows with any missing values
mcReviewsCleaned = mcReviews.dropna()
mcReviewsCleaned
```

[9]:

```
     reviewer_id                                      store_address  \
0              1  13749 US-183 Hwy, Austin, TX 78750, United States
1              1  13749 US-183 Hwy, Austin, TX 78750, United States
2              1  13749 US-183 Hwy, Austin, TX 78750, United States
3              1  13749 US-183 Hwy, Austin, TX 78750, United States
4              2  13749 US-183 Hwy, Austin, TX 78750, United States
..           …                                                   …
883          881  1698 US-209, Brodheadsville, PA 18322, United …
884          882  1698 US-209, Brodheadsville, PA 18322, United …
885          883  1698 US-209, Brodheadsville, PA 18322, United …
886          884  1698 US-209, Brodheadsville, PA 18322, United …
887          885  1698 US-209, Brodheadsville, PA 18322, United …

     latitude  rating_count   review_time  \
0    30.460718        1,240  3 months ago
1    30.460718        1,240  3 months ago
2    30.460718        1,240  3 months ago
3    30.460718        1,240  3 months ago
4    30.460718        1,240    5 days ago
..         …            …           …
883  32.778889        1,028   4 years ago
884  32.778889        1,028    a year ago
885  32.778889        1,028   4 years ago
886  32.778889        1,028   2 years ago
887  32.778889        1,028    a year ago

                                                 review   rating    city
0    Why does it look like someone spit on my food?…   1 star  Mulshi
1    Why does it look like someone spit on my food?…   1 star  Mulshi
2    Why does it look like someone spit on my food?…   1 star  Mulshi
3    Why does it look like someone spit on my food?…   1 star  Mulshi
4    It'd McDonalds. It is what it is as far as the…  4 stars  Mulshi
..                                                 …       …     …
883  I like McDonald              s, j…   1 star  Mulshi
884  Slow service inside take out.for breakfast.. w…  3 stars  Mulshi
885  I eat fast food maybe once a month. Have been …   1 star  Mulshi
886  Wind Gap, PA location was surprisingly better …  4 stars  Mulshi
887  I don't believe they were busy when we came in…  3 stars  Mulshi

[888 rows x 8 columns]
```

Converting feature rating_count to integer

[23]:
```
mcReviews['rating_count'] = mcReviews['rating_count'].apply(lambda x: int(x.
↪replace(',', '')))
mcReviews
```

[23]:

```
     reviewer_id                                      store_address  \
0              1  13749 US-183 Hwy, Austin, TX 78750, United States
4              2  13749 US-183 Hwy, Austin, TX 78750, United States
5              3  13749 US-183 Hwy, Austin, TX 78750, United States
6              4  13749 US-183 Hwy, Austin, TX 78750, United States
7              5  13749 US-183 Hwy, Austin, TX 78750, United States
..           …                                                   …
883          881  1698 US-209, Brodheadsville, PA 18322, United …
884          882  1698 US-209, Brodheadsville, PA 18322, United …
885          883  1698 US-209, Brodheadsville, PA 18322, United …
886          884  1698 US-209, Brodheadsville, PA 18322, United …
887          885  1698 US-209, Brodheadsville, PA 18322, United …

     latitude   rating_count   review_time  \
0    30.460718          1240  3 months ago
4    30.460718          1240    5 days ago
5    30.460718          1240    5 days ago
6    30.460718          1240   a month ago
7    30.460718          1240  2 months ago
..         …           …           …
883  32.778889          1028   4 years ago
884  32.778889          1028    a year ago
885  32.778889          1028   4 years ago
886  32.778889          1028   2 years ago
887  32.778889          1028    a year ago

                                               review  rating    city
0    Why does it look like someone spit on my food?…       1  Mulshi
4    It'd McDonalds. It is what it is as far as the…       4  Mulshi
5    Made a mobile order got to the speaker and che…       1  Mulshi
6    My mc. Crispy chicken sandwich was       …       5  Mulshi
7    I repeat my order 3 times in the drive thru, a…       1  Mulshi
..                                                 …     …     …
883  I like McDonald              s, j…       1  Mulshi
884  Slow service inside take out.for breakfast.. w…       3  Mulshi
885  I eat fast food maybe once a month. Have been …       1  Mulshi
886  Wind Gap, PA location was surprisingly better …       4  Mulshi
887  I don't believe they were busy when we came in…       3  Mulshi

[885 rows x 8 columns]
```

2. Handling duplicates

[20]:
```
# 2.1 Check for duplicate store_address
duplicates = mcReviews['reviewer_id'].duplicated().sum()
duplicates
```

[20]:
```
np.int64(0)
```

[19]:
```
# 2.2 Remove duplicate reviewers from the table
mcReviews.drop_duplicates(subset=['reviewer_id'], inplace=True)
mcReviews
```

[19]:

	reviewer_id	store_address	latitude	rating_count	review_time	review	rating	city
0	1	13749 US-183 Hwy, Austin, TX 78750, United States	30.460718	1240	3 months ago	Why does it look like someone spit on my food?…	1	Mulshi
4	2	13749 US-183 Hwy, Austin, TX 78750, United States	30.460718	1240	5 days ago	It'd McDonalds. It is what it is as far as the…	4	Mulshi
5	3	13749 US-183 Hwy, Austin, TX 78750, United States	30.460718	1240	5 days ago	Made a mobile order got to the speaker and che…	1	Mulshi
6	4	13749 US-183 Hwy, Austin, TX 78750, United States	30.460718	1240	a month ago	My mc. Crispy chicken sandwich was …	5	Mulshi
7	5	13749 US-183 Hwy, Austin, TX 78750, United States	30.460718	1240	2 months ago	I repeat my order 3 times in the drive thru, a…	1	Mulshi
..	…	…	…	…	…	…	…	…
883	881	1698 US-209, Brodheadsville, PA 18322, United …	32.778889	1028	4 years ago	I like McDonald s, j…	1	Mulshi
884	882	1698 US-209, Brodheadsville, PA 18322, United …	32.778889	1028	a year ago	Slow service inside take out.for breakfast.. w…	3	Mulshi
885	883	1698 US-209, Brodheadsville, PA 18322, United …	32.778889	1028	4 years ago	I eat fast food maybe once a month. Have been …	1	Mulshi
886	884	1698 US-209, Brodheadsville, PA 18322, United …	32.778889	1028	2 years ago	Wind Gap, PA location was surprisingly better …	4	Mulshi
887	885	1698 US-209, Brodheadsville, PA 18322, United …	32.778889	1028	a year ago			

```
887  I don't believe they were busy when we came in…       3  Mulshi

[885 rows x 8 columns]
```

3. Handling Categorical Values

[18]:
```
# Alternatively, list only categorical columns
categorical_cols = mcReviews.select_dtypes(include=['object']).columns
print("Categorical columns:", categorical_cols)
```

```
Categorical columns: Index(['store_address', 'review_time', 'review', 'city'],
dtype='object')
```

[17]:
```
# Conveting feature 'rating' into integer
mcReviews['rating'] = mcReviews['rating'].apply(lambda x: int(x.split()[0]))
mcReviews
```

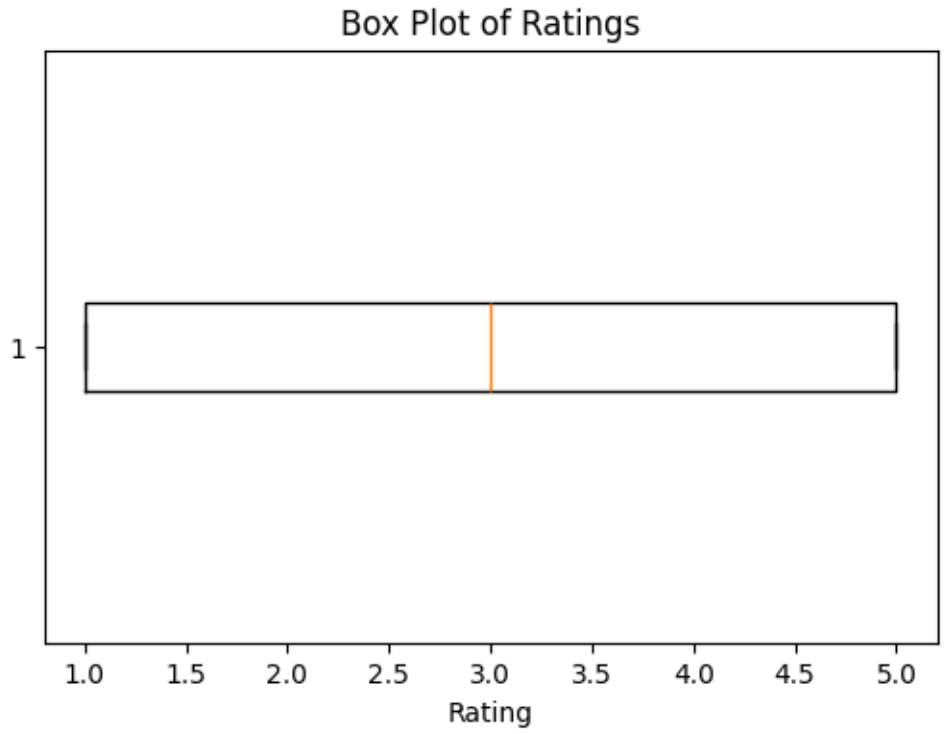
[17]:

```
     reviewer_id                                      store_address  \
0              1  13749 US-183 Hwy, Austin, TX 78750, United States
1              1  13749 US-183 Hwy, Austin, TX 78750, United States
2              1  13749 US-183 Hwy, Austin, TX 78750, United States
3              1  13749 US-183 Hwy, Austin, TX 78750, United States
4              2  13749 US-183 Hwy, Austin, TX 78750, United States
..           …                                                   …
883          881  1698 US-209, Brodheadsville, PA 18322, United …
884          882  1698 US-209, Brodheadsville, PA 18322, United …
885          883  1698 US-209, Brodheadsville, PA 18322, United …
886          884  1698 US-209, Brodheadsville, PA 18322, United …
887          885  1698 US-209, Brodheadsville, PA 18322, United …

     latitude   rating_count   review_time  \
0    30.460718          1240  3 months ago
1    30.460718          1240  3 months ago
2    30.460718          1240  3 months ago
3    30.460718          1240  3 months ago
4    30.460718          1240    5 days ago
..         …             …           …
883  32.778889          1028   4 years ago
884  32.778889          1028    a year ago
885  32.778889          1028   4 years ago
886  32.778889          1028   2 years ago
887  32.778889          1028    a year ago

                                              review  rating    city
0    Why does it look like someone spit on my food?…       1  Mulshi
1    Why does it look like someone spit on my food?…       1  Mulshi
2    Why does it look like someone spit on my food?…       1  Mulshi
```

```
3    Why does it look like someone spit on my food?…       1  Mulshi
4    It'd McDonalds. It is what it is as far as the…       4  Mulshi
..                                                   …     …      …
883  I like McDonald               s, j…       1  Mulshi
884  Slow service inside take out.for breakfast.. w…       3  Mulshi
885  I eat fast food maybe once a month. Have been …       1  Mulshi
886  Wind Gap, PA location was surprisingly better …       4  Mulshi
887  I don't believe they were busy when we came in…       3  Mulshi

[888 rows x 8 columns]
```

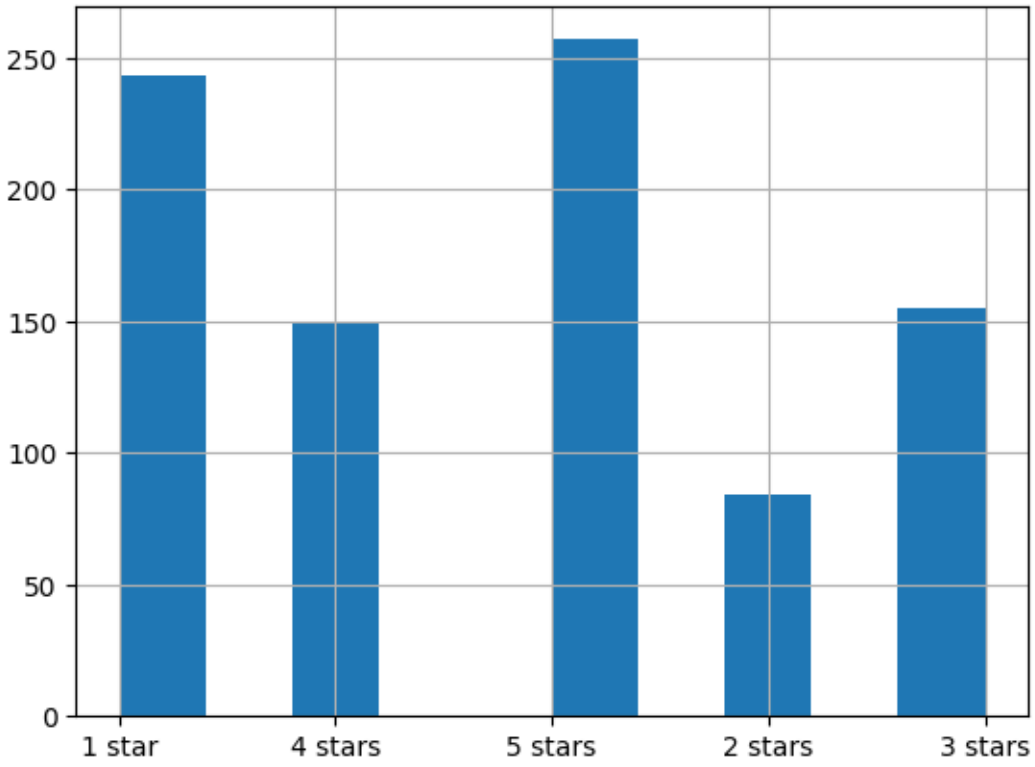
4. Detection of outliers using box plot

[24]:
```
import matplotlib.pyplot as plt

plt.figure(figsize=(6, 4))
plt.boxplot(mcReviews['rating'], vert=False)
plt.title('Box Plot of Ratings')
plt.xlabel('Rating')

plt.show()
```



[15]:
```
# Showing raitngs
mcReviews['rating'].hist(bins=10)
```

[15]: <Axes: >



[26]:
```
# Select the numeric columns
numeric_cols = ['rating']

# Calculate descriptive statistics
stats = {
    'Mean': mcReviews[numeric_cols].mean(),
    'Median': mcReviews[numeric_cols].median(),
    'Mode': mcReviews[numeric_cols].mode().iloc[0],
    'Range': mcReviews[numeric_cols].max() - mcReviews[numeric_cols].min(),
    'IQR': mcReviews[numeric_cols].quantile(0.75) - mcReviews[numeric_cols].
 ↪quantile(0.25),
    'Variance': mcReviews[numeric_cols].var(),
    'Standard Deviation': mcReviews[numeric_cols].std(),
    'Coefficient of Variation': mcReviews[numeric_cols].std() /␣
 ↪mcReviews[numeric_cols].mean(),
    'Mean Absolute Deviation': (mcReviews[numeric_cols] -␣
 ↪mcReviews[numeric_cols].mean()).abs().mean()
```

```
}

# Display the statistics
for stat, value in stats.items():
    print(f"\n{stat}:\n{value}")
```

```
Mean:
rating    3.111864
dtype: float64

Median:
rating    3.0
dtype: float64

Mode:
rating    5
Name: 0, dtype: int64

Range:
rating    4
dtype: int64

IQR:
rating    4.0
dtype: float64

Variance:
rating    2.499916
dtype: float64

Standard Deviation:
rating    1.581112
dtype: float64

Coefficient of Variation:
rating    0.508092
dtype: float64

Mean Absolute Deviation:
rating    1.395668
dtype: float64
```

6. Data Aggreation

[54]:
```
# Getting stats of rating and rating_count
aggregatedStats = mcReviews.agg({
    'rating': ['sum', 'mean', 'min', 'max'],
    'rating_count': ['sum', 'mean', 'min', 'max'],
})

aggregatedStats
```

[54]:

	rating	rating_count
sum	2757.00000	1.083100e+06
mean	3.10473	1.219707e+03
min	1.00000	1.028000e+03
max	5.00000	1.240000e+03

[68]:
```
mcReviews.groupby("city")['rating'].mean()
```

[68]:
```
city
Pune    3.10473
Name: rating, dtype: float64
```

7. Classification-Based-Dataset

7.1. To tokenize the words

[104]:
```
import spacy

# Load the small English model
nlp = spacy.load("en_core_web_sm")

# Function to preprocess text using spaCy
def preprocess_text(text):
    doc = nlp(text)  # Process the text with spaCy
    tokens = [token.text for token in doc]  # Extract tokens
    return tokens

# Apply the function to the 'review' column in the DataFrame
mcReviews['tokens'] = mcReviews['review'].apply(preprocess_text)

# Display the DataFrame with the new 'tokens' column
mcReviews['tokens']
```

[104]:
```
0       [Why, does, it, look, like, someone, spit, on,…
1       [Why, does, it, look, like, someone, spit, on,…
2       [Why, does, it, look, like, someone, spit, on,…
3       [Why, does, it, look, like, someone, spit, on,…
4       [It, 'd, McDonalds, ., It, is, what, it, is, a…
                              …
```

```
883    [I, like, McDonald, , , , , , , , , ,…
884    [Slow, service, inside, take, out.for, breakfa…
885    [I, eat, fast, food, maybe, once, a, month, .,…
886    [Wind, Gap, ,, PA, location, was, surprisingly…
887    [I, do, n't, believe, they, were, busy, when, …
Name: tokens, Length: 888, dtype: object
```

7.2. Infering whether the statement is positive or negative

[106]:
```python
import spacy
from vaderSentiment.vaderSentiment import SentimentIntensityAnalyzer
import pandas as pd

# Load the small English model
nlp = spacy.load("en_core_web_sm")

# Initialize VADER sentiment analyzer
analyzer = SentimentIntensityAnalyzer()

# Function to preprocess text (you can reuse this from earlier)
def preprocess_text(text):
    doc = nlp(text)
    tokens = [token.text for token in doc]
    return " ".join(tokens)

# Function to determine sentiment
def get_sentiment(review):
    # Use VADER to analyze the sentiment
    sentiment_score = analyzer.polarity_scores(review)
    # Determine sentiment based on compound score
    if sentiment_score['compound'] > 0.05:
        return 'Positive'
    elif sentiment_score['compound'] < -0.05:
        return 'Negative'
    else:
        return 'Neutral'

# Apply preprocessing
mcReviews['processed_review'] = mcReviews['review'].apply(preprocess_text)

# Apply the sentiment analysis function
mcReviews['sentiment'] = mcReviews['processed_review'].apply(get_sentiment)

# Display some results
mcReviews[['review', 'processed_review', 'sentiment']]
```

[106]:
```
                                                  review  \
0    Why does it look like someone spit on my food?…
1    Why does it look like someone spit on my food?…
2    Why does it look like someone spit on my food?…
3    Why does it look like someone spit on my food?…
4    It'd McDonalds. It is what it is as far as the…
..                                                   …
883  I like McDonald              s, j…
884  Slow service inside take out.for breakfast.. w…
885  I eat fast food maybe once a month. Have been …
886  Wind Gap, PA location was surprisingly better …
887  I don't believe they were busy when we came in…

                                     processed_review sentiment
0    Why does it look like someone spit on my food …  Positive
1    Why does it look like someone spit on my food …  Positive
2    Why does it look like someone spit on my food …  Positive
3    Why does it look like someone spit on my food …  Positive
4    It 'd McDonalds . It is what it is as far as t…  Positive
..                                                 …       …
883  I like McDonald                          …  Positive
884  Slow service inside take out.for breakfast .. …  Negative
885  I eat fast food maybe once a month . Have been…  Negative
886  Wind Gap , PA location was surprisingly better…  Positive
887  I do n't believe they were busy when we came i…   Neutral

[888 rows x 3 columns]
```

[113]:
```
import seaborn as sns

sentiment_counts = mcReviews['sentiment'].value_counts()

# Set up the plot
plt.figure(figsize=(8, 5))
sns.barplot(x=sentiment_counts.index, y=sentiment_counts.values,␣
 ↪palette='viridis')

# Add labels and title
plt.title('Sentiment Analysis of Reviews')
plt.xlabel('Sentiment')
plt.ylabel('Number of Reviews')
plt.xticks(rotation=45)

# Show the plot
plt.tight_layout()
plt.show()
```

```
C:\Users\HP\AppData\Local\Temp\ipykernel_10000\1550187633.py:7: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in
v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same
effect.

  sns.barplot(x=sentiment_counts.index, y=sentiment_counts.values,
palette='viridis')
```