supermarket-sales

February 4, 2025

[1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

[2]:
```
df = pd.read_csv("supermarket_sales - Sheet1.csv")
df.head()
```

[2]:

	Invoice ID	Branch	City	Customer type	Gender	Product line	Unit price	Quantity	Tax 5%	Total	Date	Time	Payment	cogs	gross margin percentage	gross income	Rating
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	4.761905	26.1415	9.1
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	4.761905	3.8200	9.6
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	4.761905	16.2155	7.4
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	4.761905	23.2880	8.4
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	4.761905	30.2085	5.3

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 17 columns):
 #   Column                   Non-Null Count  Dtype
---  ------                   --------------  -----
 0   Invoice ID               1000 non-null   object
 1   Branch                   1000 non-null   object
```

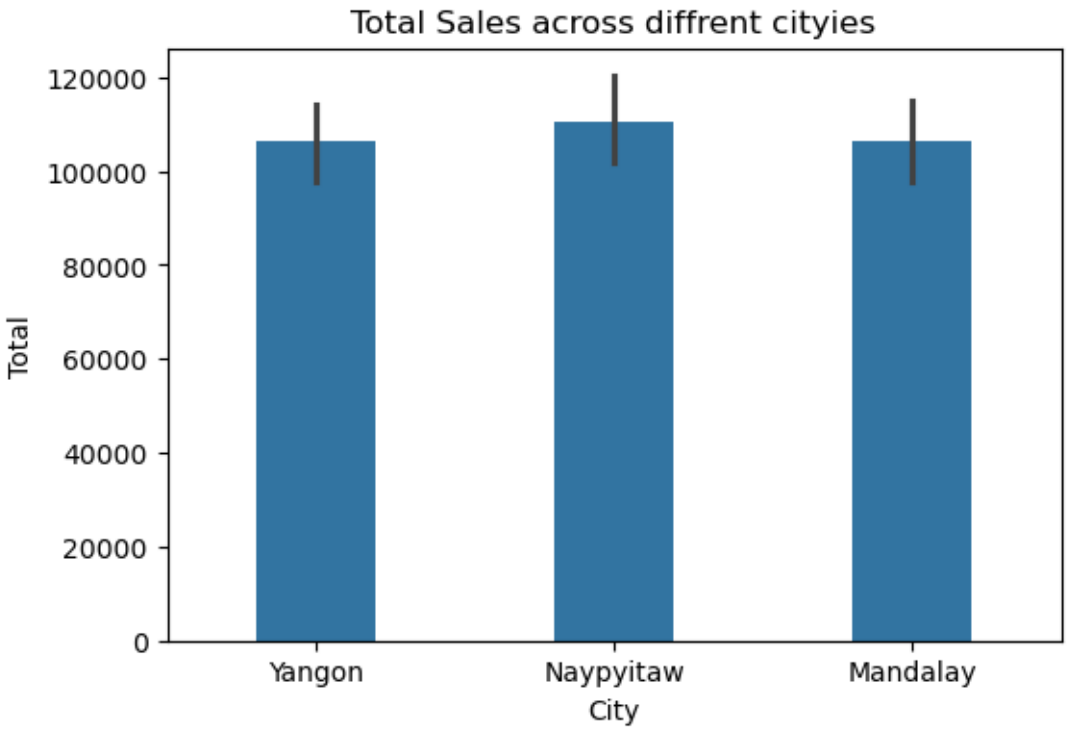
```
 2   City                      1000 non-null   object
 3   Customer type             1000 non-null   object
 4   Gender                    1000 non-null   object
 5   Product line              1000 non-null   object
 6   Unit price                1000 non-null   float64
 7   Quantity                  1000 non-null   int64
 8   Tax 5%                    1000 non-null   float64
 9   Total                     1000 non-null   float64
 10  Date                      1000 non-null   object
 11  Time                      1000 non-null   object
 12  Payment                   1000 non-null   object
 13  cogs                      1000 non-null   float64
 14  gross margin percentage   1000 non-null   float64
 15  gross income              1000 non-null   float64
 16  Rating                    1000 non-null   float64
dtypes: float64(7), int64(1), object(9)
memory usage: 132.9+ KB
```

[4]:
```
df.isnull().sum() # No Null Values in data
```

[4]:
```
Invoice ID                 0
Branch                     0
City                       0
Customer type              0
Gender                     0
Product line               0
Unit price                 0
Quantity                   0
Tax 5%                     0
Total                      0
Date                       0
Time                       0
Payment                    0
cogs                       0
gross margin percentage    0
gross income               0
Rating                     0
dtype: int64
```

0.1 Branch and City Analysis

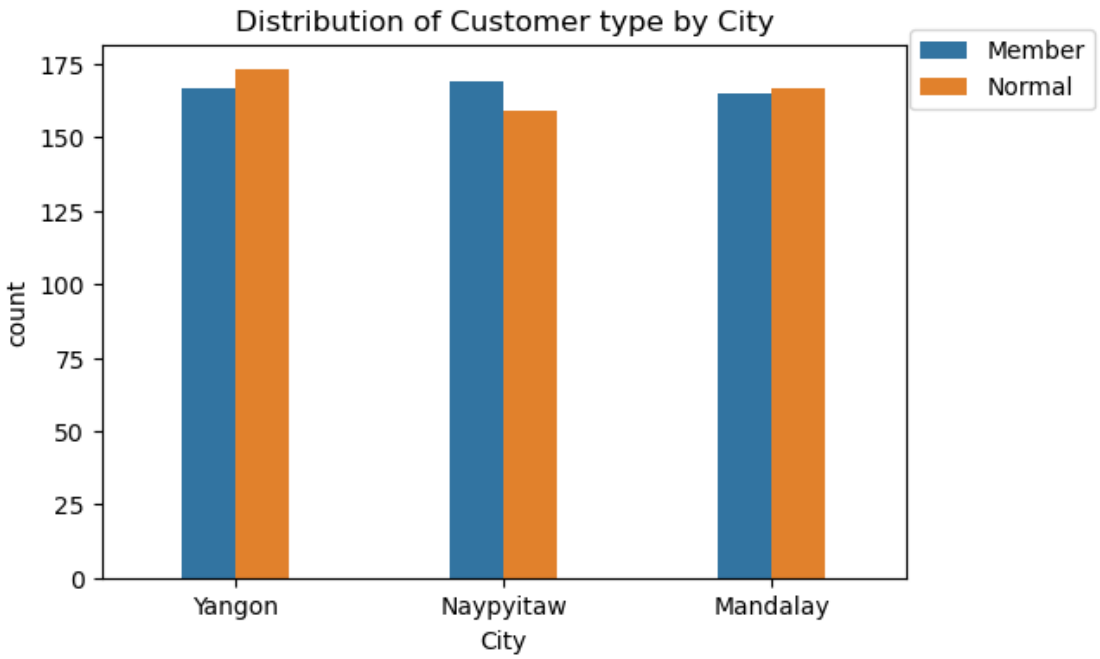
[16]:
```
plt.figure(figsize = (6,4))
sns.barplot(x = "City",y = "Total",data = df,estimator = sum,width = 0.4)

plt.title("Total Sales across diffrent cityies")
plt.show()
```



The chart show minimal variation across diffrent cities indicating that customer demand for product is relatively consistant acrros diffrent loaction or in braches.“All Branches nearly generate same revenue”.

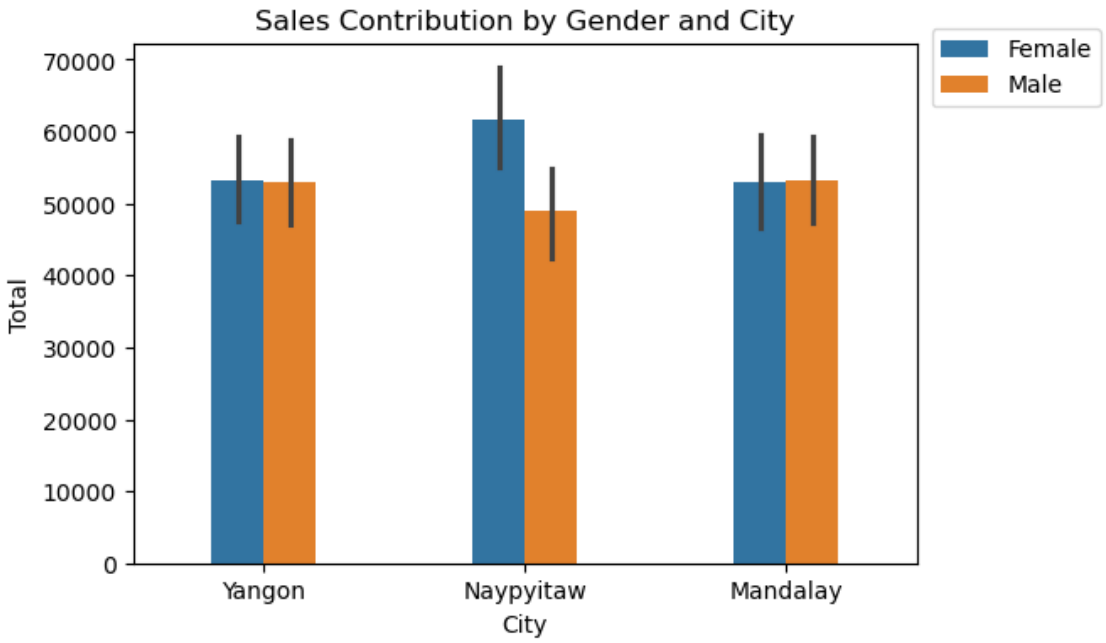
0.2 Customer Distribution

[30]:
```
plt.figure(figsize = (6,4))
sns.countplot(x = "City",data = df,hue = "Customer type",width = 0.4)

plt.title("Distribution of Customer type by City")

plt.legend(loc="upper right", bbox_to_anchor=(1.25, 1.05))
plt.show()
```



The graph show number of Member and Normal in each cities.

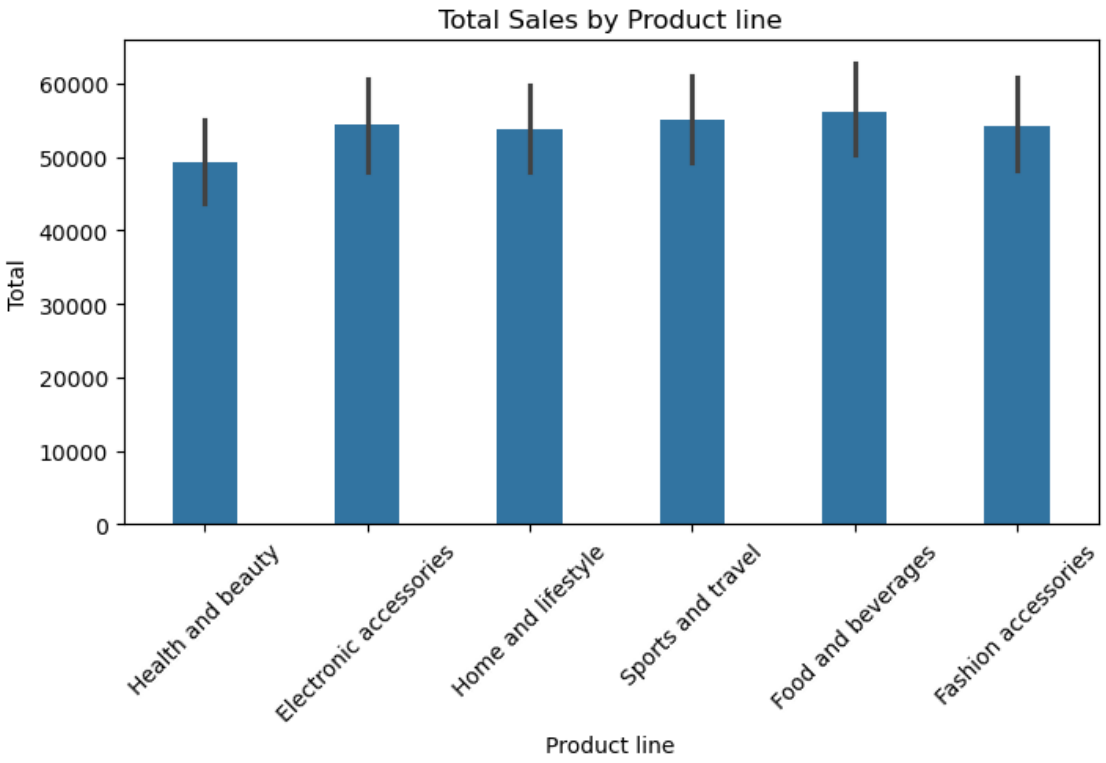
[35]:
```
plt.figure(figsize = (6,4))
sns.barplot(x = "City",y = "Total",data = df,hue = "Gender",estimator =␣
 ↪sum,width = 0.4)

plt.title("Sales Contribution by Gender and City")

plt.legend(loc="upper right", bbox_to_anchor=(1.25, 1.05))
plt.show()
```



In Yangon and Mandalay, there is no significant difference in sales contributions between male and female customers, indicating a balanced gender distribution. However, in Naypyitaw, "female" customers contribute significantly more to sales compared to male customers

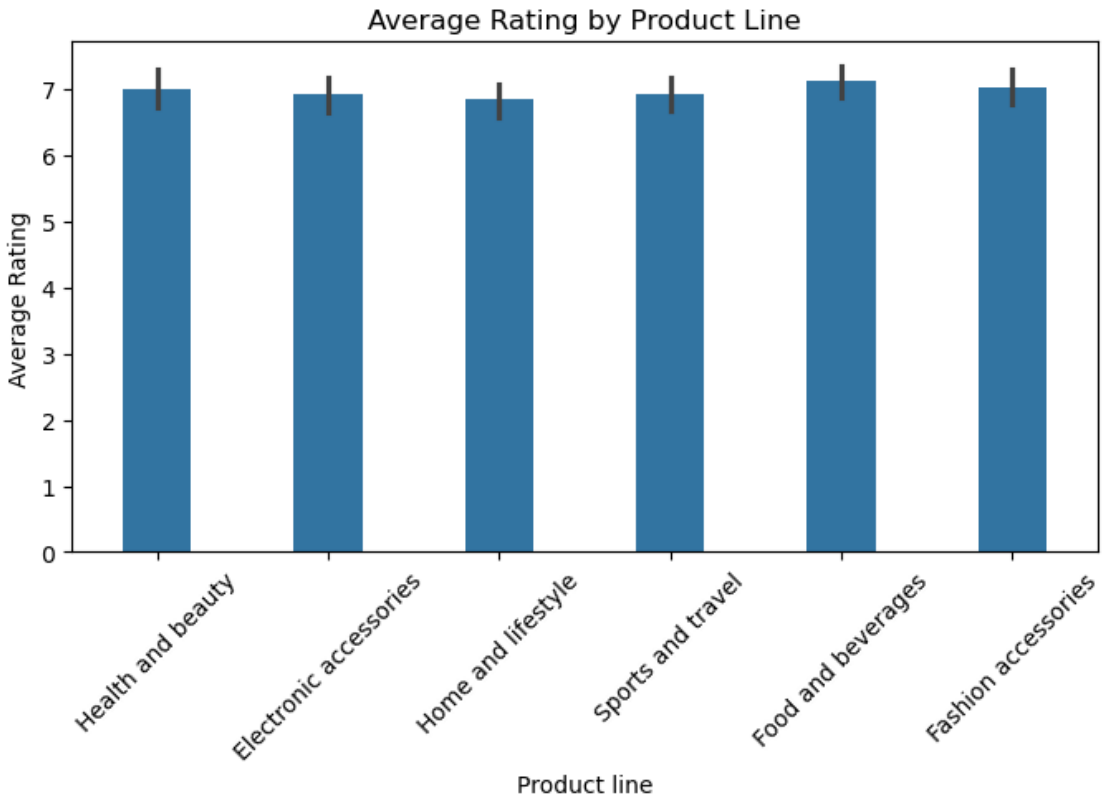
0.3 Product Line Analysis

[44]:
```
plt.figure(figsize = (8,4))
sns.barplot(x = "Product line",y = "Total",data = df,estimator = sum,width = 0.
↪4)

plt.title("Total Sales by Product line")
plt.xticks(rotation = 45)
plt.show()
```



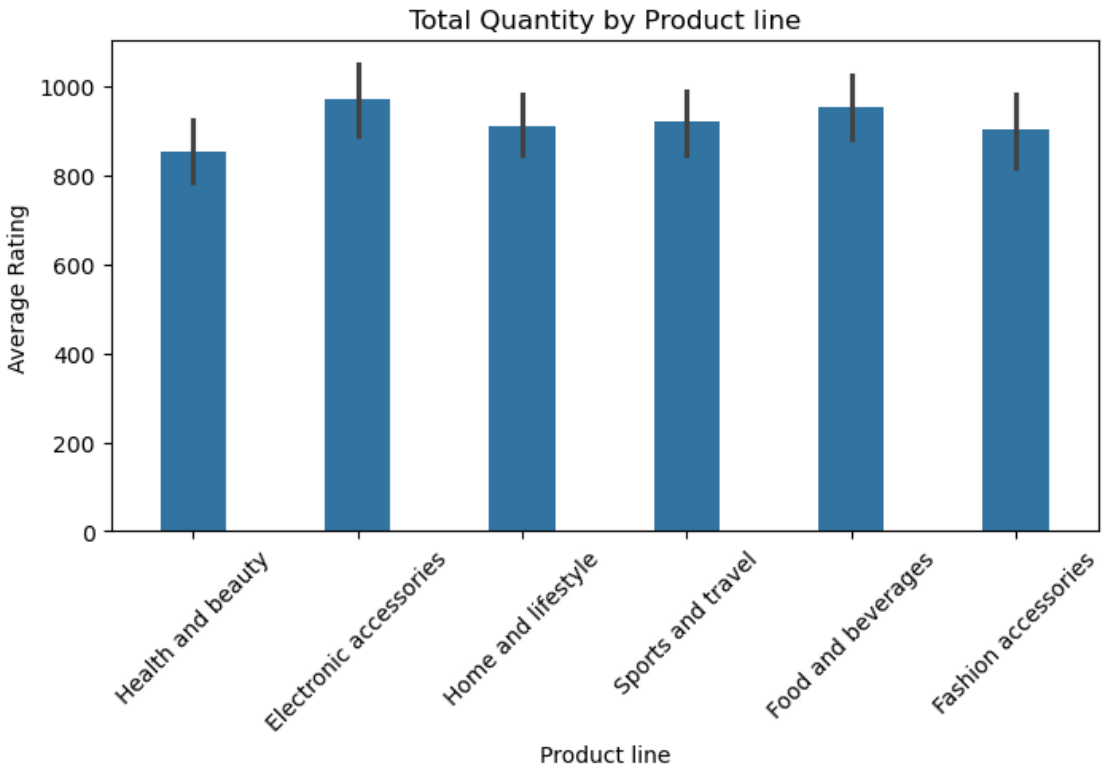
"Food and beverages" generates the highest total revenue among all product lines. "Health and beauty" have lower revenue as comapare to other.

[49]:
```
plt.figure(figsize=(8, 4))
sns.barplot(x="Product line", y="Rating", data=df, estimator='mean', width=0.4)

plt.title("Average Rating by Product Line")
plt.xticks(rotation=45)
plt.ylabel("Average Rating")
plt.show()
```



There is no significant diffrence in Rating of each Product line

[51]:
```
plt.figure(figsize=(8, 4))
sns.barplot(x="Product line", y="Quantity", data=df, estimator='sum', width=0.4)

plt.title("Total Quantity by Product line")
plt.xticks(rotation=45)
plt.ylabel("Average Rating")
plt.show()
```



From given chart "Electronic Accessories" sold highest Quantities.

0.4 Sale Trend

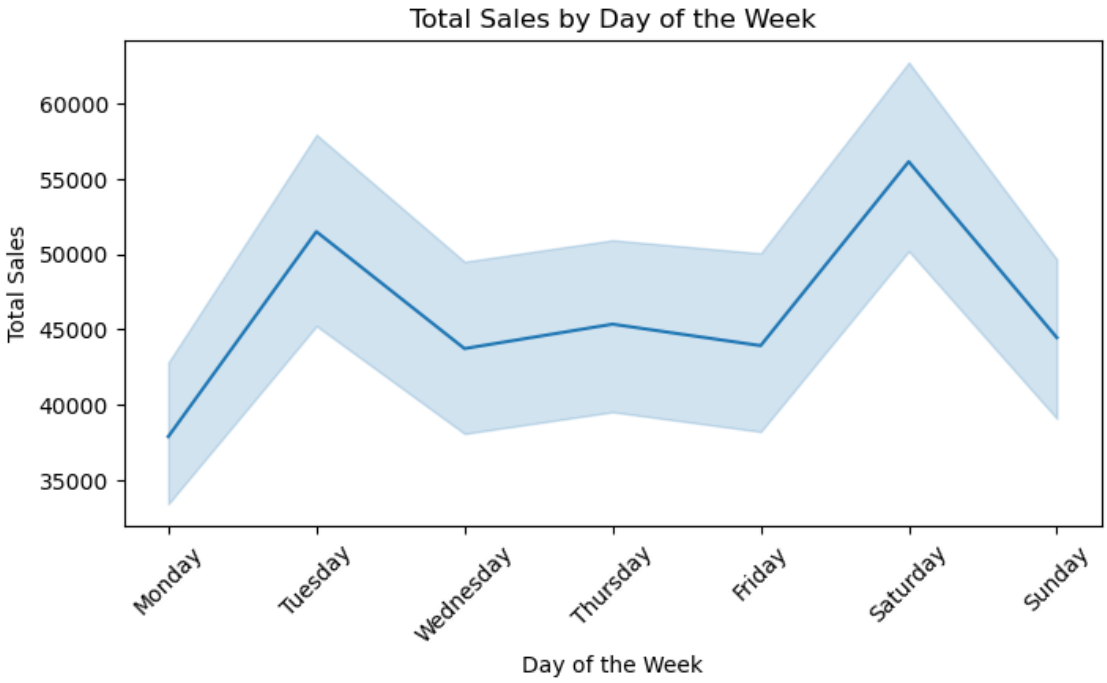
[60]:
```
df["Date"] = pd.to_datetime(df["Date"])
```

[61]:
```
df["Months"] = df["Date"].dt.month # Extracting months from date to add new␣
↪coloumn of months
```

[68]:
```
df["Day_name"] = df["Date"].dt.day_name() # Extracting DAyname from date to add␣
↪new coloumn of months
```

[77]:
```
day_order = ["Monday", "Tuesday", "Wednesday", "Thursday", "Friday",␣
↪"Saturday", "Sunday"]
df["Day_name"] = pd.Categorical(df["Day_name"], categories=day_order,␣
↪ordered=True)

plt.figure(figsize=(8, 4))
sns.lineplot(x="Day_name", y="Total", estimator=sum, data=df)

plt.title("Total Sales by Day of the Week")
plt.xticks(rotation=45)
```

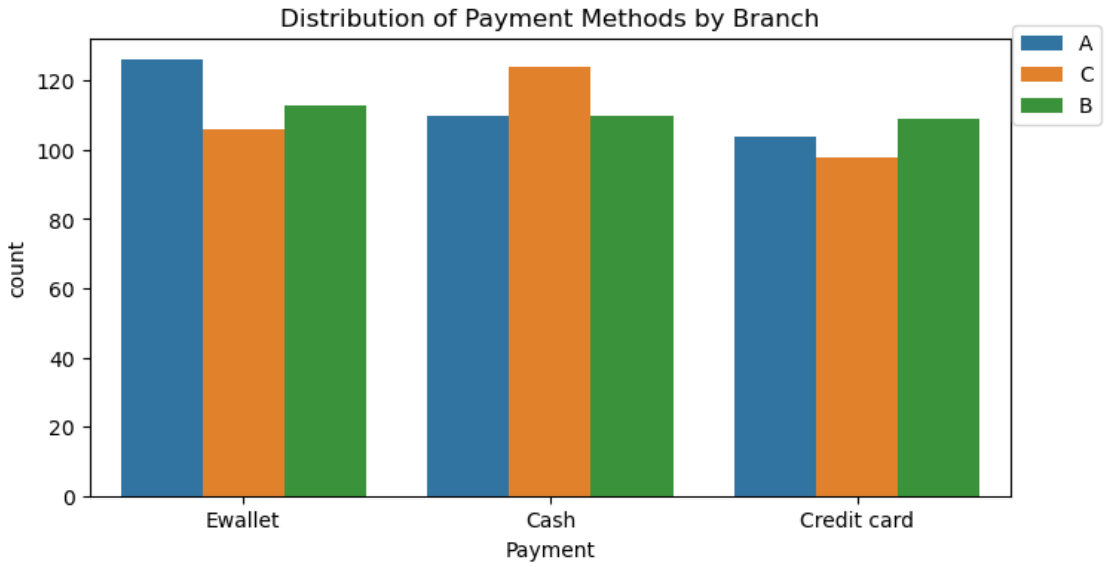
```
plt.ylabel("Total Sales")
plt.xlabel("Day of the Week")
plt.show()
```



This chart show peak Sales on "Monday and Saturday". and lower on other days.

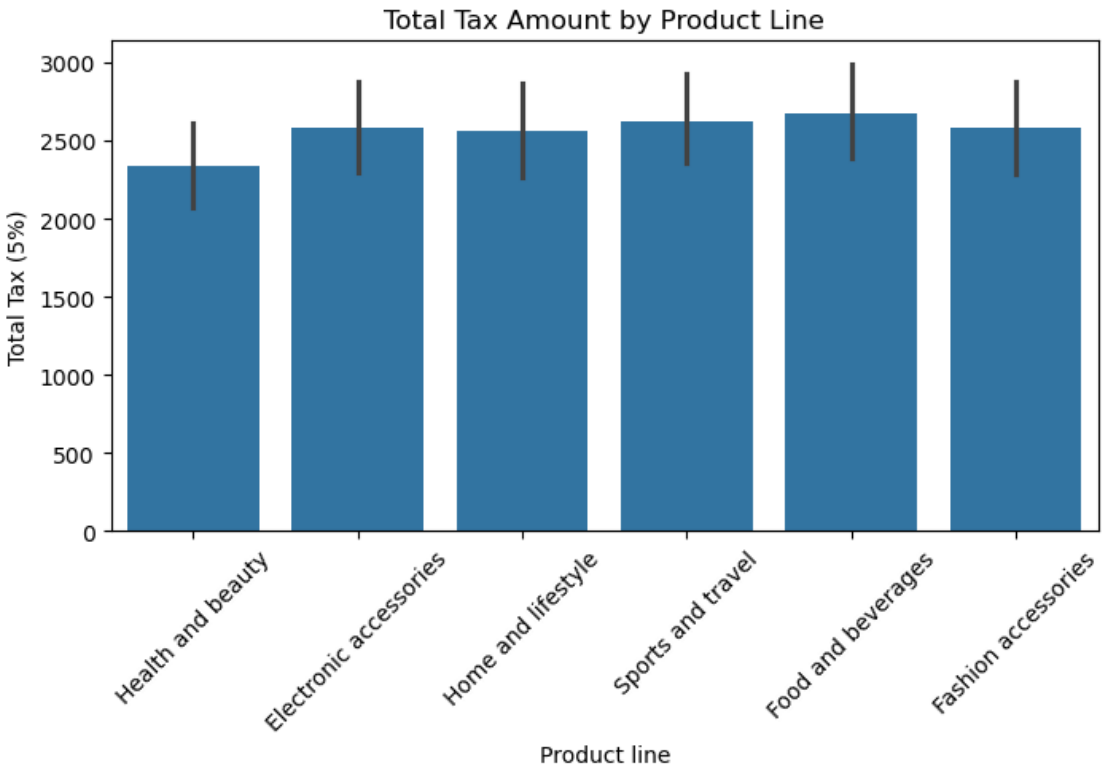
0.5 Payment Method

[84]:
```
plt.figure(figsize = (8,4))
sns.countplot(x = "Payment",data = df,hue = "Branch")

plt.title("Distribution of Payment Methods by Branch")
plt.legend(loc="upper right", bbox_to_anchor=(1.11, 1.05))
plt.show()
```



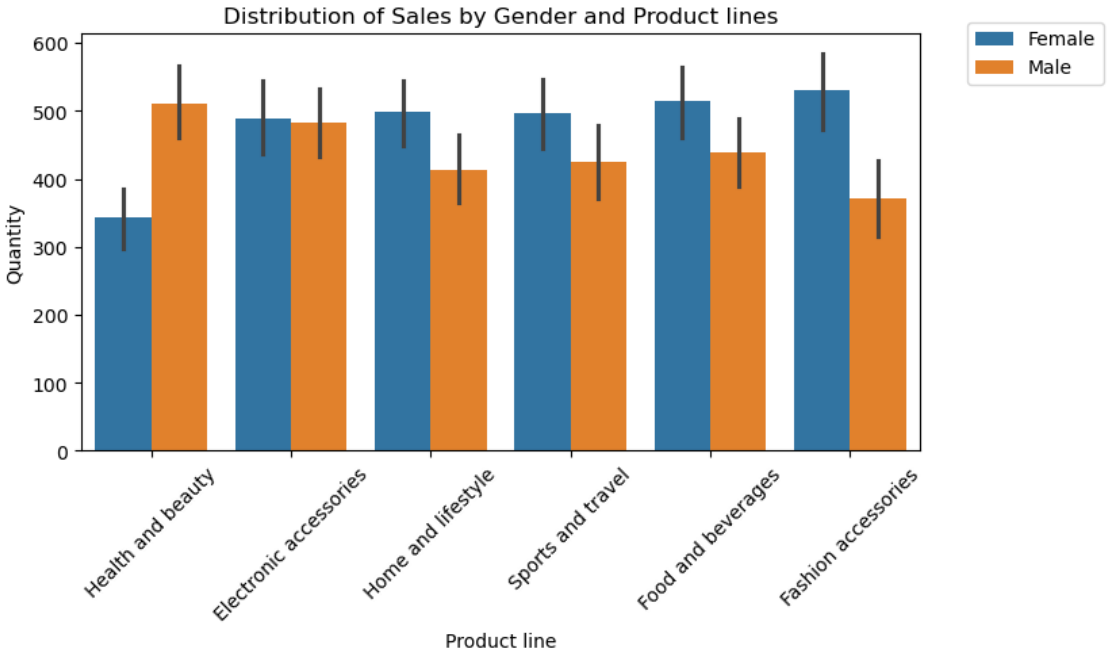
"E-wallet" is most polpular in brach A, "Cash Payment" in branh C and "Credit card" usage is balance in all branches.

[95]:
```
# Tax amount variation by product line
plt.figure(figsize=(8, 4))
sns.barplot(x="Product line", y="Tax 5%", data=df, estimator=sum)
plt.title("Total Tax Amount by Product Line")
plt.ylabel("Total Tax (5%)")
plt.xticks(rotation=45)
plt.show()
```



Health and beauty have low tax

[97]:
```
plt.figure(figsize = (8,4))
sns.barplot(x = "Product line",y = "Quantity",data = df,estimator = sum,hue =␣
 ↪"Gender")

plt.title("Distribution of Sales by Gender and Product lines")
plt.xticks(rotation = 45)
plt.legend(loc="upper right", bbox_to_anchor=(1.23, 1.05))
plt.show()
```



Males have high sales only in "Health and Beauty," while females have the highest sales across all other product types.

[ ]: