# Python Project

Diwali Sales Analysis

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Project objective

The Diwali Sale Analysis project focuses on uncovering key trends and insights from customer purchase data during the Diwali season. By analyzing customer demographics, purchasing patterns, and product preferences, this project provides valuable information to help businesses optimize their sales strategies.

Data
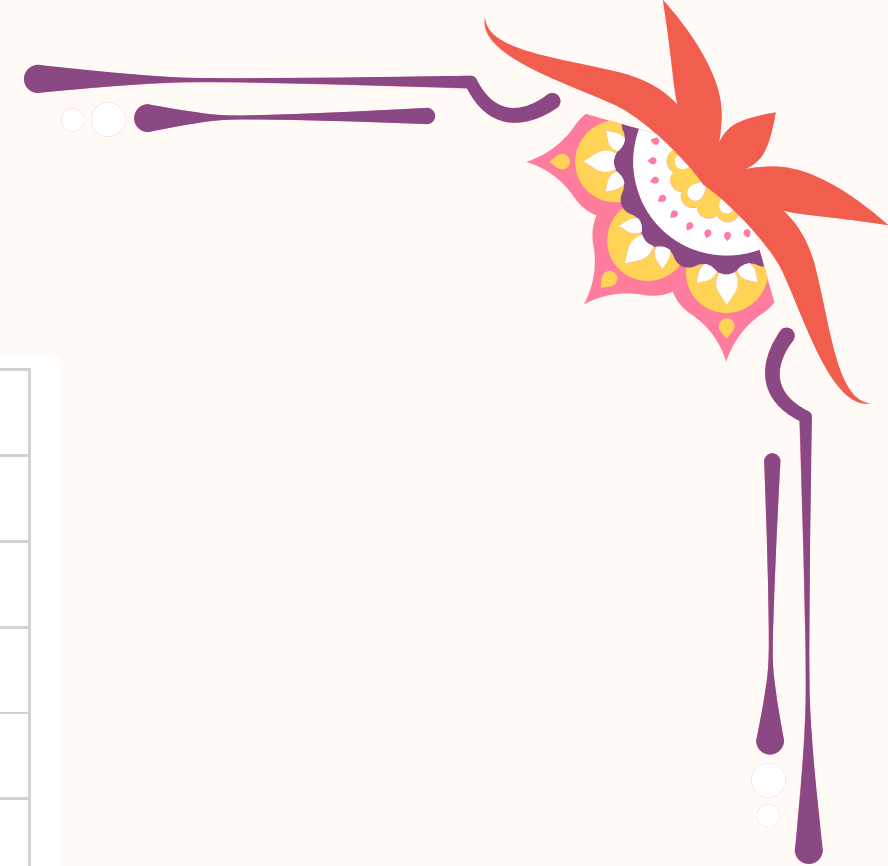
User_ID	Cust_name	Product_ID	Gender	Age Group	Age	Marital_Status	State
1002903	Sanskriti	P00125942	F	26-35	28	0	Maharashtra
1000732	Kartik	P00110942	F	26-35	35	1	Andhra Pradesh
1001990	Bindu	P00118542	F	26-35	35	1	Uttar Pradesh
1001425	Sudevi	P00237842	M	0-17	16	0	Karnataka
1000588	Joni	P00057942	M	26-35	28	1	Gujarat
1000588	Joni	P00057942	M	26-35	28	1	Himachal Pradesh
1001132	Balk	P00018042	F	18-25	25	1	Uttar Pradesh
1002092	Shivangi	P00273442	F	55+	61	0	Maharashtra
1003224	Kushal	P00205642	M	26-35	35	0	Uttar Pradesh

Zone	Occupation	Product_Category	Orders	Amount	Status	unnamed1
Western	Healthcare	Auto	1	23952		
Southern	Govt	Auto	3	23934		
Central	Automobile	Auto	3	23924		
Southern	Construction	Auto	2	23912		
Western	Food Processing	Auto	2	23877		
Northern	Food Processing	Auto	1	23877		
Central	Lawyer	Auto	4	23841		
Western	IT Sector	Auto	1			
Central	Govt	Auto	2	23809		

Steps Of Data Analysis

- Importing Libraries
- Loading Data
- Data Cleaning
- Exploratory Data Analysis {EDA}

diwali-sale-analysis-project

September 14, 2024

1 *Diwali Sales Analysis : Python Project*

Importing Libraries

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

Loading Data

```
[2]: dw = pd.read_csv('Diwali Sales Data.csv',encoding = 'unicode_escape')
```

```
[3]: dw.head(10)
```

```
[3]:    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
```

[4]: `dw.shape`

[4]: (11251, 15)

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Data Cleaning

[5]: `dw.describe()`

[5]:
```
              User_ID            Age   Marital_Status        Orders          Amount  \
count   1.125100e+04   11251.000000     11251.000000  11251.000000    11239.000000
mean    1.003004e+06      35.421207         0.420318      2.489290     9453.610858
std     1.716125e+03      12.754122         0.493632      1.115047     5222.355869
min     1.000001e+06      12.000000         0.000000      1.000000      188.000000
25%     1.001492e+06      27.000000         0.000000      1.500000     5443.000000
50%     1.003065e+06      33.000000         0.000000      2.000000     8109.000000
75%     1.004430e+06      43.000000         1.000000      3.000000    12675.000000
max     1.006040e+06      92.000000         1.000000      4.000000    23952.000000

        Status   unnamed1
count      0.0        0.0
mean       NaN        NaN
std        NaN        NaN
min        NaN        NaN
25%        NaN        NaN
50%        NaN        NaN
75%        NaN        NaN
max        NaN        NaN
```

[6]: `dw.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
```

[7]: `dw.drop(['Status','unnamed1'],axis =1 , inplace = True)`

[8]: `dw.isnull().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]: `dw.dropna(inplace = True)`

Exploratory Data Analysis

[10]: `dw.columns`

```
[10]: Index(['User_ID', 'Cust_name', 'Product_ID', 'Gender', 'Age Group', 'Age',
             'Marital_Status', 'State', 'Zone', 'Occupation', 'Product_Category',
             'Orders', 'Amount'],
           dtype='object')
```
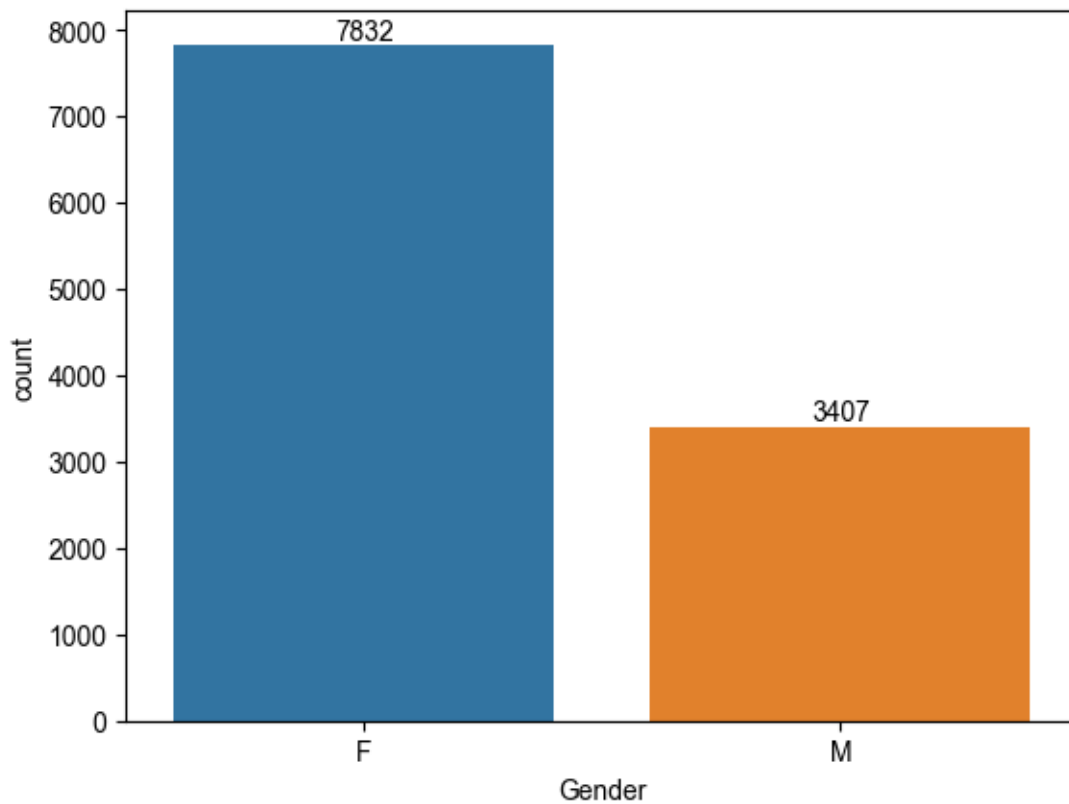
3 ─────────────────────────────────-

Exploratory Data Analysis :-

Gender Wise

```
[11]: ax = sns.countplot(x = 'Gender' , data = dw  ,hue='Gender')

      for bars in ax.containers:
          ax.bar_label(bars)
      sns.set (rc = {'figure.figsize':(28,6)})
```



```
[12]: gen_wise_sale = dw.groupby(['Gender'] , as_index = False) ['Amount'].sum().
      ↪sort_values(by='Amount', ascending = False)
      gen_wise_sale
```

[12]:   Gender   Amount
      0   F   74335856.43
      1   M   31913276.00

[13]: `sns.barplot(x='Gender' , y='Amount' ,data = gen_wise_sale ,hue='Gender')`
      `sns.set (rc = {'figure.figsize':(28,6)})`
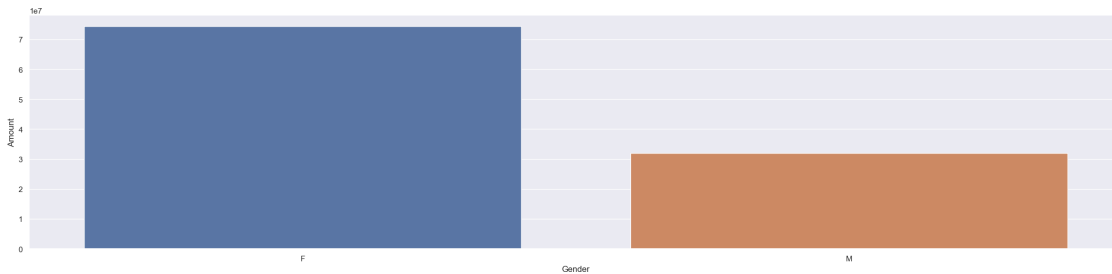
Based on the data, women appear to be the primary consumers and have a higher purchasing capacity than men.

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Age Wise

[14]: `dw.columns`

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

[15]: `ax = sns.countplot(x='Age Group' , data = dw ,hue='Gender')`

      `for bars in ax.containers:`
      `    ax.bar_label(bars)`
      `sns.set (rc = {'figure.figsize':(28,6)})`
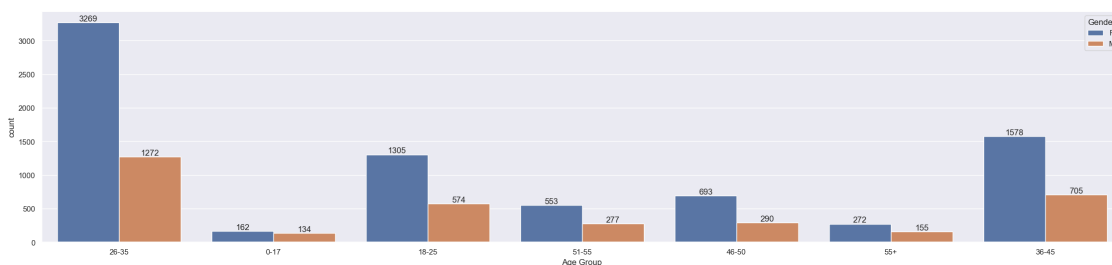
```
[16]: age_wise_sale = dw.groupby(['Age Group'] , as_index = False) ['Amount'].sum().
      ↪sort_values(by='Amount', ascending = False)
      age_wise_sale
```

```
[16]:   Age Group        Amount
      2     26-35  42613443.94
      3     36-45  22144995.49
      1     18-25  17240732.00
      4     46-50   9207844.00
      5     51-55   8261477.00
      6       55+   4080987.00
      0      0-17   2699653.00
```

```
[17]: sns.barplot(x='Age Group' , y='Amount' ,data = age_wise_sale ,hue='Age Group')
      sns.set (rc = {'figure.figsize':(28,6)})
```
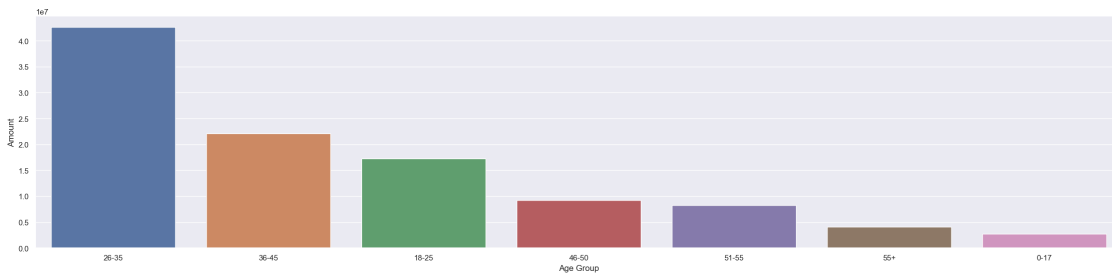

The data indicates that most female buyers are between 26 and 35 years old.

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State Wise

```
[18]: dw.columns
```

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

```
[19]: state_wise_sale = dw.groupby(['State'], as_index = False)['Orders'].sum().
      ↪sort_values(by = 'Orders' , ascending = False).head(10)
      state_wise_sale
```

```
[19]:               State  Orders
      14    Uttar Pradesh    4807
      10      Maharashtra    3810
```

```
7        Karnataka     3240
2           Delhi      2740
9    Madhya Pradesh    2252
0    Andhra Pradesh    2051
5  Himachal Pradesh    1568
8          Kerala      1137
4         Haryana      1109
3         Gujarat      1066
```

[20]:
```python
sns.barplot(x= 'State' , y = 'Orders' ,  data = state_wise_sale , hue = 'State'␣
↪)

sns.set (rc = {'figure.figsize':(28,6)})
```
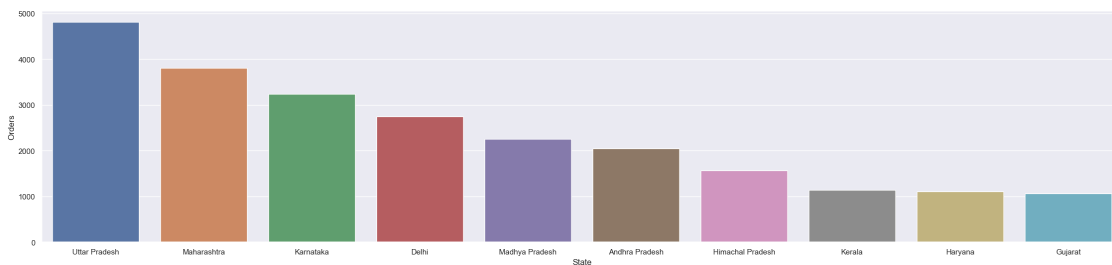

[21]:
```python
amt_wise_sale = dw.groupby(['State'], as_index = False)['Amount'].sum().
↪sort_values(by = 'Amount' , ascending = False).head(10)
amt_wise_sale
```

[21]:
```
        State        Amount
14    Uttar Pradesh  19374968.00
10      Maharashtra  14427543.00
7         Karnataka  13523540.00
2             Delhi  11603819.45
9    Madhya Pradesh   8101142.00
0    Andhra Pradesh   8037146.99
5  Himachal Pradesh   4963368.00
4           Haryana   4220175.00
1             Bihar   4022757.00
3           Gujarat   3946082.00
```

[22]:
```python
sns.barplot(x='State' , y = 'Amount' , data = amt_wise_sale , hue = 'State')
sns.set (rc = {'figure.figsize':(22,8)})
```
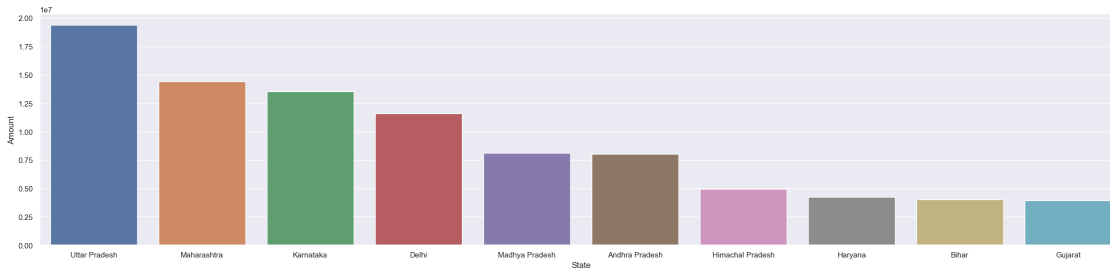
Uttar Pradesh, Maharashtra, and Karnataka emerge as the top states in terms of both order volume and total sales.
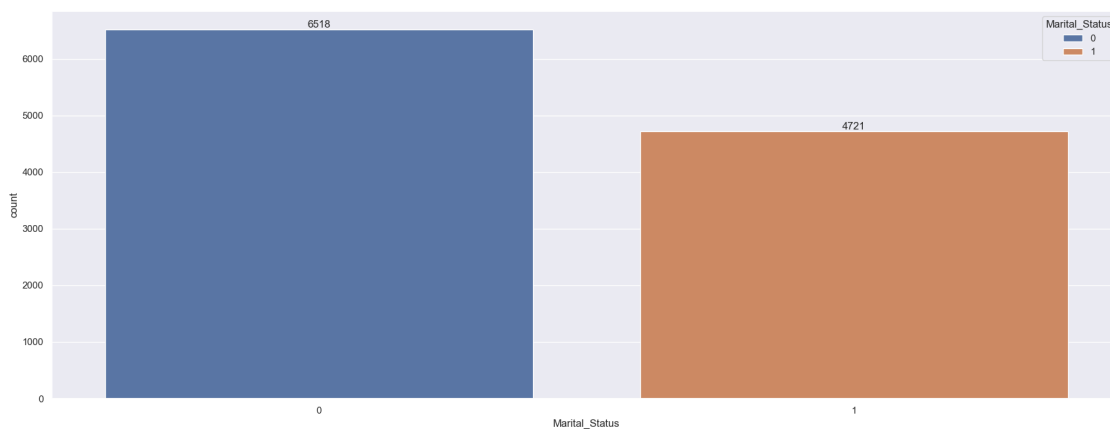
6 ————————————————————————————————

Marital Status
0 = Married
1 = Non - Married

```python
[23]: ax = sns.countplot(data = dw , x = 'Marital_Status' , hue = 'Marital_Status')
for bars in ax.containers:
    ax.bar_label(bars)

sns.set(rc = {'figure.figsize':(10,8)})
```
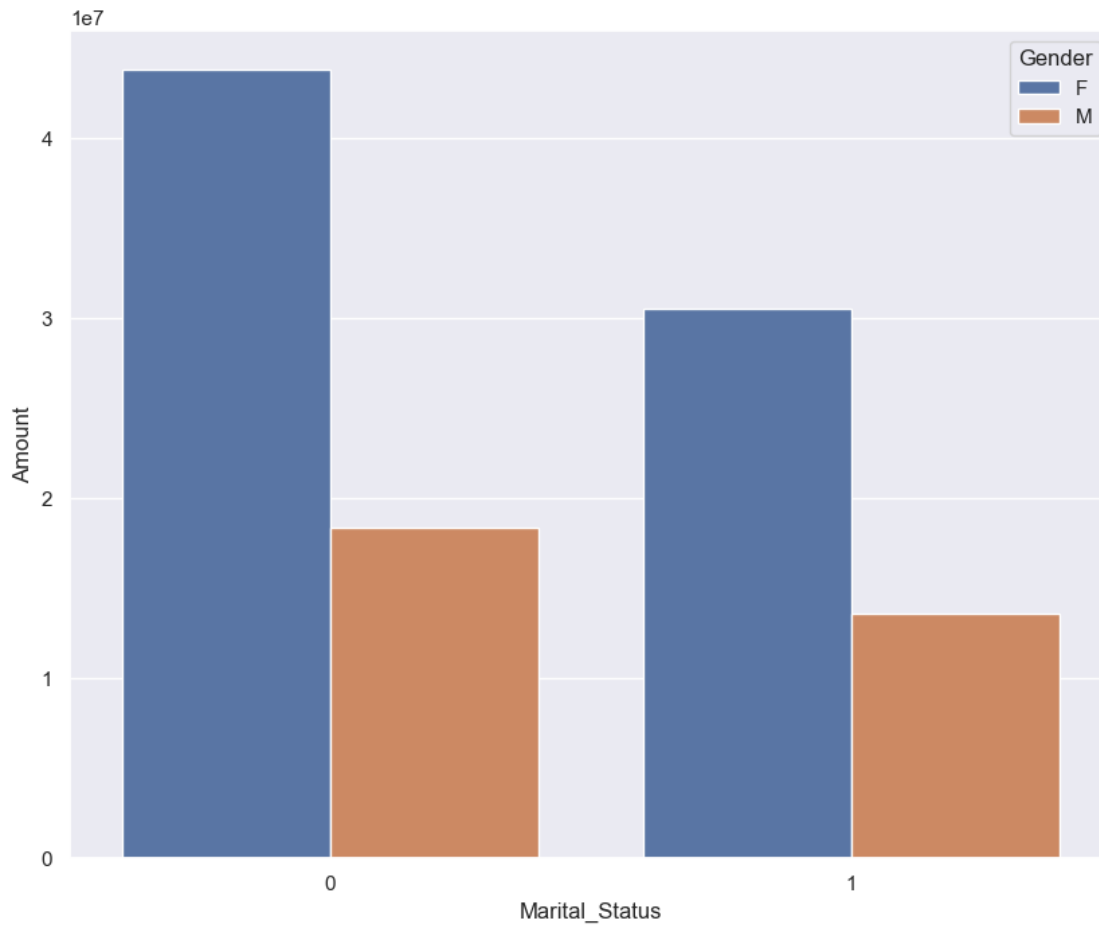


```python
[24]: ms_wise_sale = dw.groupby(['Marital_Status' , 'Gender'], as_index =␣
 ↪False)['Amount'].sum().sort_values(by = 'Amount' , ascending = False)
ms_wise_sale

# 0 = Married
# 1 = Non - Married
```

```
[24]:     Marital_Status  Gender        Amount
     0               0      F  43786648.44
     2               1      F  30549207.99
     1               0      M  18338738.00
     3               1      M  13574538.00
```

```
[25]: sns.barplot(x = 'Marital_Status' , y = 'Amount' , data = ms_wise_sale , hue =␣
      ↪'Gender')
      sns.set(rc = {'figure.figsize':(5,5)})
```


Married women dominate the market, both in terms of buyer numbers and spending ability.
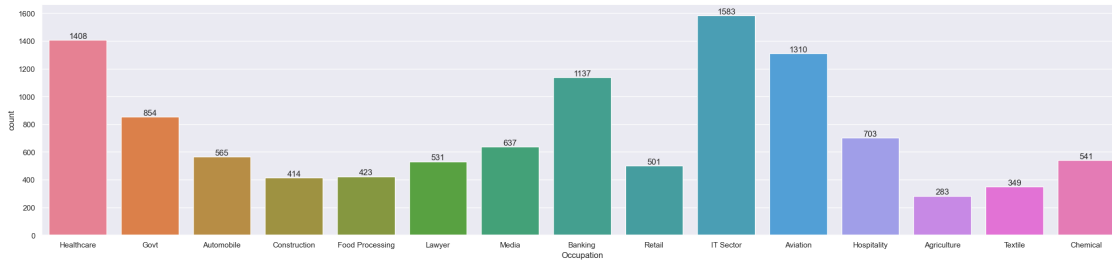
7 _____

Occupation

```
[34]: ax = sns.countplot(x = 'Occupation' , data = dw , hue = 'Occupation')

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

      sns.set(rc = {'figure.figsize':(28,6)})
```
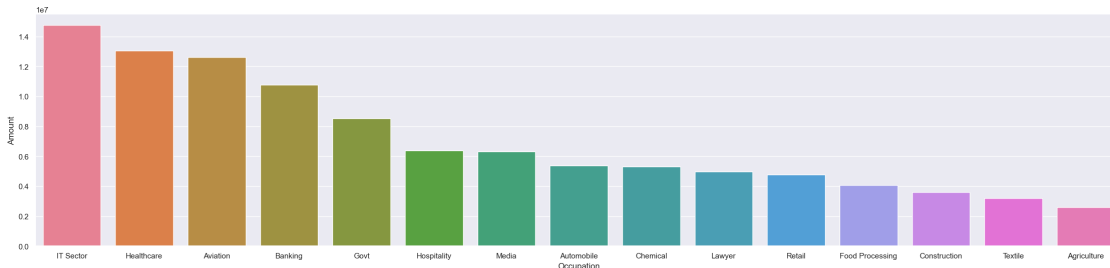


```
[27]: occ_wise_sale = dw.groupby(['Occupation'], as_index = False)['Amount'].sum().
       ↪sort_values(by = 'Amount' , ascending = False)
      occ_wise_sale
```

```
[27]:          Occupation        Amount
      10         IT Sector  14755079.00
      8         Healthcare  13034587.49
      2           Aviation  12602298.00
      3            Banking  10770610.95
      7               Govt   8517212.00
      9        Hospitality   6376405.00
      12             Media   6295832.99
      1          Automobile  5368596.00
      4           Chemical   5297436.00
      11            Lawyer   4981665.00
      13            Retail   4783170.00
      6     Food Processing   4070670.00
      5       Construction   3597511.00
      14           Textile   3204972.00
      0        Agriculture   2593087.00
```

```
[28]: sns.barplot(x = 'Occupation' , y = 'Amount' , data = occ_wise_sale , hue =␣
       ↪'Occupation')
      sns.set (rc = {'figure.figsize':(28,6)})
```

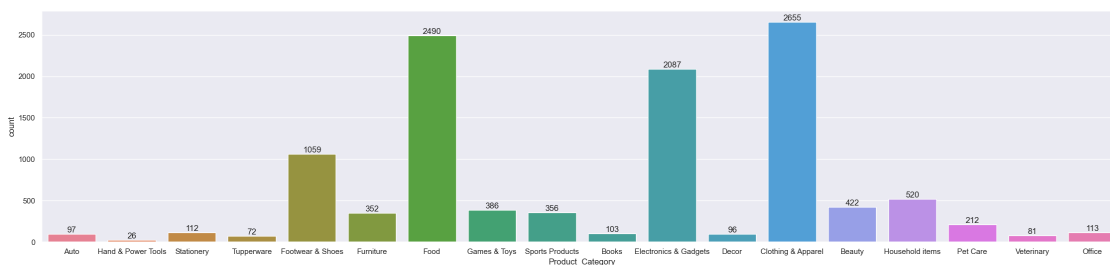The data indicates that individuals working in IT, healthcare, and aviation are the most frequent buyers.

8 ———————————————————————————

Product Category

```
[29]: ax = sns.countplot(x = 'Product_Category' , data = dw , hue =␣
      ↪'Product_Category')

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

      sns.set(rc = {'figure.figsize':(28,6)})
```



```
[30]: prod_wise_sale = dw.groupby(['Product_Category'], as_index = False)['Amount'].
      ↪sum().sort_values(by = 'Amount' , ascending = False).head(10)
      prod_wise_sale
```

```
[30]:        Product_Category        Amount
      6                  Food  33933883.50
      3     Clothing & Apparel  16495019.00
      5   Electronics & Gadgets  15643846.00
      7        Footwear & Shoes  15575209.45
      8               Furniture   5440051.99
      9            Games & Toys   4331694.00
```

```
14        Sports Products    3635933.00
1                  Beauty    1959484.00
0                    Auto    1958609.99
15             Stationery    1676051.50
```

```
[31]: sns.barplot(x = 'Product_Category' , y = 'Amount' , data = prod_wise_sale , hue␣
      ↪= 'Product_Category')
      sns.set (rc = {'figure.figsize':(28,6)})
```
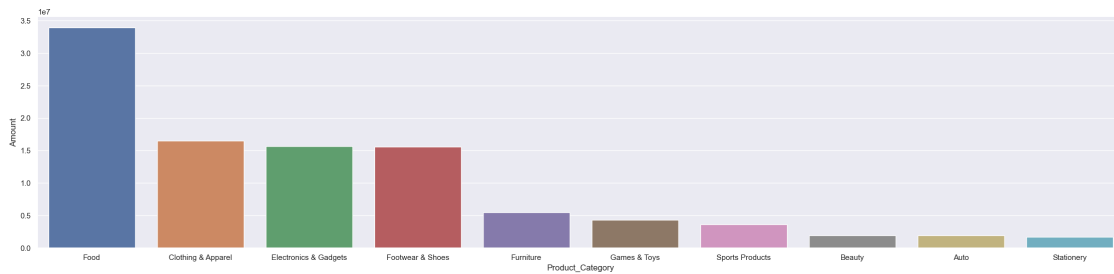

**These three categories - food, clothing, and electronics - account for the majority of sales.**

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Product_ID

```
[32]: prod_id_wise_sale = dw.groupby(['Product_ID'], as_index = False)['Amount'].
      ↪sum().sort_values(by = 'Amount' , ascending = False).head(10)
      prod_id_wise_sale
```

```
[32]:       Product_ID    Amount
      1679    P00265242  540136.0
      644     P00110942  424833.0
      1146    P00184942  401816.0
      654     P00112142  341020.0
      396     P00059442  338571.0
      1504    P00237542  322363.0
      388     P00058042  307040.0
      642     P00110742  294548.0
      643     P00110842  290661.0
      492     P00080342  283309.0
```
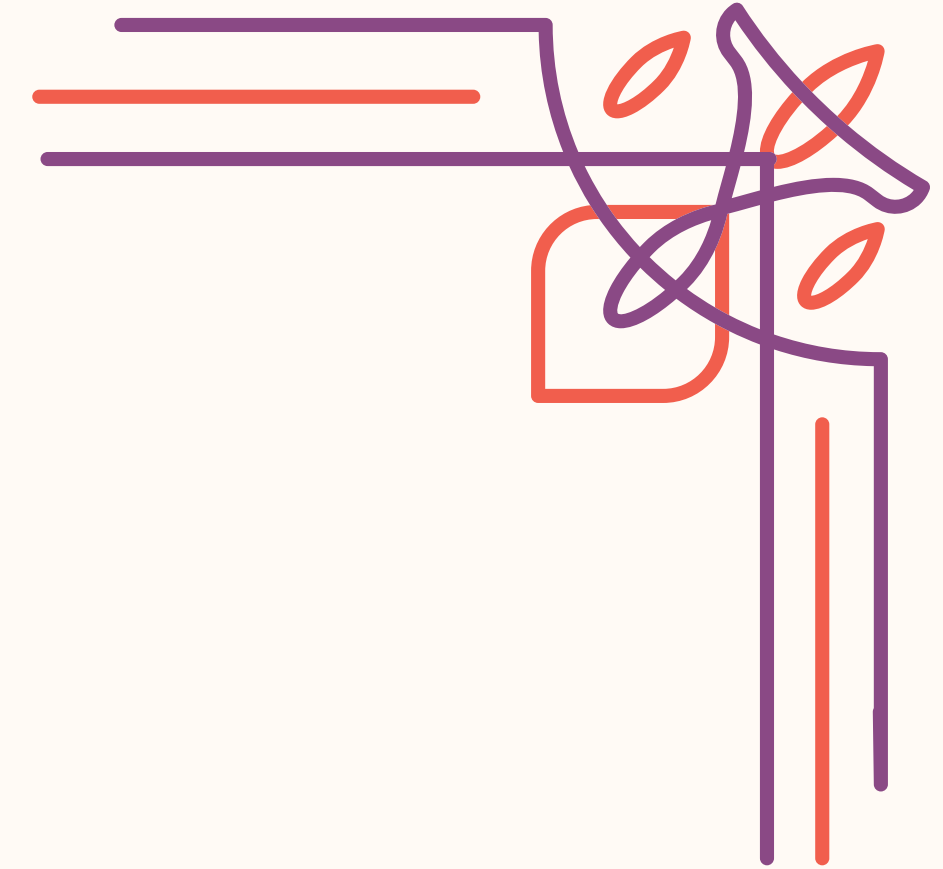
```
[33]: sns.barplot(x = 'Product_ID' , y = 'Amount' , data = prod_id_wise_sale , hue =␣
      ↪'Product_ID')
      sns.set (rc = {'figure.figsize':(28,6)})
```
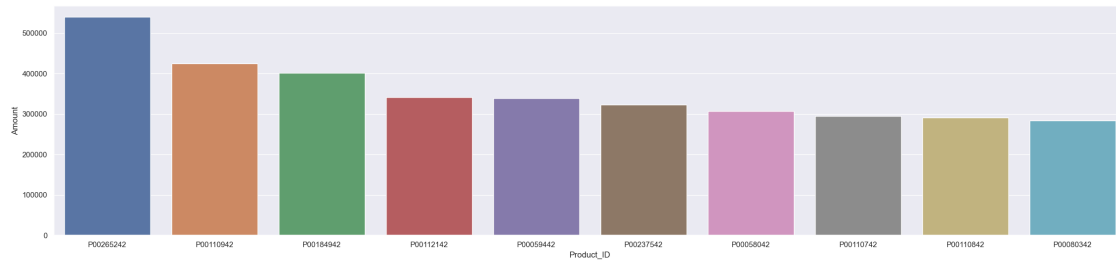
10 *Thank You - Yash Shukla*

Insights

- **Gender:** Women significantly outspent men in the sales period.
- **Age:** The 26-35 age group was the largest spending demographic, followed by the 36-45 and 18-25 age groups.
- **State:** Uttar Pradesh, Maharashtra and Karnataka were the top-performing states in terms of sales.
- **Marital Status:** Married women were the primary contributors to sales.
- **Occupation:** The IT sector, healthcare and aviation industries had the highest spending levels.
- **Product:** Food, clothing & apparel and electronics & gadgets were the most popular product categories.

Thank you!

Yash Shukla