Rafsanjan restaurants analysis

Objects:

- Reading the restaurant data based in Rafsanjan
- Data understanding
- Data preparation
- Adding new columns as new metrics
- Calculating KPIs
- Analysis and Visualization of the data

In this project, we have gathered a dataset of the restaurants based in Rafsanjan city. The restaurant's information includes the restaurant's name, google rate, number of reviews, location details on Google Maps, and the address of the restaurant.

Import necessary libraries

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

Step1. Reading the Rafsanjan's restaurant dataset.

```
# reading dataset
data = pd.read_excel("/content/restaurants_data.xlsx")

# looking at the 5 top rows of the dataset
data.head()
```

	Restaurant	Rating	Reviews	Location	Address
0	Shabhaye kavir	5.0	2.0	30.401898356081382, 55.98609652041362	62-Taleghani
1	Golha	3.5	18.0	30.39277345603133, 55.998903219864964	13-Taleghani
2	Tahchin	4.0	5.0	30.39193978839676, 56.0115383913069	0-Moghimi
3	Shahrzad	[illegible]	[illegible]	30.404012160146223,	0-Emam

Step2. Understanding data

```
# looking at the shape of the dataset (number of rows & columns)
data.shape
```

```
    (166, 5)
```

As seen, the dataset has 166 rows and 4 columns.

```
# looking at some statistics about the dataset
data.describe()
```

	Rating	Reviews
count	113.000000	113.000000
mean	4.105310	6.150442
std	0.874729	13.817833
min	1.000000	1.000000
25%	3.700000	1.000000
50%	4.000000	2.000000
75%	5.000000	5.000000
max	5.000000	100.000000

As seen;

- we have 113 rows with Rating and Reviews columns being filled.
- The average of the Ratings and Reviews is 4.10, and 6.15, respectively.
- The minimum of Ratings and Reviews is 1, and 1, respectively.
- The maximum of Ratings and Reviews is 5, and 100, respectively.

```
# some information about the values of the dataset
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 166 entries, 0 to 165
Data columns (total 5 columns):
 #   Column      Non-Null Count  Dtype  
---  ------      --------------  -----  
 0   Restaurant  166 non-null    object 
 1   Rating      113 non-null    float64
 2   Reviews     113 non-null    float64
 3   Location    166 non-null    object 
 4   Address     166 non-null    object 
dtypes: float64(2), object(3)
memory usage: 6.6+ KB
```

We can conclude that we have 53 rows in the dataset that have NULL values in the Rating and Reviews columns that must be removed as they will not help us in our analysis.

Step3. Data preparation and cleaning

```
# finding the rows that have NULL values
NaN_data = data[data["Rating"].isnull()]

#  number of the rows having NULL values in Rating column
print(NaN_data.count())

# showing top 5 rows of the NaN_data dataset
NaN_data.head()
```

```
     Restaurant    53
     Rating         0
     Reviews        0
     Location      53
     Address       53
     dtype: int64
             Restaurant  Rating  Reviews                         Location      Address
```

So we have 53 rows with NULL values to be removed as mentioned earlier.

```
                                                      30.39906406317216         0-17
```

```
# dropping rows with NULL values
data.dropna(how="any",subset=["Rating"],axis=0, inplace=True)

# looking at the shape of the dataset after dropping rows
data.shape
```

```
     (113, 5)
```

As seen above, 113 rows have remained after dropping 53 rows.

```
# checking the data types of each column
data.dtypes
```

```
     Restaurant     object
     Rating        float64
     Reviews       float64
     Location       object
     Address        object
     dtype: object
```

```
# converting the data type of the column "Reviews" into int64
data["Reviews"] = data["Reviews"].astype("int64")
data.dtypes
```

```
     Restaurant     object
     Rating        float64
     Reviews         int64
     Location       object
     Address        object
     dtype: object
```

```
# checking for any duplicated records in the dataset
data.duplicated(subset=["Restaurant"]).any()
```

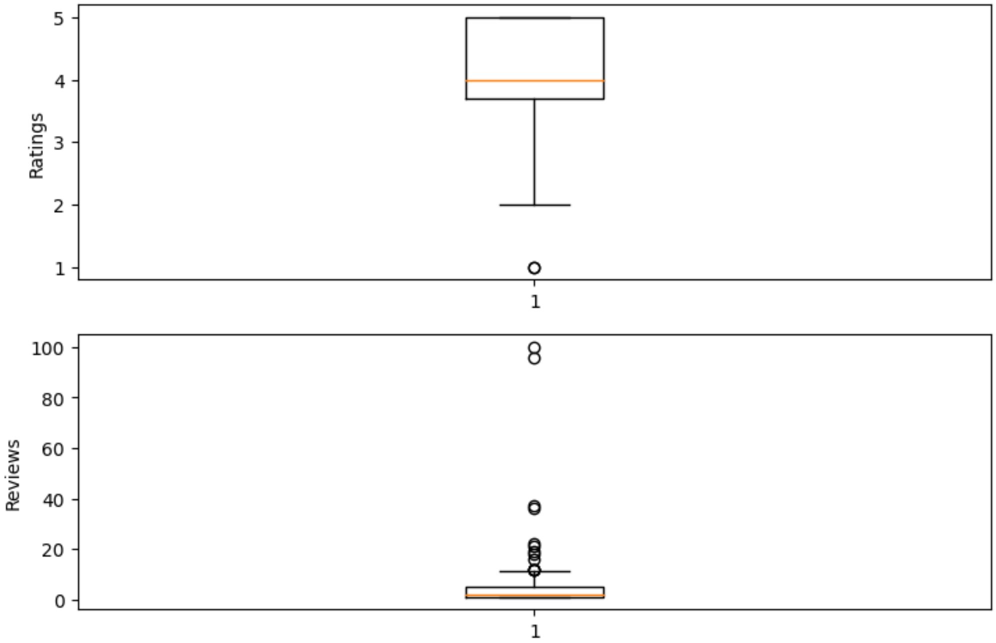
```
     False
```

As seen, there are no duplicated records even with duplicated names.

```
# checking for any outliers
plt.figure(figsize=(9,6))
plt.subplot(2,1,1)
plt.boxplot(data["Rating"])
plt.ylabel("Ratings")

plt.subplot(2,1,2)
plt.boxplot(data["Reviews"])
plt.ylabel("Reviews")

plt.show()
```



As seen above, there are no outliers in the "Rating" and "Reviews" columns.

Step4. Adding new columns as new metrics

A. "Customer satisfaction score"

1. First, we have to define a function to read the Rating column and then return a score based on the value of the Rating, ranging from A to E.
2. Then, we pass the function to the mentioned column in the dataset by the "apply" method in pandas.

```
# defining the fun_CSS() function
def fun_CSS(rating):
  if ( rating >4 and rating <=5):
    return "A"
  elif ( rating >3 and rating <=4 ):
    return "B"
  elif ( rating >2 and rating <=3 ):
    return "C"
  elif ( rating >1 and rating <=2 ):
    return "D"
  elif ( rating >=0 and rating <=1 ):
    return "E"
```

```
# Adding a "Customer satisfaction score" column by "fun_CSS()"

# this line doesnt let to rebuild the score column again if you run this cell any more times
if not("Customer Satisfaction Score" in data.columns) :

  # adding the score column to the dataset by "apply" method
  data["Customer Satisfaction Score"] = data["Rating"].apply(lambda x: fun_CSS(x))

# looking at the top 10 rows of the dataset
data.head(10)
```

	Restaurant	Rating	Reviews	Location	Address	Customer Satisfaction Score
0	Shabhaye kavir	5.0	2	30.401898356081382, 55.98609652041362	62-Taleghani	A
1	Golha	3.5	18	30.39277345603133, 55.998903219864964	13-Taleghani	B
2	Tahchin	4.0	5	30.39193978839676, 56.0115383913069	0-Moghimi	B
3	Shahrzad	4.2	12	30.404012160146223, 55.99727206343508	0-Emam Khomeini	A
4	Karen	4.1	16	30.396242680209244, 55.988202421977675	0-Jomhoriye Eslami	A
5	Tavakol	4.1	100	30.407910161503093, 55.989260992803786	7-Shohada	A
6	Kondez	3.3	3	30.406097884595923, 56.005636569217025	0-Eghtesad	B
7	Konj golestan amin	4.2	9	30.404244729973843, 55.993061783319405	0-Beheshti	A
8	Zarrin mashregh	3.9	21	30.395004826468057,	0-Emam	B

B. "Street"

In this part, we want to add a column to the dataset that holds only the street name of the address. So, we can group the restaurants by their street later in our analysis.

1. First, we have to define the function that splits the address by "-" and returns the street name.
2. Then, we have to apply that function to the "Address" colmn in the dataset.

```
# defining the "get_street()" function
def get_street(address):
  return address.split("-")[1]


# applying the function by "apply" method
if not("Street" in data.columns) :
  data["Street"] = data["Address"].apply (lambda x: get_street(x))
data.head()
```

	Restaurant	Rating	Reviews	Location	Address	Customer Satisfaction Score	Street
0	Shabhaye kavir	5.0	2	30.401898356081382, 55.98609652041362	62-Taleghani	A	Taleghani
1	Golha	3.5	18	30.39277345603133, 55.998903219864964	13-Taleghani	B	Taleghani

Step5. Calculating KPIs

3	Shahrzad	4.2	12	55.99727206343508	Khomeini	A	Khomeini

A. Average Rating

```
# Calculating a KPI named "Average Rating"
average_rating = data['Rating'].mean()
print(f"Rafsanjan average rating is: {average_rating: .2f}")
```

```
Rafsanjan average rating is:  4.11
```

The average rating for Rafsanjan is 4.11.

B. Positive Reviews Percentage

```
# Defining threshold for positive reviews
positive_threshold = 4

# Calculating Percentage of Positive Reviews
positive_reviews_percentage = (data['Rating'] >= positive_threshold).sum() / len(data) * 100
print(f"Percentage of Positive Reviews: {positive_reviews_percentage: .2f}%")
```

```
Percentage of Positive Reviews:  65.49%
```

The Percentage of Positive Reviews for Rafsanjan is 65.49%.

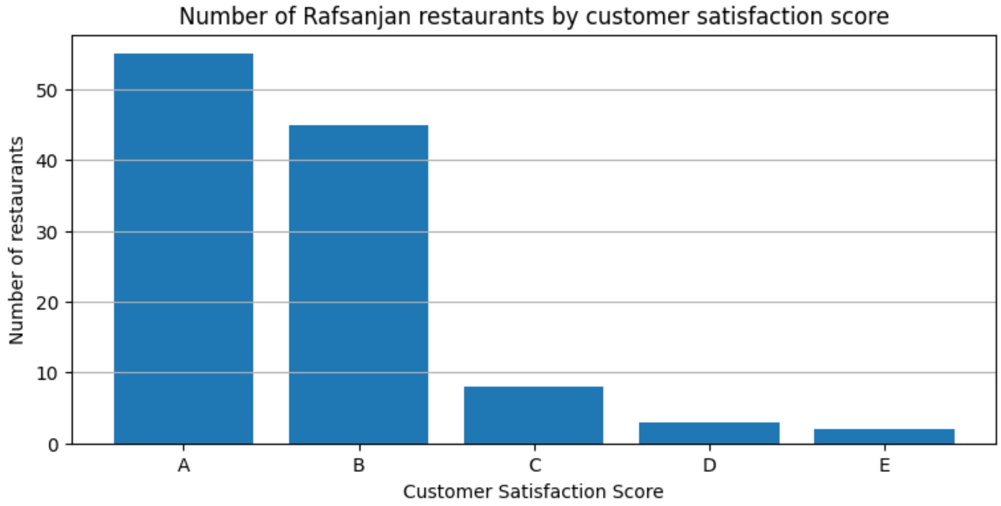
Step6. Analysis and Visualization of the data

A. Rafsanjan restaurants by customer satisfaction score

```
# grouping restaurants by "Customer Satisfaction Score"
results = data.groupby("Customer Satisfaction Score").count()
results
```

	Restaurant	Rating	Reviews	Location	Address	Street
Customer Satisfaction Score						
A	55	55	55	55	55	55
B	45	45	45	45	45	45
C	8	8	8	8	8	8
D	3	3	3	3	3	3
E	2	2	2	2	2	2

```
# plotting the above information
plt.figure(figsize=(9,4))
plt.bar(results.index,results['Restaurant'])
plt.xticks(results.index)
plt.ylabel('Number of restaurants')
plt.xlabel('Customer Satisfaction Score')
plt.title("Number of Rafsanjan restaurants by customer satisfaction score")
plt.grid(axis='y')
plt.show()
```

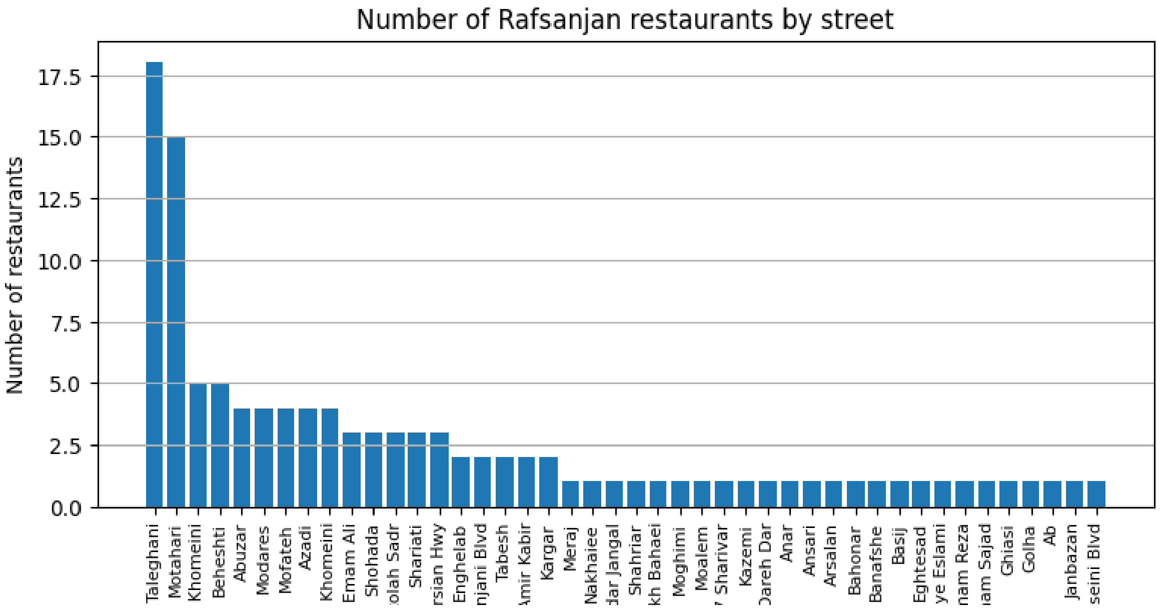


B. Rafsanjan restaurants by street.

```
# grouping restaurants by "Street"
results = data.groupby("Street").count().sort_values("Restaurant",ascending=False)
results.head()
```

	Restaurant	Rating	Reviews	Location	Address	Customer Satisfaction Score
Street						
Taleghani	18	18	18	18	18	18
Motahari	15	15	15	15	15	15
Mostafa Khomeini	5	5	5	5	5	5
Beheshti	5	5	5	5	5	5

```
# plotting the above information
plt.figure(figsize=(9,4))
plt.bar(results.index,results['Restaurant'])
plt.xticks(results.index,rotation='vertical', size=8)
plt.ylabel('Number of restaurants')
plt.xlabel('Street')
plt.title("Number of Rafsanjan restaurants by street")
plt.grid(axis='y')
plt.show()
```



```
# transforming data into an Excel file for further analysis in PowerBI
data.to_excel("./restaurants_data_processed.xlsx")
```