diwali-sales-analysis

December 18, 2023

GOAL: Provide a summary and insights from the dataset to enhance the overall customer experience.

[1]:
```
# Import necessary libraries for data analysis

import numpy as np                    # For numerical computations
import pandas as pd                   # For data manipulation and analysis
import matplotlib.pyplot as plt       # For data visualization
%matplotlib inline
import seaborn as sns                 # For enhanced data visualization
```

[2]:
```
df = pd.read_csv('Diwali Sales Data.csv' , encoding = 'latin-1') # Reading the␣
↪CSV file, using the Latin-1 encoding
```

[3]:
```
df.shape # Displaying the dimensions (rows, columns) of the DataFrame
```

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

[4]:
```
df.head(10) # Displaying the first 10 rows of the DataFrame
```

[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	
5	1000588	Joni	P00057942	M	26-35	28	1	
6	1001132	Balk	P00018042	F	18-25	25	1	
7	1002092	Shivangi	P00273442	F	55+	61	0	
8	1003224	Kushal	P00205642	M	26-35	35	0	
9	1003650	Ginny	P00031142	F	26-35	26	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	

```
5  Himachal Pradesh  Northern  Food Processing            Auto       1
6     Uttar Pradesh   Central           Lawyer            Auto       4
7       Maharashtra   Western       IT Sector             Auto       1
8     Uttar Pradesh   Central             Govt            Auto       2
9    Andhra Pradesh  Southern             Media            Auto       4

     Amount  Status  unnamed1
0  23952.00     NaN       NaN
1  23934.00     NaN       NaN
2  23924.00     NaN       NaN
3  23912.00     NaN       NaN
4  23877.00     NaN       NaN
5  23877.00     NaN       NaN
6  23841.00     NaN       NaN
7       NaN     NaN       NaN
8  23809.00     NaN       NaN
9  23799.99     NaN       NaN
```

[5]:
```
df.info() # Displaying information about the DataFrame
```

```
<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]:
```
df.shape
```

[7]: (11251, 13)

[8]:
```
# check for null values
pd.isnull(df).sum()
```

[8]:
```
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
```

[9]:
```
# drop null values
df.dropna(inplace=True)
```

[10]:
```
df.shape
```

[10]: (11239, 13)

[11]:
```
# change data type
df['Amount'] = df['Amount'].astype('int')
```

[12]:
```
df['Amount'].dtypes
```

[12]: dtype('int32')

[13]:
```
df.columns
```

[13]:
```
Index(['User_ID', 'Cust_name', 'Product_ID', 'Gender', 'Age Group', 'Age',
       'Marital_Status', 'State', 'Zone', 'Occupation', 'Product_Category',
       'Orders', 'Amount'],
      dtype='object')
```

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

[14]:

	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
```

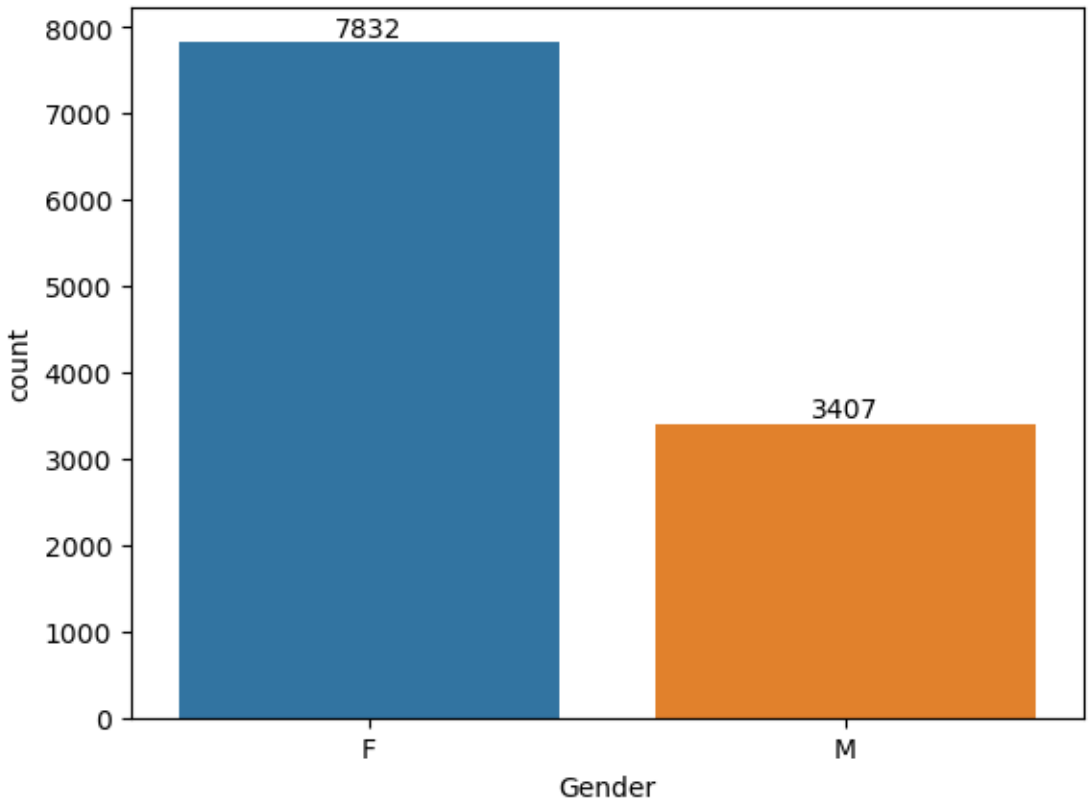
1 Exploratory Data Analysis

Gender

[15]:
```
df.columns
```

[15]:
```
Index(['User_ID', 'Cust_name', 'Product_ID', 'Gender', 'Age Group', 'Age',
       'Marital_Status', 'State', 'Zone', 'Occupation', 'Product_Category',
       'Orders', 'Amount'],
      dtype='object')
```

[16]:
```
# Creating a count plot of 'Gender' using Seaborn
ax = sns.countplot(x = 'Gender', data = df)

# Add labels to the bars in the count plot
for bars in ax.containers:
    ax.bar_label(bars)
```

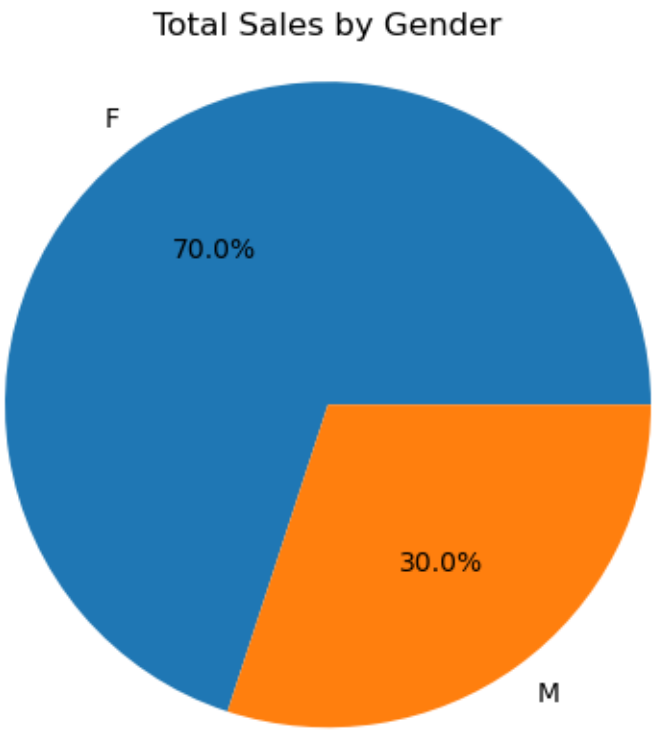


[17]:
```
# Grouping the DataFrame by 'Gender', calculating the total 'Amount' for each␣
↪gender,
# and sorting the results by 'Amount' in descending order

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

[17]:

	Gender	Amount
0	F	74335853
1	M	31913276

[18]:
```
# Creating a pie chart to visualize total sales by gender
plt.pie(sales_gen['Amount'], labels=sales_gen['Gender'], autopct='%1.1f%%') #␣
↪pie chart with sales amounts and gender labels
plt.title('Total Sales by Gender') # Adding a title to the pie chart
plt.axis('equal') # Ensuring the pie chart is drawn as a circle
plt.show() # Display the pie chart
```

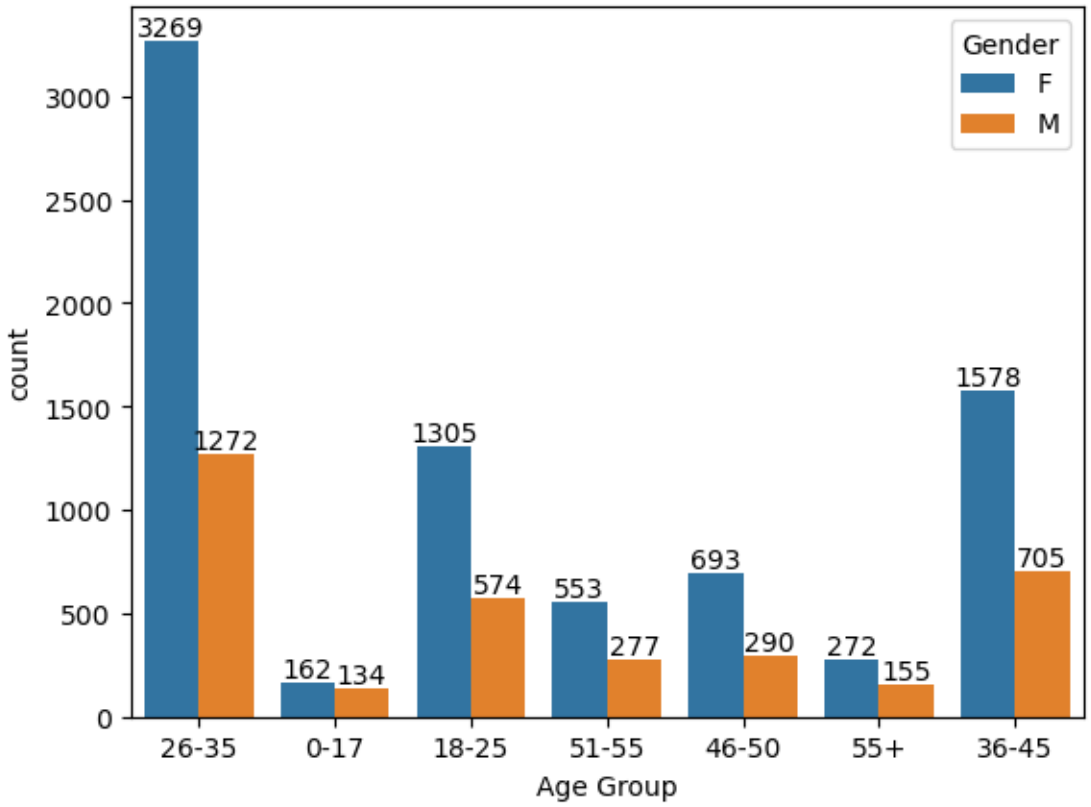


From above graphs we can see that most of the buyers are females and even the purchasing power

of females are greater than men.

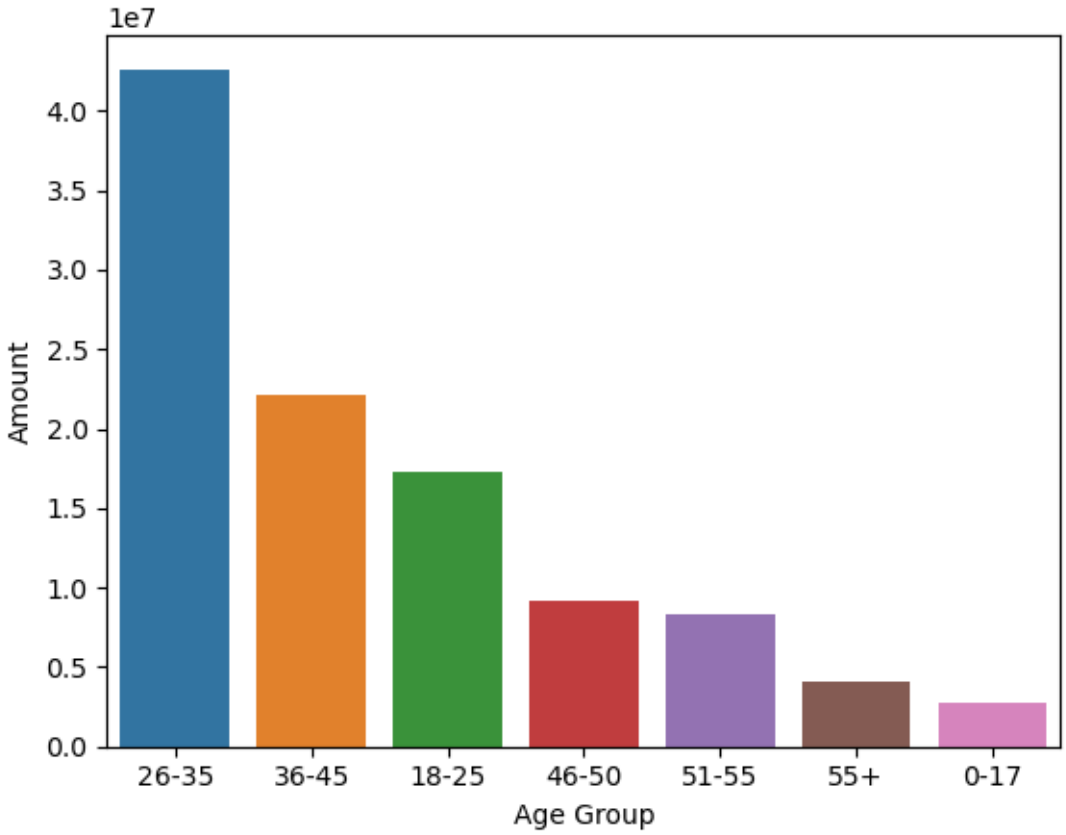
Age

[19]:
```
# Creating a count plot to visualize Age Group distribution with Gender␣
 ↪comparison
ax = sns.countplot(data = df, x = 'Age Group', hue = 'Gender')

# Add labels to the bars in the count plot
for bars in ax.containers:
    ax.bar_label(bars)
```



[20]:
```
# 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)
```

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

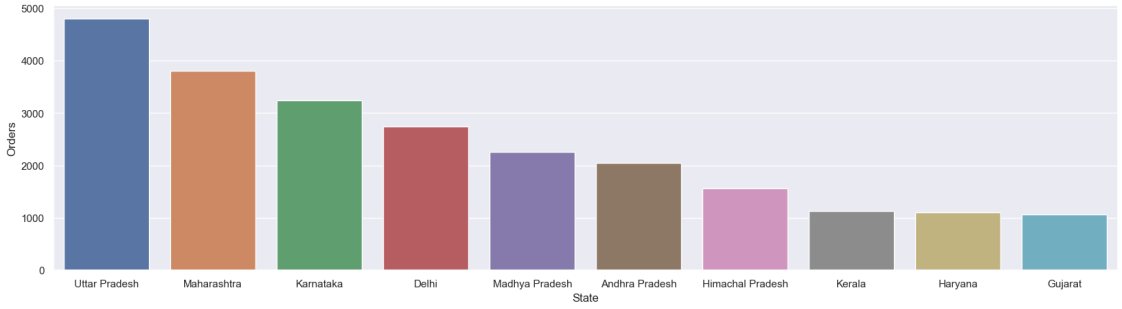


From above graphs we can see that most of the buyeres are of age group between 26-35 yrs female

State

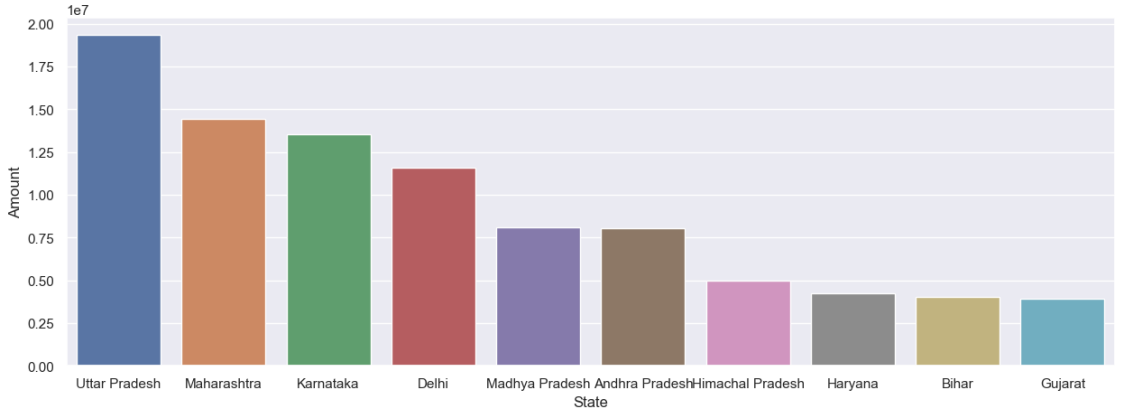
[21]:
```
# Group the DataFrame by 'State', calculate the sum of 'Orders', and sort to␣
 ↪get top 10 states with highest orders
sales_state = df.groupby(['State'], as_index = False)['Orders'].sum().
 ↪sort_values(by='Orders', ascending = False).head(10)

sns.set(rc={'figure.figsize':(20,5)}) # Set the figure size for the plot

sns.barplot(data=sales_state, x='State', y='Orders') # Creating bar plot to␣
 ↪visualize the top 10 states with highest orders
```

[21]:
```
<Axes: xlabel='State', ylabel='Orders'>
```



[22]:
```
# Group the DataFrame by 'State', calculate the sum of 'Amount', and extract the top 10 states with the highest total amount
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)}) # Set the figure size for the plot

sns.barplot(data=sales_state, x='State', y='Amount') # Creating bar plot to visualize the top 10 states with the highest amount
```

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

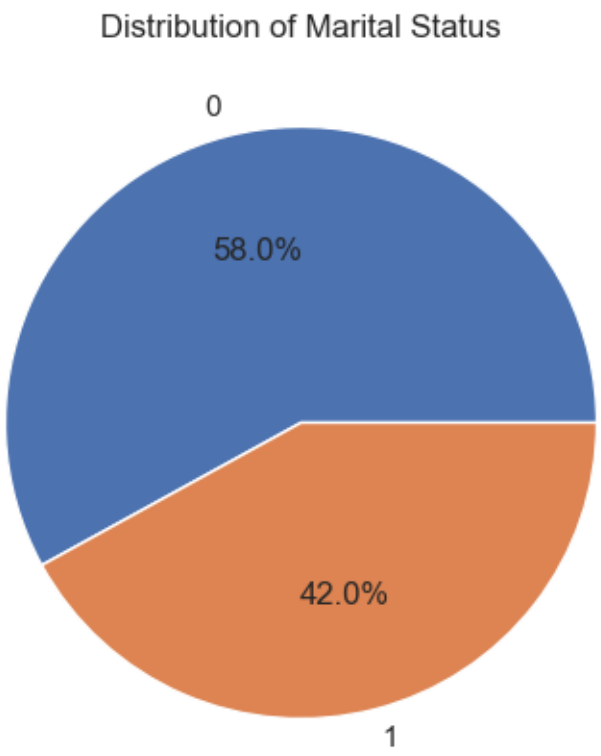


From above graphs we can see that most of the orders & total sales/amount are from Uttar Pradesh, Maharashtra and Karnatak respectively.

Marital Status

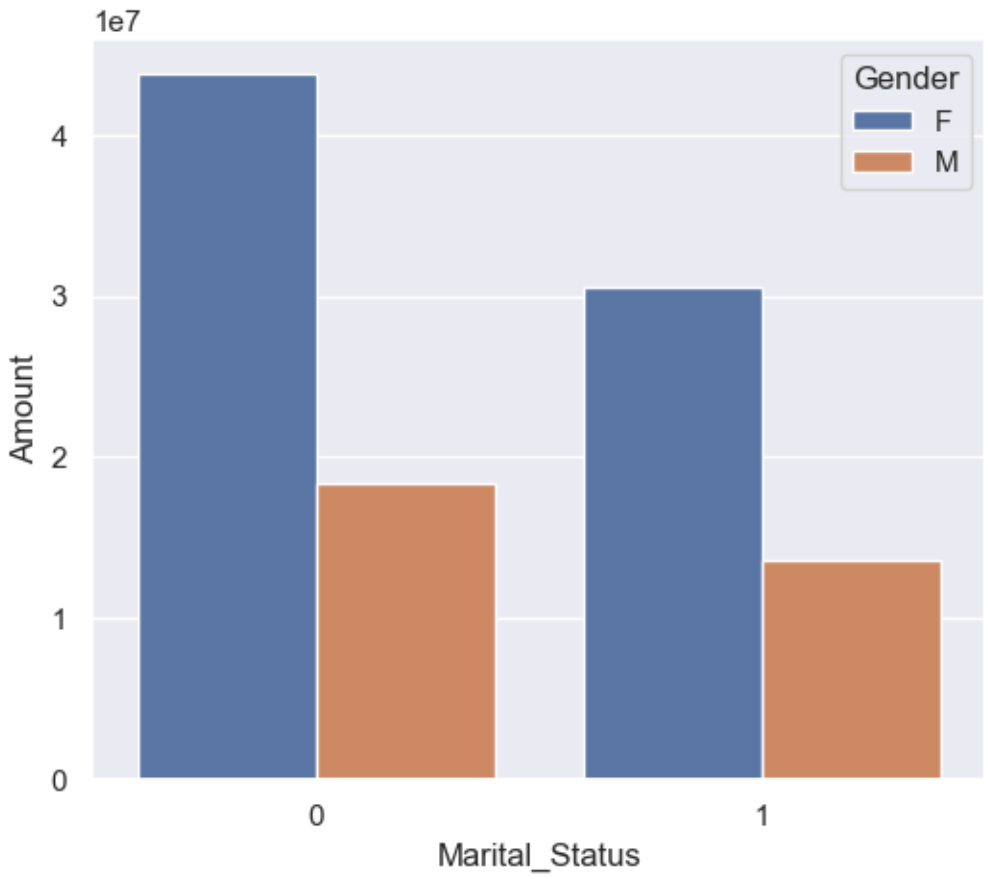
[23]:
```
# Create a count of values for each category of 'Marital_Status'
marital_counts = df['Marital_Status'].value_counts()

# Plot a pie chart using the marital status counts
```

```
plt.figure(figsize=(7, 5))
plt.pie(marital_counts, labels=marital_counts.index, autopct='%1.1f%%')
plt.title('Distribution of Marital Status')
plt.show()
```



[24]:
```
# Group the DataFrame by 'Marital_Status' and 'Gender', calculate the total␣
 ↪'Amount' for each combination, and sort the values
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)}) # Set the figure size for the plot

# Creating a bar plot to visualize 'Amount' based on 'Marital_Status' with␣
 ↪comparison by 'Gender'
sns.barplot(data=sales_state, x='Marital_Status', y='Amount', hue='Gender')
```

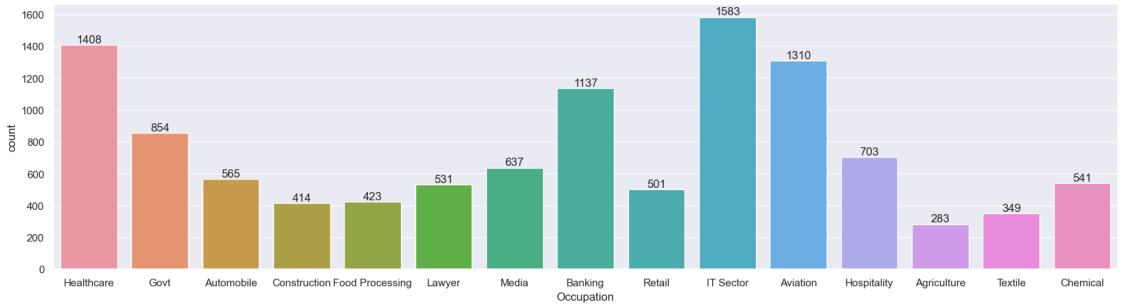
[24]: <Axes: xlabel='Marital_Status', ylabel='Amount'>



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

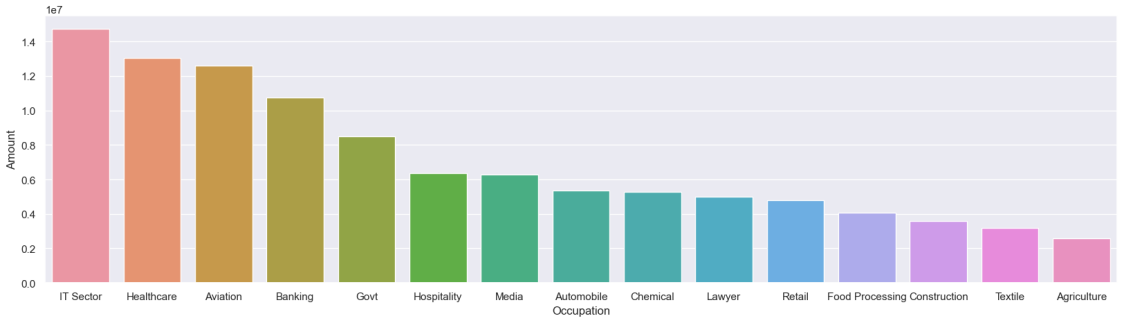
Occupation

[25]:
```
# Set the figure size for the plot
sns.set(rc={'figure.figsize':(20,5)})

# Creating a count plot to visualize the distribution of 'Occupation'
ax = sns.countplot(data=df, x='Occupation')

# Add labels to the bars in the count plot
for bars in ax.containers:
    ax.bar_label(bars)
```



[26]:
```
# Grouping the DataFrame by 'Occupation', calculating the total 'Amount' for each occupation, and sorting the values
sales_state = df.groupby(['Occupation'], as_index=False)['Amount'].sum().sort_values(by='Amount', ascending=False)

sns.set(rc={'figure.figsize':(20,5)}) # Setting the figure size for the plot

# Creating a bar plot to visualize the total 'Amount' for each occupation
sns.barplot(data = sales_state, x='Occupation',y='Amount')
```

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

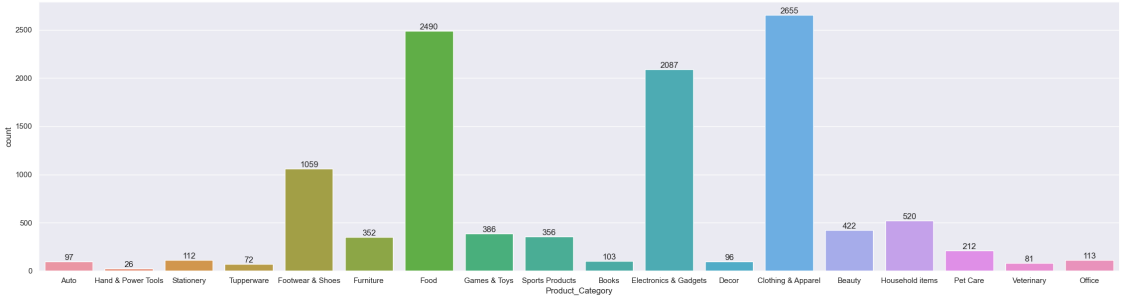


From above graphs we can see that most of the buyers are working in IT, Healthcare and Aviation sector

Product Category

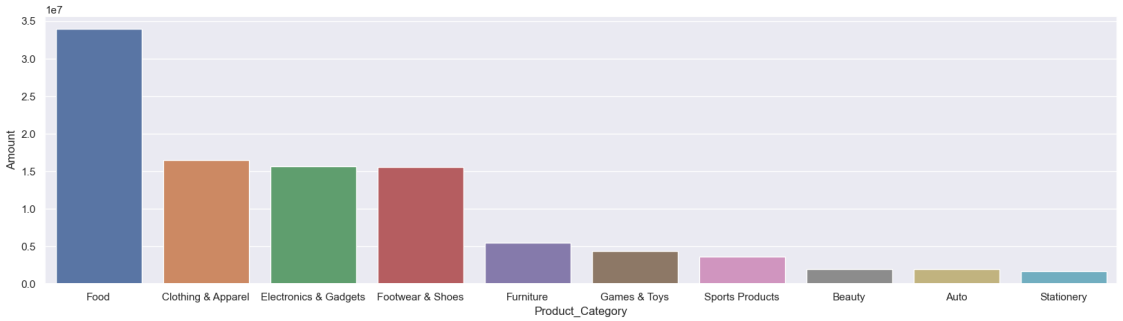
[27]:
```
sns.set(rc={'figure.figsize':(28,7)}) # Set the figure size for the plot

# Creating count plot to visualize the distribution of 'Product_Category'
ax = sns.countplot(data=df, x='Product_Category')

# Add labels to the bars in the count plot
for bars in ax.containers:
```

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



[28]:
```
# Grouping the DataFrame by 'Product_Category', calculating the total 'Amount'␣
 ↪for each category, and sorting the values
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)}) # Setting the figure size for the plot
# Creating a bar plot to visualize the total 'Amount' for each␣
 ↪'Product_Category'
sns.barplot(data=sales_state, x='Product_Category', y='Amount')
```

[28]:
```
<Axes: xlabel='Product_Category', ylabel='Amount'>
```



Married women in the age group of 26-35 years from Uttar Pradesh, Maharashtra, and Karnataka, working in IT, Healthcare, and Aviation, are more inclined to purchase products from the Food, Clothing, and Electronics categories.