q8x76t6hi

January 23, 2025

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

[2]:
```
data = pd.read_csv(r"C:\Users\91703\Downloads\restaurant_customer_satisfaction.
↪csv")
```

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

[3]:

	CustomerID	Age	Gender	Income	VisitFrequency	AverageSpend	PreferredCuisine	TimeOfVisit	GroupSize	DiningOccasion	MealType	OnlineReservation	DeliveryOrder	LoyaltyProgramMember	WaitTime	ServiceRating	FoodRating	AmbianceRating	HighSatisfaction
0	654	35	Male	83380	Weekly	27.829142	Chinese	Breakfast	3	Business	Takeaway	0	1	1	43.523929	2	5	4	0
1	655	19	Male	43623	Rarely	115.408622	American	Dinner	1	Casual	Dine-in	0	0	0	57.524294	5	5	3	0
2	656	41	Female	83737	Weekly	106.693771	American	Dinner	6	Celebration	Dine-in	0	1	0	48.682623	3	4	5	0
3	657	43	Male	96768	Rarely	43.508508	Indian	Lunch	1	Celebration	Dine-in	0	0	0	7.552993	4	5	1	0
4	658	55	Female	67937	Monthly	148.084627	Chinese	Breakfast	1	Business	Takeaway	0	0	1	37.789041	2	3	5	0

[4]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1500 entries, 0 to 1499
Data columns (total 19 columns):
 #   Column                Non-Null Count  Dtype
---  ------                --------------  -----
 0   CustomerID            1500 non-null   int64
 1   Age                   1500 non-null   int64
 2   Gender                1500 non-null   object
 3   Income                1500 non-null   int64
 4   VisitFrequency        1500 non-null   object
 5   AverageSpend          1500 non-null   float64
 6   PreferredCuisine      1500 non-null   object
 7   TimeOfVisit           1500 non-null   object
 8   GroupSize             1500 non-null   int64
 9   DiningOccasion        1500 non-null   object
 10  MealType              1500 non-null   object
 11  OnlineReservation     1500 non-null   int64
 12  DeliveryOrder         1500 non-null   int64
 13  LoyaltyProgramMember  1500 non-null   int64
 14  WaitTime              1500 non-null   float64
 15  ServiceRating         1500 non-null   int64
 16  FoodRating            1500 non-null   int64
 17  AmbianceRating        1500 non-null   int64
 18  HighSatisfaction      1500 non-null   int64
dtypes: float64(2), int64(11), object(6)
memory usage: 222.8+ KB
```

[5]:
```
data.describe()
```

[5]:

	CustomerID	Age	Income	AverageSpend	GroupSize
count	1500.000000	1500.000000	1500.000000	1500.000000	1500.000000
mean	1403.500000	43.832000	85921.890000	105.659004	5.035333
std	433.157015	14.967157	38183.051749	52.381849	2.558864
min	654.000000	18.000000	20012.000000	10.306127	1.000000
25%	1028.750000	31.750000	52444.000000	62.287907	3.000000
50%	1403.500000	44.000000	85811.000000	104.626408	5.000000
75%	1778.250000	57.000000	119159.250000	148.649330	7.000000
max	2153.000000	69.000000	149875.000000	199.973527	9.000000

	OnlineReservation	DeliveryOrder	LoyaltyProgramMember	WaitTime
count	1500.000000	1500.000000	1500.000000	1500.000000
mean	0.296667	0.405333	0.480000	30.163550
std	0.456941	0.491120	0.499766	17.214184
min	0.000000	0.000000	0.000000	0.001380
25%	0.000000	0.000000	0.000000	15.235423
50%	0.000000	0.000000	0.000000	30.044055
75%	1.000000	1.000000	1.000000	45.285649

```
max             1.000000       1.000000              1.000000    59.970762

       ServiceRating   FoodRating  AmbianceRating  HighSatisfaction
count    1500.000000  1500.000000     1500.000000       1500.000000
mean        3.044000     2.997333        2.987333          0.134000
std         1.423405     1.418920        1.450716          0.340766
min         1.000000     1.000000        1.000000          0.000000
25%         2.000000     2.000000        2.000000          0.000000
50%         3.000000     3.000000        3.000000          0.000000
75%         4.000000     4.000000        4.000000          0.000000
max         5.000000     5.000000        5.000000          1.000000
```

[6]:
```
data.isnull()
```

[6]:
```
      CustomerID    Age  Gender  Income  VisitFrequency  AverageSpend  \
0          False  False   False   False           False         False
1          False  False   False   False           False         False
2          False  False   False   False           False         False
3          False  False   False   False           False         False
4          False  False   False   False           False         False
…          …    …     …     …               …             …
1495       False  False   False   False           False         False
1496       False  False   False   False           False         False
1497       False  False   False   False           False         False
1498       False  False   False   False           False         False
1499       False  False   False   False           False         False

      PreferredCuisine  TimeOfVisit  GroupSize  DiningOccasion  MealType  \
0                False        False      False           False     False
1                False        False      False           False     False
2                False        False      False           False     False
3                False        False      False           False     False
4                False        False      False           False     False
…                …          …        …               …       …
1495             False        False      False           False     False
1496             False        False      False           False     False
1497             False        False      False           False     False
1498             False        False      False           False     False
1499             False        False      False           False     False

      OnlineReservation  DeliveryOrder  LoyaltyProgramMember  WaitTime  \
0                 False          False                 False     False
1                 False          False                 False     False
2                 False          False                 False     False
3                 False          False                 False     False
4                 False          False                 False     False
…                 …            …                     …       …
```

```
1495              False          False                 False     False
1496              False          False                 False     False
1497              False          False                 False     False
1498              False          False                 False     False
1499              False          False                 False     False

      ServiceRating  FoodRating  AmbianceRating  HighSatisfaction
0             False       False           False             False
1             False       False           False             False
2             False       False           False             False
3             False       False           False             False
4             False       False           False             False
…               …           …               …                 …
1495          False       False           False             False
1496          False       False           False             False
1497          False       False           False             False
1498          False       False           False             False
1499          False       False           False             False

[1500 rows x 19 columns]
```

[8]:
```
data.isnull().sum()
```

[8]:
```
CustomerID              0
Age                     0
Gender                  0
Income                  0
VisitFrequency          0
AverageSpend            0
PreferredCuisine        0
TimeOfVisit             0
GroupSize               0
DiningOccasion          0
MealType                0
OnlineReservation       0
DeliveryOrder           0
LoyaltyProgramMember    0
WaitTime                0
ServiceRating           0
FoodRating              0
AmbianceRating          0
HighSatisfaction        0
dtype: int64
```

[9]:
```
#What is the average Age of customers in the dataset?
average_age = data['Age'].mean()
print("Average Age:", average_age)
```

```
Average Age: 43.832
```

[10]:
```
#What percentage of customers are LoyaltyProgramMembers in the dataset?
loyalty_program_percentage = data['LoyaltyProgramMember'].
 ↪value_counts(normalize=True)[1] * 100
print("Loyalty Program Member Percentage:", loyalty_program_percentage)
```

```
Loyalty Program Member Percentage: 48.0
```

[11]:
```
#What is the average WaitTime for customers in the dataset?
average_wait_time = data['WaitTime'].mean()
print("Average Wait Time:", average_wait_time)
```

```
Average Wait Time: 30.16355008090592
```

[12]:
```
#What is the most preferred MealType among customers in the dataset?
preferred_meal_type = data['MealType'].value_counts().index[0]
print("Most Preferred Meal Type:", preferred_meal_type)
```

```
Most Preferred Meal Type: Dine-in
```

[13]:
```
#What is the average ServiceRating given by customers in the dataset?
average_service_rating = data['ServiceRating'].mean()
print("Average Service Rating:", average_service_rating)
```

```
Average Service Rating: 3.044
```

[14]:
```
#What percentage of customers made an OnlineReservation in the dataset?
online_reservation_percentage = data['OnlineReservation'].
 ↪value_counts(normalize=True)[1] * 100
print("Online Reservation Percentage:", online_reservation_percentage)
```

```
Online Reservation Percentage: 29.666666666666668
```

[15]:
```
#What is the average FoodRating given by customers in the dataset?
average_food_rating = data['FoodRating'].mean()
print("Average Food Rating:", average_food_rating)
```

```
Average Food Rating: 2.997333333333333
```

[16]:
```
#Which PreferredCuisine is most popular among customers in the dataset?
most_popular_cuisine = data['PreferredCuisine'].value_counts().index[0]
print("Most Popular Cuisine:", most_popular_cuisine)
```

```
Most Popular Cuisine: Italian
```

[17]:
```
#What is the average AmbianceRating given by customers in the dataset?
average_ambiance_rating = data['AmbianceRating'].mean()
```

```
print("Average Ambiance Rating:", average_ambiance_rating)
```

```
Average Ambiance Rating: 2.9873333333333334
```

[18]:
```
#What percentage of customers reported HighSatisfaction in the dataset?
high_satisfaction_percentage = data['HighSatisfaction'].
 ↪value_counts(normalize=True)[1] * 100
print("High Satisfaction Percentage:", high_satisfaction_percentage)
```

```
High Satisfaction Percentage: 13.4
```

[19]:
```
data.tail()
```

[19]:

	CustomerID	Age	Gender	Income	VisitFrequency	AverageSpend
1495	2149	39	Male	114857	Monthly	163.015254
1496	2150	37	Female	133506	Weekly	190.991911
1497	2151	46	Male	119159	Monthly	150.088604
1498	2152	24	Male	27970	Weekly	196.363626
1499	2153	51	Male	148333	Weekly	171.119498

	PreferredCuisine	TimeOfVisit	GroupSize	DiningOccasion	MealType
1495	American	Lunch	2	Business	Dine-in
1496	Italian	Lunch	4	Casual	Takeaway
1497	American	Lunch	4	Casual	Dine-in
1498	Italian	Dinner	6	Casual	Dine-in
1499	Chinese	Breakfast	4	Casual	Dine-in

	OnlineReservation	DeliveryOrder	LoyaltyProgramMember	WaitTime
1495	0	1	1	7.206275
1496	0	0	0	37.863952
1497	0	1	0	3.925785
1498	1	1	0	24.228038
1499	1	1	1	39.402163

	ServiceRating	FoodRating	AmbianceRating	HighSatisfaction
1495	1	2	1	0
1496	5	2	2	0
1497	3	3	3	1
1498	2	2	4	1
1499	4	5	4	1