

# Graph Base Outputs:

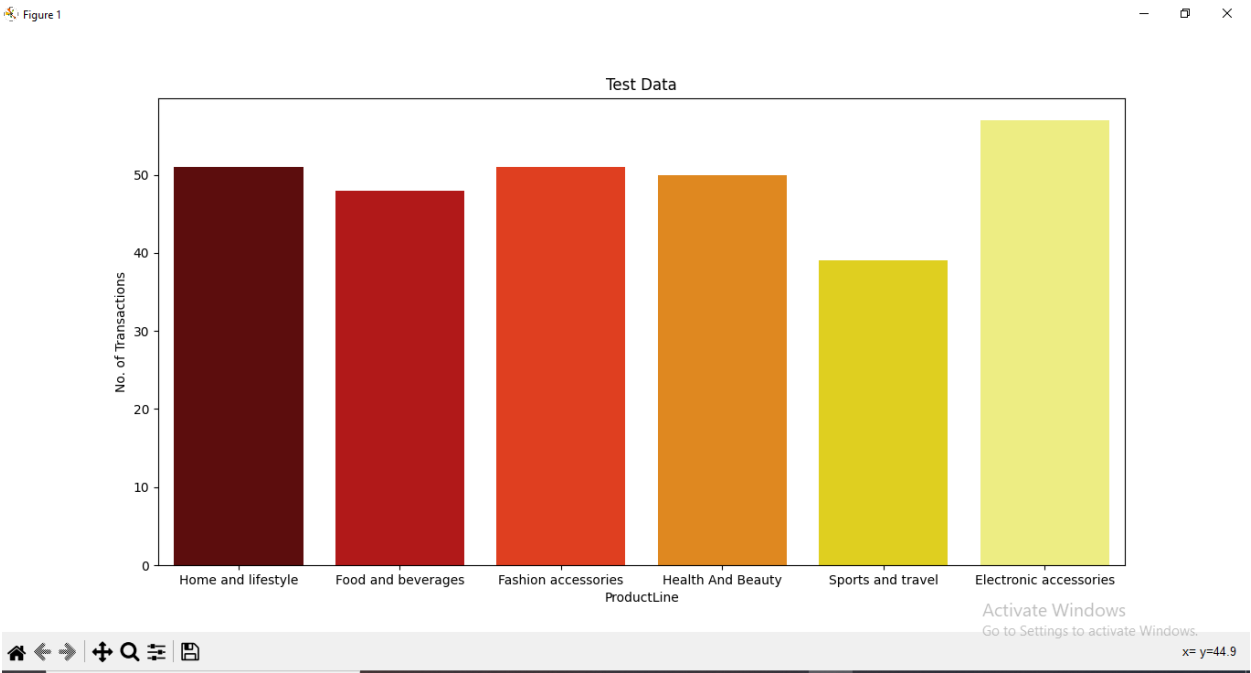
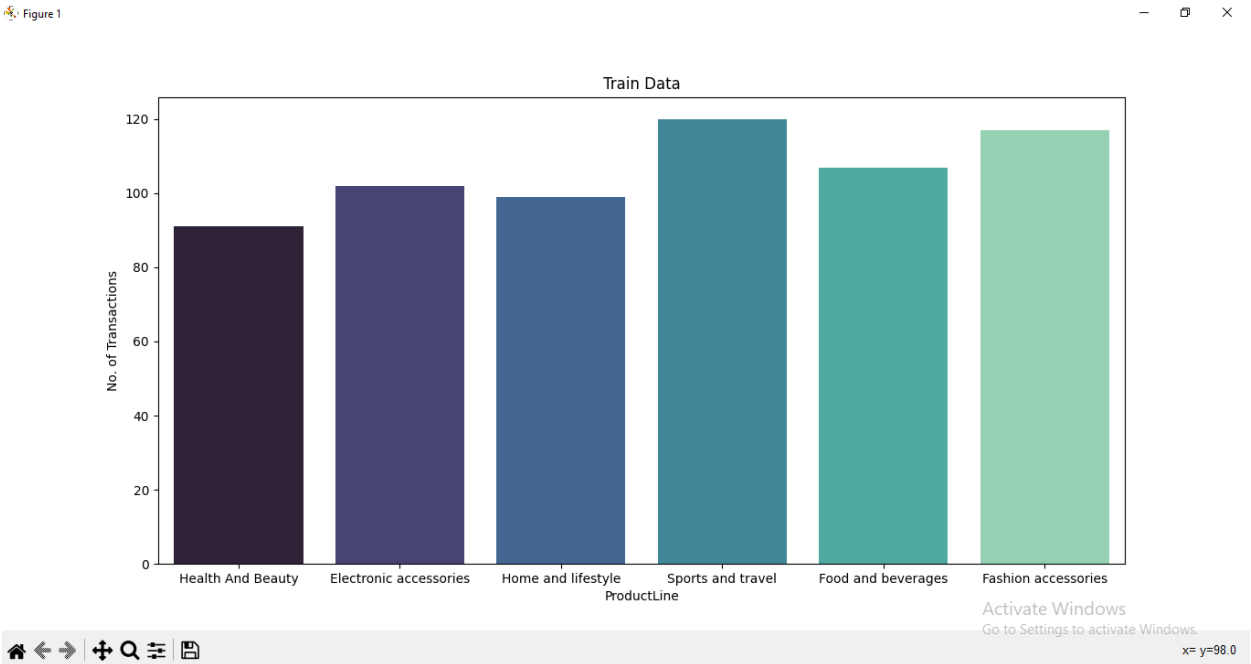
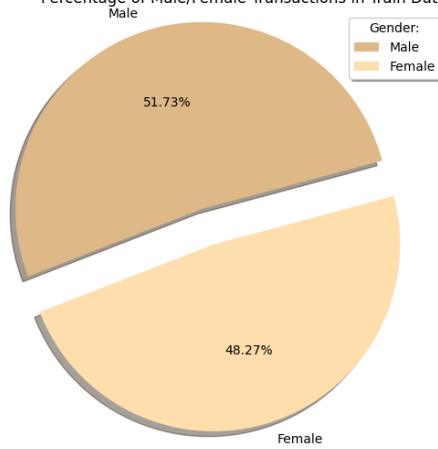


Figure 1

Percentage of Male/Female Transactions in Train Data

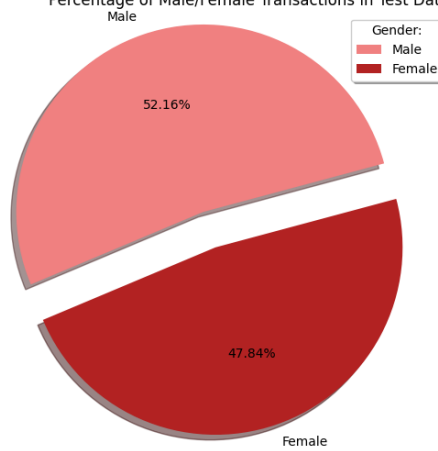


Activate Windows  
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x=-0.642 y=0.606

Figure 1

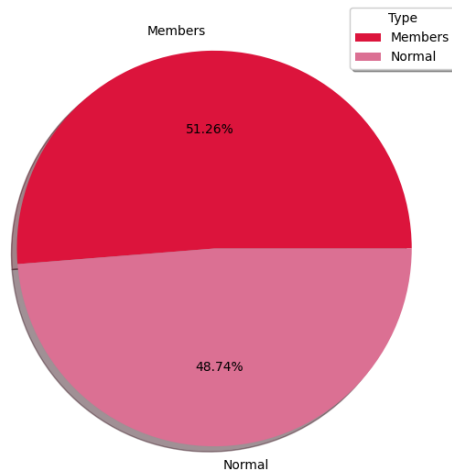
Percentage of Male/Female Transactions in Test Data



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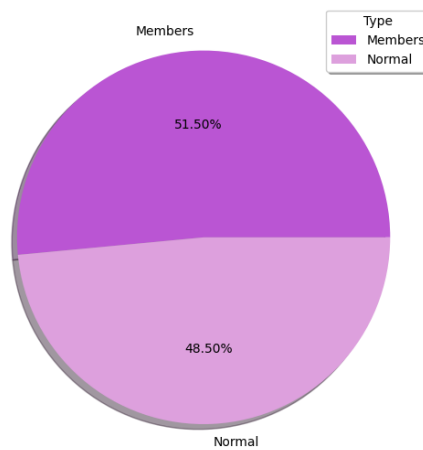
x=-0.877 y=0.606

Percentage of Members and Normal Customers in Train Data



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Percentage of Members and Normal Customers in Test Data



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Figure 1

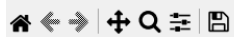
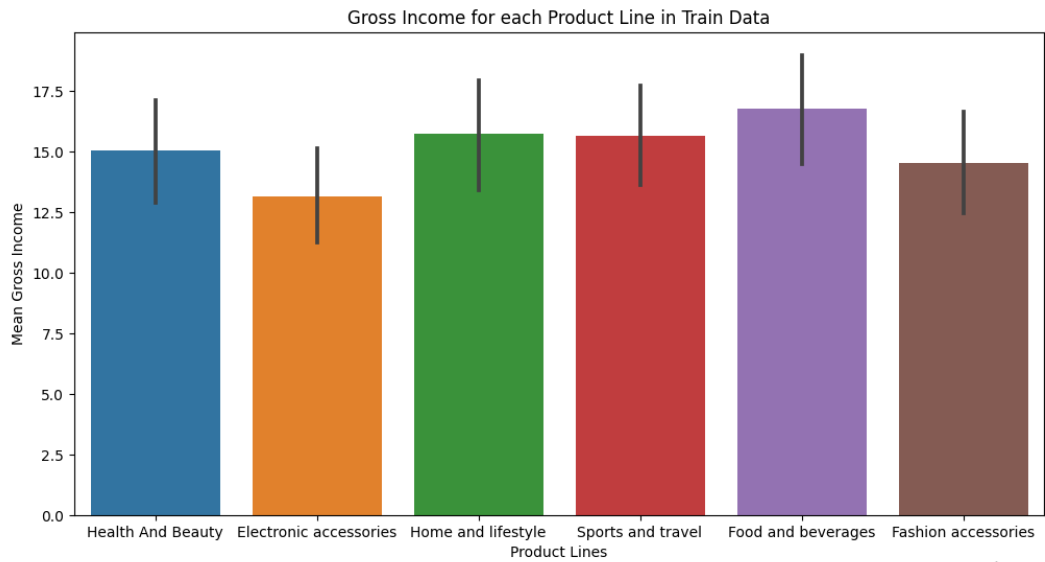
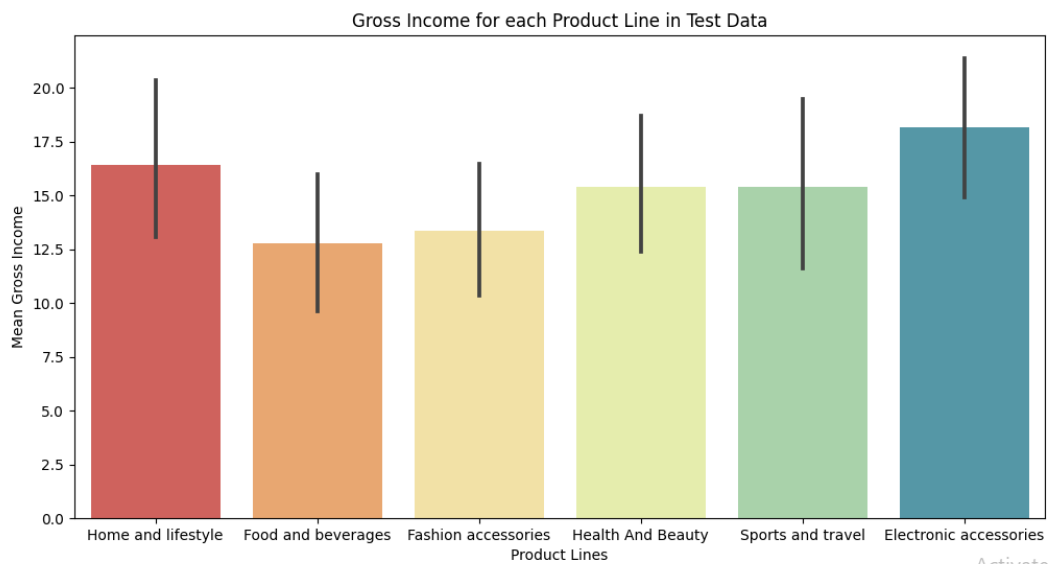


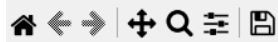
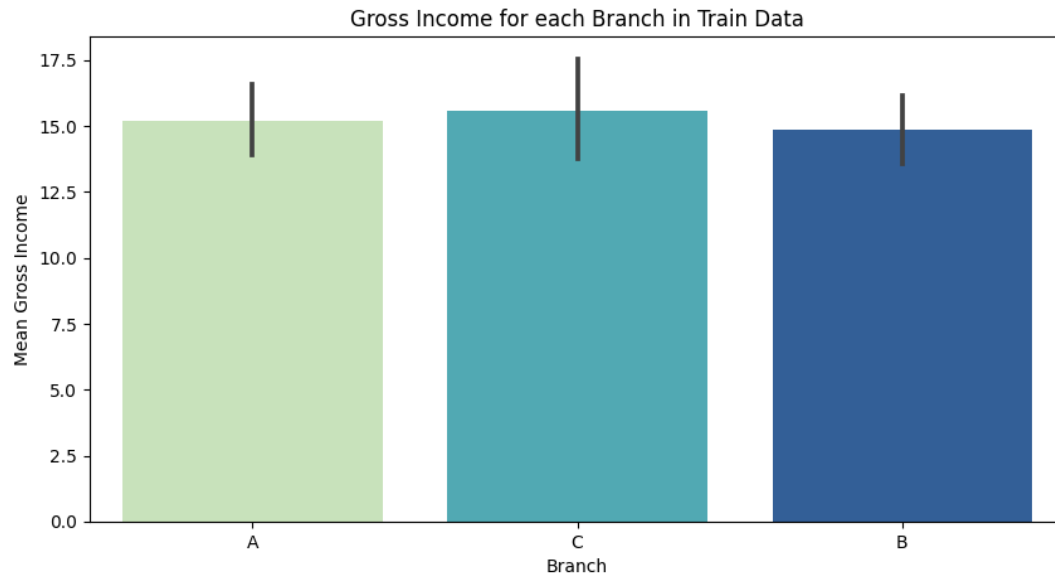
Figure 1

Activate Windows  
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x= y=16.56



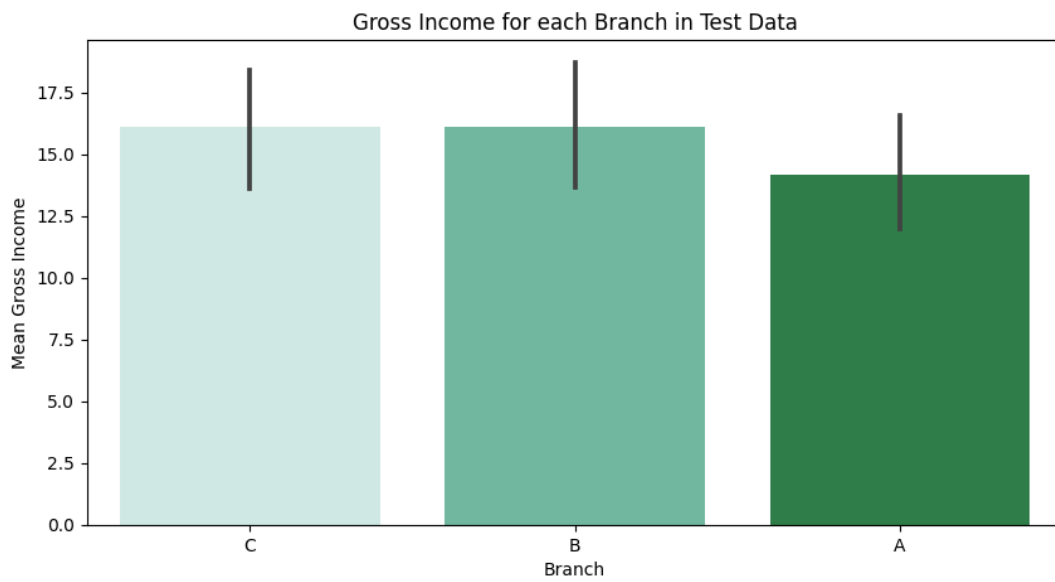
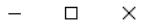
Activate Windows  
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x= y=18.55

Figure 1

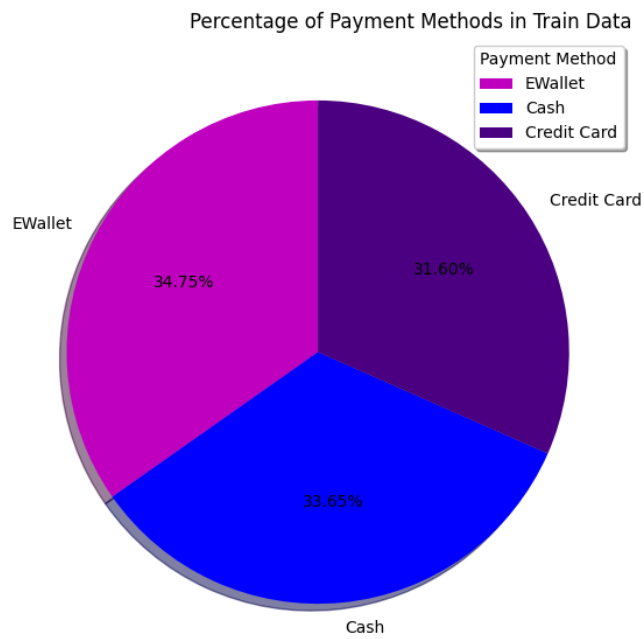


x= y=16.01

Figure 1

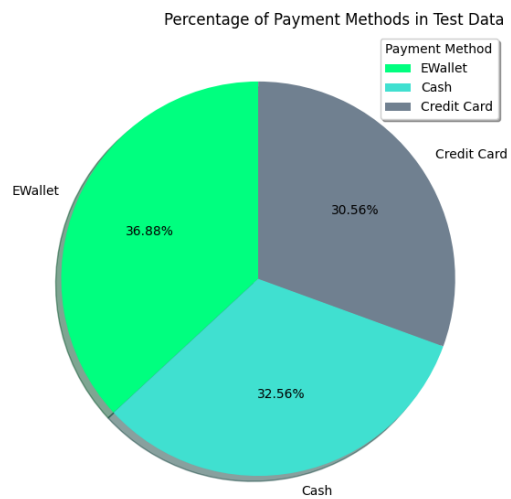


x= y=17.83



Activate Window

Figure 1



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Figure 1

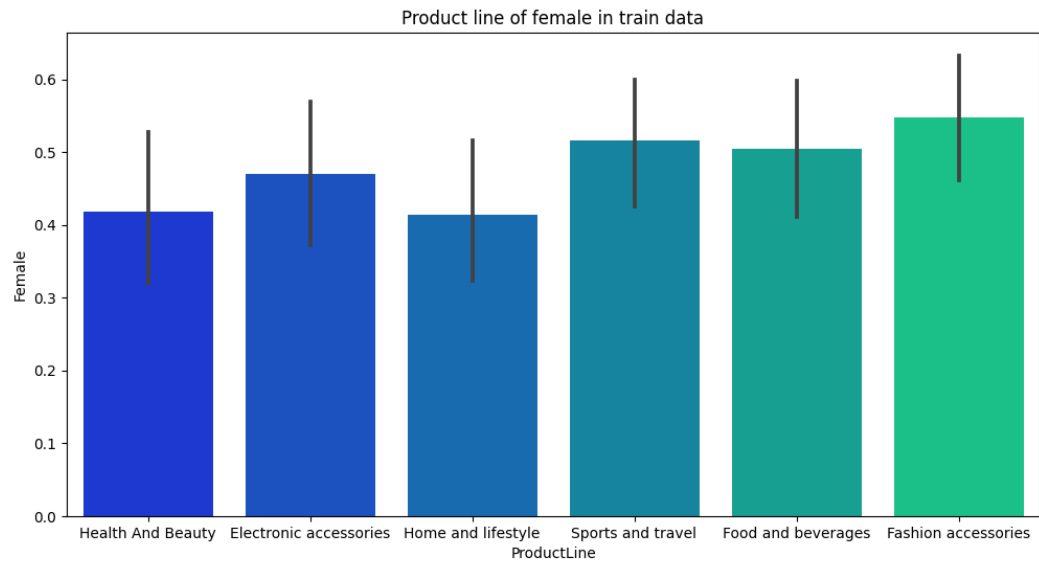


Figure 1

Activate Windows  
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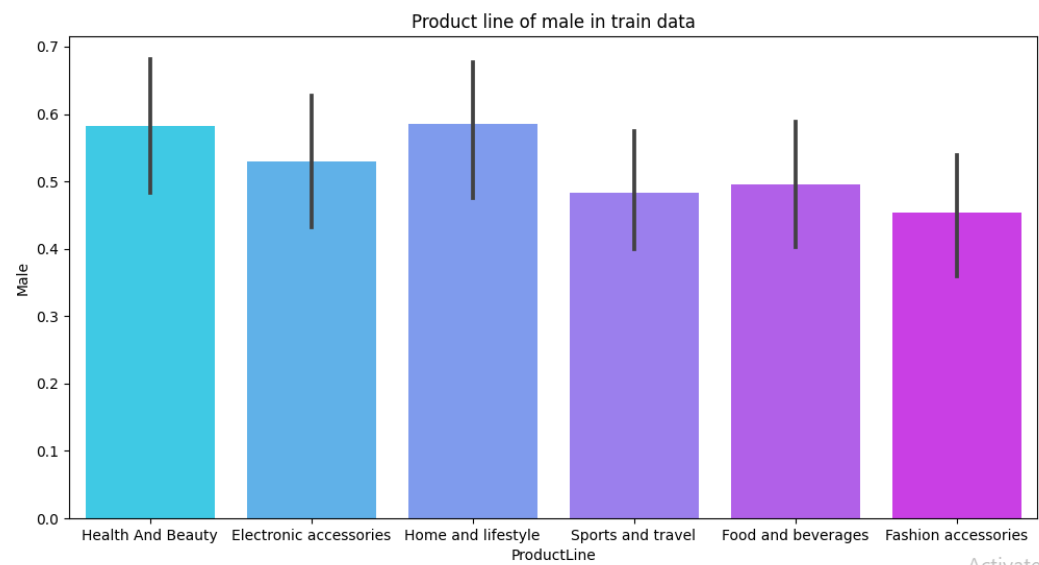


Figure 1

Activate Windows  
Go to Settings to activate Windows

Figure 1

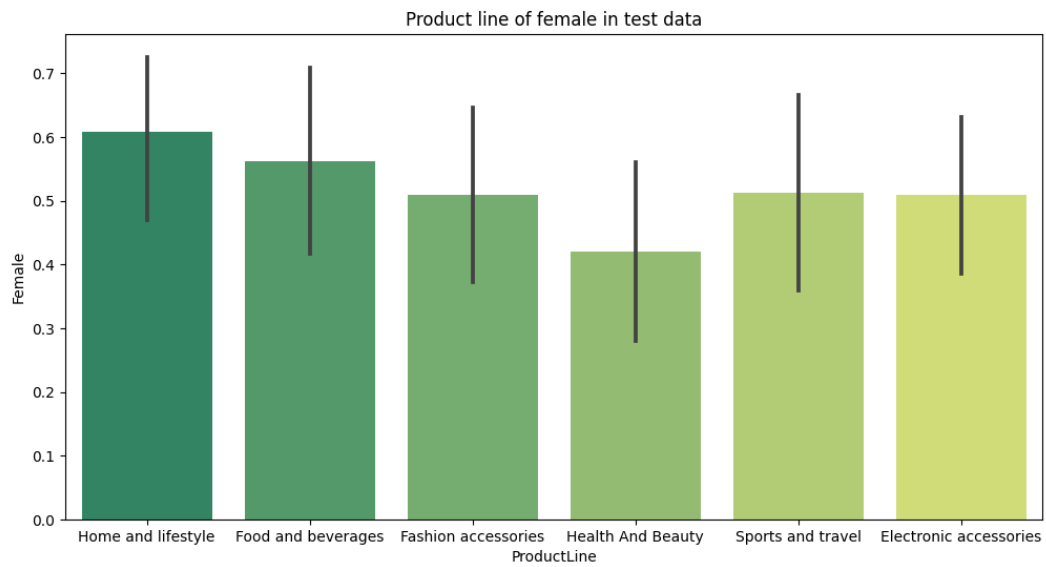
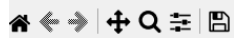
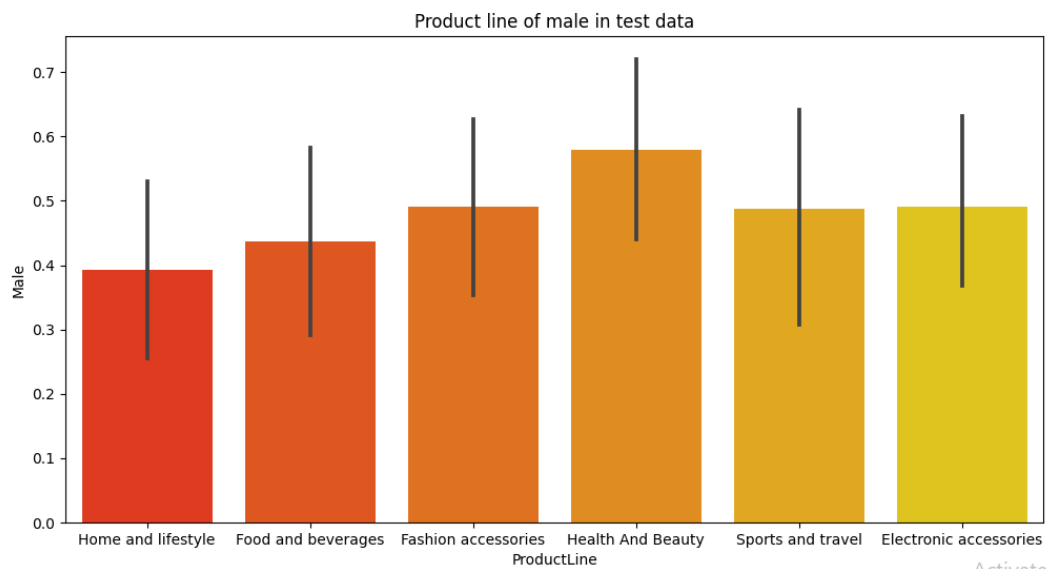


Figure 1

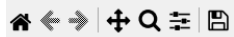
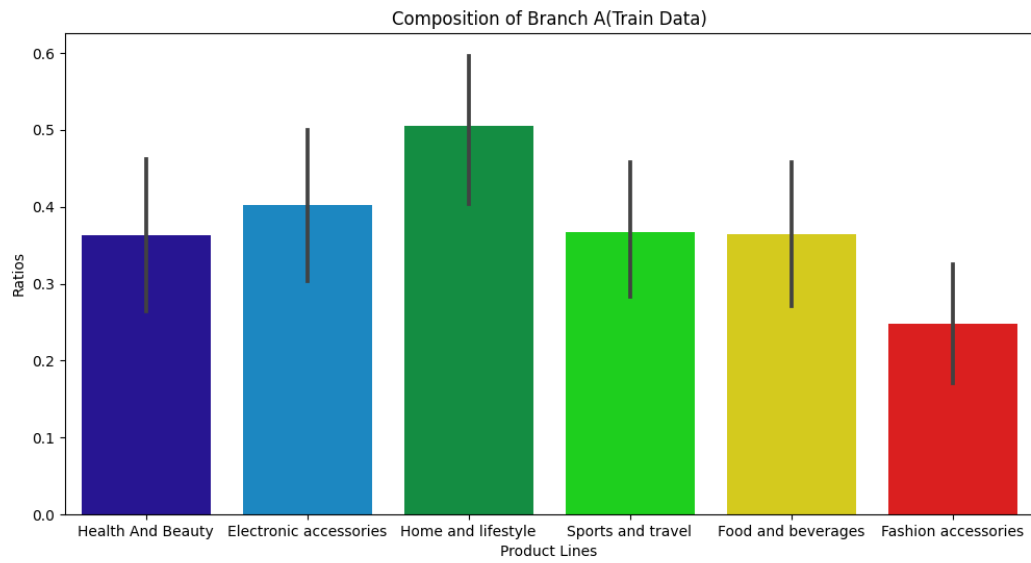
Activate Windows  
Go to Settings to activate Windows.



Activate Windows  
Go to Settings to activate Windows.

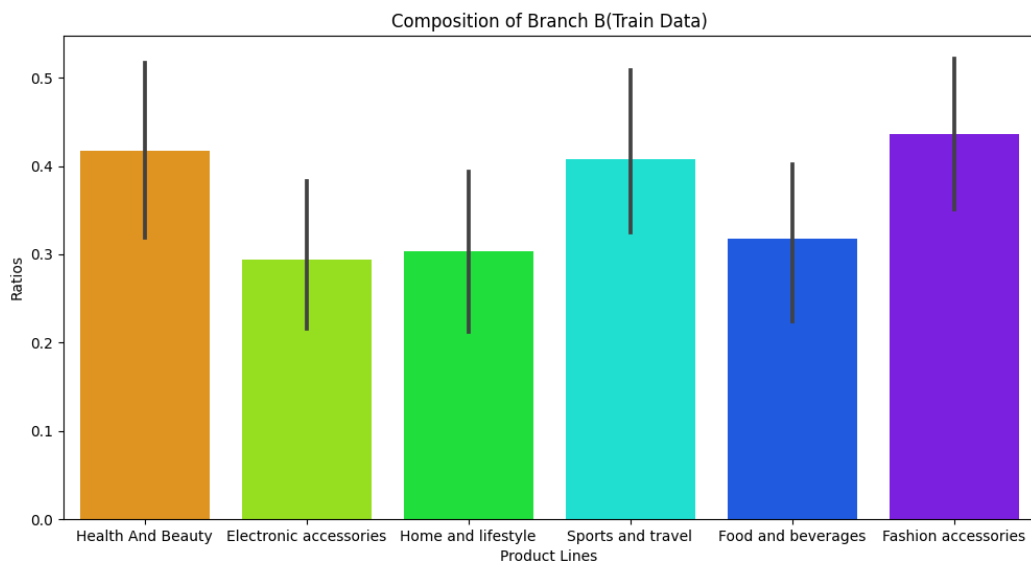


Figure 1



Activate Windows  
Go to Settings to activate Windows

Figure 1



Activate Windows  
Go to Settings to activate Windows

Figure 1

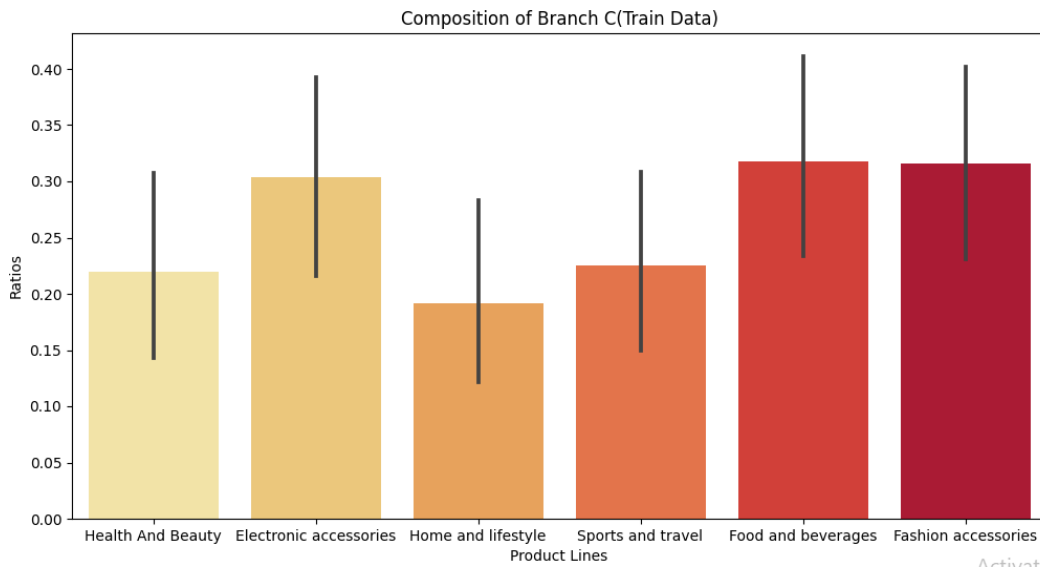
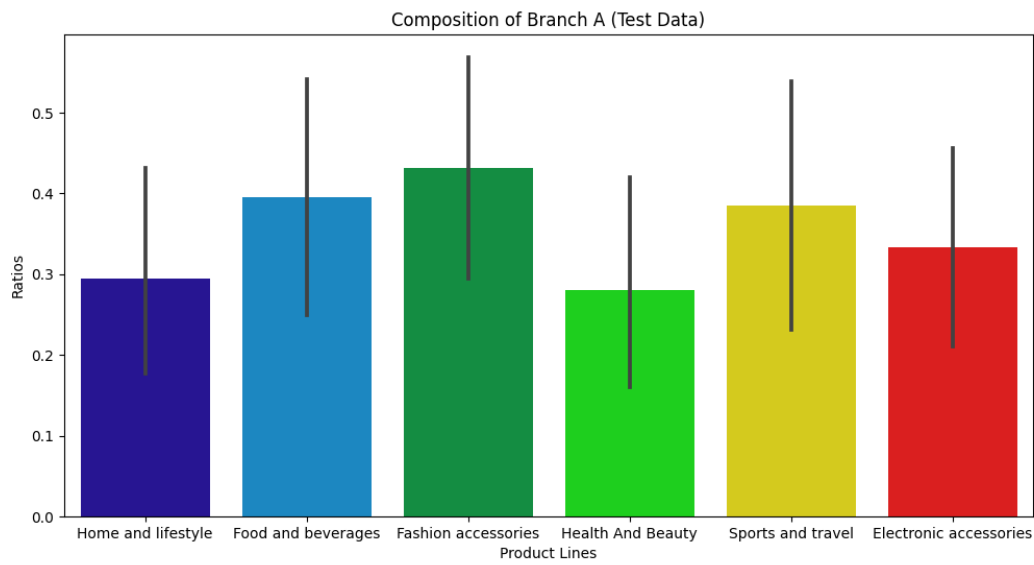


Figure 1

Activate Windows  
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x= y=0.4009



Activate Windows  
Go to Settings to activate W  
x= y=0.467/ir

Figure 1

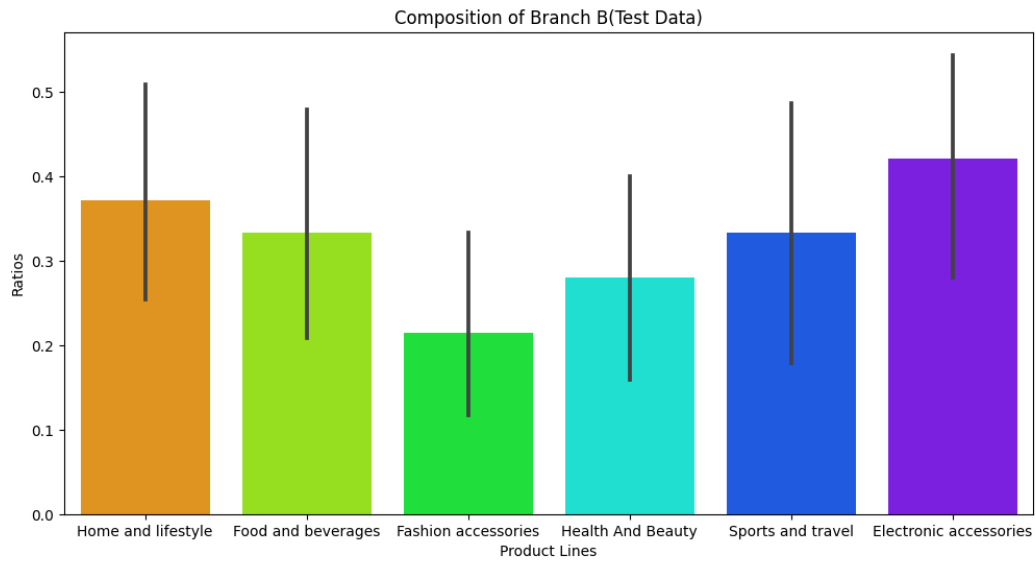
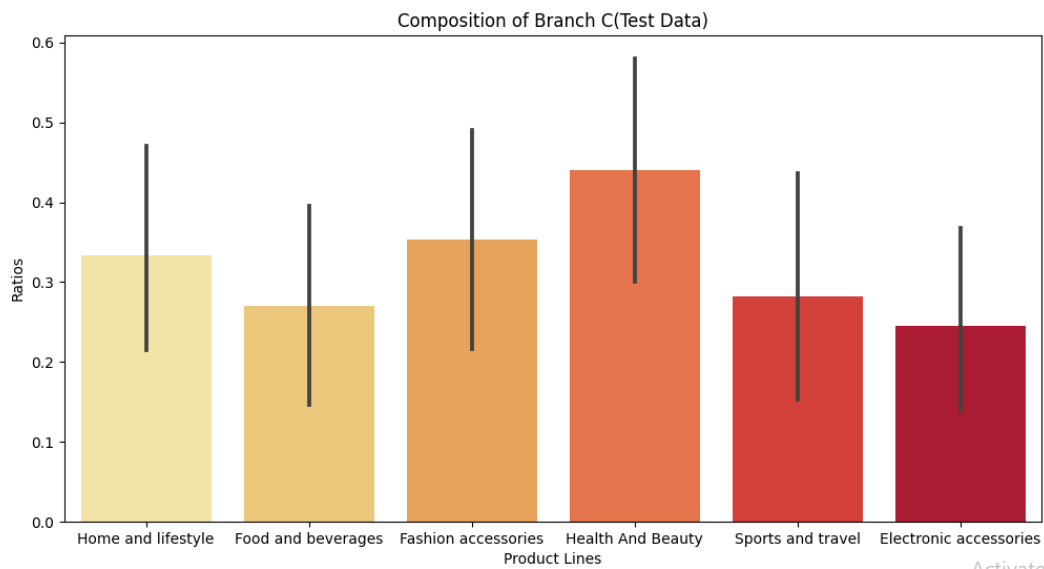


Figure 1

Activate Windows  
Go to Settings to activate

x= y=0.549



Activate Windows  
Go to Settings to activate

x= y=0.278

Figure 1

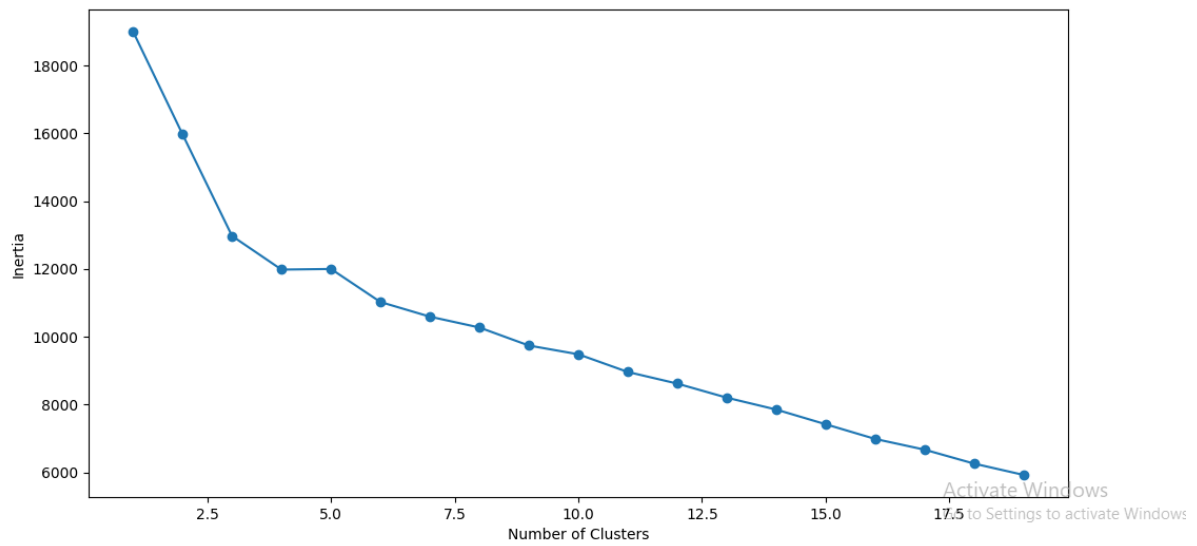
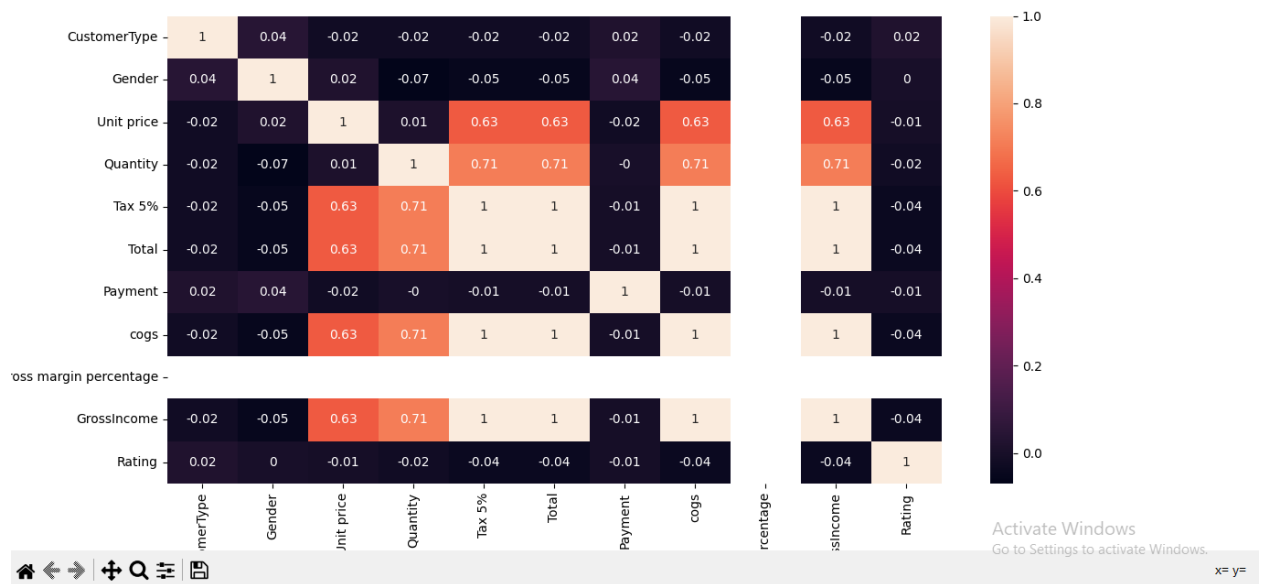
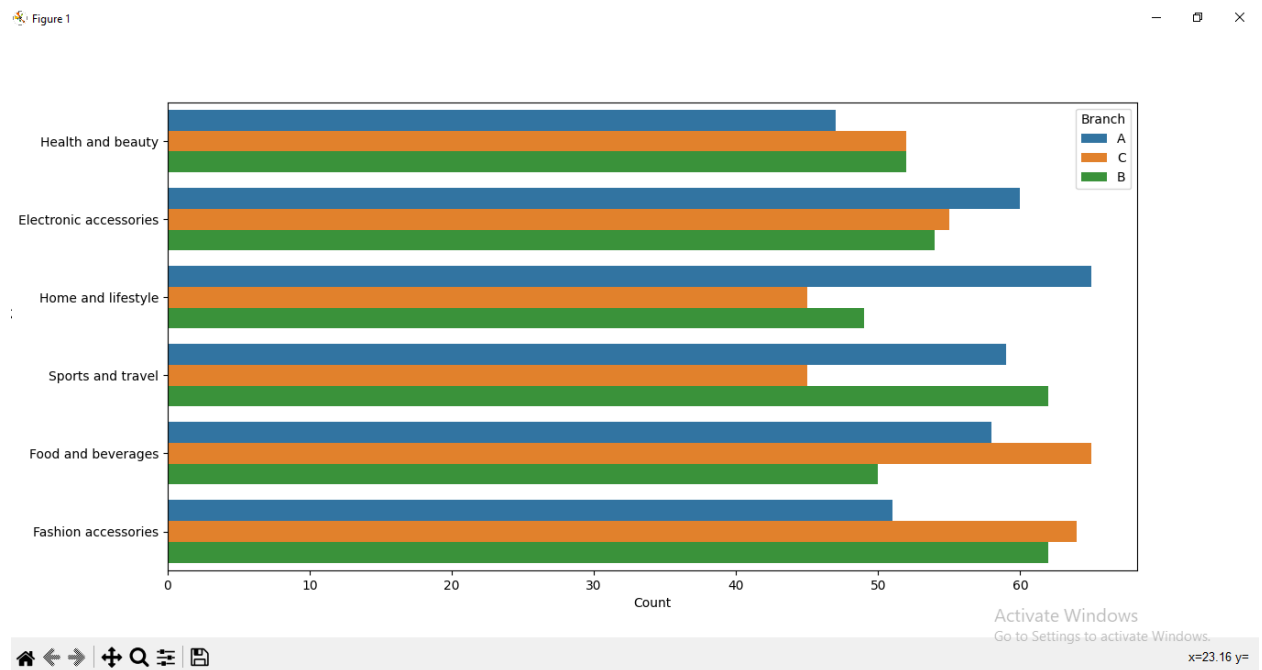
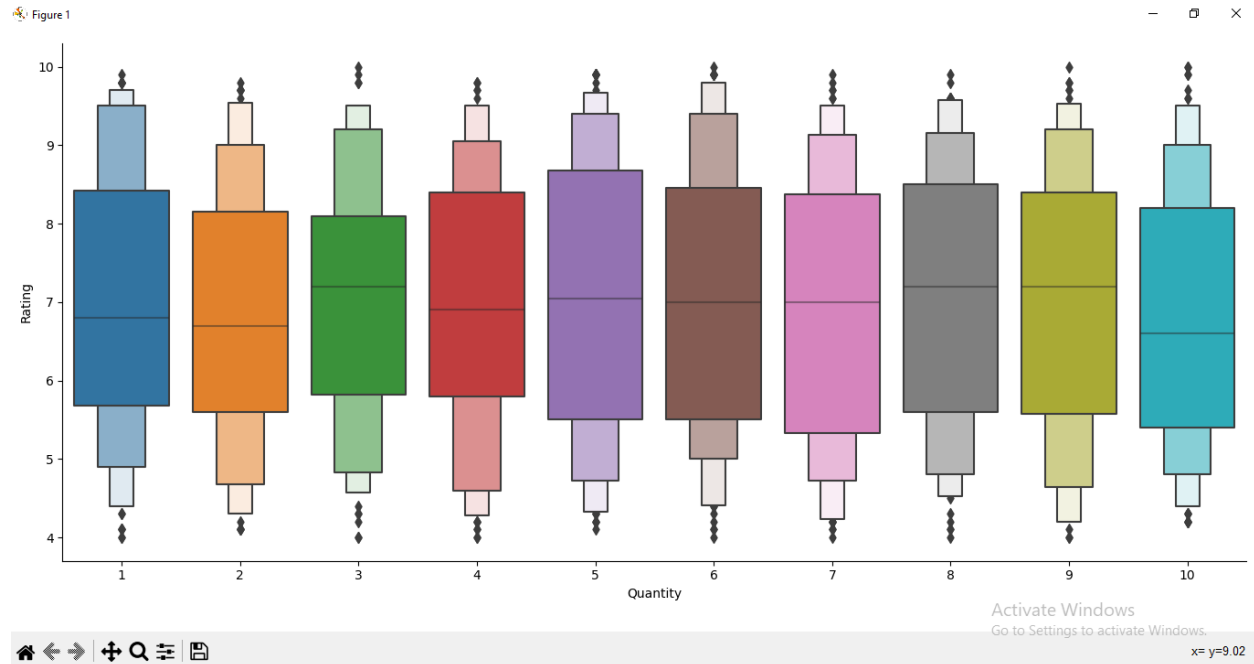


Figure 1





**Console base outpt:**

```
SalesPrediction (1) x
C:\python3.1\python.exe "D:/3rd Semester/pythonProject/SalesPrediction.py"
printing head of train data
  Invoice ID Branch      City CustomerType Gender      ProductLine Unit price Quantity Tax 5% Total Date Time Payment cogs
0 750-67-8428      A      Yangon      Member Female      Health and beauty      74.69      7 26.1415 548.9715 1/5/2019 13:08 Ewallet 522.83
1 226-31-3081      C      Naypyitaw Normal Female      Electronic accessories 15.28      5 3.8200 80.2200 3/8/2019 10:29 Cash 76.40
2 631-41-3108      A      Yangon      Normal Male      Home and lifestyle      46.33      7 16.2155 340.5255 3/3/2019 13:23 Credit card 324.31
3 123-19-1176      A      Yangon      Member Male      Health and beauty      58.22      8 23.2880 489.0480 1/27/2019 20:33 Ewallet 465.76
4 373-73-7910      A      Yangon      Normal Male      Sports and travel      86.31      7 30.2085 634.3785 2/8/2019 10:37 Ewallet 604.17
printing head of test data
  Invoice ID Branch      City CustomerType Gender      ProductLine Unit price Quantity Tax 5% Total Date Time Payment cogs
0 751-41-9720      C      Naypyitaw Normal Male      Home and lifestyle      97.50      10 48.7500 1023.7500 1/12/2019 16:18 Ewallet 975.00
1 626-43-7888      C      Naypyitaw Normal Female      NaN      60.41      8 24.1640 507.4440 2/7/2019 12:23 Ewallet 483.28
2 176-64-7711      B      Mandalay Normal Male      Food and beverages      32.32      3 4.8480 101.8080 3/27/2019 19:11 Credit card 96.96
3 191-29-0321      B      Mandalay Member Female      Fashion accessories      19.77      10 9.8850 207.5850 2/27/2019 18:57 Credit card 197.70
4 729-06-2010      B      Mandalay Member Male      NaN      80.47      9 36.2115 760.4415 1/6/2019 11:18 Cash 724.23
Training Dataset (row, col): (636, 17)

Testing Dataset (row, col): (301, 17)
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 636 entries, 0 to 635
Data columns (total 17 columns):
# Column Non-Null Count Dtype
---
0 Invoice ID 636 non-null object
1 Branch 636 non-null object
2 City 636 non-null object
```

```
Testing Dataset (row, col): (301, 17)
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 636 entries, 0 to 635
Data columns (total 17 columns):
# Column Non-Null Count Dtype
---
0 Invoice ID 636 non-null object
1 Branch 636 non-null object
2 City 636 non-null object
3 CustomerType 636 non-null object
4 Gender 636 non-null object
5 ProductLine 636 non-null object
6 Unit price 636 non-null float64
7 Quantity 636 non-null int64
8 Tax 5% 636 non-null float64
9 Total 636 non-null float64
10 Date 636 non-null object
11 Time 636 non-null object
12 Payment 636 non-null object
13 cogs 636 non-null float64
14 gross margin percentage 636 non-null float64
15 GrossIncome 636 non-null float64
16 Rating 636 non-null float64
dtypes: float64(7), int64(1), object(9)
memory usage: 84.6+ KB
None
```

Branch Count:

A 236

B 232

C 168

Name: Branch, dtype: int64

ProductLine Count:

Sports and travel 120

Fashion accessories 117

Food and beverages 107

Electronic accessories 102

Home and lifestyle 99

Health and beauty 91

Name: ProductLine, dtype: int64

Branch:

Mode of test values, Mode of train values:

['A', 'A']

ProductLine:

Mode of test values, Mode of train values:

['Electronic accessories', 'Sports and travel']

Train data information:

<class 'pandas.core.frame.DataFrame'>

RangeIndex: 636 entries, 0 to 635

Data columns (total 17 columns):

#	Column	Non-Null Count	Dtype
0	Invoice ID	636 non-null	object
1	Branch	636 non-null	object
2	City	636 non-null	object
3	CustomerType	636 non-null	object
4	Gender	636 non-null	object
5	ProductLine	636 non-null	object
6	Unit price	636 non-null	float64
7	Quantity	636 non-null	int64
8	Tax 5%	636 non-null	float64
9	Total	636 non-null	float64
10	Date	636 non-null	object
11	Time	636 non-null	object
12	Payment	636 non-null	object
13	cogs	636 non-null	float64
14	gross margin percentage	636 non-null	float64



```

12 Payment          636 non-null    object
13 cogs             636 non-null    float64
14 gross margin percentage 636 non-null    float64
15 GrossIncome      636 non-null    float64
16 Rating           636 non-null    float64

```

dtypes: float64(7), int64(1), object(9)

memory usage: 84.6+ KB

None

Test data information:

<class 'pandas.core.frame.DataFrame'>

RangeIndex: 301 entries, 0 to 300

Data columns (total 17 columns):

#	Column	Non-Null Count	Dtype
0	Invoice ID	301 non-null	object
1	Branch	301 non-null	object
2	City	301 non-null	object
3	CustomerType	301 non-null	object
4	Gender	301 non-null	object
5	ProductLine	296 non-null	object
6	Unit price	301 non-null	float64
7	Quantity	301 non-null	int64

```

7 Quantity          301 non-null    int64
8 Tax 5%            301 non-null    float64
9 Total             301 non-null    float64
10 Date             301 non-null    object
11 Time             301 non-null    object
12 Payment          301 non-null    object
13 cogs             301 non-null    float64
14 gross margin percentage 301 non-null    float64
15 GrossIncome      301 non-null    float64
16 Rating           301 non-null    float64

```

dtypes: float64(7), int64(1), object(9)

memory usage: 40.1+ KB

None

Print the values in categoric and numeric colums of traindata

[Invoice ID	Branch	City	CustomerType	Gender	ProductLine	Date	Time	Payment	
101-17-6199	A	Yangon	Normal	Male	Food and beverages	3/13/2019	19:44	Credit card	1
638-60-7125	A	Yangon	Normal	Female	Electronic accessories	2/14/2019	17:03	Credit card	1
632-90-0281	C	Naypyitaw	Normal	Female	Fashion accessories	3/8/2019	20:01	Credit card	1
633-09-3463	C	Naypyitaw	Normal	Female	Electronic accessories	3/28/2019	12:58	Credit card	1
633-44-8566	A	Yangon	Member	Male	Food and beverages	3/27/2019	20:35	Credit card	1
..									
370-96-0655	C	Naypyitaw	Normal	Female	Fashion accessories	1/9/2019	13:46	Ewallet	1
371-85-5789	B	Mandalay	Normal	Male	Health and beauty	3/5/2019	10:40	Ewallet	1
372-26-1506	C	Naypyitaw	Normal	Female	Fashion accessories	1/28/2019	19:24	Ewallet	1

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Print the values in categorical and numeric columns of traindata

```
[Invoice ID Branch City CustomerType Gender ProductLine Date Time Payment
101-17-6199 A Yangon Normal Male Food and beverages 3/13/2019 19:44 Credit card 1
638-60-7125 A Yangon Normal Female Electronic accessories 2/14/2019 17:03 Credit card 1
632-90-0281 C Naypyitaw Normal Female Fashion accessories 3/8/2019 20:01 Credit card 1
633-09-3463 C Naypyitaw Normal Female Electronic accessories 3/28/2019 12:58 Credit card 1
633-44-8566 A Yangon Member Male Food and beverages 3/27/2019 20:35 Credit card 1
..
370-96-0655 C Naypyitaw Normal Female Fashion accessories 1/9/2019 13:46 Ewallet 1
371-85-5789 B Mandalay Normal Male Health and beauty 3/5/2019 10:40 Ewallet 1
372-26-1506 C Naypyitaw Normal Female Fashion accessories 1/28/2019 19:24 Ewallet 1
372-62-5264 C Naypyitaw Normal Female Food and beverages 1/16/2019 14:42 Cash 1
898-04-2717 A Yangon Normal Male Fashion accessories 3/19/2019 15:49 Ewallet 1
Length: 636, dtype: int64, Invoice ID Branch City CustomerType Gender ProductLine Date Time Payment
101-17-6199 A Yangon Normal Male Food and beverages 3/13/2019 19:44 Credit card 1
638-60-7125 A Yangon Normal Female Electronic accessories 2/14/2019 17:03 Credit card 1
632-90-0281 C Naypyitaw Normal Female Fashion accessories 3/8/2019 20:01 Credit card 1
633-09-3463 C Naypyitaw Normal Female Electronic accessories 3/28/2019 12:58 Credit card 1
633-44-8566 A Yangon Member Male Food and beverages 3/27/2019 20:35 Credit card 1
..
370-96-0655 C Naypyitaw Normal Female Fashion accessories 1/9/2019 13:46 Ewallet 1
371-85-5789 B Mandalay Normal Male Health and beauty 3/5/2019 10:40 Ewallet 1
372-26-1506 C Naypyitaw Normal Female Fashion accessories 1/28/2019 19:24 Ewallet 1
372-62-5264 C Naypyitaw Normal Female Food and beverages 1/16/2019 14:42 Cash 1
898-04-2717 A Yangon Normal Male Fashion accessories 3/19/2019 15:49 Ewallet 1
Length: 636, dtype: int64, Invoice ID Branch City CustomerType Gender ProductLine Date Time Payment
```

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```
370-96-0655 C Naypyitaw Normal Female Fashion accessories 1/9/2019 13:46 Ewallet 1
371-85-5789 B Mandalay Normal Male Health and beauty 3/5/2019 10:40 Ewallet 1
372-26-1506 C Naypyitaw Normal Female Fashion accessories 1/28/2019 19:24 Ewallet 1
372-62-5264 C Naypyitaw Normal Female Food and beverages 1/16/2019 14:42 Cash 1
898-04-2717 A Yangon Normal Male Fashion accessories 3/19/2019 15:49 Ewallet 1
Length: 636, dtype: int64, Invoice ID Branch City CustomerType Gender ProductLine Date Time Payment
101-17-6199 A Yangon Normal Male Food and beverages 3/13/2019 19:44 Credit card 1
638-60-7125 A Yangon Normal Female Electronic accessories 2/14/2019 17:03 Credit card 1
632-90-0281 C Naypyitaw Normal Female Fashion accessories 3/8/2019 20:01 Credit card 1
633-09-3463 C Naypyitaw Normal Female Electronic accessories 3/28/2019 12:58 Credit card 1
633-44-8566 A Yangon Member Male Food and beverages 3/27/2019 20:35 Credit card 1
..
370-96-0655 C Naypyitaw Normal Female Fashion accessories 1/9/2019 13:46 Ewallet 1
371-85-5789 B Mandalay Normal Male Health and beauty 3/5/2019 10:40 Ewallet 1
372-26-1506 C Naypyitaw Normal Female Fashion accessories 1/28/2019 19:24 Ewallet 1
372-62-5264 C Naypyitaw Normal Female Food and beverages 1/16/2019 14:42 Cash 1
898-04-2717 A Yangon Normal Male Fashion accessories 3/19/2019 15:49 Ewallet 1
Length: 636, dtype: int64, Invoice ID Branch City CustomerType Gender ProductLine Date Time Payment
101-17-6199 A Yangon Normal Male Food and beverages 3/13/2019 19:44 Credit card 1
638-60-7125 A Yangon Normal Female Electronic accessories 2/14/2019 17:03 Credit card 1
632-90-0281 C Naypyitaw Normal Female Fashion accessories 3/8/2019 20:01 Credit card 1
633-09-3463 C Naypyitaw Normal Female Electronic accessories 3/28/2019 12:58 Credit card 1
633-44-8566 A Yangon Member Male Food and beverages 3/27/2019 20:35 Credit card 1
..
370-96-0655 C Naypyitaw Normal Female Fashion accessories 1/9/2019 13:46 Ewallet 1
```

Activate Windows



```

370-96-0655 C Naypyitaw Normal Female Fashion accessories 1/9/2019 13:46 Ewallet 1
371-85-5789 B Mandalay Normal Male Health and beauty 3/5/2019 10:40 Ewallet 1
372-26-1506 C Naypyitaw Normal Female Fashion accessories 1/28/2019 19:24 Ewallet 1
372-62-5264 C Naypyitaw Normal Female Food and beverages 1/16/2019 14:42 Cash 1
898-04-2717 A Yangon Normal Male Fashion accessories 3/19/2019 15:49 Ewallet 1
Length: 636, dtype: int64, Invoice ID Branch City CustomerType Gender ProductLine Date Time Payment
101-17-6199 A Yangon Normal Male Food and beverages 3/13/2019 19:44 Credit card 1
638-60-7125 A Yangon Normal Female Electronic accessories 2/14/2019 17:03 Credit card 1
632-90-0281 C Naypyitaw Normal Female Fashion accessories 3/8/2019 20:01 Credit card 1
633-09-3463 C Naypyitaw Normal Female Electronic accessories 3/28/2019 12:58 Credit card 1
633-44-8566 A Yangon Member Male Food and beverages 3/27/2019 20:35 Credit card 1
..
370-96-0655 C Naypyitaw Normal Female Fashion accessories 1/9/2019 13:46 Ewallet 1
371-85-5789 B Mandalay Normal Male Health and beauty 3/5/2019 10:40 Ewallet 1
372-26-1506 C Naypyitaw Normal Female Fashion accessories 1/28/2019 19:24 Ewallet 1
372-62-5264 C Naypyitaw Normal Female Food and beverages 1/16/2019 14:42 Cash 1
898-04-2717 A Yangon Normal Male Fashion accessories 3/19/2019 15:49 Ewallet 1
Length: 636, dtype: int64]
Print the values in categoric and numeric colums of traindata
[A 104
B 100
C 97
Name: Branch, dtype: int64, Yangon 104

```

Activate Win

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Print the values in categoric and numeric colums of traindata
[A 104
B 100
C 97
Name: Branch, dtype: int64, Yangon 104
Mandalay 100
Naypyitaw 97
Name: City, dtype: int64, Member 155
Normal 146
Name: CustomerType, dtype: int64, Female 157
Male 144
Name: Gender, dtype: int64, Electronic accessories 57
Home and lifestyle 51
Fashion accessories 51
Health and beauty 50
Food and beverages 48
Sports and travel 39
Name: ProductLine, dtype: int64, 3/2/2019 9
1/8/2019 8
1/19/2019 7
2/7/2019 7
1/24/2019 7
..
1/21/2019 1
1/16/2019 1
3/27/2019 1

```

```
Name: Date, Length: 85, dtype: int64, 11:40    4
10:33    3
14:42    3
10:38    3
12:40    3
..
13:23    1
11:27    1
11:12    1
16:36    1
13:28    1
Name: Time, Length: 241, dtype: int64, Ewallet    111
Cash    98
Credit card    92
Name: Payment, dtype: int64]
Printing product line counts after replacement in train data
Sports and travel    120
Fashion accessories    117
Food and beverages    107
Electronic accessories    102
Home and lifestyle    99
Health And Beauty    91
Name: ProductLine, dtype: int64
```

Printing product line counts after replacement in train data

Sports and travel 120  
Fashion accessories 117  
Food and beverages 107  
Electronic accessories 102  
Home and lifestyle 99  
Health And Beauty 91

Name: ProductLine, dtype: int64

Printing product line counts after replacement in test data

Electronic accessories 57  
Home and lifestyle 51  
Fashion accessories 51  
Health And Beauty 50  
Food and beverages 48  
Sports and travel 39

Name: ProductLine, dtype: int64

	Invoice ID	Branch	City	CustomerType	Gender	ProductLine	Unit price	Quantity	Tax 5%	Total	Date	Time	Payment	cogs
0	750-67-8428	A	Yangon	Member	Female	Health and beauty	74.69	7	26.1415	548.9715	1/5/2019	13:08	Ewallet	522.8
1	226-31-3081	C	Naypyitaw	Normal	Female	Electronic accessories	15.28	5	3.8200	80.2200	3/8/2019	10:29	Cash	76.4
2	631-41-3108	A	Yangon	Normal	Male	Home and lifestyle	46.33	7	16.2155	340.5255	3/3/2019	13:23	Credit card	324.3
3	123-19-1176	A	Yangon	Member	Male	Health and beauty	58.22	8	23.2880	489.0480	1/27/2019	20:33	Ewallet	465.7
4	373-73-7910	A	Yangon	Normal	Male	Sports and travel	86.31	7	30.2085	634.3785	2/8/2019	10:37	Ewallet	604.1

	Invoice ID	Branch	City	CustomerType	Gender	ProductLine	Unit price	Quantity	Tax 5%	Total	Date	Time	Payment	cogs
0	750-67-8428	A	Yangon	0	0	Health and beauty	74.69	7	26.1415	548.9715	1/5/2019	13:08	2	522.83
1	226-31-3081	C	Naypyitaw	1	0	Electronic accessories	15.28	5	3.8200	80.2200	3/8/2019	10:29	0	76.40
1	226-31-3081	C	Naypyitaw	1	0	Electronic accessories	15.28	5	3.8200	80.2200	3/8/2019	10:29	0	76.40
2	631-41-3108	A	Yangon	1	1	Home and lifestyle	46.33	7	16.2155	340.5255	3/3/2019	13:23	1	324.31
3	123-19-1176	A	Yangon	0	1	Health and beauty	58.22	8	23.2880	489.0480	1/27/2019	20:33	2	465.76
4	373-73-7910	A	Yangon	1	1	Sports and travel	86.31	7	30.2085	634.3785	2/8/2019	10:37	2	604.17

	CustomerType	Gender	...	ProductLine_Sports and travel	ProductLine_nan
0	0	0	...	0	0
1	1	0	...	0	0
2	1	1	...	0	0
3	0	1	...	0	0
4	1	1	...	1	0

[5 rows x 19 columns]

Mean Absolute Error: 0.91

Mean Squared Error: 1.55

R^2 Score: 81.56%

LinearRegression() Scores:

81.27 %

77.72 %

80.15 %

84.4 %

80.76 %

Average LinearRegression() score: 80.8578 %

Activate Windows

```
77.72 %
80.15 %
84.4 %
80.76 %
Average LinearRegression() score: 80.8578 %

```

	0	1	2	3	4	5	6	7	8	9
count	1.000000e+03	1.000000e+03	1.000000e+03	1.000000e+03	1.000000e+03	1.000000e+03	1.000000e+03	1.000000e+03	1.000000e+03	1.000000e+03
mean	-1.065814e-17	5.151435e-17	-1.065814e-16	6.394885e-17	1.314504e-16	1.243450e-16	-1.048051e-16	-2.131628e-17	-1.136868e-16	-2.131628e-17
std	1.000500e+00	1.000500e+00	1.000500e+00	1.000500e+00	1.000500e+00	1.000500e+00	1.000500e+00	1.000500e+00	1.000500e+00	1.000500e+00
min	-9.980020e-01	-9.980020e-01	-1.721668e+00	-1.543480e+00	-1.205937e+00	-1.270692e+00	-7.177406e-01	-7.049865e-01	-6.986381e-01	-7.049865e-01
25%	-9.980020e-01	-9.980020e-01	-8.608740e-01	-8.590099e-01	-1.205937e+00	-8.078714e-01	-7.177406e-01	-7.049865e-01	-6.986381e-01	-7.049865e-01
50%	-9.980020e-01	-9.980020e-01	-1.669588e-02	-1.745399e-01	-1.204733e-03	-2.812422e-01	-7.177406e-01	-7.049865e-01	-6.986381e-01	-7.049865e-01
75%	1.002002e+00	1.002002e+00	8.406991e-01	8.521652e-01	1.203528e+00	6.037682e-01	1.393261e+00	1.418467e+00	1.431356e+00	1.418467e+00
max	1.002002e+00	1.002002e+00	1.672416e+00	1.536635e+00	1.203528e+00	2.928371e+00	1.393261e+00	1.418467e+00	1.431356e+00	1.418467e+00

```
KMeans(n_clusters=3)
12974.298699086336
3 340
1 326
2 275
0 54
4 5
Name: cluster, dtype: int64

Process finished with exit code 0
```