us-online-store-customer-data-analysis

March 29, 2023

[2]:
```
# import necessary libraries
import numpy as np
import pandas as pd
```

[3]:
```
# load the dataset
df=pd.read_csv("/kaggle/input/online-store-customer-data/
 ↪online_store_customer_data.csv")
```

[4]:
```
# load 1st 5 rows
df.head()
```

[4]:

	Transaction_date	Transaction_ID	Gender	Age	Marital_status	State_names	Segment	Employees_status	Payment_method	Referal	Amount_spent
0	1/1/2019	151200	Female	19.0	Single	Kansas	Basic	Unemployment	Other	1.0	2051.36
1	1/1/2019	151201	Male	49.0	Single	Illinois	Basic	self-employed	Card	0.0	544.04
2	1/1/2019	151202	Male	63.0	Married	New Mexico	Basic	workers	PayPal	1.0	1572.60
3	1/1/2019	151203	NaN	18.0	Single	Virginia	Platinum	workers	Card	1.0	1199.79
4	1/1/2019	151204	Male	27.0	Single	Connecticut	Basic	self-employed	Card	0.0	NaN

[5]:
```
# load last 5 rows
df.tail()
```

[5]:

	Transaction_date	Transaction_ID	Gender	Age	Marital_status	State_names	Segment	Employees_status	Payment_method	Referal
2507	5/1/2021	153695	Female	57.0	Single	South Carolina	Platinum	self-employed	Card	0.0
2508	5/1/2021	153696	Female	36.0	Married	Hawaii	Silver	self-employed	PayPal	1.0
2509	5/1/2021	153697	Male	22.0	Single					
2510	5/1/2021	153698	NaN	44.0	Single					
2511	5/1/2021	153699	Male	48.0	Single					

```
2509  South Carolina     Basic          workers         PayPal      1.0
2510        New York     Basic        Employees         PayPal      0.0
2511      California    Silver          workers         PayPal      1.0

      Amount_spent
2507        150.10
2508        708.88
2509       2030.07
2510       1909.77
2511       1073.15
```

[6]:
```
# determine the shape of data
df.shape
```

[6]:
```
(2512, 11)
```

[7]:
```
# determine the size of data
df.size
```

[7]:
```
27632
```

[8]:
```
# check column names
df.columns
```

[8]:
```
Index(['Transaction_date', 'Transaction_ID', 'Gender', 'Age', 'Marital_status',
       'State_names', 'Segment', 'Employees_status', 'Payment_method',
       'Referal', 'Amount_spent'],
      dtype='object')
```

[9]:
```
# checking null values
df.isnull().sum()
```

[9]:
```
Transaction_date      0
Transaction_ID        0
Gender               28
Age                  42
Marital_status        0
State_names           0
Segment               0
Employees_status     26
Payment_method        0
Referal             155
Amount_spent        242
dtype: int64
```

[12]:
```
# dropping null values
df.dropna(inplace=True)
```

[13]:
```
# checking change in shape after dropping null values
df.shape
```

[13]:
```
(2044, 11)
```

[14]:
```
# checking change in size after dropping null values
df.size
```

[14]:
```
22484
```

[15]:
```
# checking duplicate values
df.duplicated().value_counts()
```

[15]:
```
False    2034
True       10
dtype: int64
```

[16]:
```
# dropping duplicate values
df.drop_duplicates(inplace=True)
```

[17]:
```
# checking the count after dropping duplicate values
df.duplicated().value_counts()
```

[17]:
```
False    2034
dtype: int64
```

[33]:
```
# checking the change in shape after dropping the duplicate values
df.shape
```

[33]:
```
(2034, 11)
```

[34]:
```
# checking the change in size after dropping the duplicate values
df.size
```

[34]:
```
22374
```

[18]:
```
# determining the datatypes
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2034 entries, 0 to 2511
Data columns (total 11 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   Transaction_date  2034 non-null   object
 1   Transaction_ID    2034 non-null   int64
 2   Gender            2034 non-null   object
 3   Age               2034 non-null   float64
 4   Marital_status    2034 non-null   object
```

```
 5   State_names       2034 non-null   object
 6   Segment           2034 non-null   object
 7   Employees_status  2034 non-null   object
 8   Payment_method    2034 non-null   object
 9   Referal           2034 non-null   float64
 10  Amount_spent      2034 non-null   float64
dtypes: float64(3), int64(1), object(7)
memory usage: 190.7+ KB
```

[19]:
```
# changing the datatype of date from object to datetime
df['Transaction_date']=df['Transaction_date'].apply(pd.to_datetime)
```

[23]:
```
# changing the datatype of age and referal from float to integer
df['Age']=df['Age'].astype(int)
df['Referal']=df['Referal'].astype(int)
```

[24]:
```
# checking the change in datatypes
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2034 entries, 0 to 2511
Data columns (total 11 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   Transaction_date  2034 non-null   datetime64[ns]
 1   Transaction_ID    2034 non-null   int64
 2   Gender            2034 non-null   object
 3   Age               2034 non-null   int64
 4   Marital_status    2034 non-null   object
 5   State_names       2034 non-null   object
 6   Segment           2034 non-null   object
 7   Employees_status  2034 non-null   object
 8   Payment_method    2034 non-null   object
 9   Referal           2034 non-null   int64
 10  Amount_spent      2034 non-null   float64
dtypes: datetime64[ns](1), float64(1), int64(3), object(6)
memory usage: 190.7+ KB
```

[25]:
```
# checking the change in values of dataset
df.head()
```

[25]:

	Transaction_date	Transaction_ID	Gender	Age	Marital_status	State_names	\
0	2019-01-01	151200	Female	19	Single	Kansas	
1	2019-01-01	151201	Male	49	Single	Illinois	
2	2019-01-01	151202	Male	63	Married	New Mexico	
5	2019-01-03	151205	Male	71	Single	Hawaii	
6	2019-01-03	151206	Female	34	Married	New Mexico	

```
    Segment Employees_status Payment_method  Referal  Amount_spent
0     Basic     Unemployment          Other        1       2051.36
1     Basic    self-employed           Card        0        544.04
2     Basic          workers         PayPal        1       1572.60
5     Basic        Employees         PayPal        1       2922.66
6  Platinum        Employees         PayPal        1       1481.42
```

[32]:
```
# statistical summary of age and amount_spent
df.drop(columns=['Transaction_ID', 'Referal']).describe()
```

[32]:
```
                Age  Amount_spent
count  2034.000000   2034.000000
mean     46.897247   1430.370492
std      18.218701    884.733030
min      15.000000      2.090000
25%      32.000000    678.192500
50%      47.000000   1358.310000
75%      62.000000   2056.622500
max      78.000000   2999.980000
```

[39]:
```
# checking the unique values in each column
df.nunique()
```

[39]:
```
Transaction_date     787
Transaction_ID      2034
Gender                 2
Age                   63
Marital_status         2
State_names           50
Segment                5
Employees_status       4
Payment_method         3
Referal                2
Amount_spent        2028
dtype: int64
```

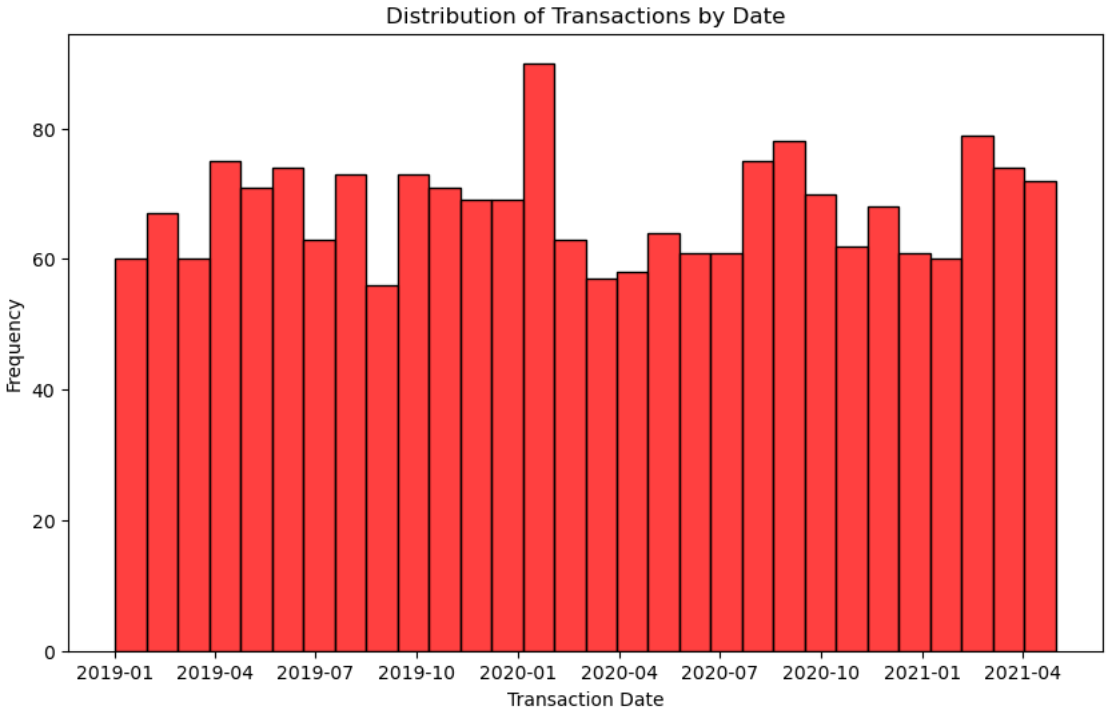
[60]:
```
# correcting the index
df.reset_index(inplace=True)
```

[93]:
```
df.drop(columns=['index', 'Transaction_ID'], inplace=True)
```

[94]:
```
# data visualisation libraries
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px
```

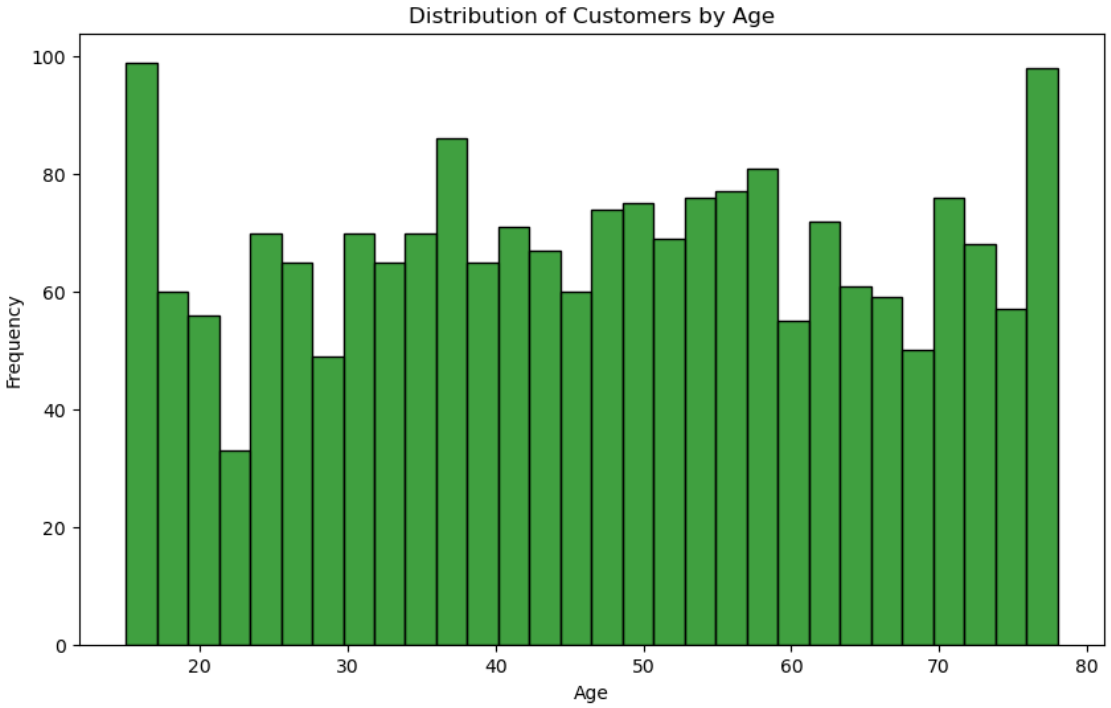
[96]:
```
# Univariate analysis for Transaction_date
plt.figure(figsize=(10, 6))
sns.histplot(data=df, x="Transaction_date", color='red', bins=30)
plt.xlabel("Transaction Date")
plt.ylabel("Frequency")
plt.title("Distribution of Transactions by Date")
```

[96]: Text(0.5, 1.0, 'Distribution of Transactions by Date')



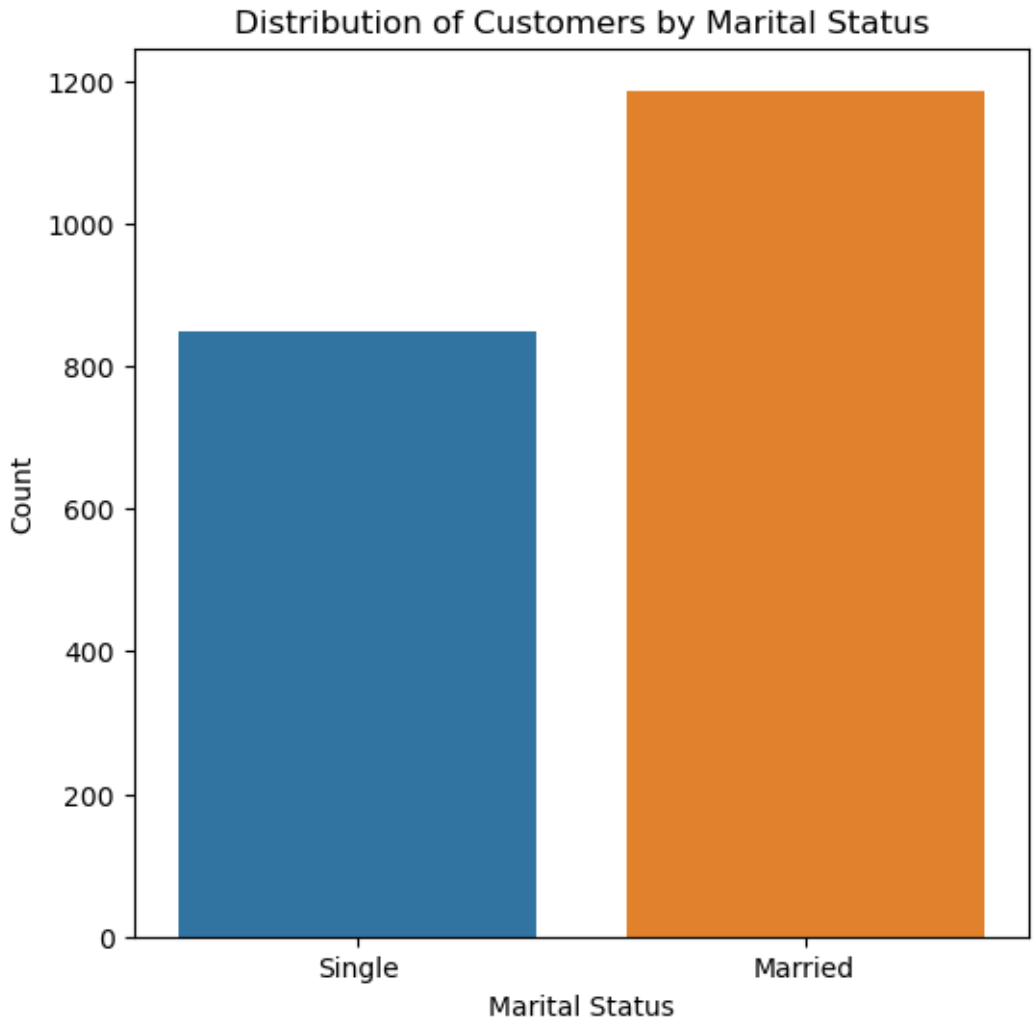
[97]:
```
# Univariate analysis for Age
plt.figure(figsize=(10, 6))
sns.histplot(data=df, x="Age", color='green', bins=30)
plt.xlabel("Age")
plt.ylabel("Frequency")
plt.title("Distribution of Customers by Age")
```

[97]: Text(0.5, 1.0, 'Distribution of Customers by Age')



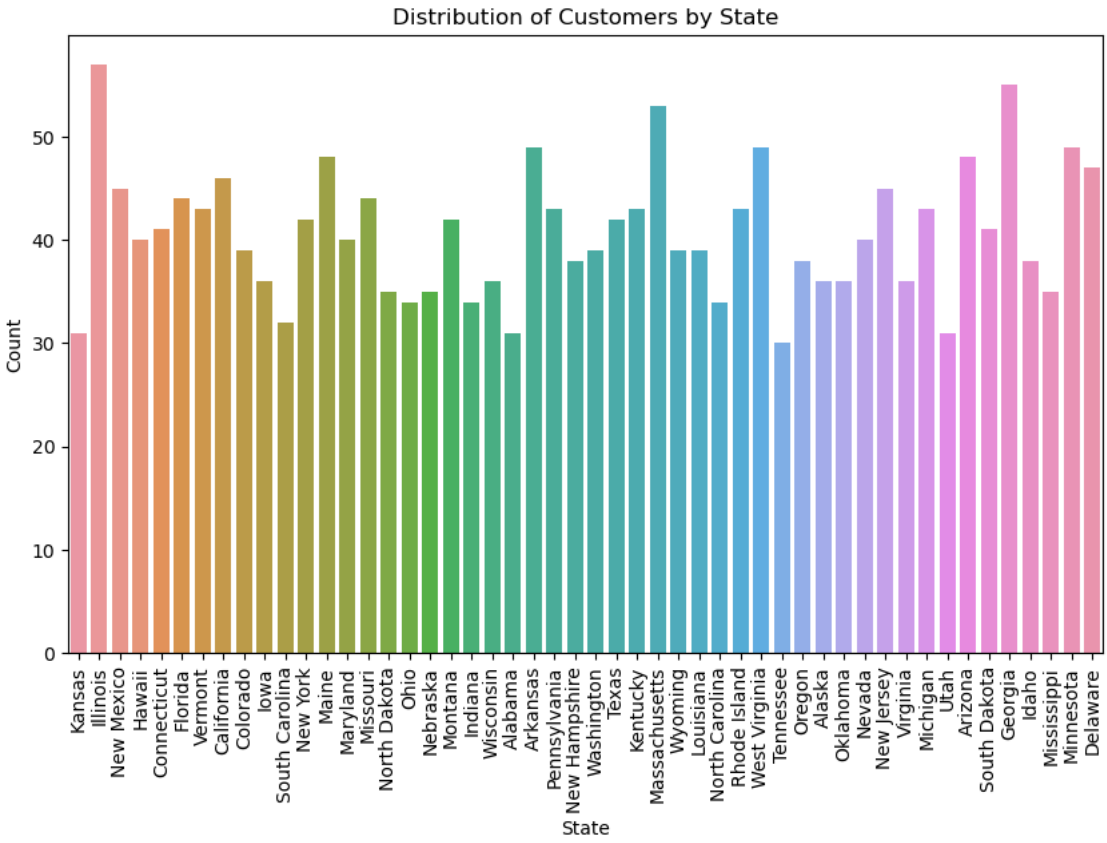
[98]:
```
# Univariate analysis for Marital_status
plt.figure(figsize=(6, 6))
sns.countplot(data=df, x="Marital_status")
plt.xlabel("Marital Status")
plt.ylabel("Count")
plt.title("Distribution of Customers by Marital Status")
```

[98]: Text(0.5, 1.0, 'Distribution of Customers by Marital Status')



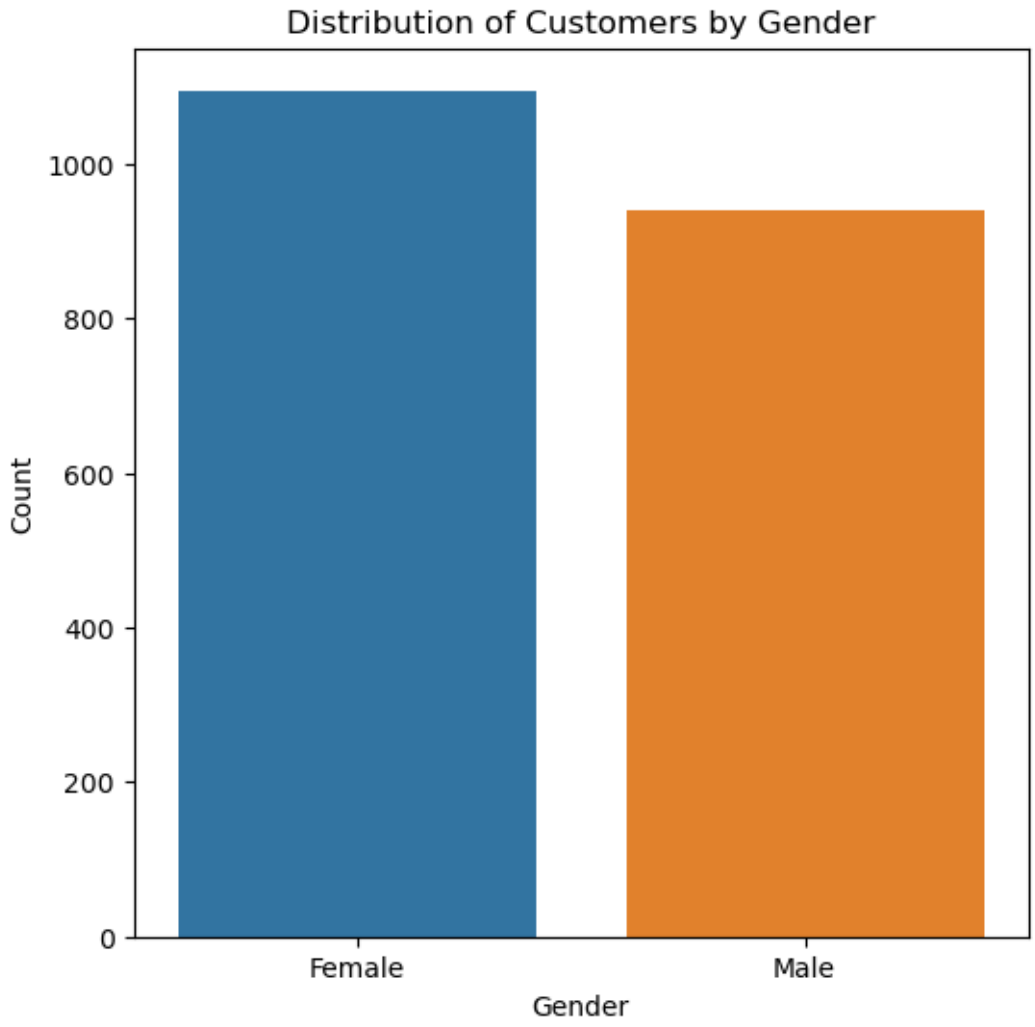
[99]:
```
# Univariate analysis for State_names
plt.figure(figsize=(10, 6))
sns.countplot(data=df, x="State_names")
plt.xticks(rotation=90)
plt.xlabel("State")
plt.ylabel("Count")
plt.title("Distribution of Customers by State")
```

[99]: Text(0.5, 1.0, 'Distribution of Customers by State')



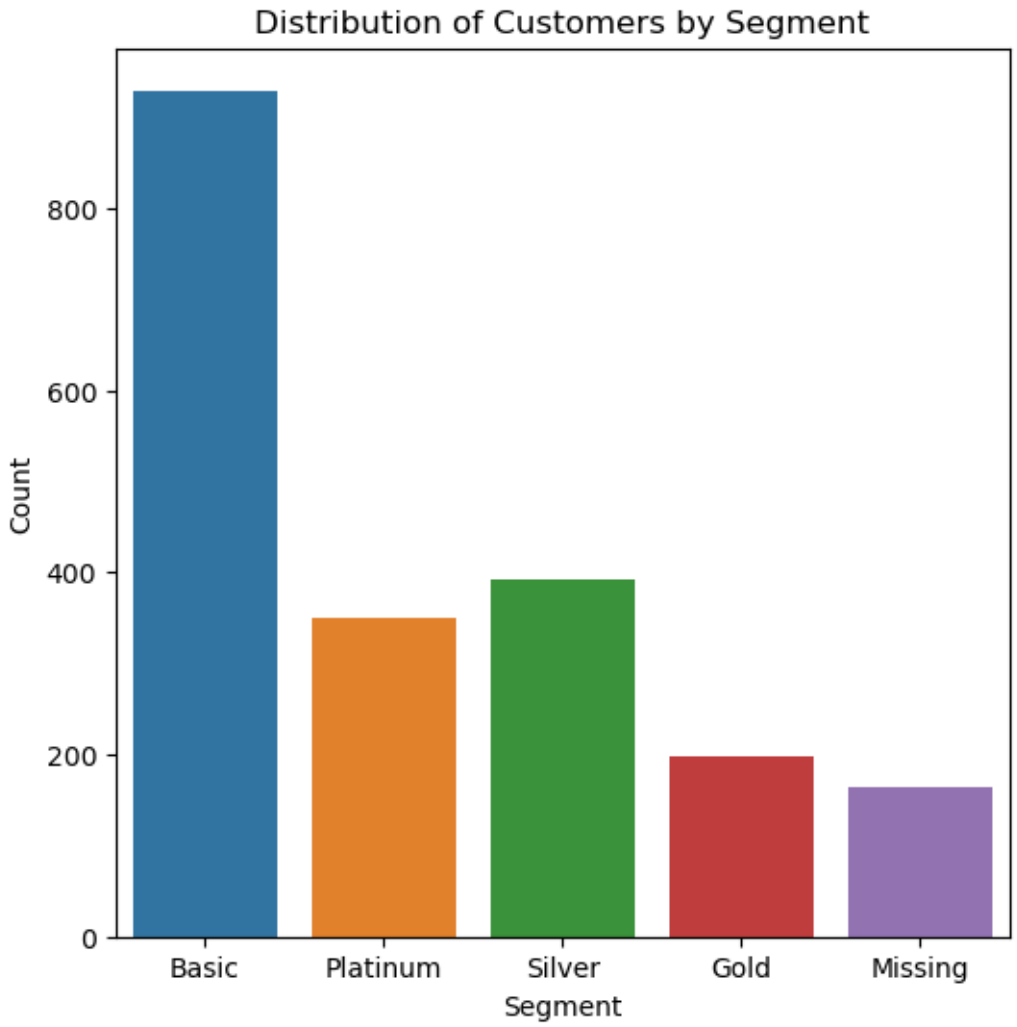
[100]:
```
# Univariate analysis for Gender
plt.figure(figsize=(6, 6))
sns.countplot(data=df, x="Gender")
plt.xlabel("Gender")
plt.ylabel("Count")
plt.title("Distribution of Customers by Gender")
```

[100]: Text(0.5, 1.0, 'Distribution of Customers by Gender')



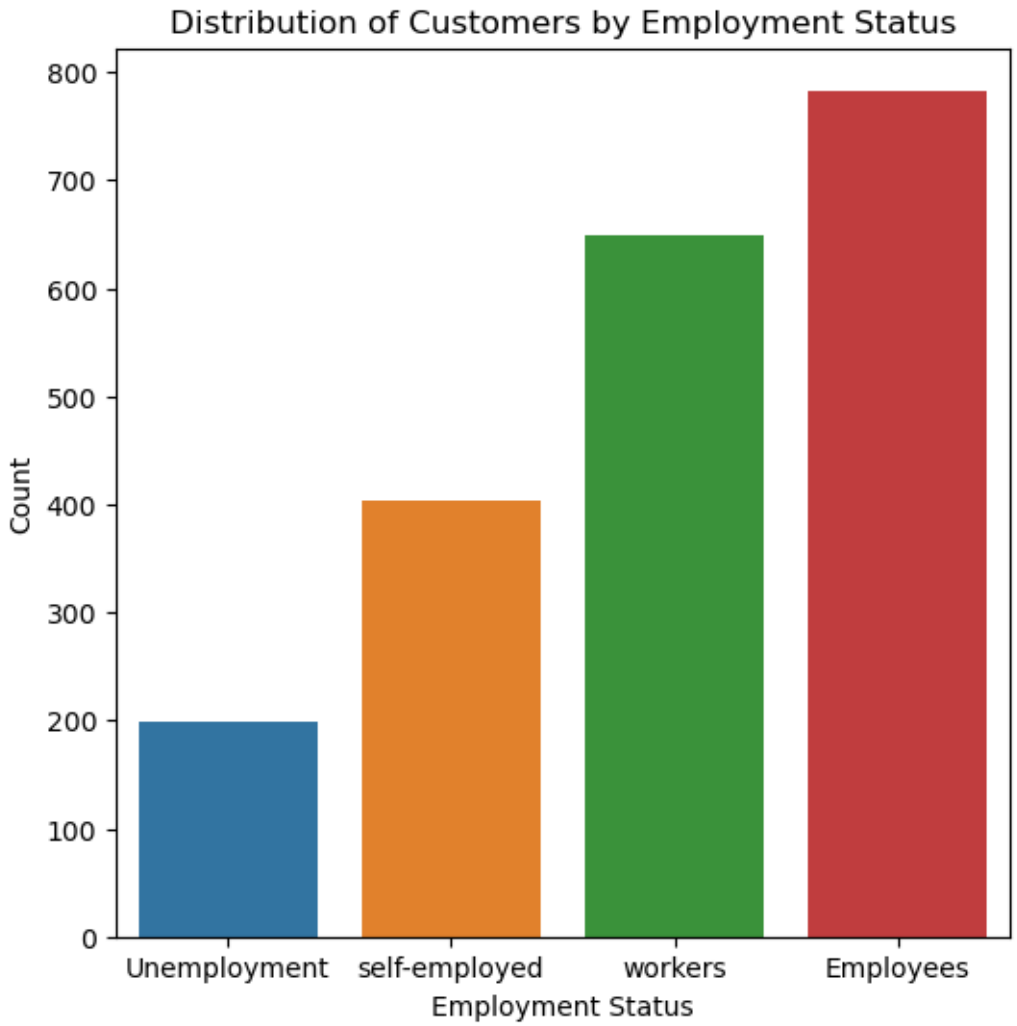
[101]:
```
# Univariate analysis for Segment
plt.figure(figsize=(6, 6))
sns.countplot(data=df, x="Segment")
plt.xlabel("Segment")
plt.ylabel("Count")
plt.title("Distribution of Customers by Segment")
```

[101]: Text(0.5, 1.0, 'Distribution of Customers by Segment')



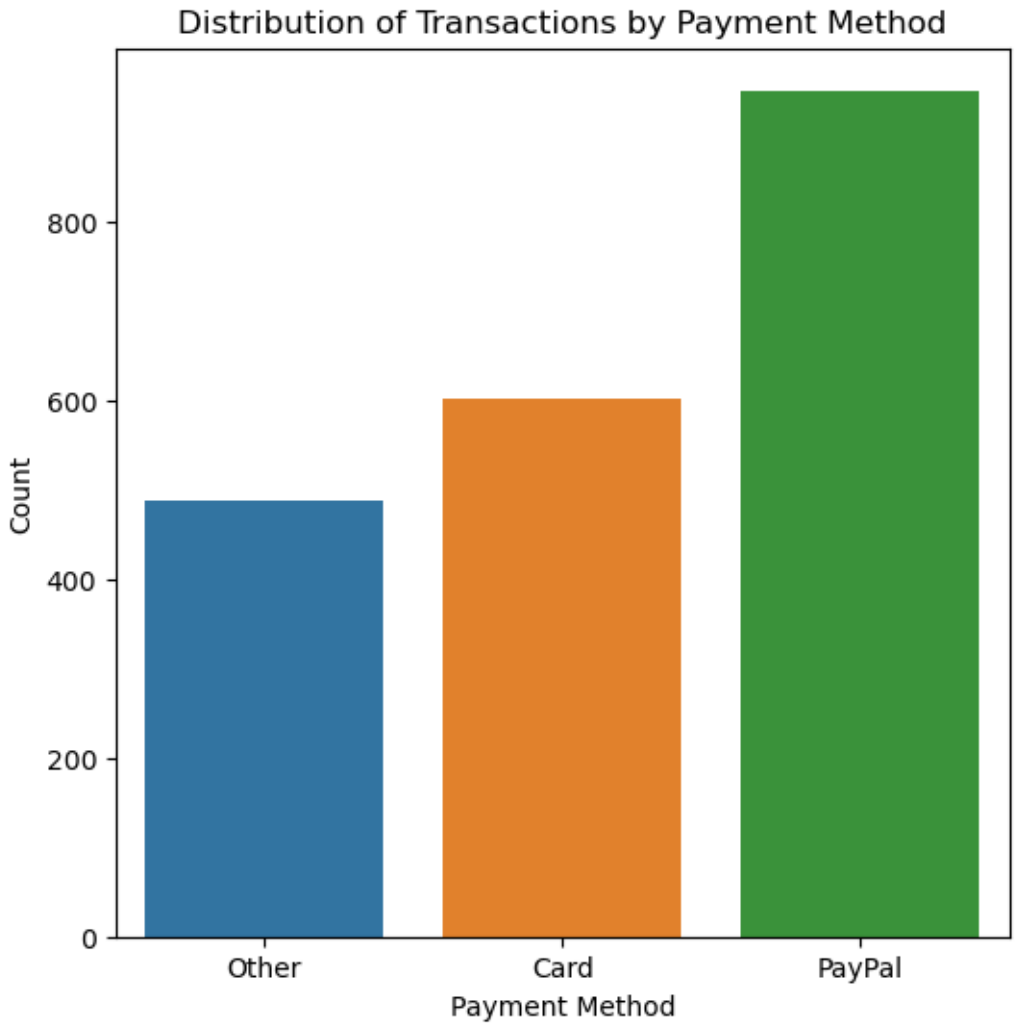
[102]:
```
# Univariate analysis for Employees_status
plt.figure(figsize=(6, 6))
sns.countplot(data=df, x="Employees_status")
plt.xlabel("Employment Status")
plt.ylabel("Count")
plt.title("Distribution of Customers by Employment Status")
```

[102]: Text(0.5, 1.0, 'Distribution of Customers by Employment Status')



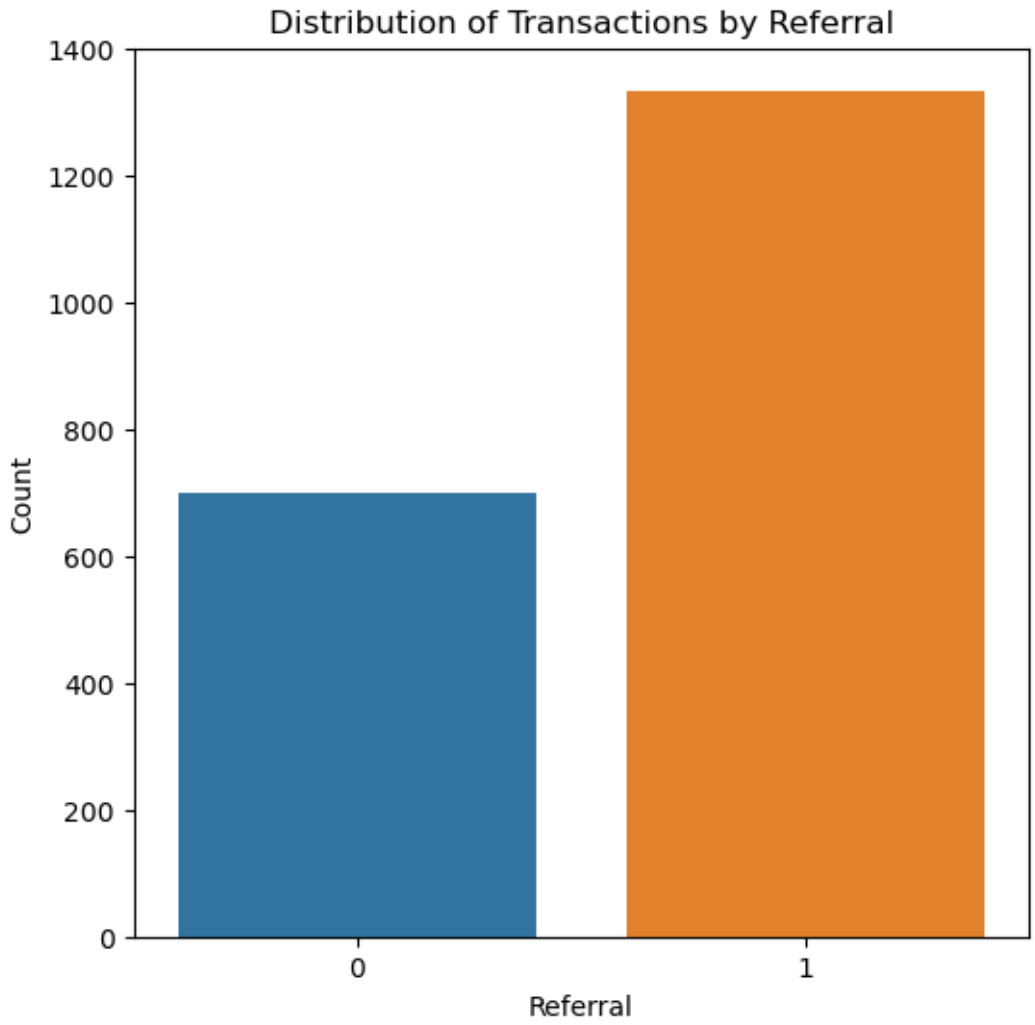
[103]:
```
# Univariate analysis for Payment_method
plt.figure(figsize=(6, 6))
sns.countplot(data=df, x="Payment_method")
plt.xlabel("Payment Method")
plt.ylabel("Count")
plt.title("Distribution of Transactions by Payment Method")
```

[103]: Text(0.5, 1.0, 'Distribution of Transactions by Payment Method')



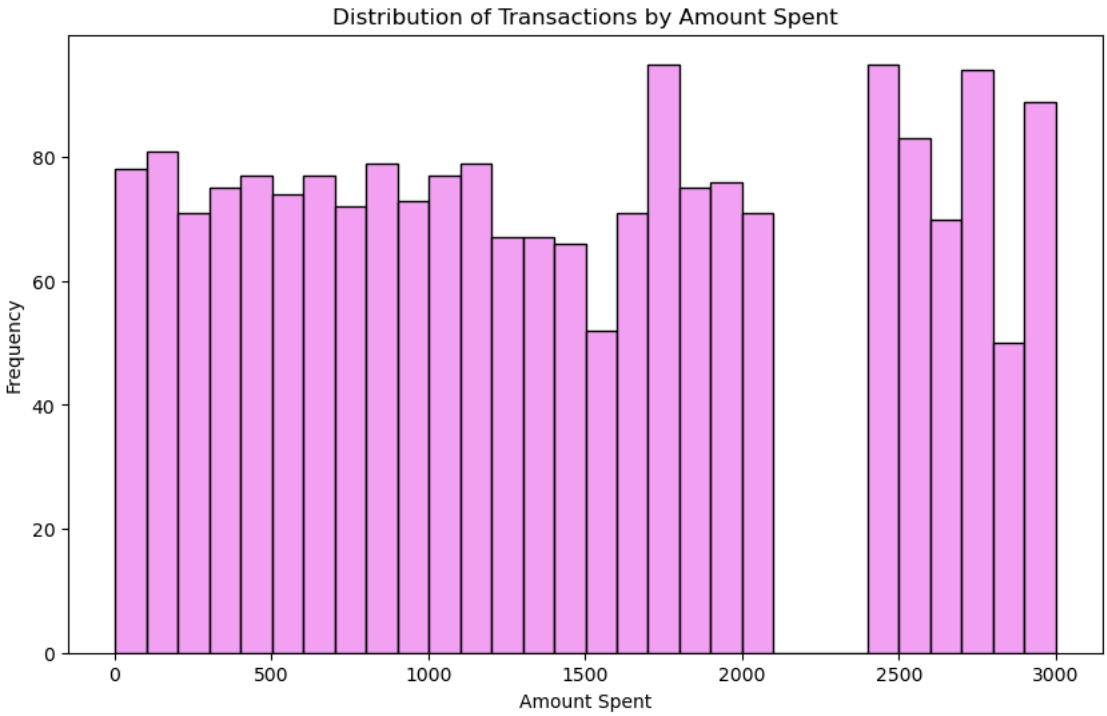
[104]:
```
# Univariate analysis for Referal
plt.figure(figsize=(6, 6))
sns.countplot(data=df, x="Referal")
plt.xlabel("Referral")
plt.ylabel("Count")
plt.title("Distribution of Transactions by Referral")
```

[104]: Text(0.5, 1.0, 'Distribution of Transactions by Referral')

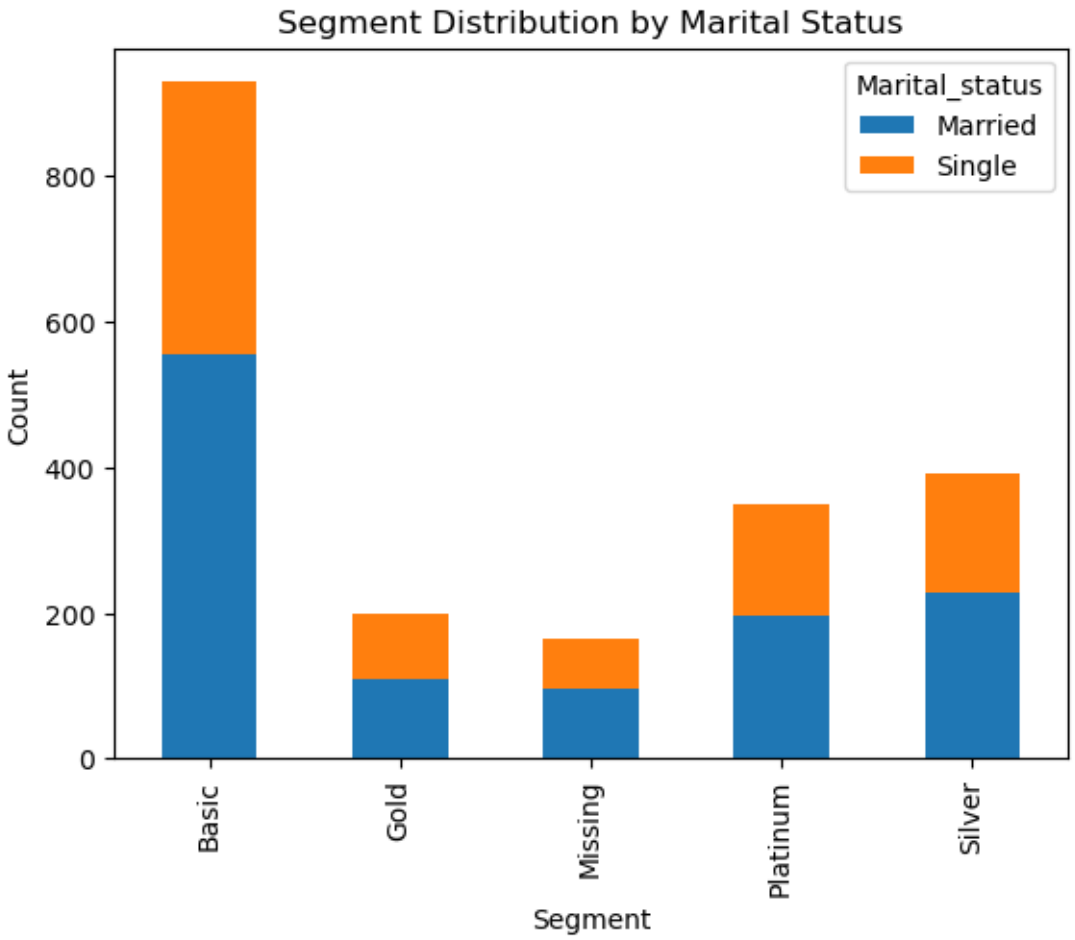


[172]:
```
# Univariate analysis for Amount_spent
plt.figure(figsize=(10, 6))
sns.histplot(data=df, x="Amount_spent", color='violet', bins=30)
plt.xlabel("Amount Spent")
plt.ylabel("Frequency")
plt.title("Distribution of Transactions by Amount Spent")
```

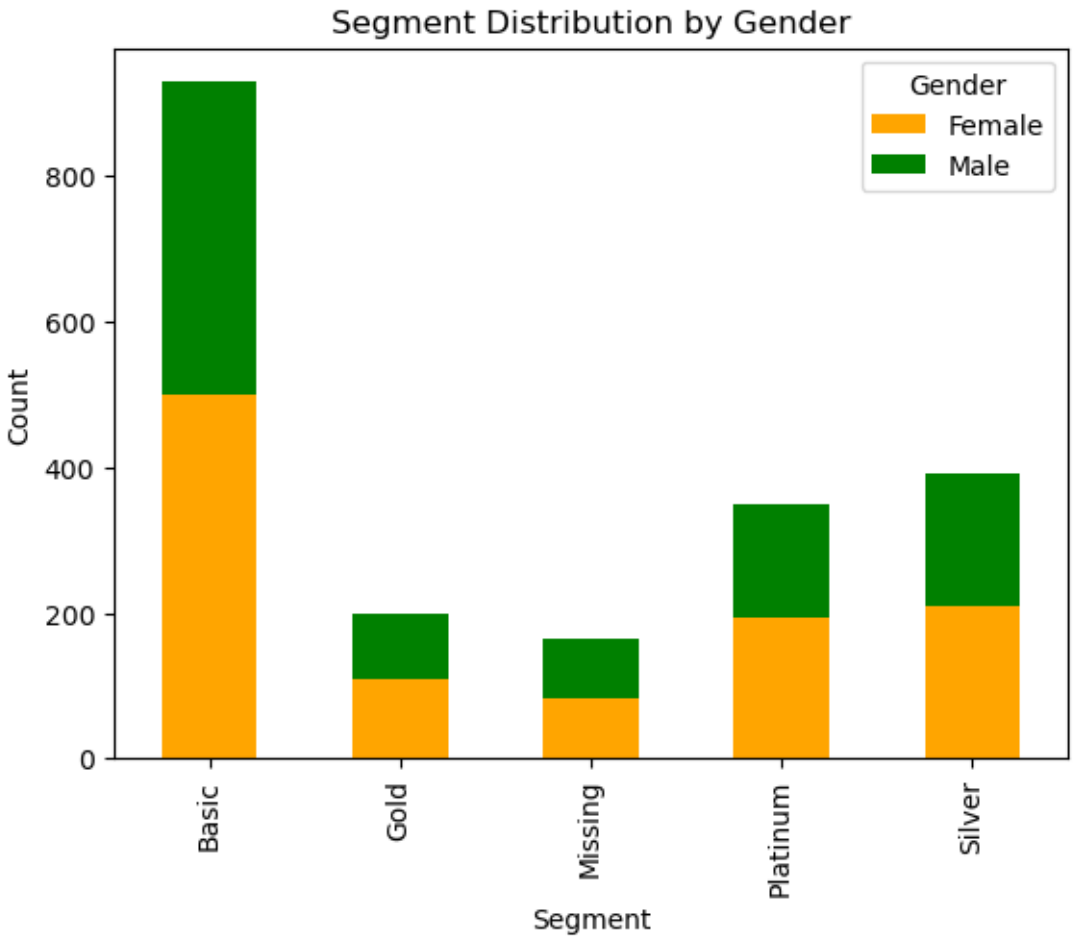
[172]: Text(0.5, 1.0, 'Distribution of Transactions by Amount Spent')



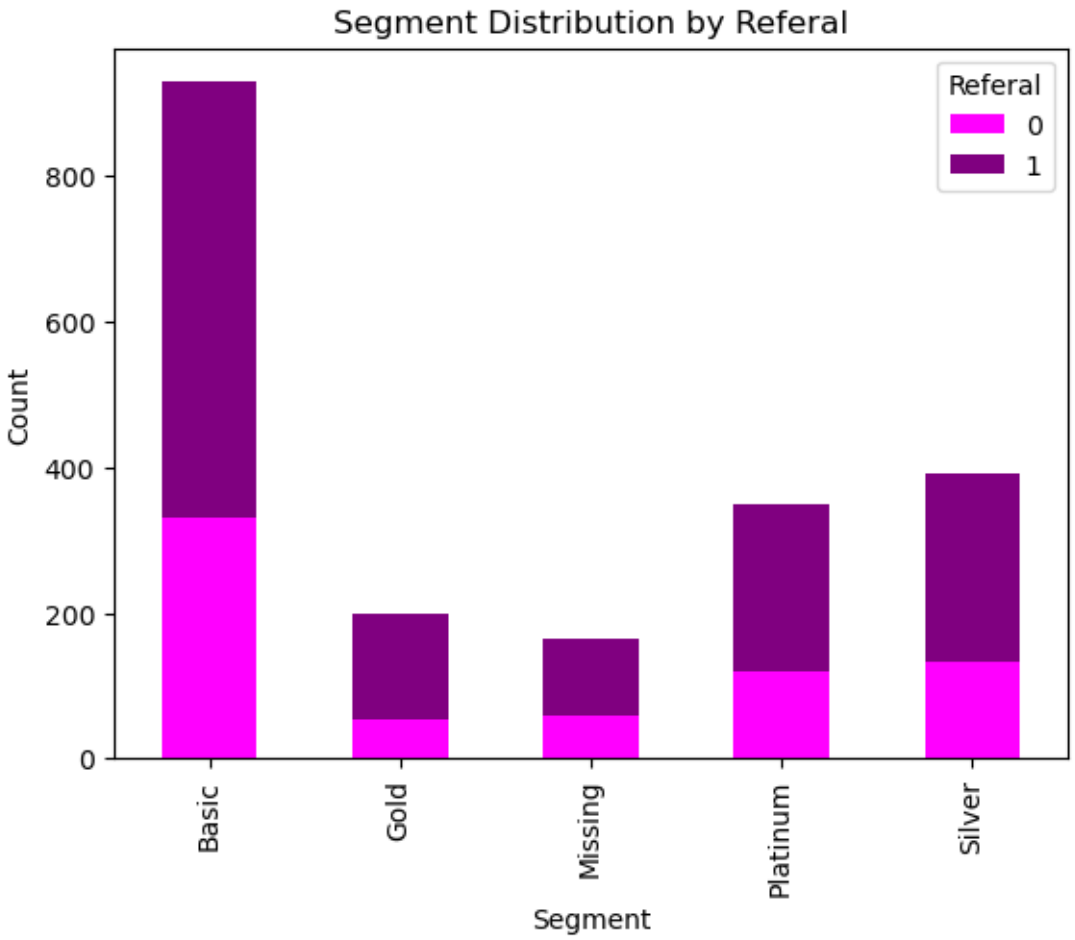
[141]:
```
# BIVARIATE ANALYSIS OF segment and marital status
# Group the data by segment, and calculate the count of each marital status␣
 ↪group
grouped = df.groupby(['Segment'])['Marital_status'].value_counts().
 ↪unstack(fill_value=0)

# Plot the stacked bar chart
grouped.plot(kind='bar', stacked=True)

# Add axis labels and title
plt.xlabel('Segment')
plt.ylabel('Count')
plt.title('Segment Distribution by Marital Status')

# Show the plot
plt.show()
```



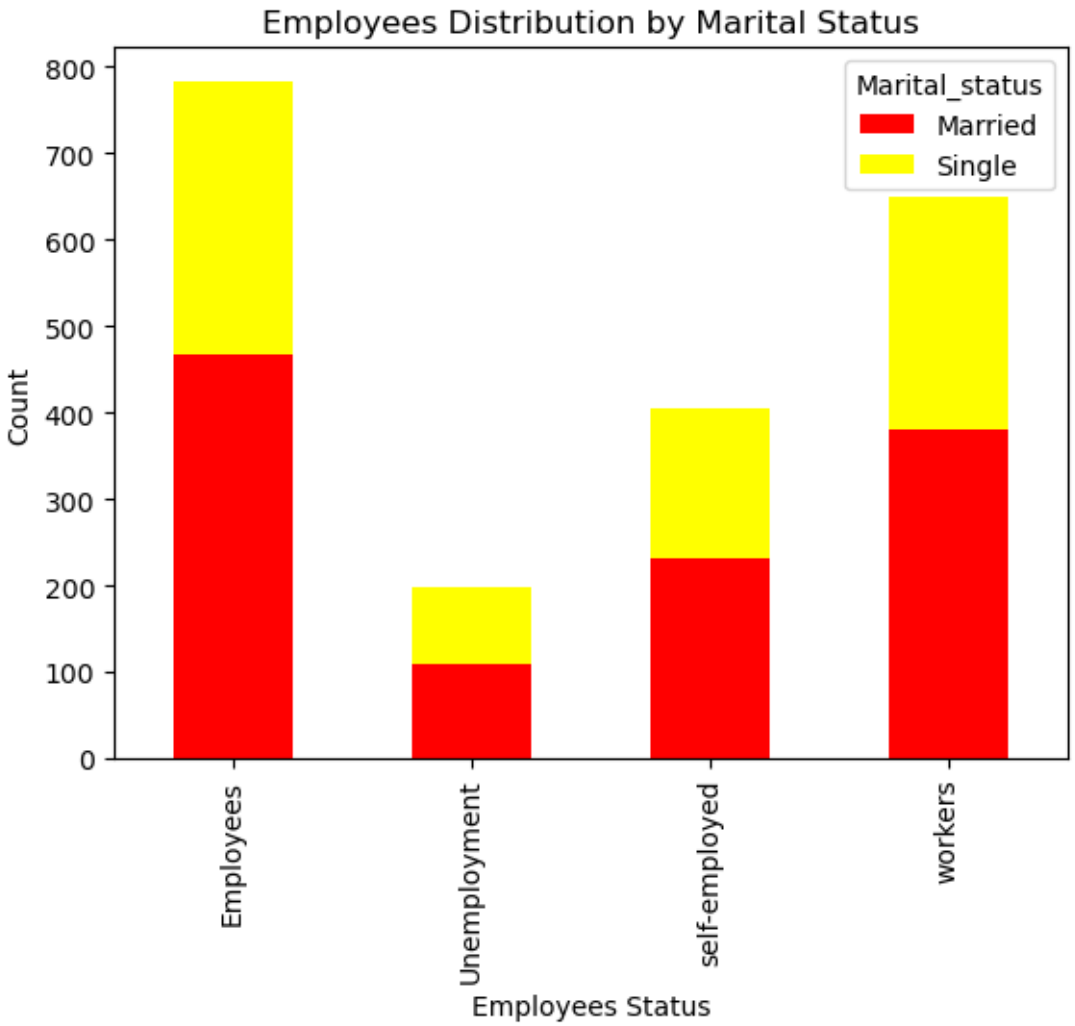
[158]:
```
# BIVARIATE ANALYSIS OF segment and gender
# Group the data by segment, and calculate the count of each gender group
grouped = df.groupby(['Segment'])['Gender'].value_counts().unstack(fill_value=0)

# Plot the stacked bar chart
grouped.plot(kind='bar', color=['orange', 'green'], stacked=True)

# Add axis labels and title
plt.xlabel('Segment')
plt.ylabel('Count')
plt.title('Segment Distribution by Gender')

# Show the plot
plt.show()
```



[180]:
```
# BIVARIATE ANALYSIS OF segment and referal
# Group the data by segment, and calculate the count of each referal group
grouped = df.groupby(['Segment'])['Referal'].value_counts().
 ↪unstack(fill_value=0)

# Plot the stacked bar chart
grouped.plot(kind='bar', color=['magenta', 'purple'], stacked=True)

# Add axis labels and title
plt.xlabel('Segment')
plt.ylabel('Count')
plt.title('Segment Distribution by Referal')

# Show the plot
plt.show()
```

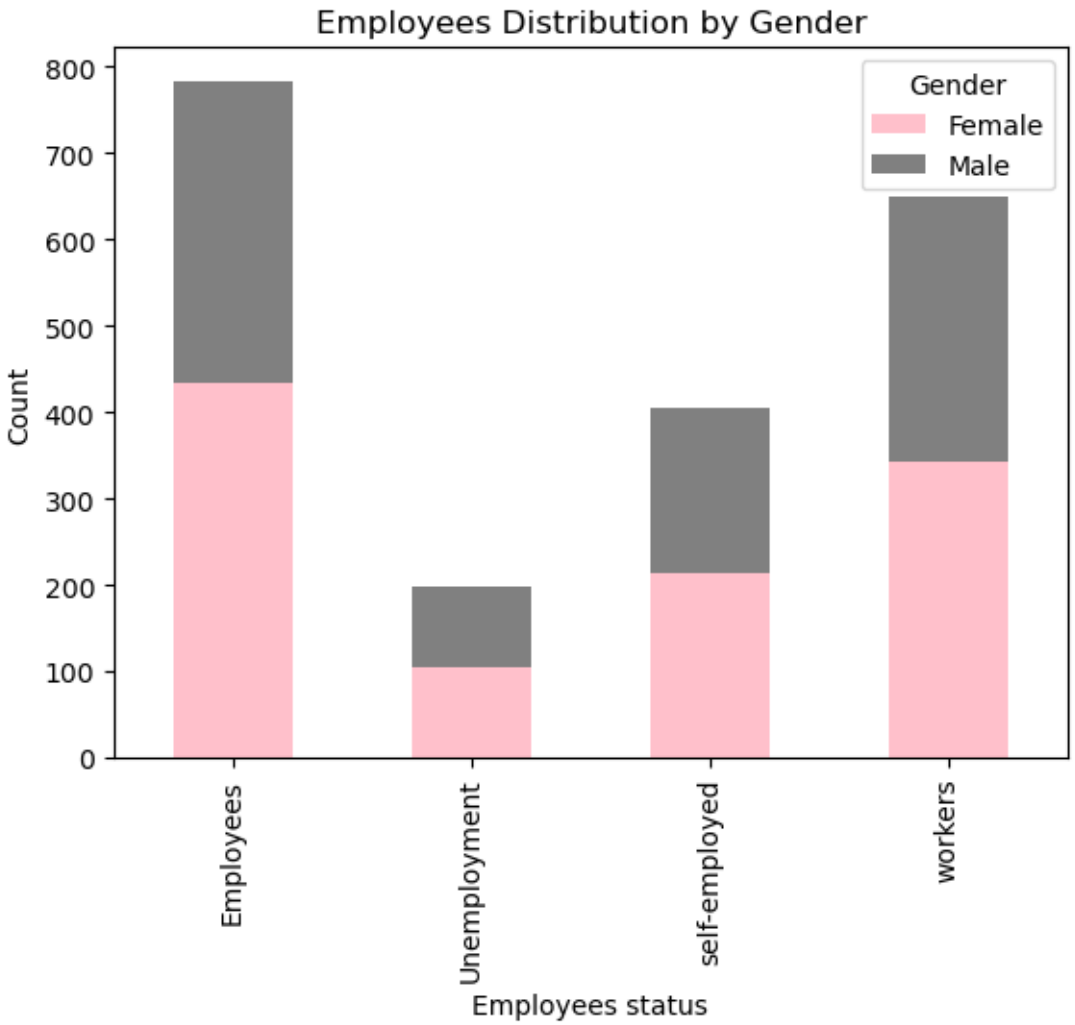


[160]:
```
# BIVARIATE ANALYSIS OF employees status and marital status
# Group the data by employees status, and calculate the count of each marital␣
 ↪status
grouped = df.groupby(['Employees_status'])['Marital_status'].value_counts().
 ↪unstack(fill_value=0)

# Plot the stacked bar chart
grouped.plot(kind='bar', color=['red', 'yellow'], stacked=True)

# Add axis labels and title
plt.xlabel('Employees Status')
plt.ylabel('Count')
plt.title('Employees Distribution by Marital Status')

# Show the plot
plt.show()
```



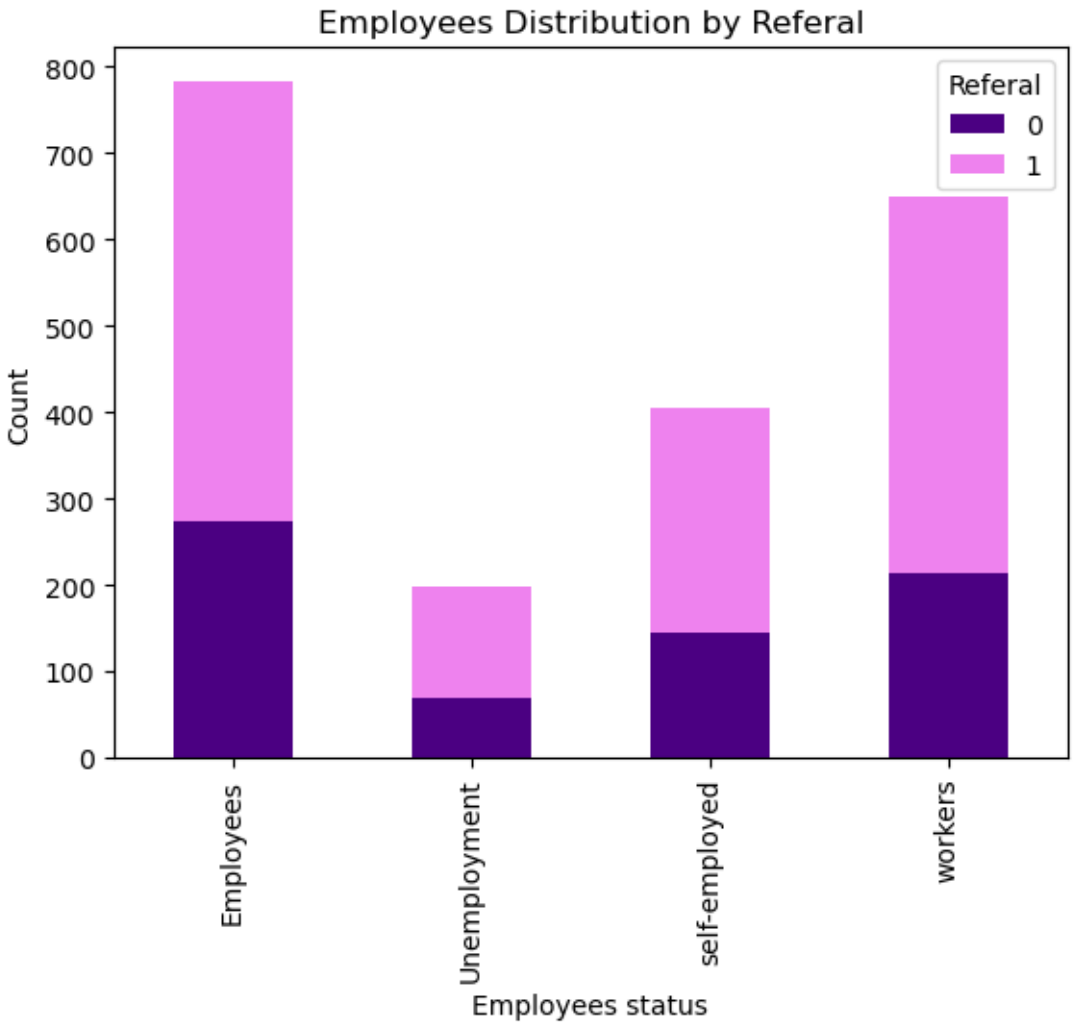
[171]:
```
# BIVARIATE ANALYSIS OF employees status and gender
# Group the data by employees status, and calculate the count of each gender␣
 ↪group
grouped = df.groupby(['Employees_status'])['Gender'].value_counts().
 ↪unstack(fill_value=0)

# Plot the stacked bar chart
grouped.plot(kind='bar', color=['pink', 'grey'], stacked=True)

# Add axis labels and title
plt.xlabel('Employees status')
plt.ylabel('Count')
plt.title('Employees Distribution by Gender')

# Show the plot
```

```
plt.show()
```



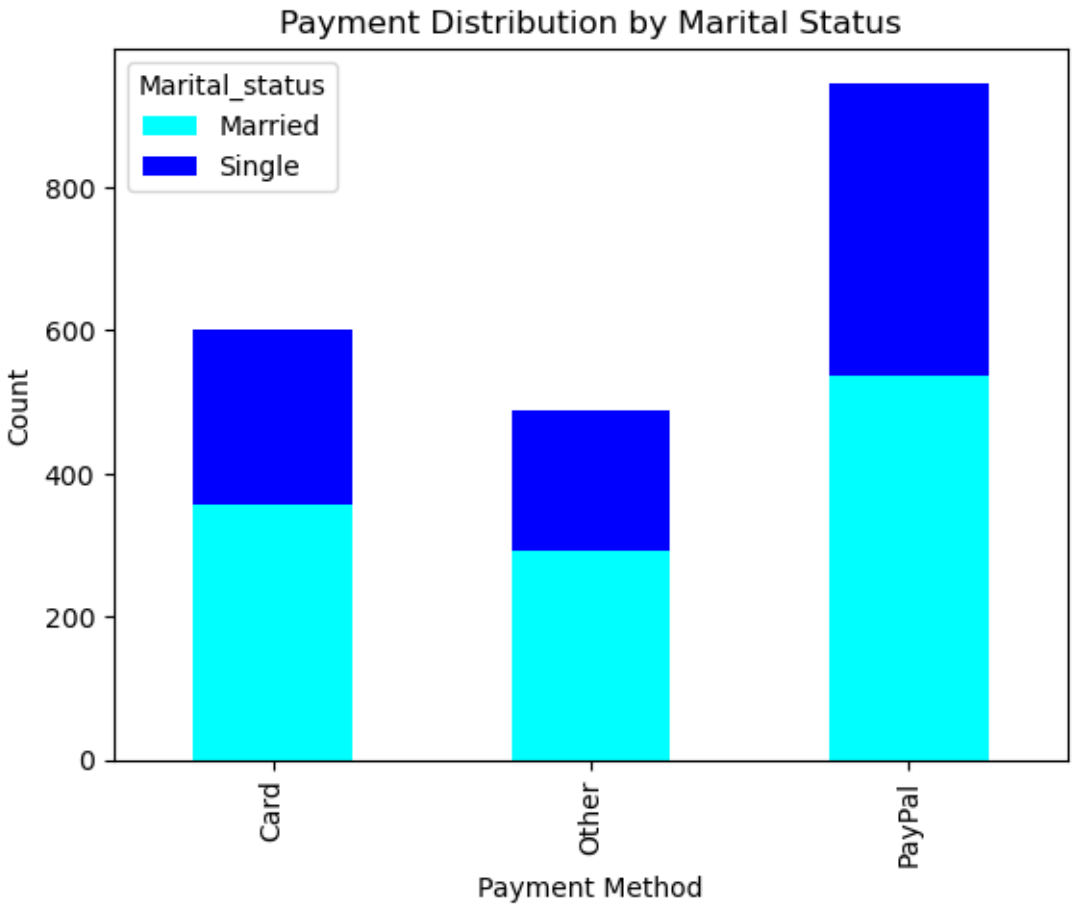
[170]:
```
# BIVARIATE ANALYSIS OF employee status and referal
# Group the data by employees status, and calculate the count of each referal␣
 ↪group
grouped = df.groupby(['Employees_status'])['Referal'].value_counts().
 ↪unstack(fill_value=0)

# Plot the stacked bar chart
grouped.plot(kind='bar', color=['indigo', 'violet'], stacked=True)

# Add axis labels and title
plt.xlabel('Employees status')
plt.ylabel('Count')
```

```
plt.title('Employees Distribution by Referal')

# Show the plot
plt.show()
```



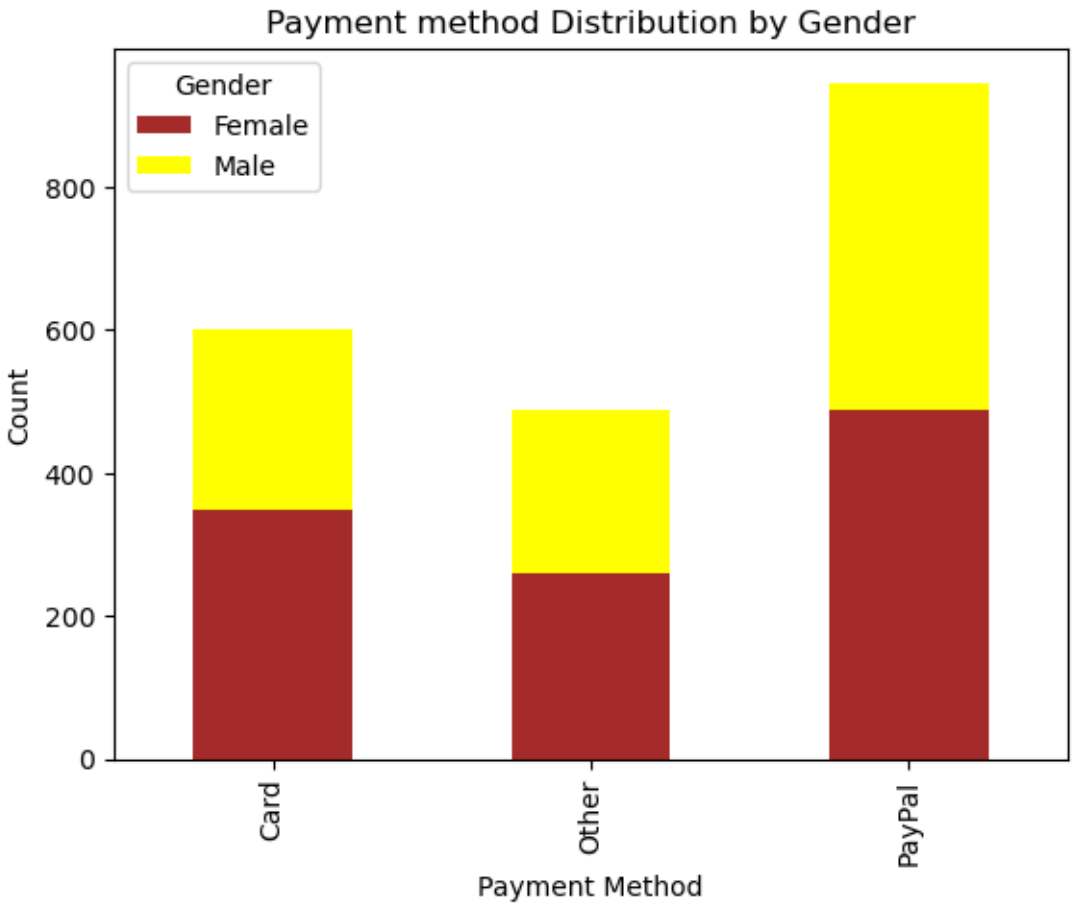
[166]:
```
# BIVARIATE ANALYSIS OF payment method and marital status
# Group the data by payment method, and calculate the count of each marital␣
 ↪status
grouped = df.groupby(['Payment_method'])['Marital_status'].value_counts().
 ↪unstack(fill_value=0)

# Plot the stacked bar chart
grouped.plot(kind='bar', color=['cyan', 'blue'], stacked=True)
```

```
# Add axis labels and title
plt.xlabel('Payment Method')
plt.ylabel('Count')
plt.title('Payment Distribution by Marital Status')

# Show the plot
plt.show()
```



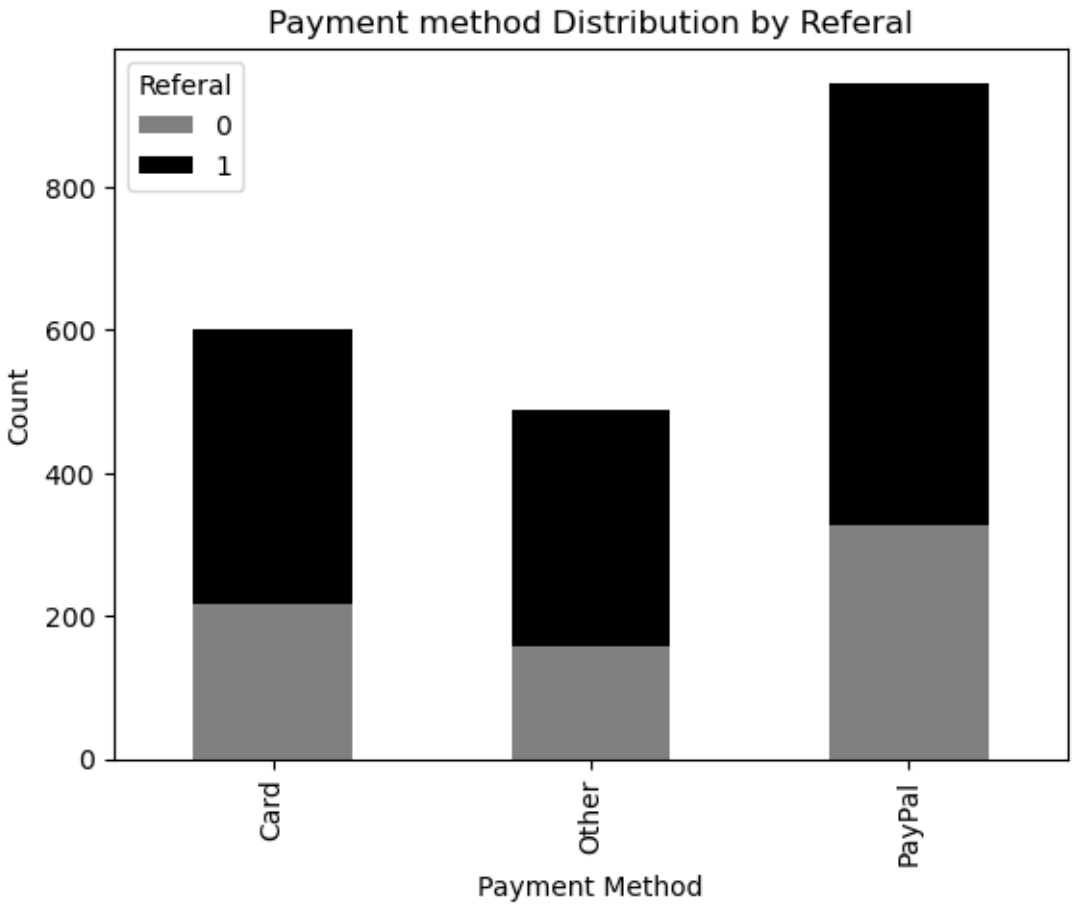
[167]:
```
# BIVARIATE ANALYSIS OF payment method and gender
# Group the data by payment, and calculate the count of each gender group
grouped = df.groupby(['Payment_method'])['Gender'].value_counts().
 ↪unstack(fill_value=0)

# Plot the stacked bar chart
grouped.plot(kind='bar', color=['brown', 'yellow'], stacked=True)

# Add axis labels and title
plt.xlabel('Payment Method')
```

```
plt.ylabel('Count')
plt.title('Payment method Distribution by Gender')

# Show the plot
plt.show()
```

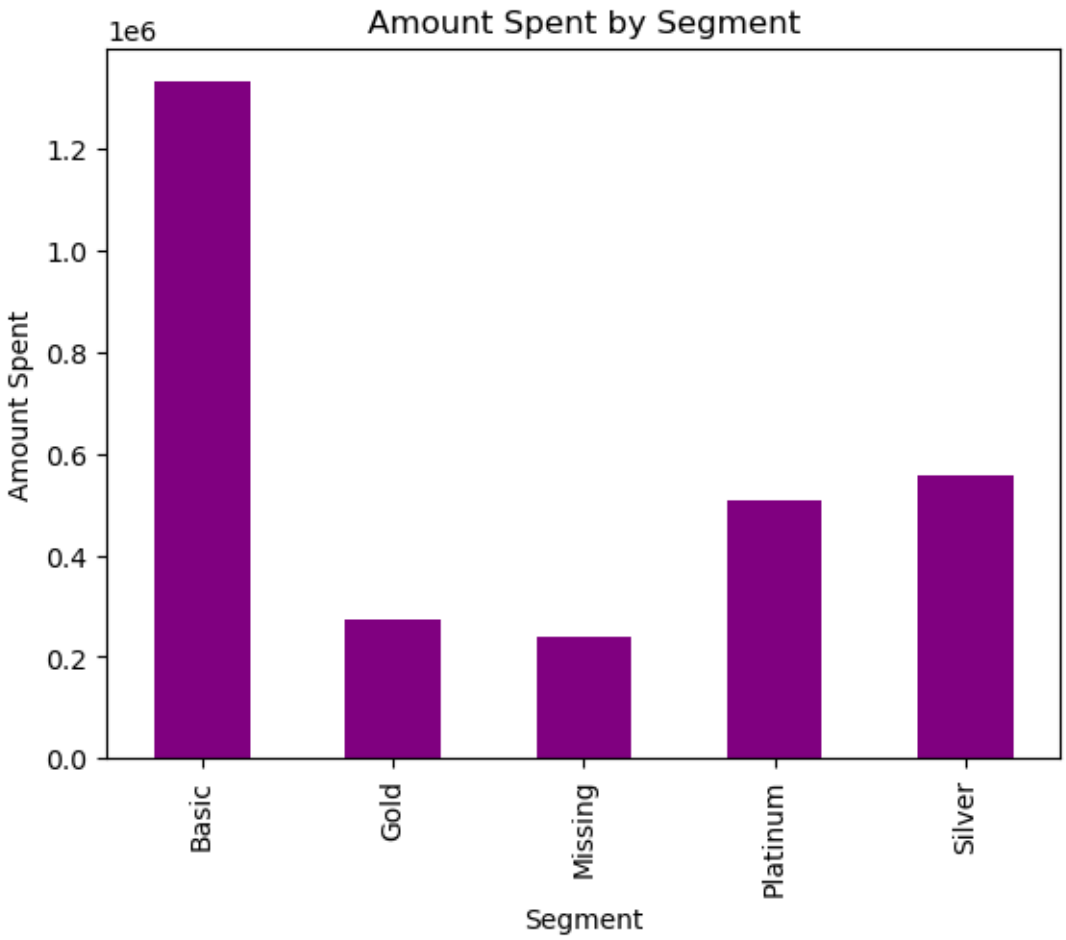


[169]:
```
# BIVARIATE ANALYSIS OF payment method and referal
# Group the data by payment, and calculate the count of each referal group
grouped = df.groupby(['Payment_method'])['Referal'].value_counts().
 ↪unstack(fill_value=0)

# Plot the stacked bar chart
grouped.plot(kind='bar', color=['grey', 'black'], stacked=True)

# Add axis labels and title
plt.xlabel('Payment Method')
plt.ylabel('Count')
plt.title('Payment method Distribution by Referal')
```

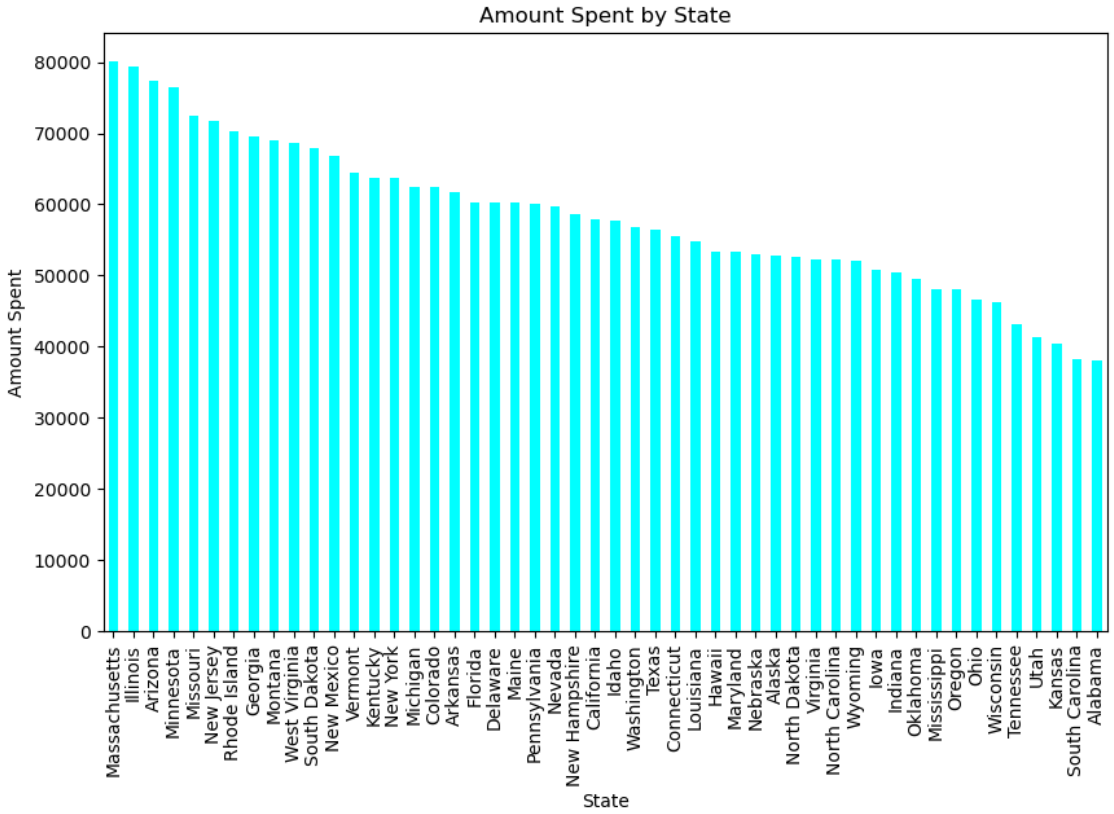
```
# Show the plot
plt.show()
```



[152]:
```
# BIVARIATE ANALYSIS OF segment and amount spent
# Create a bar chart of the amount spent by segment
segment_amounts = df.groupby('Segment')['Amount_spent'].sum()
segment_amounts.plot(kind='bar', xlabel='Segment', ylabel='Amount Spent',␣
 ↪title='Amount Spent by Segment', color='purple')
plt.show()
```



[183]:
```
# BIVARIATE ANALYSIS OF state and amount spent
# Create a bar chart of the amount spent by state
segment_amounts = df.groupby('State_names')['Amount_spent'].sum().
 ↪sort_values(ascending=False)
segment_amounts.plot(kind='bar', xlabel='State', ylabel='Amount Spent',␣
 ↪figsize=(10,6), title='Amount Spent by State', color='cyan')
plt.show()
```


Amount Spent by State
Amount Spent
0
10000
20000
30000
40000
50000
60000
70000
80000
Massachusetts
Illinois
Arizona
Minnesota
Missouri
New Jersey
Rhode Island
Georgia
Montana
West Virginia
South Dakota
New Mexico
Vermont
Kentucky
New York
Michigan
Colorado
Arkansas
Florida
Delaware
Maine
Pennsylvania
Nevada
New Hampshire
California
Idaho
Washington
Texas
Connecticut
Louisiana
Hawaii
Maryland
Nebraska
Alaska
North Dakota
Virginia
North Carolina
Wyoming
Iowa
Indiana
Oklahoma
Mississippi
Oregon
Ohio
Wisconsin
Tennessee
Utah
Kansas
South Carolina
Alabama
State

[ ]: