

# statistics

February 14, 2024

```
[1]: import pandas as pd
import numpy as np
```

```
[2]: df=pd.read_csv('Restaurant reviews.csv', encoding = "ISO-8859-1")
```

```
[3]: df.head()
```

```
[3]:
```

	Restaurant	Reviewer \
0	Beyond Flavours	Rusha Chakraborty
1	Beyond Flavours	Anusha Tirumalaneedi
2	Beyond Flavours	Ashok Shekhawat
3	Beyond Flavours	Swapnil Sarkar
4	Beyond Flavours	Dileep

		Review Rating \
0	The ambience was good, food was quite good . h...	5
1	Ambience is too good for a pleasant evening. S...	5
2	A must try.. great food great ambience. Thnx f...	5
3	Soumen das and Arun was a great guy. Only beca...	5
4	Food is good.we ordered Kodi drumsticks and ba...	5

	Metadata	Time	Pictures
0	1 Review , 2 Followers	5/25/2019 15:54	0
1	3 Reviews , 2 Followers	5/25/2019 14:20	0
2	2 Reviews , 3 Followers	5/24/2019 22:54	0
3	1 Review , 1 Follower	5/24/2019 22:11	0
4	3 Reviews , 2 Followers	5/24/2019 21:37	0

```
[4]: df.shape
```

```
[4]: (10000, 7)
```

```
[5]: # Get the number of columns
num_columns = len(df.columns)

print("Total columns present in the dataset:", num_columns)
```

Total columns present in the dataset: 7

```
[6]: # Get the column names
column_names = df.columns

print("Column names present in the dataset:")
for col in column_names:
    print(col)
```

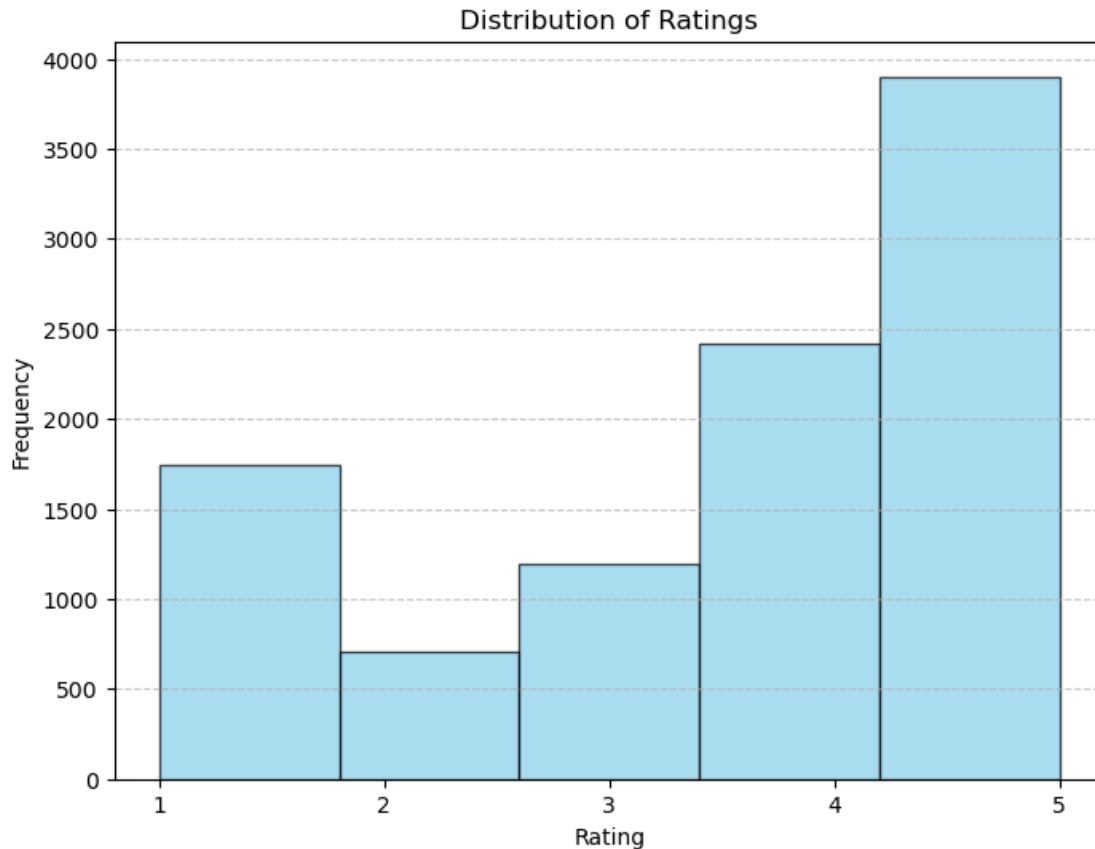
Column names present in the dataset:  
Restaurant  
Reviewer  
Review  
Rating  
Metadata  
Time  
Pictures

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

```
[8]: # Convert 'Rating' column to numeric, coerce errors to NaN
df['Rating'] = pd.to_numeric(df['Rating'], errors='coerce')

# Drop NaN values
df.dropna(subset=['Rating'], inplace=True)

# Plotting the histogram
plt.figure(figsize=(8, 6))
plt.hist(df['Rating'], bins=5, color='skyblue', edgecolor='black', alpha=0.7)
plt.title('Distribution of Ratings')
plt.xlabel('Rating')
plt.ylabel('Frequency')
plt.xticks(range(1, 6)) # Ensure ticks are only on integers from 1 to 5
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.show()
```



```
[9]: import seaborn as sns
```

```
[10]: # Set up the figure
plt.figure(figsize=(10, 12)) # Adjusting figure size for vertical display

# Plotting the count of reviews for each restaurant
plt.subplot(2, 1, 1) # 2 rows, 1 column, subplot 1
sns.countplot(data=df, x='Restaurant', palette='Set2')
plt.title('Count of Reviews for Each Restaurant')
plt.xlabel('Restaurant')
plt.ylabel('Count')
plt.xticks(rotation=45) # Rotate x-axis labels for better readability

# Plotting the count of reviews by each reviewer
plt.subplot(2, 1, 2) # 2 rows, 1 column, subplot 2
sns.countplot(data=df, x='Reviewer', palette='Set1')
plt.title('Count of Reviews by Each Reviewer')
plt.xlabel('Reviewer')
plt.ylabel('Count')
plt.xticks(rotation=45) # Rotate x-axis labels for better readability
```

```
# Adjust layout to prevent overlap
plt.tight_layout()

# Show plots
plt.show()
```

```
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 141 (\x8d) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 130 (\x82) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 135 (\x87) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 156 (\x9c) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 148 (\x94) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 143 (\x8f) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 159 (\x9f) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 129 (\x81) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 145 (\x91) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 128 (\x80) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 153 (\x99) missing from current font.
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C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 140 (\x8c) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 139 (\x8b) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
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Glyph 155 (\x9b) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 151 (\x97) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 146 (\x92) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 133 (\x85) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 149 (\x95) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 152 (\x98) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 142 (\x8e) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 131 (\x83) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 132 (\x84) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 154 (\x9a) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 134 (\x86) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 137 (\x89) missing from current font.
    plt.tight_layout()
C:\Users\iamim\AppData\Local\Temp\ipykernel_18020\3484736635.py:21: UserWarning:
Glyph 150 (\x96) missing from current font.
    plt.tight_layout()
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 141 (\x8d) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 130 (\x82) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 135 (\x87) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:

```

```

UserWarning: Glyph 156 (\x9c) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 148 (\x94) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 143 (\x8f) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 159 (\x9f) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 129 (\x81) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 145 (\x91) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 128 (\x80) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 153 (\x99) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 140 (\x8c) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 139 (\x8b) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 155 (\x9b) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 151 (\x97) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 146 (\x92) missing from current font.
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c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 133 (\x85) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 149 (\x95) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 152 (\x98) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:

```

```
UserWarning: Glyph 142 (\x8e) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
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UserWarning: Glyph 154 (\x9a) missing from current font.
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UserWarning: Glyph 134 (\x86) missing from current font.
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c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152:
UserWarning: Glyph 150 (\x96) missing from current font.
    fig.canvas.print_figure(bytes_io, **kw)
```





```

# Set up the figure
plt.figure(figsize=(14, 8)) # Adjust figure size as needed

# Plotting the count of reviews for each restaurant
plt.subplot(2, 1, 1)
sns.barplot(x=subset_restaurant.index, y=subset_restaurant.values,
            palette='Set2')
plt.title('Count of Reviews for Each Restaurant (Top 10)')
plt.xlabel('Restaurant')
plt.ylabel('Count')
plt.xticks(rotation=45) # Rotate x-axis labels for better readability

# Plotting the count of reviews by each reviewer
plt.subplot(2, 1, 2)
sns.barplot(x=subset_reviewer.index, y=subset_reviewer.values, palette='Set1')
plt.title('Count of Reviews by Each Reviewer (Top 10)')
plt.xlabel('Reviewer')
plt.ylabel('Count')
plt.xticks(rotation=45) # Rotate x-axis labels for better readability

# Adjust layout to prevent overlap
plt.tight_layout()

# Show plots
plt.show()

```

C:\Users\iamim\AppData\Local\Temp\ipykernel\_18020\4044501812.py:25: UserWarning: Glyph 128 (\x80) missing from current font.

```
plt.tight_layout()
```

C:\Users\iamim\AppData\Local\Temp\ipykernel\_18020\4044501812.py:25: UserWarning: Glyph 153 (\x99) missing from current font.

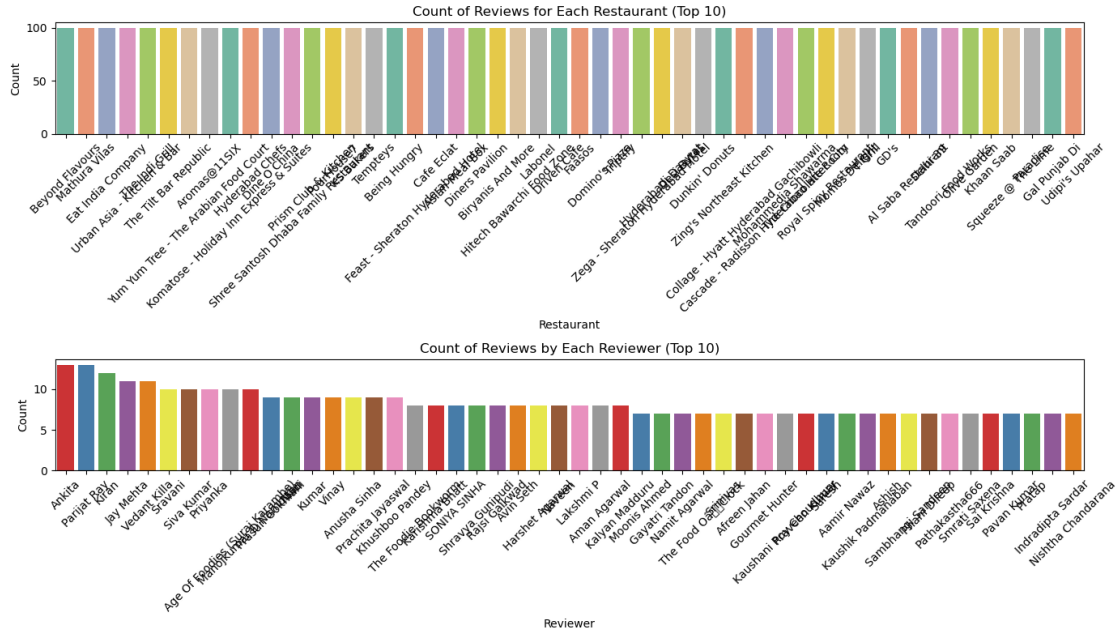
```
plt.tight_layout()
```

c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152: UserWarning: Glyph 128 (\x80) missing from current font.

```
fig.canvas.print_figure(bytes_io, **kw)
```

c:\Users\iamim\anaconda3\Lib\site-packages\IPython\core\pylabtools.py:152: UserWarning: Glyph 153 (\x99) missing from current font.

```
fig.canvas.print_figure(bytes_io, **kw)
```



```
[12]: # Analyze different aspects of Metadata column
metadata_counts = df['Metadata'].value_counts()

# Plotting multiple pie charts for different analyses
plt.figure(figsize=(15, 10)) # Adjust figure size as needed

# First analysis: Distribution of Metadata categories
plt.subplot(2, 2, 1)
metadata_counts.plot(kind='pie', autopct='%1.1f%%', startangle=140)
plt.title('Distribution of Metadata Categories')

# Second analysis: Distribution of Metadata categories (Top 5)
plt.subplot(2, 2, 2)
metadata_counts.head().plot(kind='pie', autopct='%1.1f%%', startangle=140)
plt.title('Distribution of Top 5 Metadata Categories')

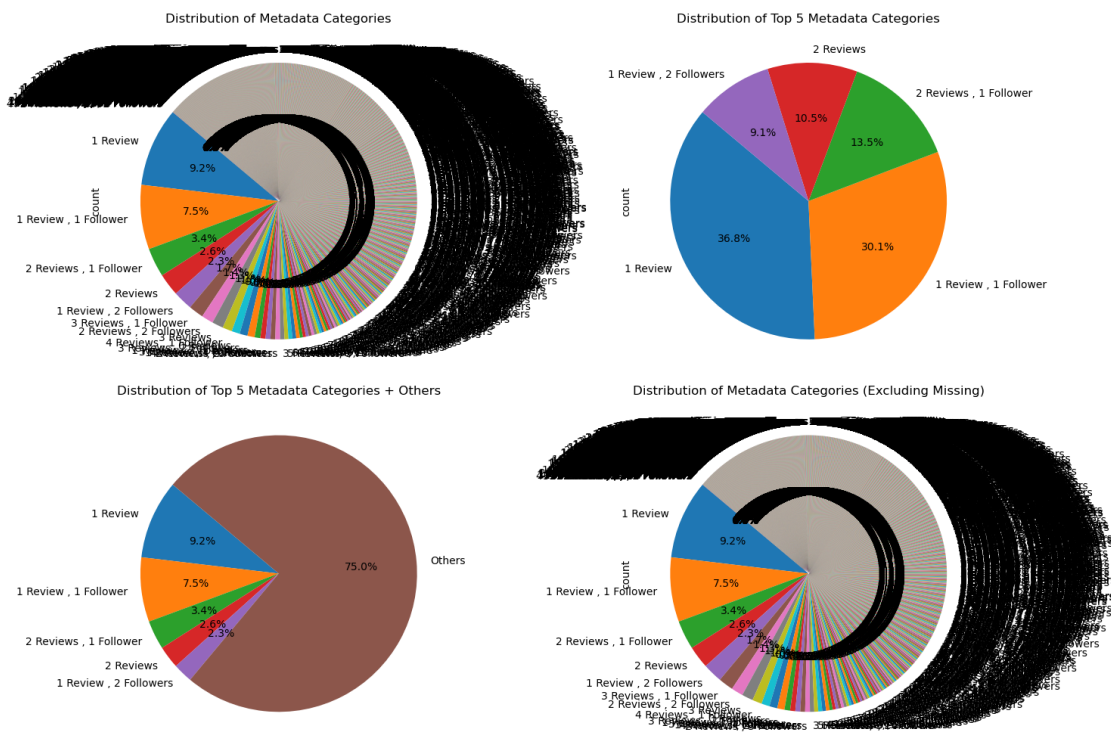
# Third analysis: Distribution of Metadata categories (Others)
plt.subplot(2, 2, 3)
top5_metadata_counts = metadata_counts.head()
other_count = metadata_counts[5:].sum() # Sum of counts beyond top 5
other_data = pd.Series([other_count], index=['Others'])
combined_data = pd.concat([top5_metadata_counts, other_data])
combined_data.plot(kind='pie', autopct='%1.1f%%', startangle=140)
plt.title('Distribution of Top 5 Metadata Categories + Others')

# Fourth analysis: Distribution of Metadata categories excluding missing values
```

```
plt.subplot(2, 2, 4)
metadata_without_missing = df['Metadata'].dropna().value_counts()
metadata_without_missing.plot(kind='pie', autopct='%1.1f%%', startangle=140)
plt.title('Distribution of Metadata Categories (Excluding Missing)')

# Adjust layout to prevent overlap
plt.tight_layout()

# Show plots
plt.show()
```



### improved version of the above plots

```
[13]: # Analyze different aspects of Metadata column
metadata_counts = df['Metadata'].value_counts()

# Set the number of top categories to display
top_n = 10

# Filter out missing values for the fourth analysis
metadata_without_missing = df['Metadata'].dropna()

# Get top N most frequent categories
```

```

top_metadata_counts = metadata_counts.head(top_n)

# Plotting multiple pie charts for different analyses
plt.figure(figsize=(15, 10)) # Adjust figure size as needed

# First analysis: Distribution of top N Metadata categories
plt.subplot(2, 2, 1)
top_metadata_counts.plot(kind='pie', autopct='%1.1f%%', startangle=140)
plt.title(f'Distribution of Top {top_n} Metadata Categories')

# Second analysis: Distribution of Metadata categories (Top 5)
plt.subplot(2, 2, 2)
metadata_counts.head().plot(kind='pie', autopct='%1.1f%%', startangle=140)
plt.title('Distribution of Top 5 Metadata Categories')

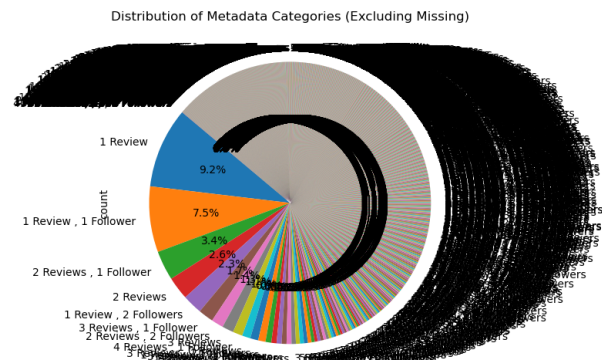
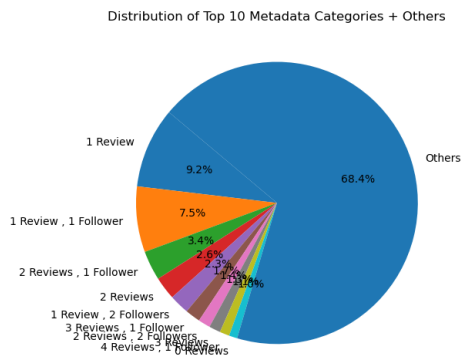
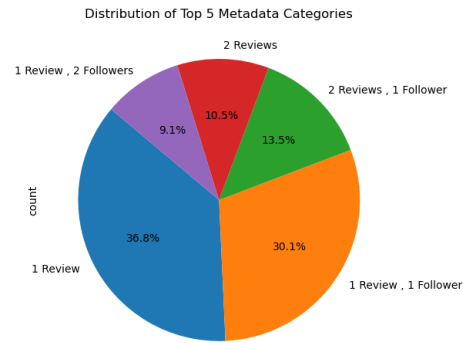
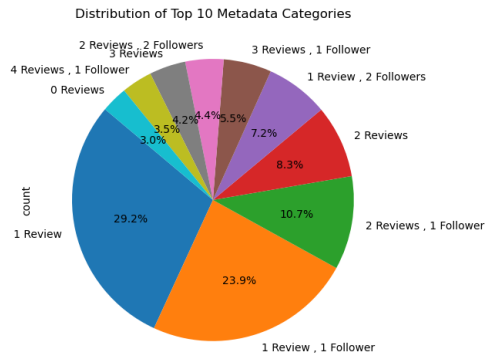
# Third analysis: Distribution of Metadata categories (Others)
plt.subplot(2, 2, 3)
other_count = metadata_counts[top_n:].sum() # Sum of counts beyond top N
other_data = pd.Series([other_count], index=['Others'])
combined_data = pd.concat([top_metadata_counts, other_data])
combined_data.plot(kind='pie', autopct='%1.1f%%', startangle=140)
plt.title(f'Distribution of Top {top_n} Metadata Categories + Others')

# Fourth analysis: Distribution of Metadata categories excluding missing values
plt.subplot(2, 2, 4)
metadata_without_missing.value_counts().plot(kind='pie', autopct='%1.1f%%',
↵startangle=140)
plt.title('Distribution of Metadata Categories (Excluding Missing)')

# Adjust layout to prevent overlap
plt.tight_layout()

# Show plots
plt.show()

```



```
[14]: from wordcloud import WordCloud

# Drop NaN values and convert to string
reviews_str = df['Review'].dropna().astype(str)

# Concatenate all reviews into a single string
all_reviews = ' '.join(reviews_str)

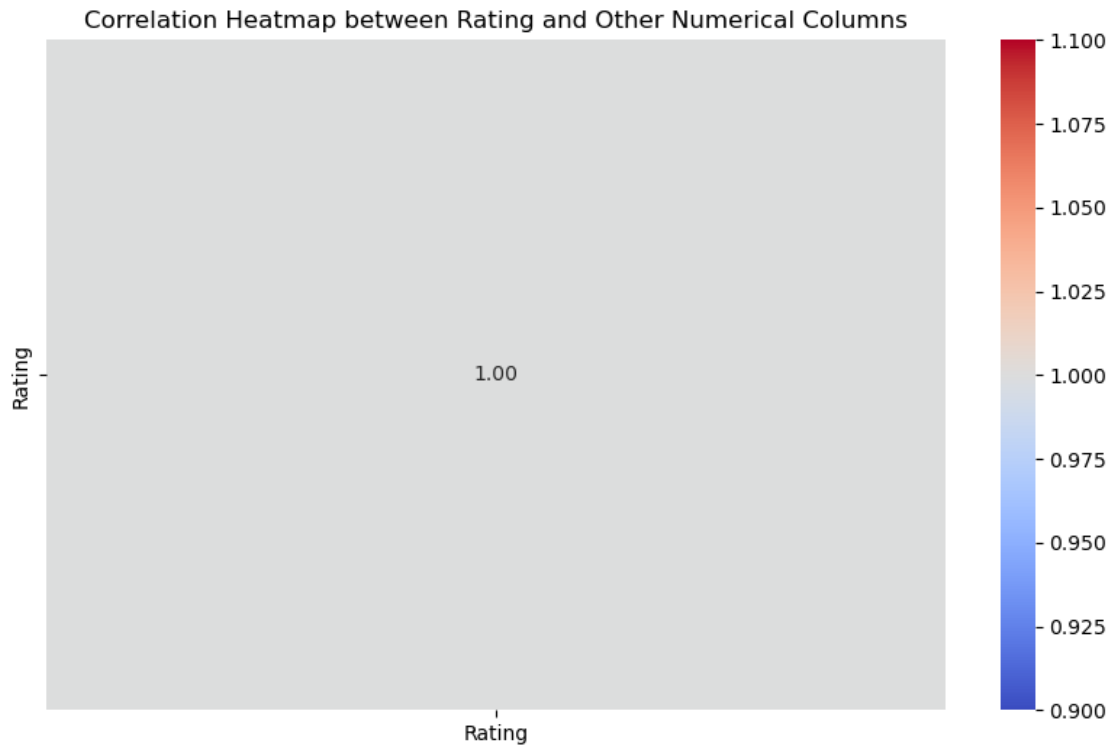
# Generate the word cloud
wordcloud = WordCloud(width=800, height=400, background_color='white').
    generate(all_reviews)

# Display the word cloud
plt.figure(figsize=(10, 6))
plt.imshow(wordcloud, interpolation='bilinear')
plt.title('Word Cloud for Reviews')
plt.axis('off')
plt.show()
```

[illegible]

```
# Select numerical columns for correlation
numerical_columns = ['Rating'] # Add more numerical columns as needed

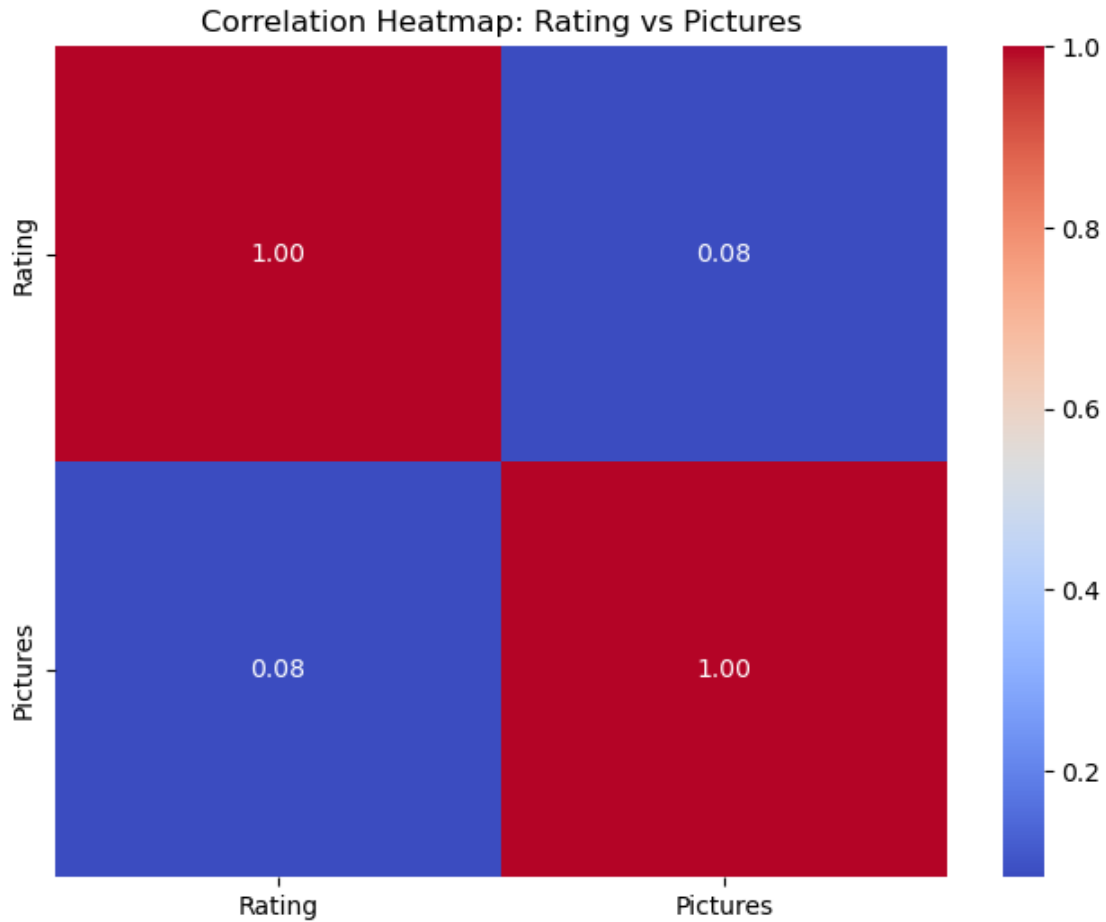
# Plotting the heatmap
plt.figure(figsize=(10, 6))
sns.heatmap(df[numerical_columns].corr(), annot=True, cmap='coolwarm', fmt=".
↪2f")
plt.title('Correlation Heatmap between Rating and Other Numerical Columns')
plt.show()
```



```
[16]: import seaborn as sns

# Select columns for correlation
cols = ['Rating', 'Pictures']

# Plotting the heatmap
plt.figure(figsize=(8, 6))
sns.heatmap(df[cols].corr(), annot=True, cmap='coolwarm', fmt=".2f")
plt.title('Correlation Heatmap: Rating vs Pictures')
plt.show()
```



```
[17]: import plotly.express as px

# Assuming the columns "Rating", "Metadata", and "Time" are numerical
fig = px.density_heatmap(df, x="Rating", y="Metadata", z="Time",
                        color_continuous_scale="magma", text_auto=True)
fig.show()
```

```
[18]: import matplotlib.pyplot as plt
import seaborn as sns

# Set the style
sns.set_style("whitegrid")

# Define the layout of subplots
fig, axes = plt.subplots(2, 2, figsize=(15, 10))
axes = axes.flatten()

# Plot scatter plots for each pair of variables
```

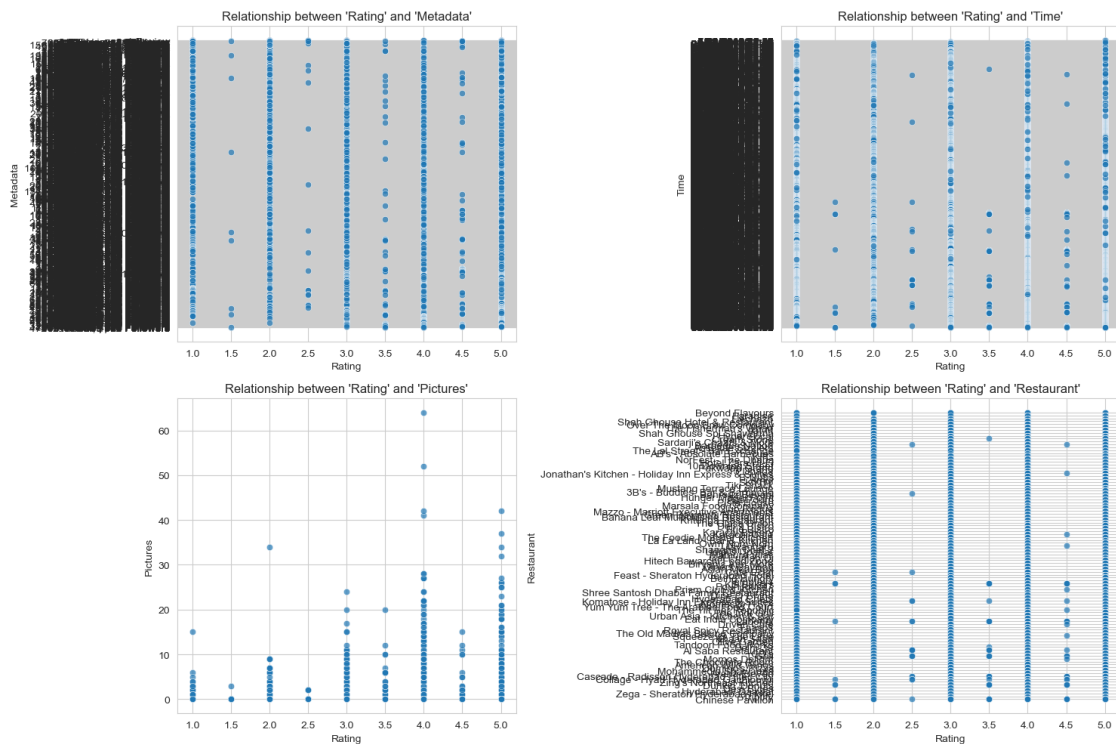


```
sns.scatterplot(ax=axes[0], x="Rating", y="Metadata", data=df, alpha=0.7).
    ↪set(title="Relationship between 'Rating' and 'Metadata'")
sns.scatterplot(ax=axes[1], x="Rating", y="Time", data=df, alpha=0.7).
    ↪set(title="Relationship between 'Rating' and 'Time'")
sns.scatterplot(ax=axes[2], x="Rating", y="Pictures", data=df, alpha=0.7).
    ↪set(title="Relationship between 'Rating' and 'Pictures'")
sns.scatterplot(ax=axes[3], x="Rating", y="Restaurant", data=df, alpha=0.7).
    ↪set(title="Relationship between 'Rating' and 'Restaurant'")
```

```
# Adjust layout
plt.tight_layout()
```

```
# Remove legend
for ax in axes:
    ax.legend([], [], frameon=False)
```

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



```
[19]: import matplotlib.pyplot as plt
import seaborn as sns
```

```
# Define the layout of subplots
```

```

fig, axes = plt.subplots(2, 2, figsize=(15, 10))
axes = axes.flatten()

# Create swarm plots for each variable
sns.swarmplot(ax=axes[0], x="Rating", y="Metadata", data=df, alpha=0.7)
axes[0].set_title("Swarm Plot: Rating vs Metadata")

sns.swarmplot(ax=axes[1], x="Rating", y="Time", data=df, alpha=0.7)
axes[1].set_title("Swarm Plot: Rating vs Time")

sns.swarmplot(ax=axes[2], x="Rating", y="Pictures", data=df, alpha=0.7)
axes[2].set_title("Swarm Plot: Rating vs Pictures")

sns.swarmplot(ax=axes[3], x="Rating", y="Restaurant", data=df, alpha=0.7)
axes[3].set_title("Swarm Plot: Rating vs Restaurant")

# Adjust layout
plt.tight_layout()

# Show the plot
plt.show()

```

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:  
UserWarning:

97.4% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

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71.4% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

92.4% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

20.0% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

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c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

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c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

75.0% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

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UserWarning:

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UserWarning:

72.7% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

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UserWarning:

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c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

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c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

28.6% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

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UserWarning:

85.7% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

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UserWarning:

83.3% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

64.3% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

37.5% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

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UserWarning:

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c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:



UserWarning:

91.2% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

86.4% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

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72.2% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

76.5% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

57.1% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

73.9% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

70.6% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

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c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

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UserWarning:

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c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

69.2% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:



UserWarning:

80.8% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

28.6% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

84.0% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

94.7% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

88.2% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

85.7% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

94.0% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

81.0% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

81.5% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

83.3% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

64.3% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

37.5% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

63.6% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

91.2% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

86.4% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

84.4% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

88.9% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

72.2% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

76.5% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

57.1% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

73.9% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

70.6% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

73.3% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

91.7% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

78.3% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

61.5% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

70.0% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

80.0% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

71.4% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

92.4% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

20.0% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

84.2% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

58.3% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

68.8% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

80.6% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

77.8% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

68.4% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

81.8% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

78.9% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

16.7% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

98.9% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

11.1% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

95.5% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

47.4% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

96.0% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

42.6% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

96.5% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

71.0% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

95.0% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

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c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

92.0% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

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c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

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c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

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c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:

UserWarning:

96.1% of the points cannot be placed; you may want to decrease the size of the markers or use stripplot.

c:\Users\iamim\anaconda3\Lib\site-packages\seaborn\categorical.py:3544:





```
[21]: import plotly.express as px

# Define the list of columns
columns = ['Rating', 'Metadata', 'Time', 'Pictures', 'Restaurant']

# Iterate over each column and create a density heatmap plot
for col in columns:
    fig = px.density_heatmap(df, x=col, y=col, text_auto=True,
        ↪color_continuous_scale="sunsetdark",
                                title=f"Density Heatmap: {col.capitalize()} vs_
        ↪{col.capitalize()}")
fig.show()
```