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

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

```
df.shape
```

```
(11251, 15)
```

```
df.head()
```

| | User_ID | Cust_name | Product_ID | Gender | Age Group | Age | Marital_Status | State | Zone | Occupation | Product_Category | Orders | Amount | Status | unnamed1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1002903 | Sanskriti | P00125942 | F | 26-35 | 28 | 0 | Maharashtra | Western | Healthcare | Auto | 1 | 23952.0 | NaN | NaN |
| 1 | 1003132 | Kartik | P00110942 | F | 26-35 | 35 | 1 | Andhra Pradesh | Southern | Govt | Auto | 3 | 23934.0 | NaN | NaN |
| 2 | 1003462 | Bindu | P00118942 | F | 26-35 | 35 | 1 | Uttar Pradesh | Central | Automobile | Auto | 3 | 23924.0 | NaN | NaN |
| 3 | 1003627 | Sudeer | P00237842 | M | 0-17 | 16 | 0 | Karnataka | Southern | Construction | Auto | 2 | 23912.0 | NaN | NaN |
| 4 | 1003699 | Joni | P00057942 | M | 26-35 | 28 | 1 | Gujarat | Western | Food Processing | Auto | 2 | 23877.0 | NaN | NaN |

```
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
```

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

```
# check null value
df['Amount'].isnull().sum()
```

```
12
```

```
df['Amount'].fillna(df['Amount'].mean(), inplace=True)
df['Amount']=df['Amount'].astype('int')
```

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

```
dtype('int64')
```

```
df.columns
```

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

```
df.rename(columns= {'Marital_Status':'Shaadi'})
```

| | User_ID | Cust_name | Product_ID | Gender | Age Group | Age | Shaadi | State | Zone | Occupation | Product_Category | Orders | Amount |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1002903 | Sanskriti | P00125942 | F | 26-35 | 28 | 0 | Maharashtra | Western | Healthcare | Auto | 1 | 23952 |
| 1 | 1003132 | Kartik | P00110942 | F | 26-35 | 35 | 1 | Andhra Pradesh | Southern | Govt | Auto | 3 | 23934 |
| 2 | 1003462 | Bindu | P00118942 | F | 26-35 | 35 | 1 | Uttar Pradesh | Central | Automobile | Auto | 3 | 23924 |
| 3 | 1003627 | Sudeer | P00237842 | M | 0-17 | 16 | 0 | Karnataka | Southern | Construction | Auto | 2 | 23912 |
| 4 | 1003699 | Joni | P00057942 | M | 26-35 | 28 | 1 | Gujarat | Western | Food Processing | Auto | 2 | 23877 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11246 | 1000800 | Manning | P00296942 | M | 18-25 | 19 | 1 | Maharashtra | Western | Chemical | Office | 4 | 370 |
| 11247 | 1004067 | Reichenbach | P00171342 | M | 26-35 | 33 | 0 | Haryana | Northern | Healthcare | Veterinary | 3 | 367 |
| 11248 | 1001209 | Oshin | P00201342 | F | 36-45 | 40 | 0 | Madhya Pradesh | Central | Textile | Office | 4 | 213 |
| 11249 | 1004023 | Noonan | P00088442 | M | 36-45 | 37 | 0 | Karnataka | Southern | Agriculture | Office | 3 | 206 |
| 11250 | 1002744 | Brumley | P00078742 | F | 18-25 | 19 | 0 | Maharashtra | Western | Healthcare | Office | 3 | 188 |

11239 rows × 13 columns

```
df.describe()
```

| | 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 |

```
df[['Age', 'Orders', 'Amount']].describe()
```

| | 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 |

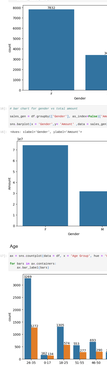
## Exploratory Data Analysis

### Gender

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

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

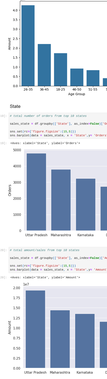

```
# Get chart for gender vs total amount

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)
```

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



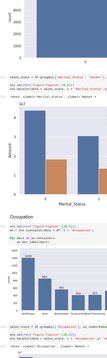

### Age

```
ax = sns.countplot(data = df, x = 'Age Group', hue = 'Gender')

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




```
# 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)
```

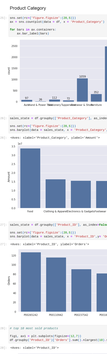
```
<Axes: xlabel='Age Group', ylabel='Amount'>
```




### State

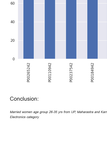
```
# Total number of orders from top 10 states

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')
```

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




```
# 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')
```

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




### Marital Status

```
ax = sns.countplot('Marital_Status', data = df)

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




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

sns.set(rc={'figure.figsize':(8,5)})
sns.barplot(data = sales_state, x = 'Marital_Status',y= 'Amount', hue='Gender')
```

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




### Occupation

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

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




```
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')
```

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




### Product Category

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

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




```
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')
```

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




```
sales_state = df.groupby(['Product_ID'], 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 = 'Product_ID',y= 'Orders')
```

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




```
# Top 10 most sold products

fig1, ax1 = plt.subplots(figsize=(12,7))
df.groupby('Product_ID')['Orders'].sum().nlargest(10).sort_values(ascending=False).plot(kind='bar')
```

```
<Axes: xlabel="Product_ID">
```




## Conclusion:

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