Food-wastage Analysis

importing libraries

In [104…
```
import pandas as pd
#  data cleaning, manipulation, and analysis
```

In [105…
```
import numpy as np
#  numerical computation
import plotly.express as px
# px visualization library
import matplotlib.pyplot as plt
#  basic plotting
import plotly.graph_objects as go
#  go advance and customer graph
import plotly.io as pio
#  pio help to customize  the graph templates
import plotly.colors as colors
#  colors for colors and Pick and use predefined color scales and color sets
pio.templates.default = "plotly_white"
# This line sets the default style (theme) for all your Plotly charts to use the
```

creating the data frame

In [106…
```
data=pd.read_csv("Food_waste-dataset.csv ",encoding='latin-1') # Load the datase
```

In [107…
```
data
```

Out[107…

	Customer_Name	Food_Name	Plate_Size	Serving_Food_Weight_g	Leftover_Food_W
0	Customer_1	Ice Cream	2	400	
1	Customer_2	Soup	2	400	
2	Customer_3	Pizza	1	250	
3	Customer_4	Burger	1	250	
4	Customer_5	Thali	3	550	
...	...	...	...	...	
755	Customer_756	Fried Rice	1	250	
756	Customer_757	Pasta	1	250	
757	Customer_758	Ice Cream	2	400	
758	Customer_759	Thali	3	550	
759	Customer_760	Fried Rice	3	550	

760 rows × 6 columns

Let’s start by looking at the descriptive statistics of the dataset

In [108…

```
data.head() # Display the first few rows of the DataFrame
```

Out[108…

	Customer_Name	Food_Name	Plate_Size	Serving_Food_Weight_g	Leftover_Food_Wei
0	Customer_1	Ice Cream	2	400	
1	Customer_2	Soup	2	400	
2	Customer_3	Pizza	1	250	
3	Customer_4	Burger	1	250	
4	Customer_5	Thali	3	550	

In [109…

```
data.describe()
#  for descriptive statistics
```

Out[109…

	Plate_Size	Serving_Food_Weight_g	Leftover_Food_Weight_g	Price_Rs
count	760.000000	760.000000	760.000000	760.000000
mean	1.857895	378.684211	75.039605	250.386842
std	0.763679	114.551794	50.704225	121.983607
min	1.000000	250.000000	0.200000	90.000000
25%	1.000000	250.000000	35.125000	150.000000
50%	2.000000	400.000000	67.100000	220.000000
75%	2.000000	400.000000	106.150000	317.000000
max	3.000000	550.000000	218.200000	637.000000

In [110…

```
data.info() #  for basic information about the DataFrame
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 760 entries, 0 to 759
Data columns (total 6 columns):
 #   Column                 Non-Null Count  Dtype  
---  ------                 --------------  -----  
 0   Customer_Name          760 non-null    object 
 1   Food_Name              760 non-null    object 
 2   Plate_Size             760 non-null    int64  
 3   Serving_Food_Weight_g  760 non-null    int64  
 4   Leftover_Food_Weight_g  760 non-null    float64
 5   Price_Rs               760 non-null    int64  
dtypes: float64(1), int64(3), object(2)
memory usage: 35.8+ KB
```

In [111…

```
# recall the data
data
```

Out[111…

	Customer_Name	Food_Name	Plate_Size	Serving_Food_Weight_g	Leftover_Food_W
0	Customer_1	Ice Cream	2	400	
1	Customer_2	Soup	2	400	
2	Customer_3	Pizza	1	250	
3	Customer_4	Burger	1	250	
4	Customer_5	Thali	3	550	
...	...	...	...	...	
755	Customer_756	Fried Rice	1	250	
756	Customer_757	Pasta	1	250	
757	Customer_758	Ice Cream	2	400	
758	Customer_759	Thali	3	550	
759	Customer_760	Fried Rice	3	550	

760 rows × 6 columns

In [122…

```
# Pie chart of order counts by food item
fig = px.pie(food_order_counts,
             names='Food_Name',
             values='Order_Count',
             title='Order Distribution by Food Item',
             color_discrete_sequence=px.colors.qualitative.Set3)
fig.update_traces(textposition='inside', textinfo='percent+label')
fig.show()
```

Calculate waste percentage

In [112…

```
data["Waste_Percentage"] = (data["Leftover_Food_Weight_g"] / data["Serving_Food_

# Average waste percentage per food item
avg_waste = data.groupby("Food_Name")["Waste_Percentage"].mean().reset_index().s

# Show top 10 most wasted and bottom 10 least wasted foods
top10_wasted = avg_waste.head(10)
bottom10_wasted = avg_waste.tail(10)

print("Top 10 most wasted foods (by avg waste %):")
print(top10_wasted.to_string(index=False))
print("\nBottom 10 least wasted foods (by avg waste %):")
print(bottom10_wasted.to_string(index=False))

# Visualize top 10 most wasted foods
fig = px.bar(top10_wasted, x="Food_Name", y="Waste_Percentage",
             title="Top 10 Foods by Average Waste Percentage",
             labels={"Waste_Percentage": "Avg Waste (%)", "Food_Name": "Food"})
fig.update_layout(xaxis_tickangle=-45)
fig.show()
```

```
# Optional: distribution of waste percentage by plate size
fig = px.box(data, x="Plate_Size", y="Waste_Percentage",
             title="Waste Percentage Distribution by Plate Size",
             labels={"Plate_Size": "Plate Size", "Waste_Percentage": "Waste (%)"
fig.show()
```

```
Top 10 most wasted foods (by avg waste %):
 Food_Name  Waste_Percentage
  Sandwich         21.119018
   Biryani         20.669675
      Dosa         20.523709
    Burger         20.510603
     Pasta         20.014225
      Soup         19.917869
     Salad         19.770408
     Pizza         19.661927
Fried Rice         19.603930
 Ice Cream         19.420873

Bottom 10 least wasted foods (by avg waste %):
 Food_Name  Waste_Percentage
      Dosa         20.523709
    Burger         20.510603
     Pasta         20.014225
      Soup         19.917869
     Salad         19.770408
     Pizza         19.661927
Fried Rice         19.603930
 Ice Cream         19.420873
   Noodles         18.828202
     Thali         18.628011
```

Food item by oder count

In [113…

```
# Group data by Food_Name and count orders
food_order_counts = data.groupby('Food_Name').size().reset_index(name='Order_Cou
food_order_counts = food_order_counts.sort_values('Order_Count', ascending=False

# Create an interactive bar plot
fig = px.bar(food_order_counts,
             x='Food_Name',
             y='Order_Count',
             title='Food Items by Order Frequency',
             labels={'Food_Name': 'Food Item', 'Order_Count': 'Number of Orders'
             color='Order_Count',
             color_continuous_scale='Viridis')

# Update layout for better readability
fig.update_layout(
    xaxis_tickangle=-45,
    showlegend=False,
    height=500
)

fig.show()
```

Food waste percentage Distribution by Plate size

In [114…

```
fig = px.box(data,
             x="Food_Name",
             y="Waste_Percentage",
             color="Plate_Size",
             title="Food Waste Percentage Distribution by Plate Size",
             labels={
                 "Food_Name": "Food Item",
                 "Waste_Percentage": "Waste Percentage (%)",
                 "Plate_Size": "Plate Size"
             })

fig.update_layout(
    xaxis_tickangle=-45,
    height=600
)

fig.show()
```