

Business Intelligence & Insights

Business intelligence can be defined as a data driven solution provided by an expert business team which includes the insights on sales and marketing data, prediction on the sales or another aspect of the business organization, or the profit making analysis of the given data.

There are various business tools that project and general managers along with the sales department of an organization to provide insights on business or products or the on the areas that needs to be concentrated or on the areas that needs to be improvised or dropped for the business to move on in a smooth way.

The common business tools in this process used are:

- 1.SAP business Intelligence
- 2.Microstrategy
- 3.Data Pine
- 4.SAS business Intelligence
- 5.Microsoft Power BI

And many more.

The Business intelligence tools are as well used in Cloud Systems and are also can be implemented through Programming using various Programming Languages such as Python.

Python's matplotlib Library and the Seaborn library are one of the best libraries which are used in data visualization. Experts good in programming usually use the Python as their tool to asses the given data of any business organization.

The data that I have chosen here is from Kaggle.it is a Super market dataset.

The link for the dataset is as given below:

<https://www.kaggle.com/aungpyaeap/supermarket-sales>

the dataset Metadata which was attached with the data set is as follows:

Description

Context

The growth of supermarkets in most populated cities are increasing and market competitions are also high. The dataset is one of the historical sales of supermarket company which has recorded in 3 different branches for 3 months data. Predictive data analytics methods are easy to apply with this dataset.

Attribute information

Invoice id: Computer generated sales slip invoice identification number

Branch: Branch of supercenter (3 branches are available identified by A, B and C).

City: Location of supercenters

Customer type: Type of customers, recorded by Members for customers using member card and Normal for without member card.

Gender: Gender type of customer

Product line: General item categorization groups - Electronic accessories, Fashion accessories, Food and beverages, Health and beauty, Home and lifestyle, Sports and travel

Unit price: Price of each product in \$

Quantity: Number of products purchased by customer

Tax: 5% tax fee for customer buying

Total: Total price including tax

Date: Date of purchase (Record available from January 2019 to March 2019)

Time: Purchase time (10am to 9pm)

Payment: Payment used by customer for purchase (3 methods are available – Cash, Credit card and Ewallet)

COGS: Cost of goods sold

Gross margin percentage: Gross margin percentage

Gross income: Gross income

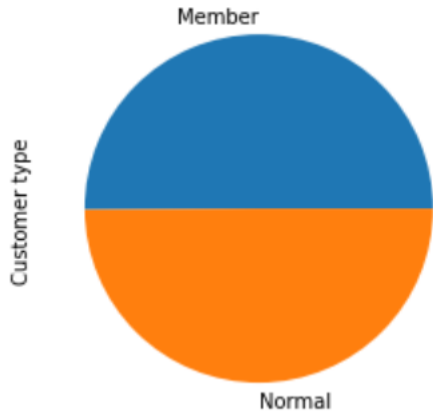
Rating: Customer stratification rating on their overall shopping experience (On a scale of 1 to 10)

The Analysis on this dataset showed the Following insights:

1. Analysis was done how many People are Customer Types of Members and Non Members:

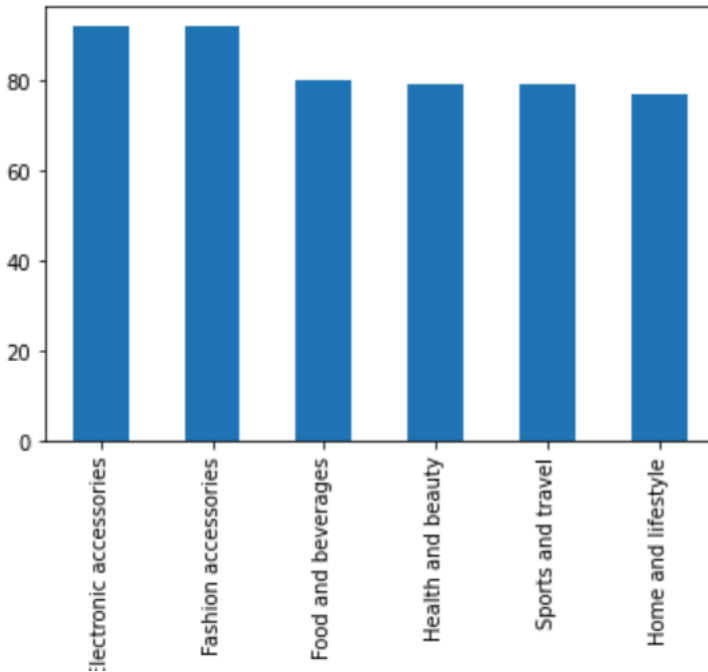
The Following Results were obtained:

```
Member      501
Normal      499
Name: Customer type, dtype: int64
<matplotlib.axes._subplots.AxesSubplot :>
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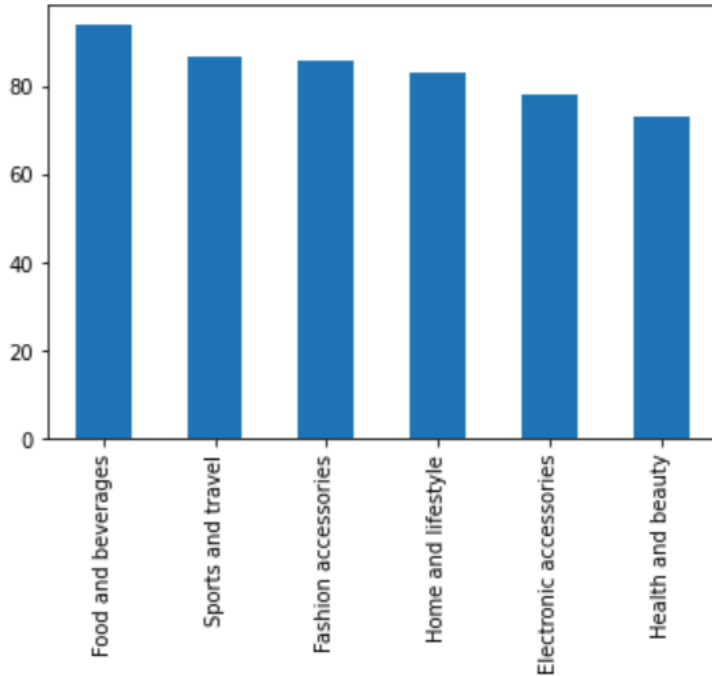


So there were Equal Number of Member Customers than the Non Members

2. Analysis on what type of products Non Member Customers was done and the results are as follows:



3. Member Customers also bought products in the following manner:



Here the Members also show similar types of behaviors as that of the Non Members. Only Difference is the number of people purchasing the health and beauty products are more.

The Preference of Member Customers is more in buying the Electronic accessories and the preferences of Non Members is mostly on Food and Beverages.

4. Now Let us analyse how many people in total regardless of members or non members purchase various products

The total number of Sale invoice recorded in the following is 1000

```

Fashion accessories      178
Food and beverages      174
Electronic accessories   170
Sports and travel        166
Home and lifestyle       160
Health and beauty        152
Name: Product line, dtype: int64

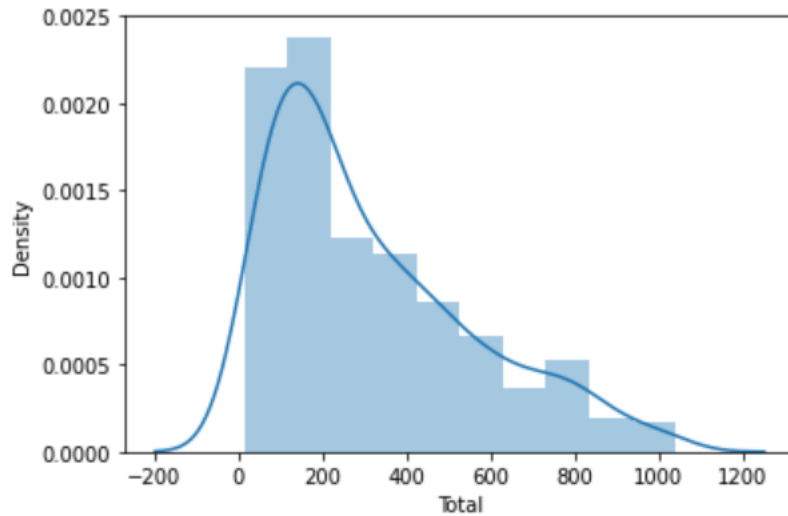
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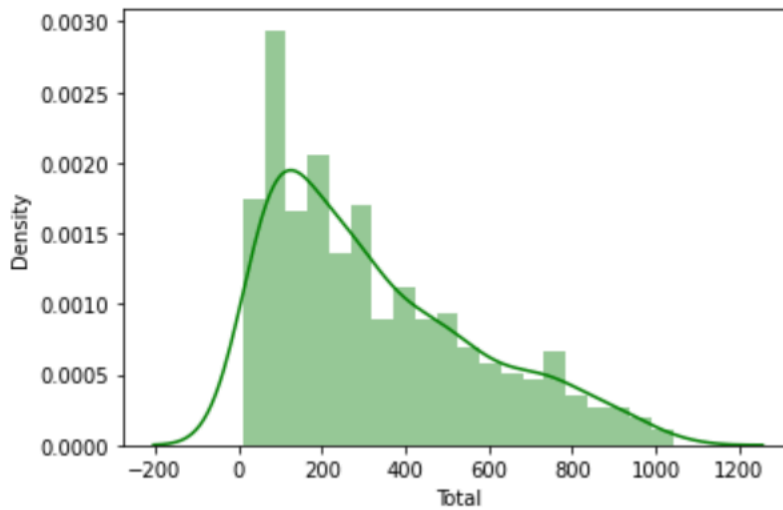
Hence the customer being a member or a Non member has not affected the has not affected much in the product purchase as the products are bought equally.

But the Popularity of the product bought is important

5. Now Let us Analyse the Spending Pattern of Members and NonMembers



The Above is for NON members



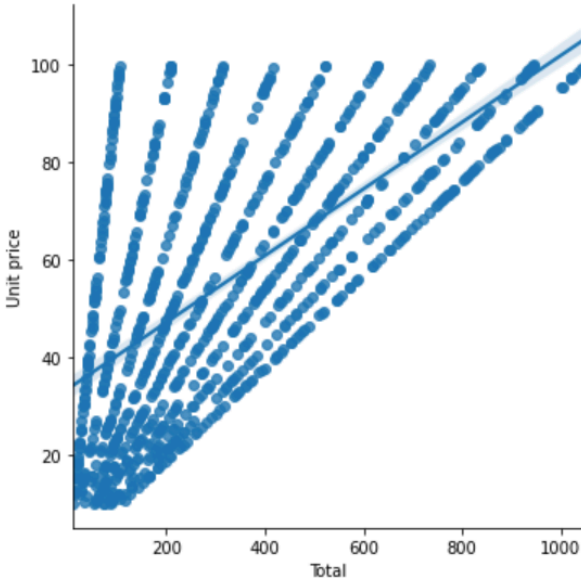
The Above is the Graph of Members

We can Observe that Non Members spend very less in the range of 800 to 1000

Where as there are many members who spend in that range

Increasing the Way the Members Spend in this range can have effect on Profit.

6. Analysis of Effect of Unit Price on the Total amount spent

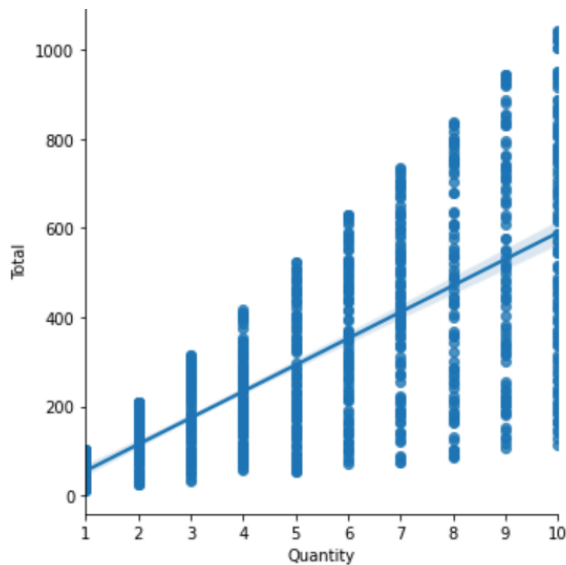


The Above plot shows that there is a linearity is Total Spend by customers with the unit price.

Hence Unit price can only be increased but not decreased. But Increase in unit price may not attract many customers. Hence ,Best option is to provide offers to customers and where the Unit price is too high and increasing the low priced items can balance the Income.

7. Some times giving Discounts on the Products can increase the Quantity Purchased and hence the Total Spend as well

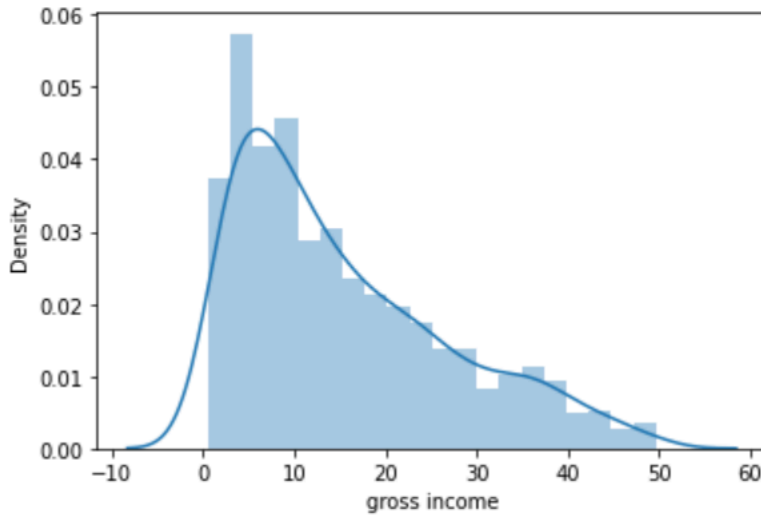
This can be shown by the following graph:



So Quantity has Linear positive Relationship with the Total.

On a whole Increasing the member privileges can benefit the Sales.

8. The Gross Income from various customers is as obtained:



A maximum gross income is obtained as per the graph from 1 to 15.

Hence it is a good range but needs to be targeted for changes in sales in a positive manner.

9. With respect to the Numerical Values from member data and the Non Member Data:

Nonmembers:

	Unit price	Quantity	Tax 5%	Total	cogs	gross margin percentage	gross income	Rating
count	499.000000	499.000000	499.000000	499.000000	499.000000	4.990000e+02	499.000000	499.000000
mean	55.135130	5.460922	15.148707	318.122856	302.974148	4.761905e+00	15.148707	7.005210
std	26.262452	2.886747	11.614419	243.902800	232.288381	4.000814e-14	11.614419	1.688222
min	10.560000	1.000000	0.604500	12.694500	12.090000	4.761905e+00	0.604500	4.000000
25%	33.230000	3.000000	6.154000	129.234000	123.080000	4.761905e+00	6.154000	5.700000
50%	54.280000	5.000000	11.306000	237.426000	226.120000	4.761905e+00	11.306000	7.000000
75%	76.460000	8.000000	22.029000	462.609000	440.580000	4.761905e+00	22.029000	8.400000
max	99.960000	10.000000	49.490000	1039.290000	989.800000	4.761905e+00	49.490000	10.000000

Members:

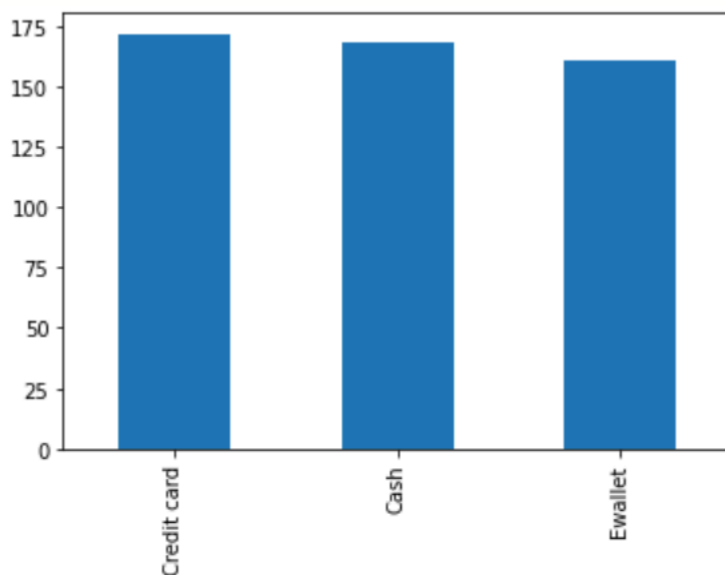
	Unit price	Quantity	Tax 5%	Total	cogs	gross margin percentage	gross income	Rating
count	501.000000	501.000000	501.000000	501.000000	501.000000	5.010000e+02	501.000000	501.000000
mean	56.206986	5.558882	15.609110	327.791305	312.182196	4.761905e+00	15.609110	6.940319
std	26.739386	2.961592	11.809228	247.993782	236.184554	4.000798e-14	11.809228	1.749380
min	10.080000	1.000000	0.508500	10.678500	10.170000	4.761905e+00	0.508500	4.000000
25%	32.250000	3.000000	5.631000	118.251000	112.620000	4.761905e+00	5.631000	5.400000
50%	56.040000	5.000000	12.668000	266.028000	253.360000	4.761905e+00	12.668000	7.000000
75%	79.930000	8.000000	23.122500	485.572500	462.450000	4.761905e+00	23.122500	8.500000
max	99.960000	10.000000	49.650000	1042.650000	993.000000	4.761905e+00	49.650000	10.000000

The Following Conclusions are Obtained:

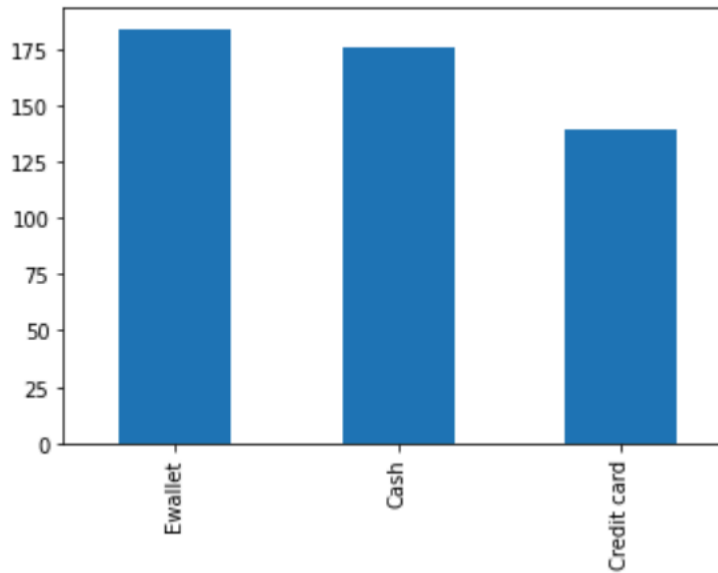
- COGS is found to be slightly more for members than Non-Members
- Tax Amounts obtained from Members is also high
- But Rating of Experience with Members is not so good as that of Non-Members
- Total Spend is Also High
- Hence Concentration on Experience of Members Must be Given and Concentration on Converting Non-Members to Members must be Targeted
- Gross Marginal Percentage is not affected by the Membership
- COGS is High in Members but on the other side Gross Marginal percentage is also high in Members

Hence increasing the Number of Members have good Benefits.

10. Now Analysis must be made on the Mode of Payments the Members and the Non-Members Use



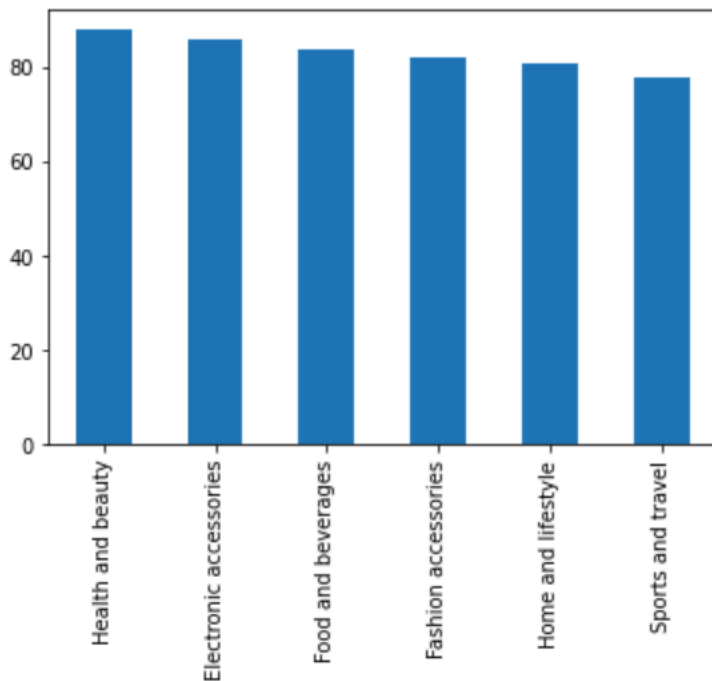
The Above is of Members. Members are found to use a Credit Card than the E wallets.



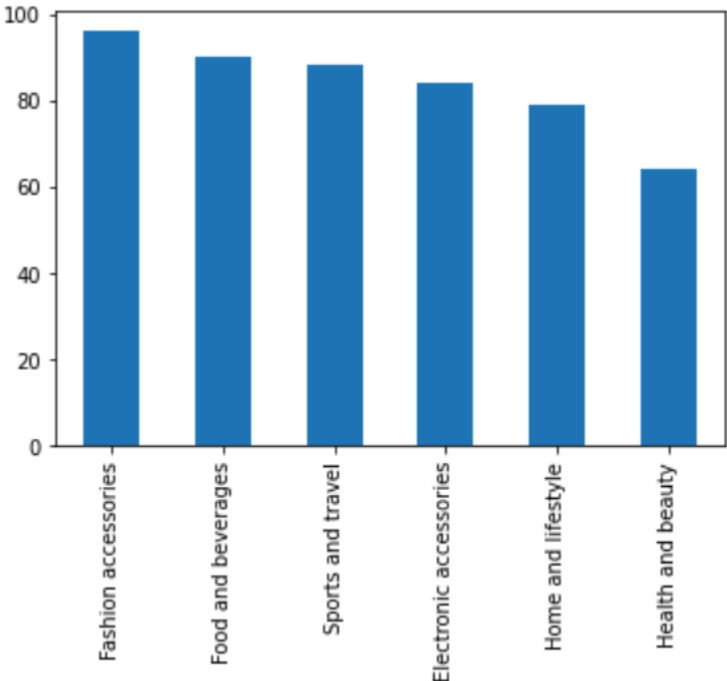
The Above graph is of the Nonmembers. They Use a lot of EWallets.

The Special offers on E-Wallets can be given to members as well to ease the Conversion of Members to non members. Members become our Frequent Customers due to the Privileges given and hence Benefits do increase

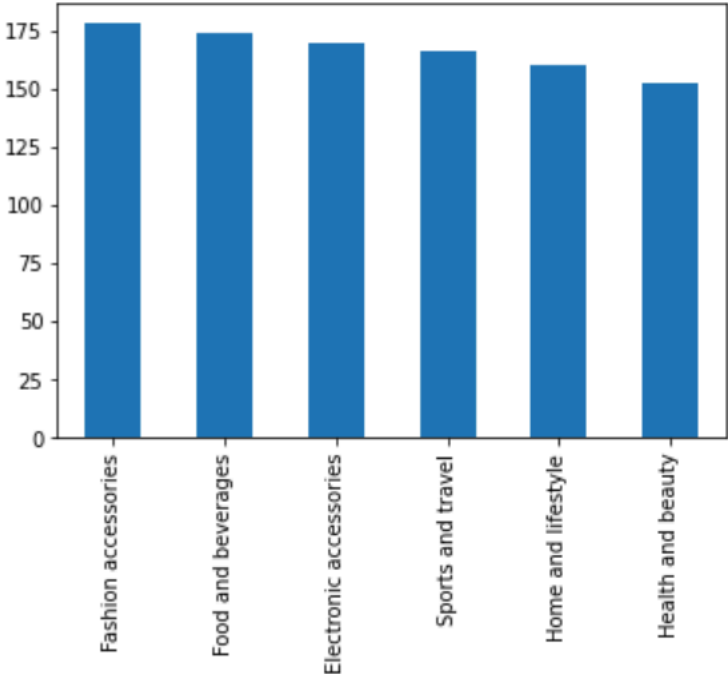
11. Now let us analyse how is purchase of men going on in the market



12. Analysis on Women going to market:



The data of Various Products have been Collected as Following Described below:



The Unit Prices have been found to have Profound effect on Total Spend.

The Unit Prices as shown above have been high for Fashion Accessories and less for Health and beauty.

From the above graphs :

1. Men are found more to shop on health and beauty products and Women are found more to shop on Fashion accessories.

- So from above descriptions increasing sales for Fashion accessories for women**
- and increasing health and beauty sales for Men will gain profit, provided there should also be an increase in unit prices.**
- and increasing food sales in both of quantities in large amounts with offers will increase customer experience**
- both male and female experience standards must be concentrated**
- the target on Nonmembers becoming members should be concentrated**
- especially among male**
- and sale among women must be calculated to get good profit**

The python notebook for the following data can be seen at

<https://colab.research.google.com/drive/1Wv7cPTnvdsRtrXVmH1YTyfCs-5jwTQ-?usp=sharing>