

Diwali_Sales_Analysis

June 2, 2025

```
[1]: # import python libraries
```

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt # visualizing data
%matplotlib inline
import seaborn as sns
```

```
[2]: # import csv file
```

```
df = pd.read_csv('Diwali Sales Data.csv', encoding= 'unicode_escape')
```

```
[3]: df.shape
```

```
[3]: (11251, 15)
```

```
[4]: df.head()
```

```
[4]:   User_ID  Cust_name Product_ID Gender Age Group  Age  Marital_Status  \
0  1002903  Sanskriti  P00125942      F   26-35   28           0
1  1000732    Kartik  P00110942      F   26-35   35           1
2  1001990    Bindu  P00118542      F   26-35   35           1
3  1001425    Sudevi  P00237842      M    0-17   16           0
4  1000588     Joni  P00057942      M   26-35   28           1
```

```
   State      Zone      Occupation Product_Category  Orders  \
0  Maharashtra  Western      Healthcare           Auto      1
1  Andhra Pradesh  Southern           Govt           Auto      3
2  Uttar Pradesh  Central      Automobile           Auto      3
3   Karnataka  Southern      Construction           Auto      2
4    Gujarat  Western  Food Processing           Auto      2
```

```
   Amount  Status  unnamed1
0  23952.0    NaN      NaN
1  23934.0    NaN      NaN
2  23924.0    NaN      NaN
3  23912.0    NaN      NaN
4  23877.0    NaN      NaN
```

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 11251 entries, 0 to 11250
Data columns (total 15 columns):
#   Column                Non-Null Count  Dtype
---  -
0   User_ID               11251 non-null  int64
1   Cust_name             11251 non-null  object
2   Product_ID           11251 non-null  object
3   Gender                11251 non-null  object
4   Age Group             11251 non-null  object
5   Age                   11251 non-null  int64
6   Marital_Status        11251 non-null  int64
7   State                 11251 non-null  object
8   Zone                  11251 non-null  object
9   Occupation            11251 non-null  object
10  Product_Category      11251 non-null  object
11  Orders                11251 non-null  int64
12  Amount                11239 non-null  float64
13  Status                0 non-null      float64
14  unnamed1              0 non-null      float64
dtypes: float64(3), int64(4), object(8)
memory usage: 1.3+ MB
```

```
[6]: #drop unrelated/blank columns
df.drop(['Status', 'unnamed1'], axis=1, inplace=True)
```

```
[7]: #check for null values
pd.isnull(df).sum()
```

```
[7]: User_ID           0
Cust_name           0
Product_ID          0
Gender              0
Age Group           0
Age                 0
Marital_Status      0
State               0
Zone                0
Occupation          0
Product_Category    0
Orders              0
Amount              12
dtype: int64
```

```
[8]: # drop null values
df.dropna(inplace=True)
```

```
[9]: # change data type
df['Amount'] = df['Amount'].astype('int')
```

```
[10]: df['Amount'].dtypes
```

```
[10]: dtype('int32')
```

```
[11]: df.columns
```

```
[11]: Index(['User_ID', 'Cust_name', 'Product_ID', 'Gender', 'Age Group', 'Age',
        'Marital_Status', 'State', 'Zone', 'Occupation', 'Product_Category',
        'Orders', 'Amount'],
        dtype='object')
```

```
[12]: #rename column
df.rename(columns= {'Marital_Status': 'Shaadi'})
```

```
[12]:
```

	User_ID	Cust_name	Product_ID	Gender	Age Group	Age	Shaadi	\
0	1002903	Sanskriti	P00125942	F	26-35	28	0	
1	1000732	Kartik	P00110942	F	26-35	35	1	
2	1001990	Bindu	P00118542	F	26-35	35	1	
3	1001425	Sudevi	P00237842	M	0-17	16	0	
4	1000588	Joni	P00057942	M	26-35	28	1	
...	
11246	1000695	Manning	P00296942	M	18-25	19	1	
11247	1004089	Reichenbach	P00171342	M	26-35	33	0	
11248	1001209	Oshin	P00201342	F	36-45	40	0	
11249	1004023	Noonan	P00059442	M	36-45	37	0	
11250	1002744	Brumley	P00281742	F	18-25	19	0	

	State	Zone	Occupation	Product_Category	Orders	\
0	Maharashtra	Western	Healthcare	Auto	1	
1	Andhra Pradesh	Southern	Govt	Auto	3	
2	Uttar Pradesh	Central	Automobile	Auto	3	
3	Karnataka	Southern	Construction	Auto	2	
4	Gujarat	Western	Food Processing	Auto	2	
...	
11246	Maharashtra	Western	Chemical	Office	4	
11247	Haryana	Northern	Healthcare	Veterinary	3	
11248	Madhya Pradesh	Central	Textile	Office	4	
11249	Karnataka	Southern	Agriculture	Office	3	
11250	Maharashtra	Western	Healthcare	Office	3	

	Amount
0	23952
1	23934
2	23924

```

3      23912
4      23877
...
11246    370
11247    367
11248    213
11249    206
11250    188

```

[11239 rows x 13 columns]

```

[13]: # describe() method returns description of the data in the DataFrame (i.e.
      ↪ count, mean, std, etc)
      df.describe()

```

```

[13]:
      count      User_ID      Age  Marital_Status      Orders      Amount
count  1.123900e+04  11239.000000    11239.000000  11239.000000  11239.000000
mean    1.003004e+06    35.410357      0.420055      2.489634   9453.610553
std     1.716039e+03    12.753866      0.493589      1.114967   5222.355168
min     1.000001e+06    12.000000      0.000000      1.000000    188.000000
25%     1.001492e+06    27.000000      0.000000      2.000000   5443.000000
50%     1.003064e+06    33.000000      0.000000      2.000000   8109.000000
75%     1.004426e+06    43.000000      1.000000      3.000000  12675.000000
max     1.006040e+06    92.000000      1.000000      4.000000  23952.000000

```

```

[14]: # use describe() for specific columns
      df[['Age', 'Orders', 'Amount']].describe()

```

```

[14]:
      count      Age      Orders      Amount
count  11239.000000  11239.000000  11239.000000
mean      35.410357      2.489634   9453.610553
std      12.753866      1.114967   5222.355168
min      12.000000      1.000000    188.000000
25%      27.000000      2.000000   5443.000000
50%      33.000000      2.000000   8109.000000
75%      43.000000      3.000000  12675.000000
max      92.000000      4.000000  23952.000000

```

1 Exploratory Data Analysis

1.0.1 Gender

```

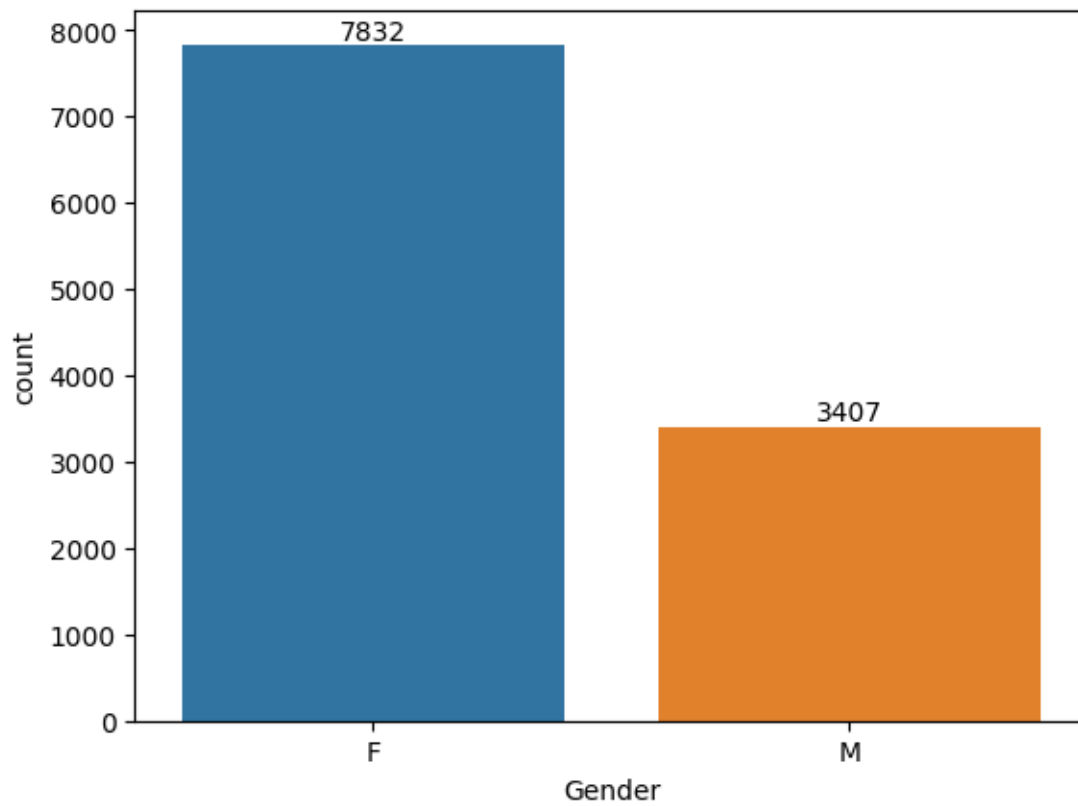
[15]: # plotting a bar chart for Gender and it's count

ax = sns.countplot(x = 'Gender', data = df)

for bars in ax.containers:

```

```
ax.bar_label(bars)
```

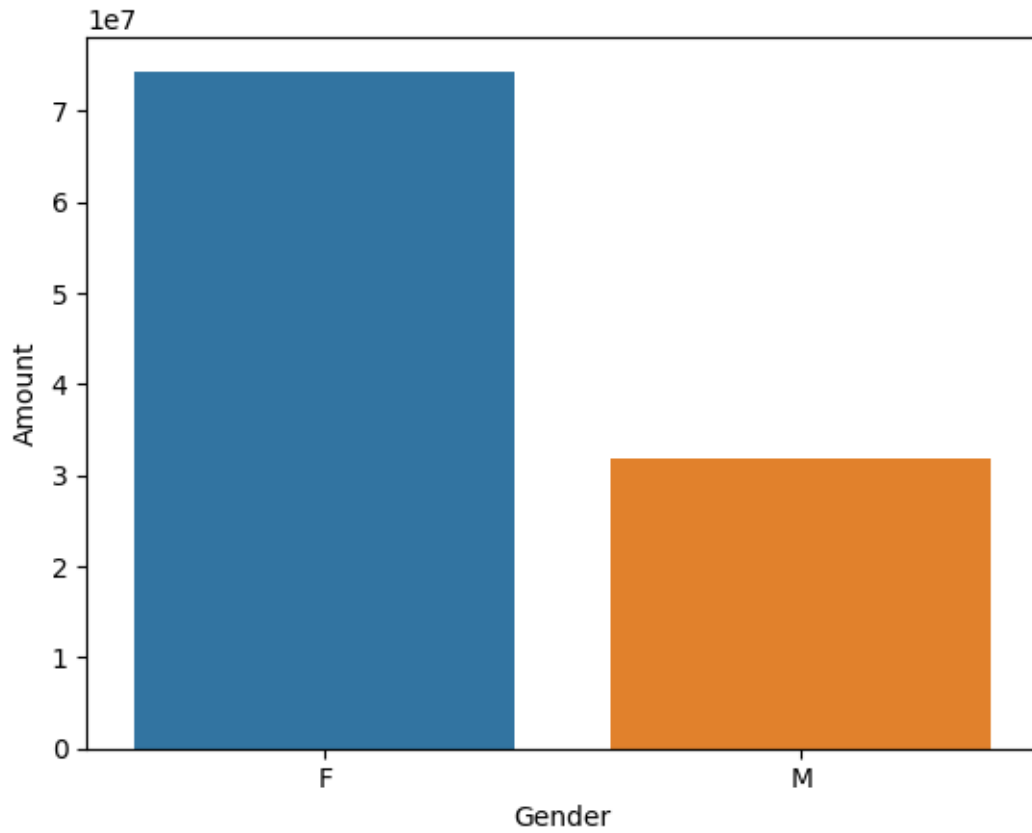


```
[16]: # plotting a bar chart for gender vs total amount

sales_gen = df.groupby(['Gender'], as_index=False)['Amount'].sum().
    ↪sort_values(by='Amount', ascending=False)

sns.barplot(x = 'Gender',y= 'Amount' ,data = sales_gen)
```

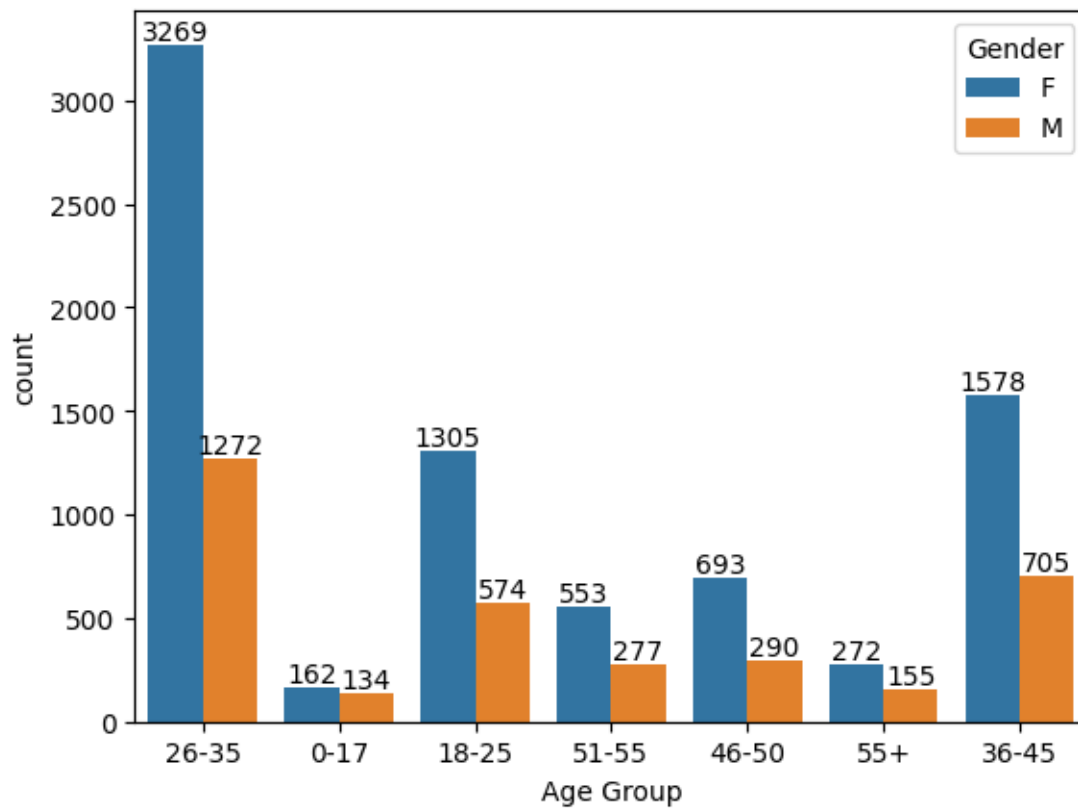
```
[16]: <Axes: xlabel='Gender', ylabel='Amount'>
```



From above graphs we can see that most of the buyers are females and even the purchasing power of females are greater than men

1.0.2 Age

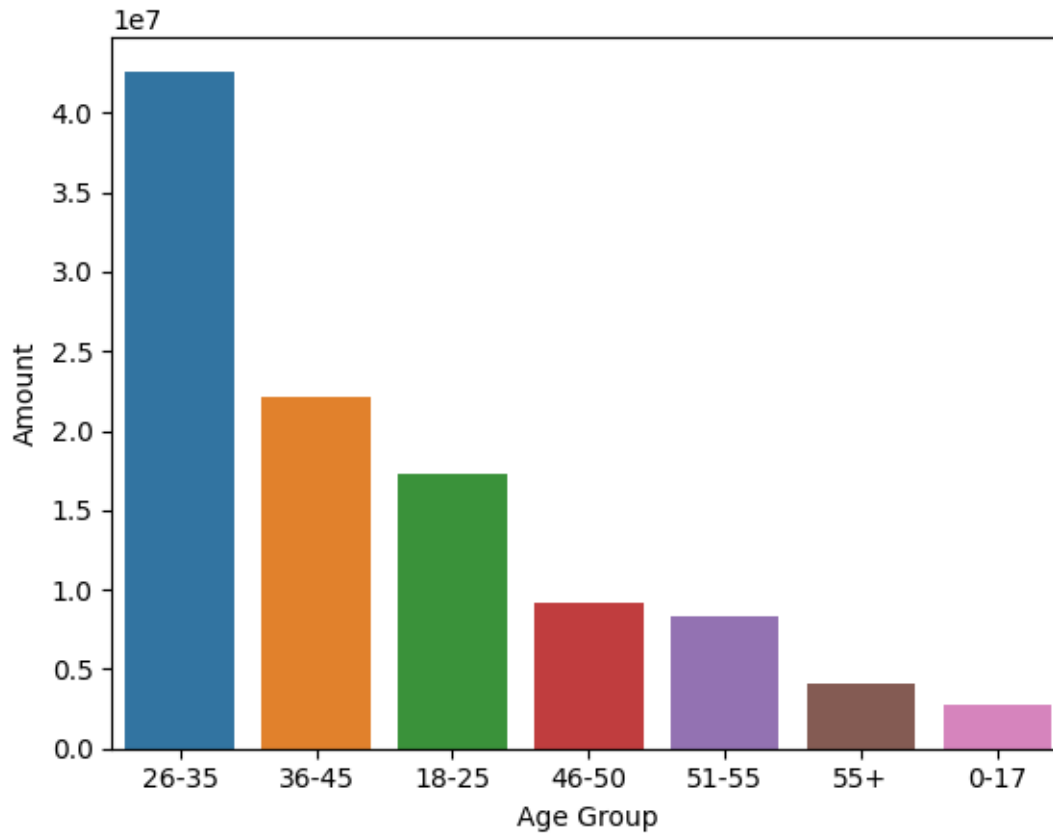
```
[17]: ax = sns.countplot(data = df, x = 'Age Group', hue = 'Gender')  
  
for bars in ax.containers:  
    ax.bar_label(bars)
```



```
[18]: # Total Amount vs Age Group
sales_age = df.groupby(['Age Group'], as_index=False)['Amount'].sum().
    ↪sort_values(by='Amount', ascending=False)

sns.barplot(x = 'Age Group',y= 'Amount' ,data = sales_age)
```

```
[18]: <Axes: xlabel='Age Group', ylabel='Amount'>
```



From above graphs we can see that most of the buyers are of age group between 26-35 yrs female

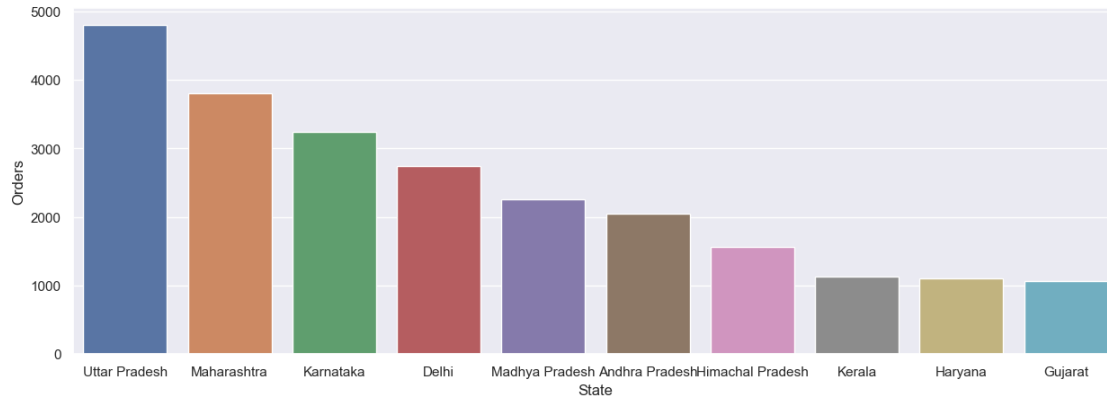
1.0.3 State

```
[19]: # total number of orders from top 10 states

sales_state = df.groupby(['State'], as_index=False)['Orders'].sum().
    ↪sort_values(by='Orders', ascending=False).head(10)

sns.set(rc={'figure.figsize':(15,5)})
sns.barplot(data = sales_state, x = 'State',y= 'Orders')
```

```
[19]: <Axes: xlabel='State', ylabel='Orders'>
```

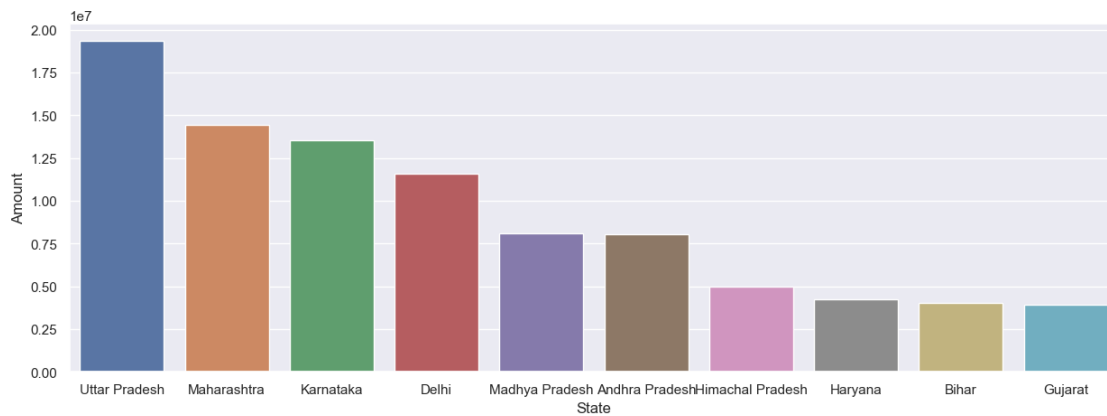



```
[20]: # total amount/sales from top 10 states

sales_state = df.groupby(['State'], as_index=False)['Amount'].sum().
    ↪sort_values(by='Amount', ascending=False).head(10)

sns.set(rc={'figure.figsize':(15,5)})
sns.barplot(data = sales_state, x = 'State',y= 'Amount')
```

```
[20]: <Axes: xlabel='State', ylabel='Amount'>
```

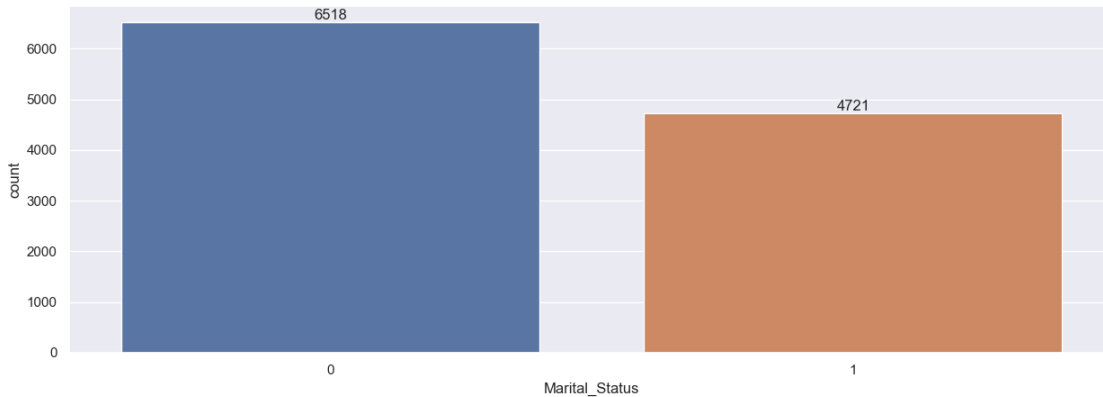


From above graphs we can see that most of the orders & total sales/amount are from Uttar Pradesh, Maharashtra and Karnataka respectively

1.0.4 Marital Status

```
[21]: ax = sns.countplot(data = df, x = 'Marital_Status')

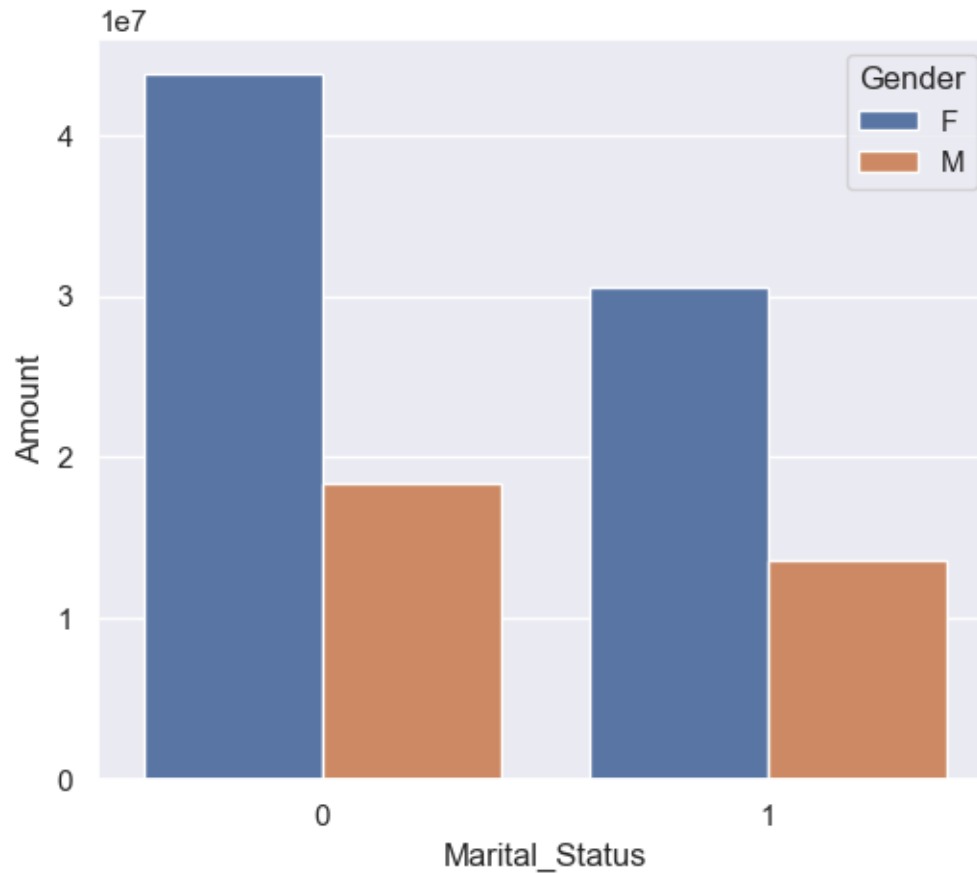
sns.set(rc={'figure.figsize':(7,5)})
for bars in ax.containers:
    ax.bar_label(bars)
```



```
[22]: sales_state = df.groupby(['Marital_Status', 'Gender'],
    ↪as_index=False)['Amount'].sum().sort_values(by='Amount', ascending=False)

sns.set(rc={'figure.figsize':(6,5)})
sns.barplot(data = sales_state, x = 'Marital_Status', y= 'Amount', hue='Gender')
```

```
[22]: <Axes: xlabel='Marital_Status', ylabel='Amount'>
```

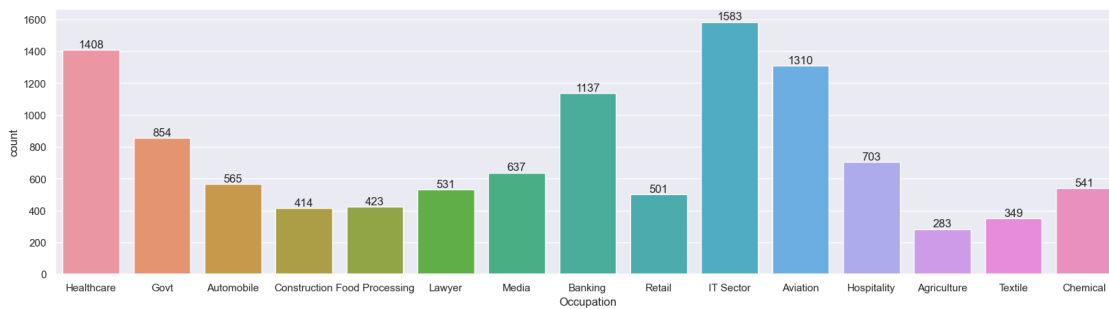


From above graphs we can see that most of the buyers are married (women) and they have high purchasing power

1.0.5 Occupation

```
[23]: sns.set(rc={'figure.figsize':(20,5)})
      ax = sns.countplot(data = df, x = 'Occupation')

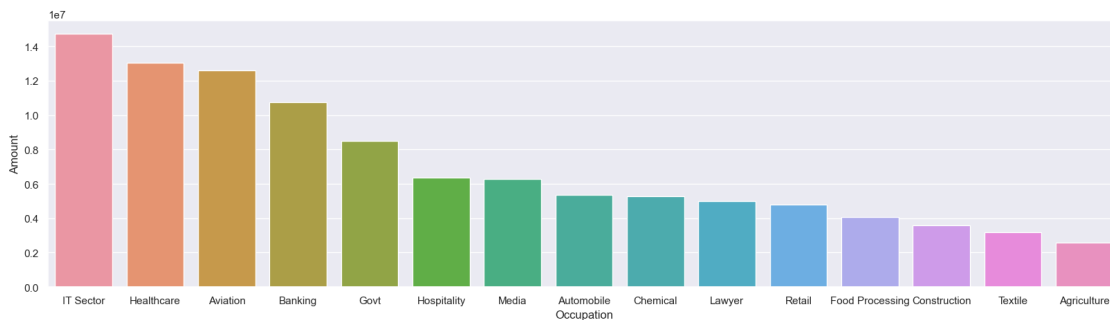
      for bars in ax.containers:
          ax.bar_label(bars)
```



```
[24]: sales_state = df.groupby(['Occupation'], as_index=False)['Amount'].sum().
      ↪sort_values(by='Amount', ascending=False)

sns.set(rc={'figure.figsize':(20,5)})
sns.barplot(data = sales_state, x = 'Occupation',y= 'Amount')
```

[24]: <Axes: xlabel='Occupation', ylabel='Amount'>

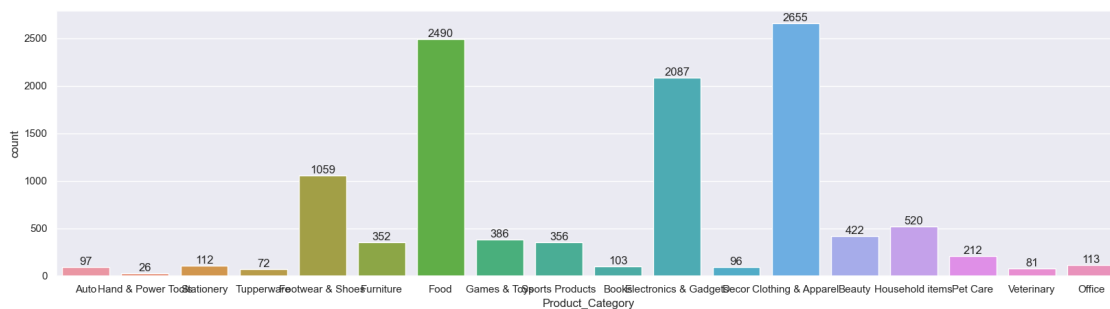


From above graphs we can see that most of the buyers are working in IT, Healthcare and Aviation sector

1.0.6 Product Category

```
[25]: sns.set(rc={'figure.figsize':(20,5)})
ax = sns.countplot(data = df, x = 'Product_Category')

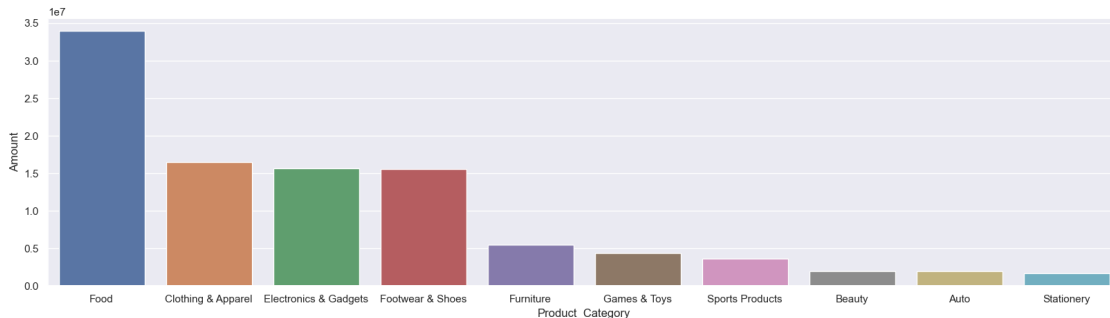
for bars in ax.containers:
    ax.bar_label(bars)
```



```
[26]: sales_state = df.groupby(['Product_Category'], as_index=False)['Amount'].sum().
      ↪sort_values(by='Amount', ascending=False).head(10)
```

```
sns.set(rc={'figure.figsize':(20,5)})
sns.barplot(data = sales_state, x = 'Product_Category',y= 'Amount')
```

```
[26]: <Axes: xlabel='Product_Category', ylabel='Amount'>
```

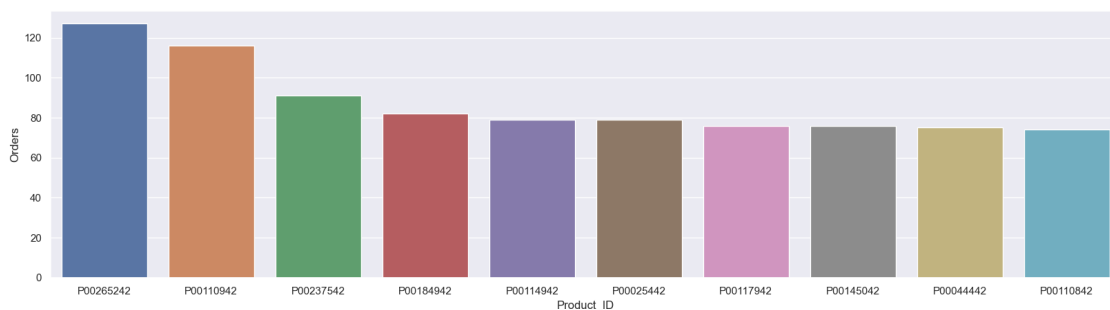


From above graphs we can see that most of the sold products are from Food, Clothing and Electronics category

```
[27]: sales_state = df.groupby(['Product_ID'], as_index=False)['Orders'].sum().
      ↪sort_values(by='Orders', ascending=False).head(10)
```

```
sns.set(rc={'figure.figsize':(20,5)})
sns.barplot(data = sales_state, x = 'Product_ID',y= 'Orders')
```

```
[27]: <Axes: xlabel='Product_ID', ylabel='Orders'>
```

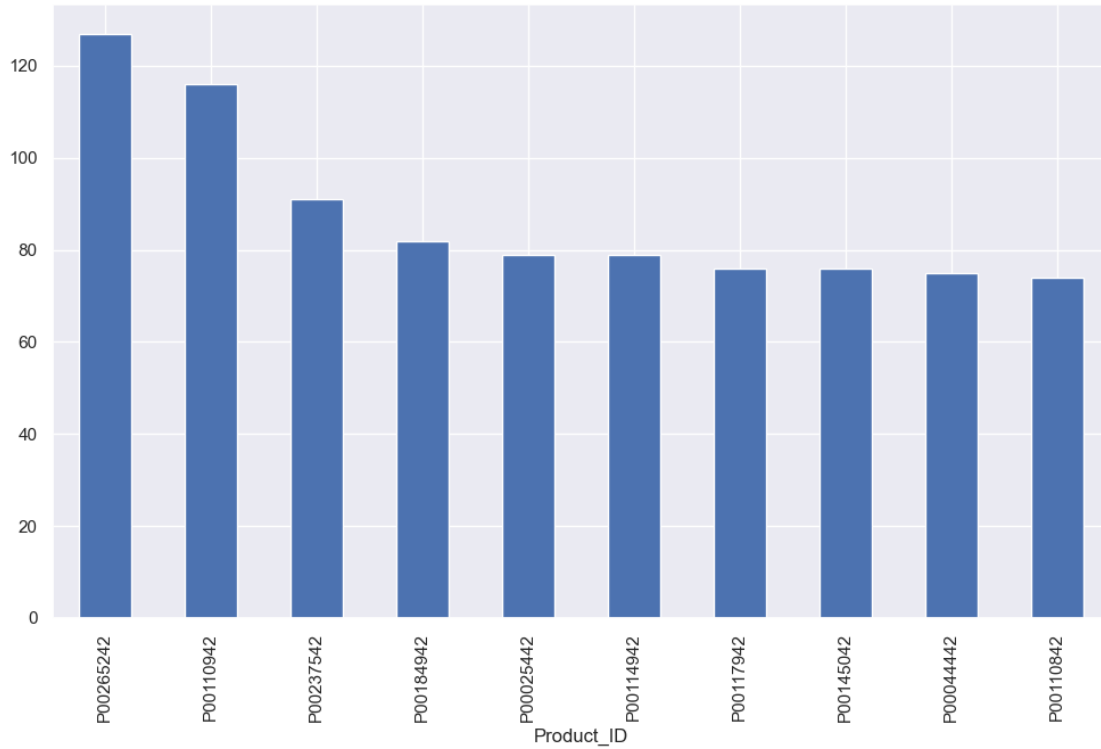


```
[28]: # top 10 most sold products (same thing as above)
```

```
fig1, ax1 = plt.subplots(figsize=(12,7))
```

```
df.groupby('Product_ID')['Orders'].sum().nlargest(10).
↪sort_values(ascending=False).plot(kind='bar')
```

[28]: <Axes: xlabel='Product_ID'>



1.1 Conclusion:

1.1.1

- 2 Married women age group 26-35 yrs from UP, Maharastra and Karnataka working in IT, Healthcare and Aviation are more likely to buy products from Food, Clothing and Electronics category.

[]: