

```

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import missingno as msno
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import LabelEncoder, StandardScaler
from sklearn.linear_model import LinearRegression
from sklearn.tree import DecisionTreeRegressor
from sklearn.metrics import mean_squared_error, r2_score
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score, precision_score, recall_score, classification_report
from sklearn.neighbors import NearestNeighbors
import folium

```

```
df=pd.read_csv('/Dataset .csv')
```

```
print(df)
```

```

9547      Koşuyolu, İstanbul 29.041297
9548      Kuruçeşme, İstanbul 29.034640
9549      Kuruçeşme, İstanbul 29.036019
9550      Moda, İstanbul 29.026016

   Latitude  Cuisines  ...  Currency \
0   14.565443  French, Japanese, Desserts  ...  Botswana Pula(P)
1   14.553708      Japanese  ...  Botswana Pula(P)
2   14.581404  Seafood, Asian, Filipino, Indian  ...  Botswana Pula(P)
3   14.585318      Japanese, Sushi  ...  Botswana Pula(P)
4   14.584450      Japanese, Korean  ...  Botswana Pula(P)
...      ...      ...      ...
9546  41.022793      Turkish  ...  Turkish Lira(TL)
9547  41.009847  World Cuisine, Patisserie, Cafe  ...  Turkish Lira(TL)
9548  41.055817      Italian, World Cuisine  ...  Turkish Lira(TL)
9549  41.057979      Restaurant Cafe  ...  Turkish Lira(TL)
9550  40.984776      Cafe  ...  Turkish Lira(TL)

   Has Table booking  Has Online delivery  Is delivering now \
0                   Yes                   No                   No
1                   Yes                   No                   No
2                   Yes                   No                   No
3                   No                    No                   No
4                   Yes                   No                   No
...      ...      ...      ...
9546                No                   No                   No
9547                No                   No                   No
9548                No                   No                   No
9549                No                   No                   No
9550                No                   No                   No

   Switch to order menu  Price range  Aggregate rating  Rating color \
0                      No           3           4.8      Dark Green
1                      No           3           4.5      Dark Green
2                      No           4           4.4         Green
3                      No           4           4.9      Dark Green
4                      No           4           4.8      Dark Green
...      ...      ...      ...
9546                No           3           4.1         Green
9547                No           3           4.2         Green
9548                No           4           3.7        Yellow
9549                No           4           4.0         Green
9550                No           2           4.0         Green

   Rating text  Votes
0      Excellent   314
1      Excellent   591
2      Very Good   270
3      Excellent   365
4      Excellent   229
...      ...      ...
9546      Very Good   788
9547      Very Good  1034
9548         Good    661
9549      Very Good   901
9550      Very Good   591

```

```
[9551 rows x 21 columns]
```

```
print(df.head())
```

```

Restaurant ID      Restaurant Name  Country Code      City \
0      6317637      Le Petit Souffle      162      Makati City
1      6304287      Izakaya Kikufuji      162      Makati City
2      6300002      Heat - Edsa Shangri-La      162      Mandaluyong City
3      6318506      Ooma      162      Mandaluyong City
4      6314302      Sambo Kojin      162      Mandaluyong City

Address \
0      Third Floor, Century City Mall, Kalayaan Avenu...
1      Little Tokyo, 2277 Chino Roces Avenue, Legaspi...
2      Edsa Shangri-La, 1 Garden Way, Ortigas, Mandal...
3      Third Floor, Mega Fashion Hall, SM Megamall, O...
4      Third Floor, Mega Atrium, SM Megamall, Ortigas...

Locality \
0      Century City Mall, Poblacion, Makati City
1      Little Tokyo, Legaspi Village, Makati City
2      Edsa Shangri-La, Ortigas, Mandaluyong City
3      SM Megamall, Ortigas, Mandaluyong City
4      SM Megamall, Ortigas, Mandaluyong City

Locality Verbose  Longitude  Latitude \
0      Century City Mall, Poblacion, Makati City, Mak...  121.027535  14.565443
1      Little Tokyo, Legaspi Village, Makati City, Ma...  121.014101  14.553708
2      Edsa Shangri-La, Ortigas, Mandaluyong City, Ma...  121.056831  14.581404
3      SM Megamall, Ortigas, Mandaluyong City, Mandal...  121.056475  14.585318
4      SM Megamall, Ortigas, Mandaluyong City, Mandal...  121.057508  14.584450

Cuisines ...      Currency Has Table booking \
0      French, Japanese, Desserts ...      Botswana Pula(P)      Yes
1      Japanese ...      Botswana Pula(P)      Yes
2      Seafood, Asian, Filipino, Indian ...      Botswana Pula(P)      Yes
3      Japanese, Sushi ...      Botswana Pula(P)      No
4      Japanese, Korean ...      Botswana Pula(P)      Yes

Has Online delivery Is delivering now Switch to order menu Price range \
0      No      No      No      3
1      No      No      No      3
2      No      No      No      4
3      No      No      No      4
4      No      No      No      4

Aggregate rating  Rating color  Rating text  Votes
0      4.8      Dark Green      Excellent      314
1      4.5      Dark Green      Excellent      591
2      4.4      Green      Very Good      270
3      4.9      Dark Green      Excellent      365
4      4.8      Dark Green      Excellent      229

```

```
[5 rows x 21 columns]
```

```
print(df.tail())
```

```

Restaurant ID      Restaurant Name  Country Code      City \
9546      5915730      Naml' Gurme      208      Istanbul
9547      5908749      Ceviz A'ac'      208      Istanbul
9548      5915807      Huqqa      208      Istanbul
9549      5916112      A'k Kahve      208      Istanbul
9550      5927402      Walter's Coffee Roastery      208      Istanbul

Address      Locality \
9546      Kemanke' Karamustafa Pa'a Mahallesi, R'ht'm ...      Karak_y
9547      Ko'uyolu Mahallesi, Muhittin 'st'nda' Cadd...      Ko'uyolu
9548      Kuru'e'eme Mahallesi, Muallim Naci Caddesi, N...      Kuru'e'eme
9549      Kuru'e'eme Mahallesi, Muallim Naci Caddesi, N...      Kuru'e'eme
9550      Cafea'a Mahallesi, Bademalt' Sokak, No 21/B, ...      Moda

Locality Verbose  Longitude  Latitude \
9546      Karak_y, Istanbul  28.977392  41.022793
9547      Ko'uyolu, Istanbul  29.041297  41.009847
9548      Kuru'e'eme, Istanbul  29.034640  41.055817
9549      Kuru'e'eme, Istanbul  29.036019  41.057979
9550      Moda, Istanbul  29.026016  40.984776

Cuisines ...      Currency \
9546      Turkish ...      Turkish Lira(TL)
9547      World Cuisine, Patisserie, Cafe ...      Turkish Lira(TL)
9548      Italian, World Cuisine ...      Turkish Lira(TL)
9549      Restaurant Cafe ...      Turkish Lira(TL)
9550      Cafe ...      Turkish Lira(TL)

```

	Has Table booking	Has Online delivery	Is delivering now	\
9546	No	No	No	
9547	No	No	No	
9548	No	No	No	
9549	No	No	No	
9550	No	No	No	

	Switch to order menu	Price range	Aggregate rating	Rating color	\
9546	No	3	4.1	Green	
9547	No	3	4.2	Green	
9548	No	4	3.7	Yellow	
9549	No	4	4.0	Green	
9550	No	2	4.0	Green	

	Rating text	Votes
9546	Very Good	788
9547	Very Good	1034
9548	Good	661
9549	Very Good	901
9550	Very Good	591

[5 rows x 21 columns]

```
print(df.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9551 entries, 0 to 9550
Data columns (total 21 columns):
#   Column                                Non-Null Count  Dtype
---  -
0   Restaurant ID                        9551 non-null  int64
1   Restaurant Name                      9551 non-null  object
2   Country Code                        9551 non-null  int64
3   City                                9551 non-null  object
4   Address                             9551 non-null  object
5   Locality                            9551 non-null  object
6   Locality Verbose                    9551 non-null  object
7   Longitude                           9551 non-null  float64
8   Latitude                           9551 non-null  float64
9   Cuisines                            9542 non-null  object
10  Average Cost for two                 9551 non-null  int64
11  Currency                            9551 non-null  object
12  Has Table booking                   9551 non-null  object
13  Has Online delivery                 9551 non-null  object
14  Is delivering now                   9551 non-null  object
15  Switch to order menu                9551 non-null  object
16  Price range                         9551 non-null  int64
17  Aggregate rating                    9551 non-null  float64
18  Rating color                        9551 non-null  object
19  Rating text                         9551 non-null  object
20  Votes                              9551 non-null  int64
dtypes: float64(3), int64(5), object(13)
memory usage: 1.5+ MB
None
```

```
# Handling missing values
df.dropna(inplace=True)

# Identifying categorical columns
categorical_cols = df.select_dtypes(include=['object']).columns

# One-hot encoding categorical variables
df_encoded = pd.get_dummies(df, columns=categorical_cols, drop_first=True)

# Splitting data
X = df_encoded.drop(columns=['Aggregate rating']) # Replace with actual rating column name
y = df_encoded['Aggregate rating']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

# Model training (Linear Regression)
model = LinearRegression()
model.fit(X_train, y_train)

# Predictions and Evaluation
y_pred = model.predict(X_test)
print("MSE:", mean_squared_error(y_test, y_pred))
print("R-squared:", r2_score(y_test, y_pred))
```

```
➦ MSE: 0.05129977391409926
  R-squared: 0.9775986670018971
```

```
print(df.dropna(inplace=True))
```

```
➦ None
```

```
print(categorical_cols)
```

```
➦ Index(['Restaurant Name', 'City', 'Address', 'Locality', 'Locality Verbose',
        'Cuisines', 'Currency', 'Has Table booking', 'Has Online delivery',
        'Is delivering now', 'Switch to order menu', 'Rating color',
        'Rating text'],
        dtype='object')
```

```
print(df_encoded)
```

```
➦
```

	Restaurant ID	Country	Code	Longitude	Latitude	\
0	6317637		162	121.027535	14.565443	
1	6304287		162	121.014101	14.553708	
2	6300002		162	121.056831	14.581404	
3	6318506		162	121.056475	14.585318	
4	6314302		162	121.057508	14.584450	
...	
9546	5915730		208	28.977392	41.022793	
9547	5908749		208	29.041297	41.009847	
9548	5915807		208	29.034640	41.055817	
9549	5916112		208	29.036019	41.057979	
9550	5927402		208	29.026016	40.984776	

	Average Cost for two	Price range	Aggregate rating	Votes	\
0	1100	3	4.8	314	
1	1200	3	4.5	591	
2	4000	4	4.4	270	
3	1500	4	4.9	365	
4	1500	4	4.8	229	
...	
9546	80	3	4.1	788	
9547	105	3	4.2	1034	
9548	170	4	3.7	661	
9549	120	4	4.0	901	
9550	55	2	4.0	591	

	Restaurant Name_#Dilliwaala6	Restaurant Name_#InstaFreeze	...	\
0	False	False	...	
1	False	False	...	
2	False	False	...	
3	False	False	...	
4	False	False	...	
...	
9546	False	False	...	
9547	False	False	...	
9548	False	False	...	
9549	False	False	...	

```

9550          False          False ...

      Rating color_Green Rating color_Orange Rating color_Red \
0          False          False          False
1          False          False          False
2           True          False          False
3          False          False          False
4          False          False          False
...          ...          ...          ...
9546         True          False          False
9547         True          False          False
9548         False          False          False
9549         True          False          False
9550         True          False          False

      Rating color_White Rating color_Yellow Rating text_Excellent \
0          False          False          True
1          False          False          True
2          False          False          False
3          False          False          True
4          False          False          True

print(X_train)

5200          False          False ...
5399          False          False ...
869           False          False ...
7279          False          False ...

      Rating color_Green Rating color_Orange Rating color_Red \
8177          False          True          False
6401          False          True          False
81             True          False          False
1332          False          False          False
9041          False          True          False
...          ...          ...          ...
5743          False          False          False
5200           True          False          False
5399          False          True          False
869           False          True          False
7279          False          False          False

      Rating color_White Rating color_Yellow Rating text_Excellent \
8177          False          False          False
6401          False          False          False
81             False          False          False
1332           True          False          False
9041          False          False          False
...          ...          ...          ...
5743           True          False          False
5200          False          False          False
5399          False          False          False
869           False          False          False
7279           True          False          False

      Rating text_Good Rating text_Not rated Rating text_Poor \
8177          False          False          False
6401          False          False          False
81             False          False          False
1332          False          True          False
9041          False          False          False
...          ...          ...          ...
5743          False          True          False
5200          False          False          False
5399          False          False          False
869           False          False          False
7279          False          True          False

      Rating text_Very Good
8177          False
6401          False
81             True
1332          False
9041          False
...          ...
5743          False
5200           True
5399          False
869           False
7279          False

```

[7633 rows x 20806 columns]

```
print(X_test)
```

```

4061      False      False ...
8746      False      False ...
7678      False      False ...
4430      False      False ...

      Rating color_Green Rating color_Orange Rating color_Red \
7142      False      False      False
1860      True       False      False
4425      False      True       False
3219      False      False      False
8308      False      False      False
...      ...        ...        ...
5612      False      False      False
4061      False      False      False
8746      False      False      False
7678      False      False      False
4430      False      True       False

      Rating color_White Rating color_Yellow Rating text_Excellent \
7142      True        False      False
1860      False       False      False
4425      False       False      False
3219      False       True       False
8308      True        False      False
...      ...        ...        ...
5612      True        False      False
4061      True        False      False
8746      True        False      False
7678      True        False      False
4430      False       False      False

      Rating text_Good Rating text_Not rated Rating text_Poor \
7142      False        True        False
1860      False       False       False
4425      False       False       False
3219      True        False       False
8308      False       True        False
...      ...        ...        ...
5612      False       True        False
4061      False       True        False
8746      False       True        False
7678      False       True        False
4430      False       False       False

      Rating text_Very Good
7142      False
1860      True
4425      False
3219      False
8308      False
...      ...
5612      False
4061      False
8746      False
7678      False
4430      False

```

```
[1909 rows x 20806 columns]
```

```
print(y_train)
```

```

8177      2.8
6401      3.2
81        4.1
1332      0.0
9041      3.4
...
5743      0.0
5200      4.0
5399      3.0
869       2.8
7279      0.0
Name: Aggregate rating, Length: 7633, dtype: float64

```

```
print(y_test)
```

```

7142      0.0
1860      4.1
4425      3.3
3219      3.9

```

```
8308    0.0
      ...
5612    0.0
4061    0.0
8746    0.0
7678    0.0
4430    3.3
```

```
Name: Aggregate rating, Length: 1909, dtype: float64
```

```
print(y_pred)
```

```
[-0.04508521  4.13618071  3.25845705 ... -0.17969713 -0.14377941
 3.08539643]
```

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