
Level 2

Task 1 : Table Booking and Online Delivery

```
In [ ]: # importing the Libraries

import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import folium

import warnings
warnings.filterwarnings('ignore')
```

```
In [ ]: # reading dataset

retail=pd.read_csv('Dataset .csv')
retail
```

Out[]:

	Restaurant ID	Restaurant Name	Country Code	City	Address	Locality
0	6317637	Le Petit Souffle	162	Makati City	Third Floor, Century City Mall, Kalayaan Avenu...	Century City Mall, Poblacion, Makati City
1	6304287	Izakaya Kikufuji	162	Makati City	Little Tokyo, 2277 Chino Roces Avenue, Legaspi...	Little Tokyo, Legaspi Village, Makati City
2	6300002	Heat - Edsa Shangri-La	162	Mandaluyong City	Edsa Shangri-La, 1 Garden Way, Ortigas, Mandal...	Edsa Shangri-La, Ortigas, Mandaluyong City
3	6318506	Ooma	162	Mandaluyong City	Third Floor, Mega Fashion Hall, SM Megamall, O...	SM Megamall, Ortigas, Mandaluyong City
4	6314302	Sambo Kojin	162	Mandaluyong City	Third Floor, Mega Atrium, SM Megamall, Ortigas...	SM Megamall, Ortigas, Mandaluyong City
...
9546	5915730	Naml Gurme	208	İstanbul	Kemankeş Karamustafa Paşası Mahallesi, Rıhtım ...	Karaköy
9547	5908749	Ceviz Aca	208	İstanbul	Koşuyolu Mahallesi, Muhittin ... Cadd...	Koşuyolu
9548	5915807	Huqqa	208	İstanbul	Kuruçeşme Mahallesi, Muallim Naci Caddesi, N...	Kuruçeşme
9549	5916112	Ak Kahve	208	İstanbul	Kuruçeşme Mahallesi, Muallim Naci Caddesi, N...	Kuruçeşme
9550	5927402	Walter's Coffee Roastery	208	İstanbul	Cafea Mahallesi, Bademaltı Sokak, No 21/B, ...	Moda

9551 rows × 21 columns

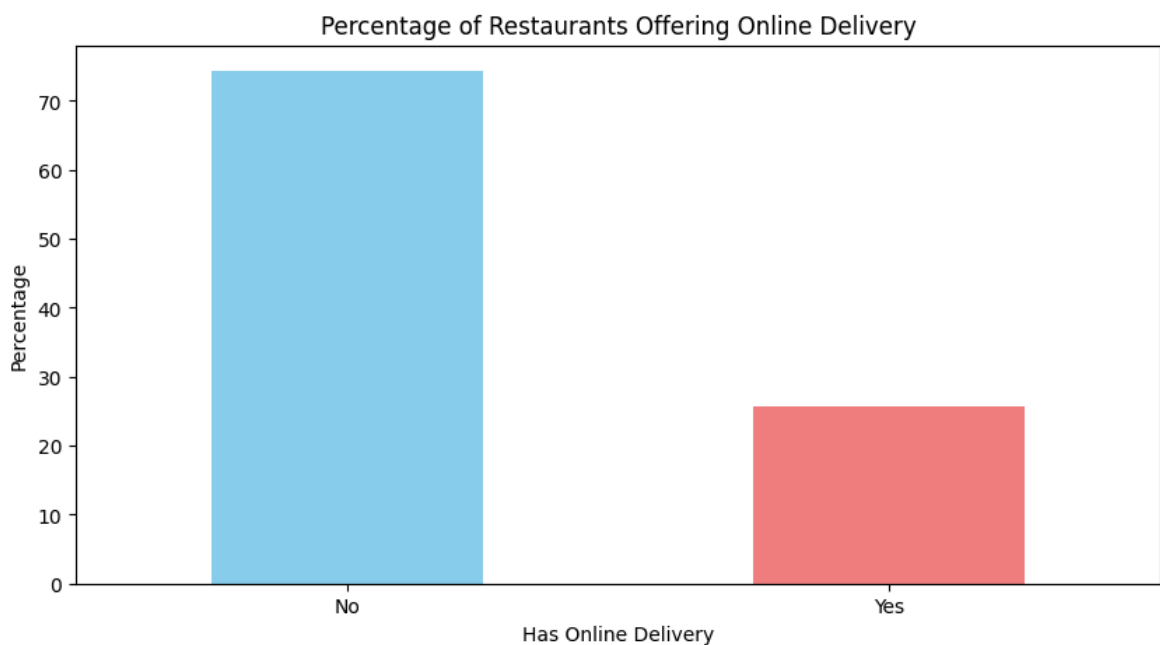
```
In [ ]: # Calculate the percentage of restaurants that offer table booking
table_booking_counts = retail['Has Table booking'].value_counts(normalize=True)
print("Percentage of Restaurants Offering Table Booking:")
print(table_booking_counts)

# Calculate the percentage of restaurants that offer online delivery
online_delivery_counts = retail['Has Online delivery'].value_counts(normalize=True)
print("Percentage of Restaurants Offering Online Delivery:")
print(online_delivery_counts)
```

Percentage of Restaurants Offering Table Booking:
Has Table booking
No 87.875615
Yes 12.124385
Name: proportion, dtype: float64
Percentage of Restaurants Offering Online Delivery:
Has Online delivery
No 74.337766
Yes 25.662234
Name: proportion, dtype: float64

```
In [ ]: # Visualize the results for table booking
plt.figure(figsize=(10, 5))
table_booking_counts.plot(kind='bar', color=['skyblue', 'lightcoral'])
plt.title('Percentage of Restaurants Offering Table Booking')
plt.xlabel('Has Table Booking')
plt.ylabel('Percentage')
plt.xticks(rotation=0)
plt.show()

# Visualize the results for online delivery
plt.figure(figsize=(10, 5))
online_delivery_counts.plot(kind='bar', color=['skyblue', 'lightcoral'])
plt.title('Percentage of Restaurants Offering Online Delivery')
plt.xlabel('Has Online Delivery')
plt.ylabel('Percentage')
plt.xticks(rotation=0)
plt.show()
```



```
In [ ]: # Group by 'Has Table booking' and calculate the mean of 'Aggregate rating'
mean_ratings = retail.groupby('Has Table booking')['Aggregate rating'].mean().re
```

```
In [ ]: # Print the mean ratings for each group
print("Average Ratings Based on Table Booking Availability:")
print(mean_ratings)
```

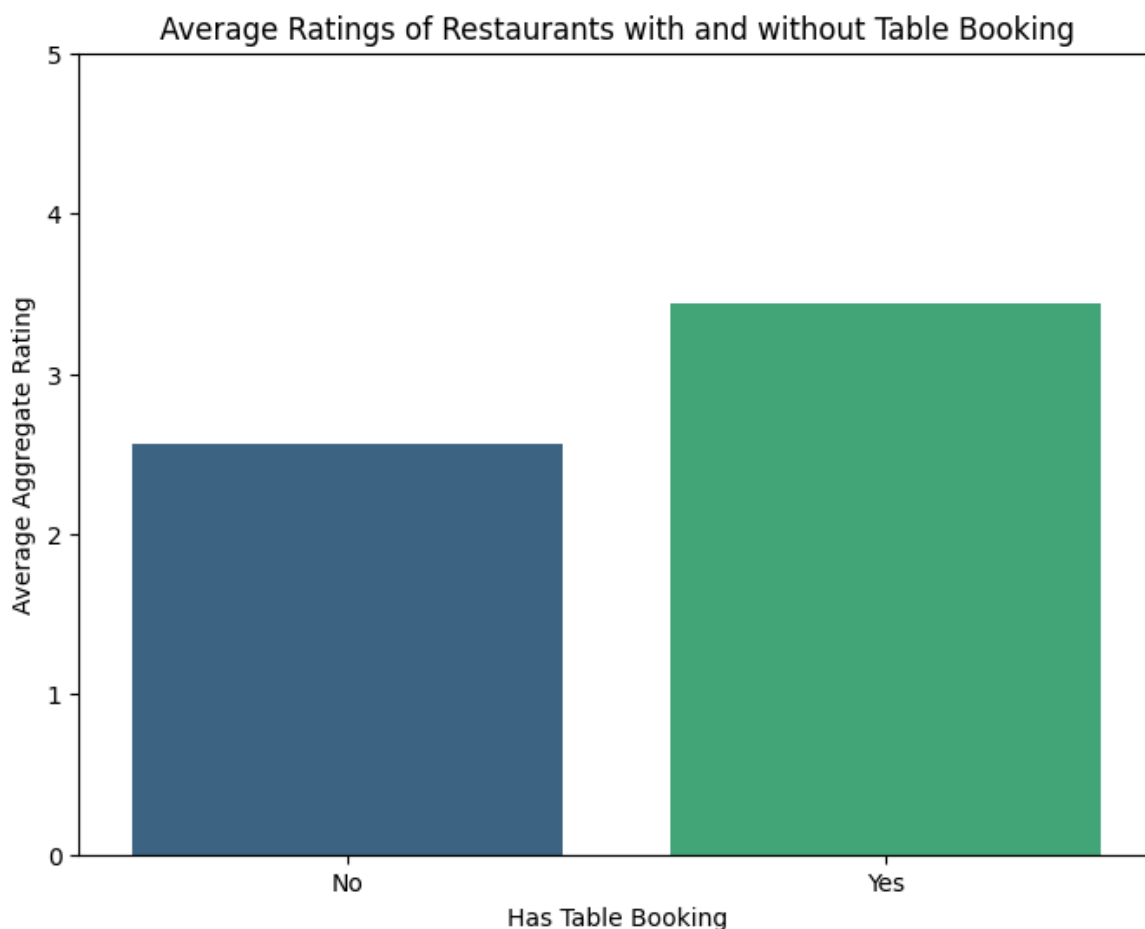
Average Ratings Based on Table Booking Availability:

	Has Table booking	Aggregate rating
0	No	2.559359
1	Yes	3.441969

From the data, it is evident that restaurants offering table booking have a higher average rating (3.442) compared to those that do not offer table booking (2.559). This suggests that restaurants with table booking services tend to receive better ratings from customers.

```
In [ ]: # Visualize the comparison
plt.figure(figsize=(8, 6))
```

```
sns.barplot(x='Has Table booking', y='Aggregate rating', data=mean_ratings, palette='magma')
plt.title('Average Ratings of Restaurants with and without Table Booking')
plt.xlabel('Has Table Booking')
plt.ylabel('Average Aggregate Rating')
plt.ylim(0, 5)
plt.show()
```



```
In [ ]: # Group by 'Price range' and 'Has Online delivery', then calculate the count
online_delivery_by_price_range = retail.groupby(['Price range', 'Has Online delivery']).count()
```

```
In [ ]: # Calculate the percentage of restaurants offering online delivery within each price range
online_delivery_percentage = online_delivery_by_price_range.div(online_delivery_by_price_range.sum('Has Online delivery'), axis=1)

# Print the results
print("Availability of Online Delivery by Price Range:")
print(online_delivery_percentage)
```

Availability of Online Delivery by Price Range:

Has Online delivery	No	Yes
Price range		
1	84.225923	15.774077
2	58.689367	41.310633
3	70.809659	29.190341
4	90.955631	9.044369

```
In [ ]: # Visualize the results
plt.figure(figsize=(10, 6))
online_delivery_percentage.plot(kind='bar', stacked=True, color=['skyblue', 'lightcoral'])
plt.title('Availability of Online Delivery by Price Range')
plt.xlabel('Price Range')
plt.ylabel('Percentage of Restaurants')
```

```
plt.legend(title='Has Online Delivery')
plt.xticks(rotation=0)
plt.show()
```



Task 2 : Price Range Analysis

```
In [ ]: # Count the occurrences of each price range
price_range_counts = retail['Price range'].value_counts()
```

```
In [ ]: # Determine the most common price range
most_common_price_range = price_range_counts.idxmax()
```

```
In [ ]: # Print the most common price range
print("The most common price range among all the restaurants is:", most_common_p
```

The most common price range among all the restaurants is: 1

```
In [ ]: # Group by 'Price range' and calculate the mean of 'Aggregate rating'
average_rating_by_price_range = retail.groupby('Price range')['Aggregate rating'
```

```
In [ ]: # Display the results
print("Average Rating for Each Price Range:")
print(average_rating_by_price_range)
```

Average Rating for Each Price Range:

Price range

1 1.999887

2 2.941054

3 3.683381

4 3.817918

Name: Aggregate rating, dtype: float64

These ratings indicate that as price range increases, so does the average rating, suggesting higher customer satisfaction in more expensive restaurants.

```
In [ ]: # Map average ratings to corresponding rating colors
average_rating_colors = retail.groupby('Price range')['Rating color'].first()

# Identify the color with the highest average rating
highest_rating_color = average_rating_colors[average_rating_by_price_range.idxmax()]

# Print the result
print("Color representing the highest average rating among different price range")
```

Color representing the highest average rating among different price ranges: Green

Task 3 : Feature Engineering

```
In [ ]: # Extracting Length of Restaurant Name and Address
retail['Restaurant Name Length'] = retail['Restaurant Name'].str.len()
retail['Address Length'] = retail['Address'].str.len()
```

```
In [ ]: # Display the updated DataFrame with new features
print(retail[['Restaurant Name', 'Restaurant Name Length', 'Address', 'Address Length']])
```

	Restaurant Name	Restaurant Name Length \		Address	Address Length
0	Le Petit Souffle	16		Third Floor, Century City Mall, Kalayaan Avenu...	71
1	Izakaya Kikufuji	16		Little Tokyo, 2277 Chino Roces Avenue, Legaspi...	67
2	Heat - Edsa Shangri-La	22		Edsa Shangri-La, 1 Garden Way, Ortigas, Mandal...	56
3	Ooma	4		Third Floor, Mega Fashion Hall, SM Megamall, O...	70
4	Sambo Kojin	11		Third Floor, Mega Atrium, SM Megamall, Ortigas...	64

```
In [ ]: # Convert categorical variables to binary features
retail['Has Table Booking Binary'] = (retail['Has Table booking'] == 'Yes').astype(int)
retail['Has Online Delivery Binary'] = (retail['Has Online delivery'] == 'Yes').astype(int)
```

```
In [ ]: # Display the updated DataFrame with new binary features
print(retail[['Has Table booking', 'Has Table Booking Binary', 'Has Online delivery', 'Has Online Delivery Binary']])
```

	Has Table booking	Has Table Booking Binary	Has Online delivery	\
0	Yes	1	No	
1	Yes	1	No	
2	Yes	1	No	
3	No	0	No	
4	Yes	1	No	

	Has Online Delivery Binary
0	0
1	0
2	0
3	0
4	0

```
In [ ]: retail
```


Out[]:

	Restaurant ID	Restaurant Name	Country Code	City	Address	Locality
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In []: