amazon-data-analysis

October 30, 2024

1. IMPORTING LIBRARIES

[87]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline
```

2. IMPORT CSV FILES

[88]:
```
df = pd.read_csv(r"H:\DA Python\Amazon Sales Analysis\Amazon Sale Report.
↪csv",encoding = 'unicode_escape')
```

3. DATA CLEANING

[89]:
```
df.shape
```

[89]:
```
(128976, 21)
```

[90]:
```
df.head()
```

[90]:

	index	Order ID	Date	Status	\
0	0	405-8078784-5731545	04-30-22	Cancelled	
1	1	171-9198151-1101146	04-30-22	Shipped - Delivered to Buyer	
2	2	404-0687676-7273146	04-30-22	Shipped	
3	3	403-9615377-8133951	04-30-22	Cancelled	
4	4	407-1069790-7240320	04-30-22	Shipped	

	Fulfilment	Sales Channel	ship-service-level	Category	Size	Courier Status	\
0	Merchant	Amazon.in	Standard	T-shirt	S	On the Way	
1	Merchant	Amazon.in	Standard	Shirt	3XL	Shipped	
2	Amazon	Amazon.in	Expedited	Shirt	XL	Shipped	
3	Merchant	Amazon.in	Standard	Blazzer	L	On the Way	
4	Amazon	Amazon.in	Expedited	Trousers	3XL	Shipped	

	…	currency	Amount	ship-city	ship-state	ship-postal-code	\
0	…	INR	647.62	MUMBAI	MAHARASHTRA	400081.0	
1	…	INR	406.00	BENGALURU	KARNATAKA	560085.0	
2	…	INR	329.00	NAVI MUMBAI	MAHARASHTRA	410210.0	

```
3  …       INR  753.33   PUDUCHERRY   PUDUCHERRY         605008.0
4  …       INR  574.00      CHENNAI   TAMIL NADU         600073.0

   ship-country    B2B  fulfilled-by New  PendingS
0            IN  False     Easy Ship NaN       NaN
1            IN  False     Easy Ship NaN       NaN
2            IN   True           NaN NaN       NaN
3            IN  False     Easy Ship NaN       NaN
4            IN  False           NaN NaN       NaN

[5 rows x 21 columns]
```

[91]:
```
df.tail()
```

[91]:
```
         index             Order ID      Date   Status Fulfilment  \
128971  128970  406-6001380-7673107  05-31-22  Shipped     Amazon
128972  128971  402-9551604-7544318  05-31-22  Shipped     Amazon
128973  128972  407-9547469-3152358  05-31-22  Shipped     Amazon
128974  128973  402-6184140-0545956  05-31-22  Shipped     Amazon
128975  128974  408-7436540-8728312  05-31-22  Shipped     Amazon

       Sales Channel ship-service-level Category Size Courier Status  …  \
128971     Amazon.in          Expedited    Shirt   XL        Shipped  …
128972     Amazon.in          Expedited  T-shirt    M        Shipped  …
128973     Amazon.in          Expedited  Blazzer  XXL        Shipped  …
128974     Amazon.in          Expedited  T-shirt   XS        Shipped  …
128975     Amazon.in          Expedited  T-shirt    S        Shipped  …

        currency  Amount  ship-city    ship-state ship-postal-code  \
128971       INR   517.0  HYDERABAD     TELANGANA         500013.0
128972       INR   999.0   GURUGRAM       HARYANA         122004.0
128973       INR   690.0  HYDERABAD     TELANGANA         500049.0
128974       INR  1199.0      Halol       Gujarat         389350.0
128975       INR   696.0     Raipur  CHHATTISGARH         492014.0

        ship-country    B2B  fulfilled-by New  PendingS
128971            IN  False           NaN NaN       NaN
128972            IN  False           NaN NaN       NaN
128973            IN  False           NaN NaN       NaN
128974            IN  False           NaN NaN       NaN
128975            IN  False           NaN NaN       NaN

[5 rows x 21 columns]
```

[92]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
```

```
RangeIndex: 128976 entries, 0 to 128975
Data columns (total 21 columns):
 #   Column              Non-Null Count   Dtype  
---  ------              --------------   -----  
 0   index               128976 non-null  int64  
 1   Order ID            128976 non-null  object 
 2   Date                128976 non-null  object 
 3   Status              128976 non-null  object 
 4   Fulfilment          128976 non-null  object 
 5   Sales Channel       128976 non-null  object 
 6   ship-service-level  128976 non-null  object 
 7   Category            128976 non-null  object 
 8   Size                128976 non-null  object 
 9   Courier Status      128976 non-null  object 
 10  Qty                 128976 non-null  int64  
 11  currency            121176 non-null  object 
 12  Amount              121176 non-null  float64
 13  ship-city           128941 non-null  object 
 14  ship-state          128941 non-null  object 
 15  ship-postal-code    128941 non-null  float64
 16  ship-country        128941 non-null  object 
 17  B2B                 128976 non-null  bool   
 18  fulfilled-by        39263 non-null   object 
 19  New                 0 non-null       float64
 20  PendingS            0 non-null       float64
dtypes: bool(1), float64(4), int64(2), object(14)
memory usage: 19.8+ MB
```

[93]:
```
#drop unrelated / blank columns

df.drop(['New','PendingS'], axis=1, inplace=True)
```

[94]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 128976 entries, 0 to 128975
Data columns (total 19 columns):
 #   Column              Non-Null Count   Dtype  
---  ------              --------------   -----  
 0   index               128976 non-null  int64  
 1   Order ID            128976 non-null  object 
 2   Date                128976 non-null  object 
 3   Status              128976 non-null  object 
 4   Fulfilment          128976 non-null  object 
 5   Sales Channel       128976 non-null  object 
 6   ship-service-level  128976 non-null  object 
 7   Category            128976 non-null  object 
 8   Size                128976 non-null  object 
```

```
 9   Courier Status      128976 non-null  object
 10  Qty                 128976 non-null  int64
 11  currency            121176 non-null  object
 12  Amount              121176 non-null  float64
 13  ship-city           128941 non-null  object
 14  ship-state          128941 non-null  object
 15  ship-postal-code    128941 non-null  float64
 16  ship-country        128941 non-null  object
 17  B2B                 128976 non-null  bool
 18  fulfilled-by        39263 non-null   object
dtypes: bool(1), float64(2), int64(2), object(14)
memory usage: 17.8+ MB
```

[95]:
```
#checking null value
pd.isnull(df)
```

[95]:

	index	Order ID	Date	Status	Fulfilment	Sales Channel	\
0	False	False	False	False	False	False	
1	False	False	False	False	False	False	
2	False	False	False	False	False	False	
3	False	False	False	False	False	False	
4	False	False	False	False	False	False	
…	…	…	…	…	…	…	
128971	False	False	False	False	False	False	
128972	False	False	False	False	False	False	
128973	False	False	False	False	False	False	
128974	False	False	False	False	False	False	
128975	False	False	False	False	False	False	

	ship-service-level	Category	Size	Courier Status	Qty	currency	\
0	False	False	False	False	False	False	
1	False	False	False	False	False	False	
2	False	False	False	False	False	False	
3	False	False	False	False	False	False	
4	False	False	False	False	False	False	
…	…	…	…	…	…	…	
128971	False	False	False	False	False	False	
128972	False	False	False	False	False	False	
128973	False	False	False	False	False	False	
128974	False	False	False	False	False	False	
128975	False	False	False	False	False	False	

	Amount	ship-city	ship-state	ship-postal-code	ship-country	B2B	\
0	False	False	False	False	False	False	
1	False	False	False	False	False	False	
2	False	False	False	False	False	False	
3	False	False	False	False	False	False	

```
4         False      False       False              False          False  False
…         …        …         …                …            …      …
128971    False      False       False              False          False  False
128972    False      False       False              False          False  False
128973    False      False       False              False          False  False
128974    False      False       False              False          False  False
128975    False      False       False              False          False  False

         fulfilled-by
0               False
1               False
2                True
3               False
4                True
…                …
128971           True
128972           True
128973           True
128974           True
128975           True

[128976 rows x 19 columns]
```

[96]:
```
#sum will give total values of null values.
pd.isnull(df).sum()
```

[96]:
```
index                   0
Order ID                0
Date                    0
Status                  0
Fulfilment              0
Sales Channel           0
ship-service-level      0
Category                0
Size                    0
Courier Status          0
Qty                     0
currency             7800
Amount               7800
ship-city              35
ship-state             35
ship-postal-code       35
ship-country           35
B2B                     0
fulfilled-by        89713
dtype: int64
```

[97]:
```
df.shape
```

[97]:
```
(128976, 19)
```

[98]:
```
#drop null values
df.dropna(inplace = True)
```

[99]:
```
df.shape
```

[99]:
```
(37514, 19)
```

[100]:
```
df.columns
```

[100]:
```
Index(['index', 'Order ID', 'Date', 'Status', 'Fulfilment', 'Sales Channel',
       'ship-service-level', 'Category', 'Size', 'Courier Status', 'Qty',
       'currency', 'Amount', 'ship-city', 'ship-state', 'ship-postal-code',
       'ship-country', 'B2B', 'fulfilled-by'],
      dtype='object')
```

[101]:
```
#change data type
df['ship-postal-code'] = df['ship-postal-code'].astype('int')
```

[102]:
```
#checking data type
df['ship-postal-code'].dtype
```

[102]:
```
dtype('int64')
```

[103]:
```
df['Date'] = pd.to_datetime(df['Date'])
```

```
C:\Users\Ebad\AppData\Local\Temp\ipykernel_11744\3386729631.py:1: UserWarning:
Could not infer format, so each element will be parsed individually, falling
back to `dateutil`. To ensure parsing is consistent and as-expected, please
specify a format.
  df['Date'] = pd.to_datetime(df['Date'])
```

[104]:
```
df['Date'].dtype
```

[104]:
```
dtype('<M8[ns]')
```

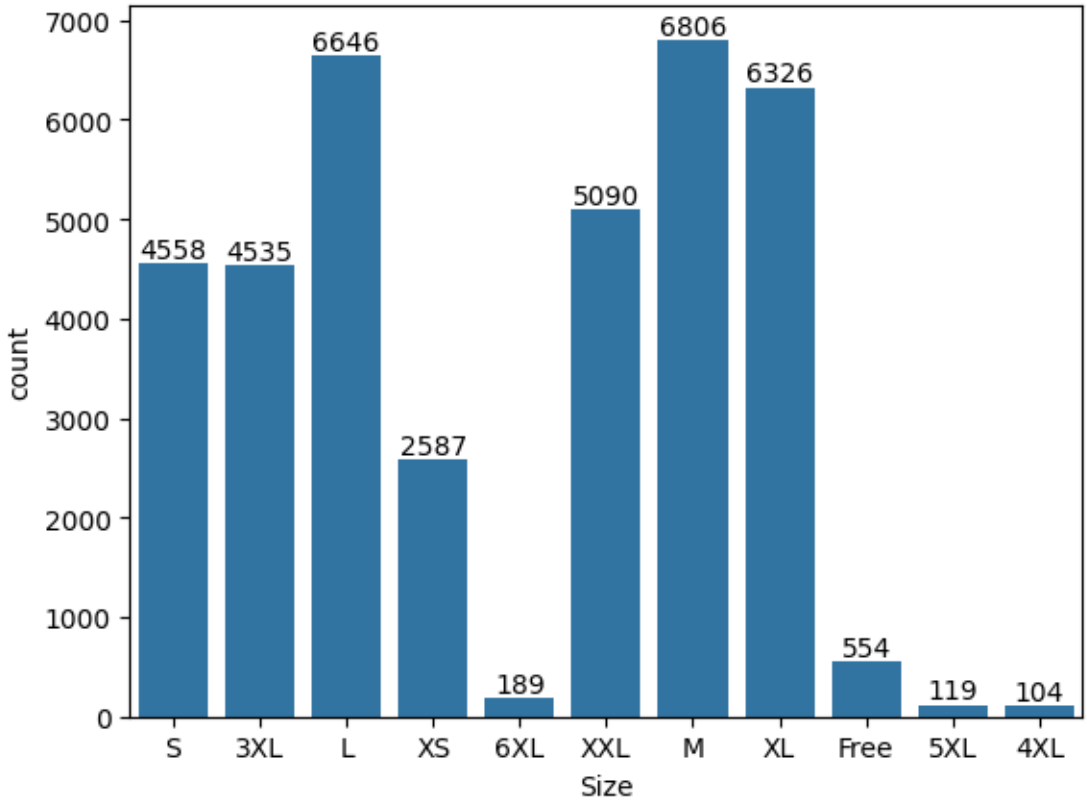
4. Exploratory Data Analysis.

[105]:
```
df.columns
```

[105]:
```
Index(['index', 'Order ID', 'Date', 'Status', 'Fulfilment', 'Sales Channel',
       'ship-service-level', 'Category', 'Size', 'Courier Status', 'Qty',
       'currency', 'Amount', 'ship-city', 'ship-state', 'ship-postal-code',
       'ship-country', 'B2B', 'fulfilled-by'],
      dtype='object')
```

size

[108]:
```
ax = sns.countplot(x='Size', data=df)

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



Note: from above graph we can see that most of the people buy M-Size

Group By

[109]:
```
df.groupby(['Size'], as_index=False)['Qty'].sum().
↪sort_values(by='Qty',ascending=False)
```

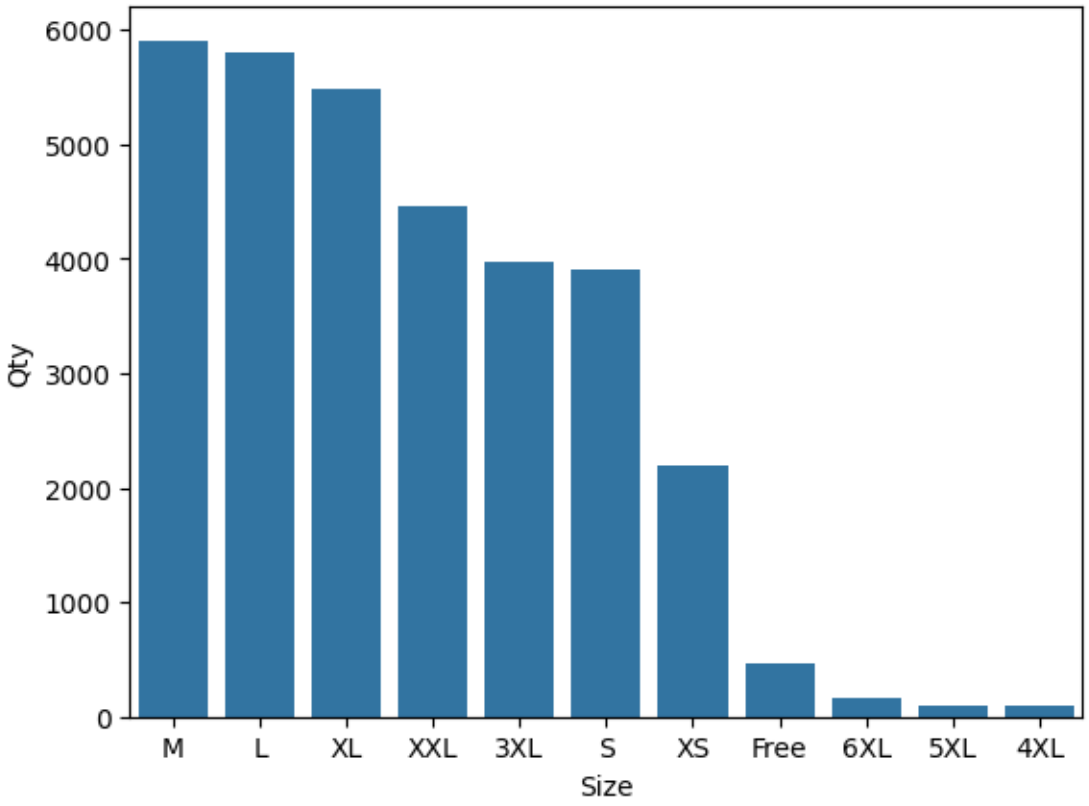
[109]:

	Size	Qty
6	M	5905
5	L	5795
8	XL	5481
10	XXL	4465
0	3XL	3972
7	S	3896
9	XS	2191

```
4   Free   467
3    6XL   170
2    5XL   104
1    4XL    93
```

[111]:
```
S_Qty = df.groupby(['Size'], as_index=False)['Qty'].sum().sort_values(by='Qty',␣
↪ascending=False)

sns.barplot(x='Size', y='Qty', data=S_Qty)
```

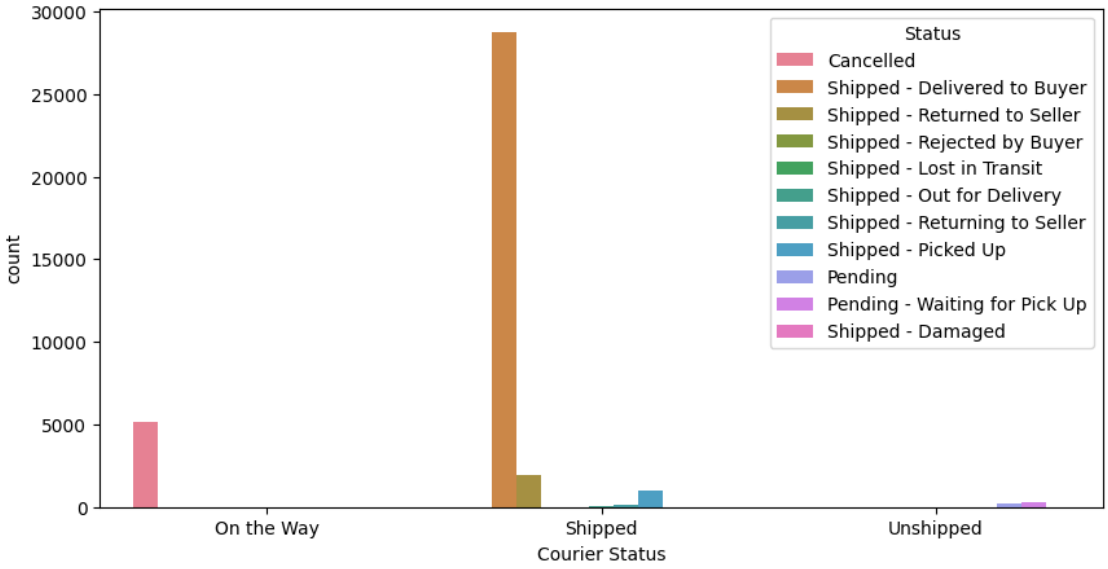
[111]: <Axes: xlabel='Size', ylabel='Qty'>



Note: From the above graph we can see that most of the qty buys M_Size in the sale.

Courier Status

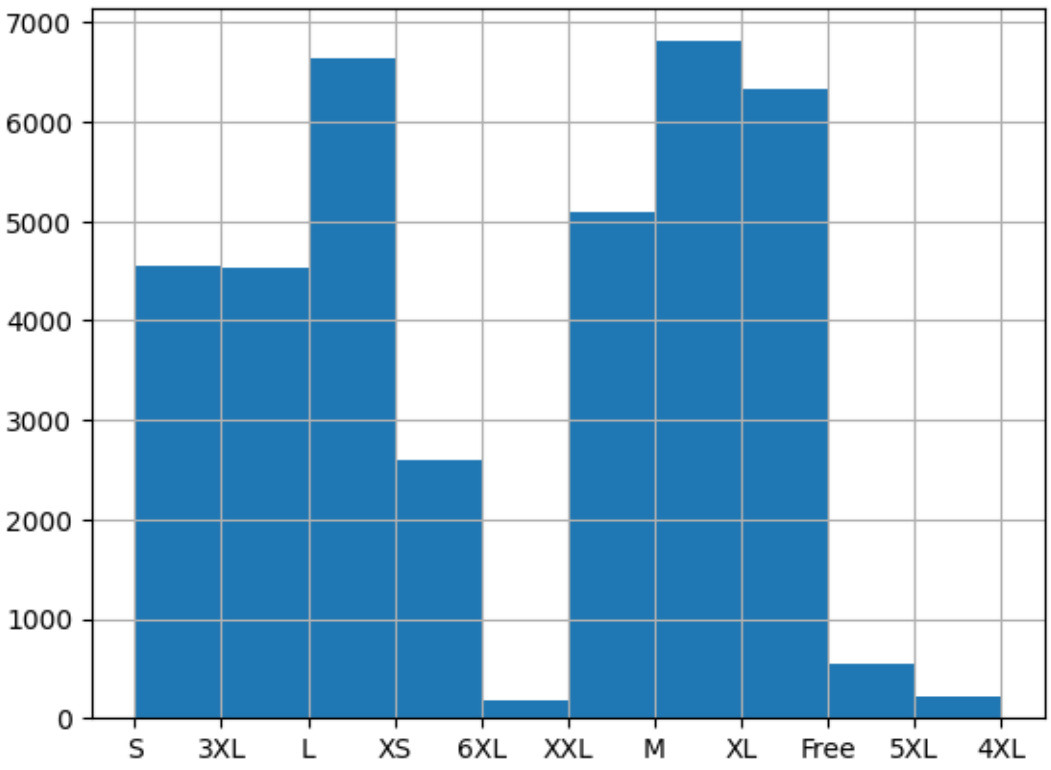
[116]:
```
plt.figure(figsize=(10,5))

sns.countplot(data=df, x='Courier Status', hue='Status')

plt.show()
```



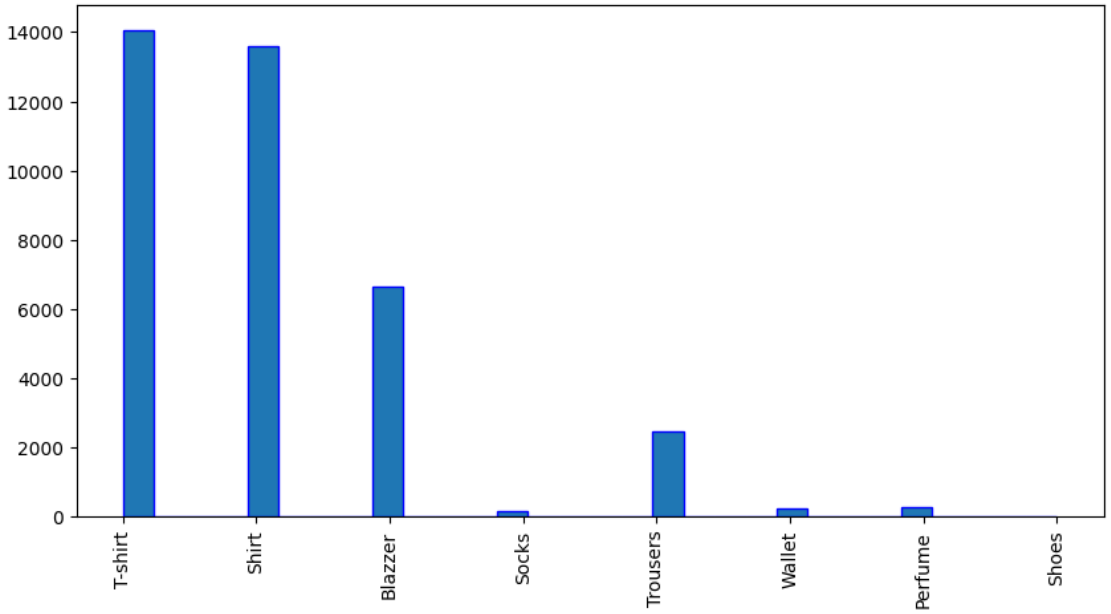
Note: From the above graph the majority of the orders are shipped through courier

[117]:
```
#histogram

df['Size'].hist()
```

[117]: <Axes: >

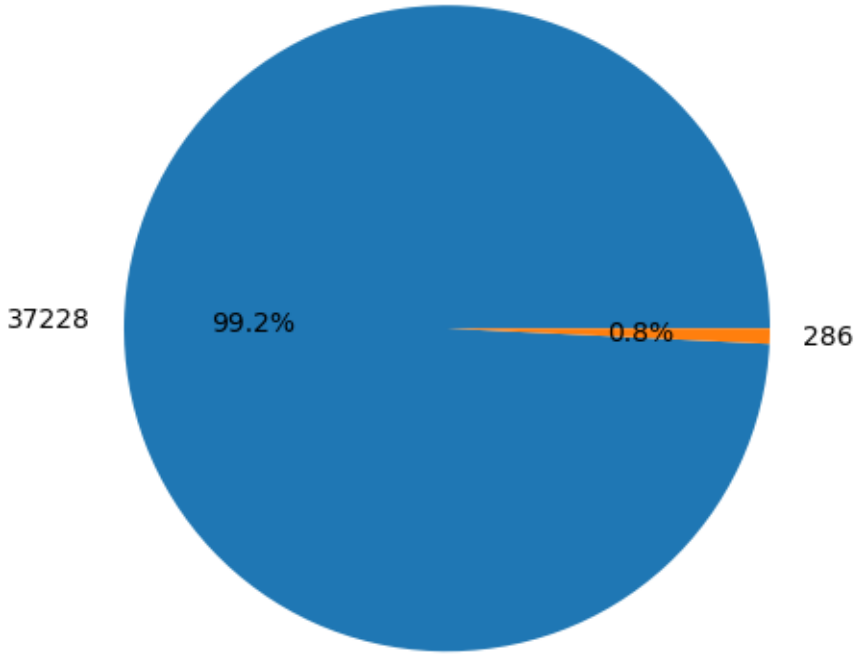


[123]:
```
df['Category'] = df['Category'].astype(str)
column_data = df['Category']
plt.figure(figsize=(10,5))
plt.hist(column_data, bins=30, edgecolor='Blue')
plt.xticks(rotation=90)
plt.show()
```

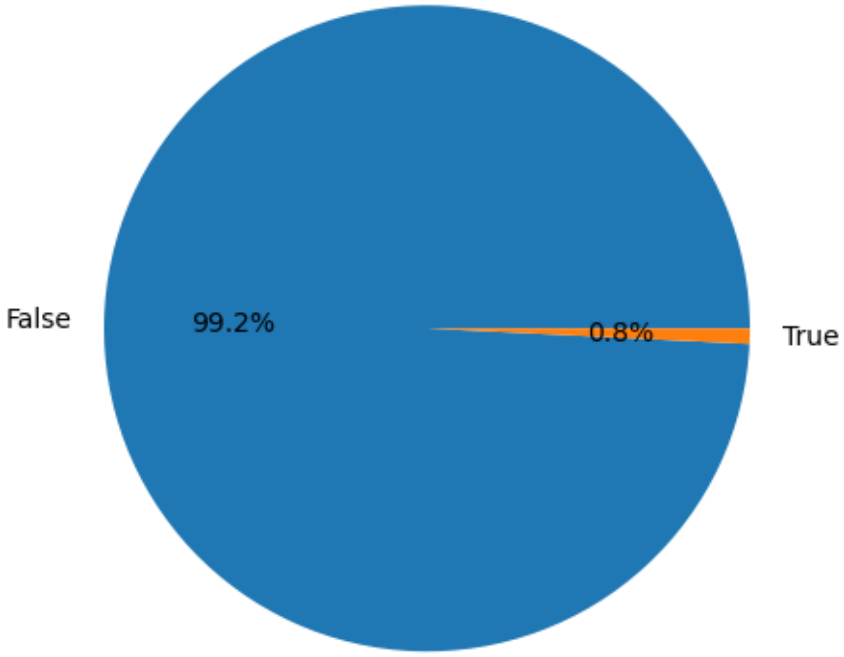


Note: From above graph we can se that most of the purchases are T shirt

[128]:
```
#Checking B2B data by usinig pie chart
B2B_check = df['B2B'].value_counts()

#Plot the pie chart
plt.pie(B2B_check, labels=B2B_check, autopct='%1.1f%%')
plt.axis('equal')
plt.show()
```

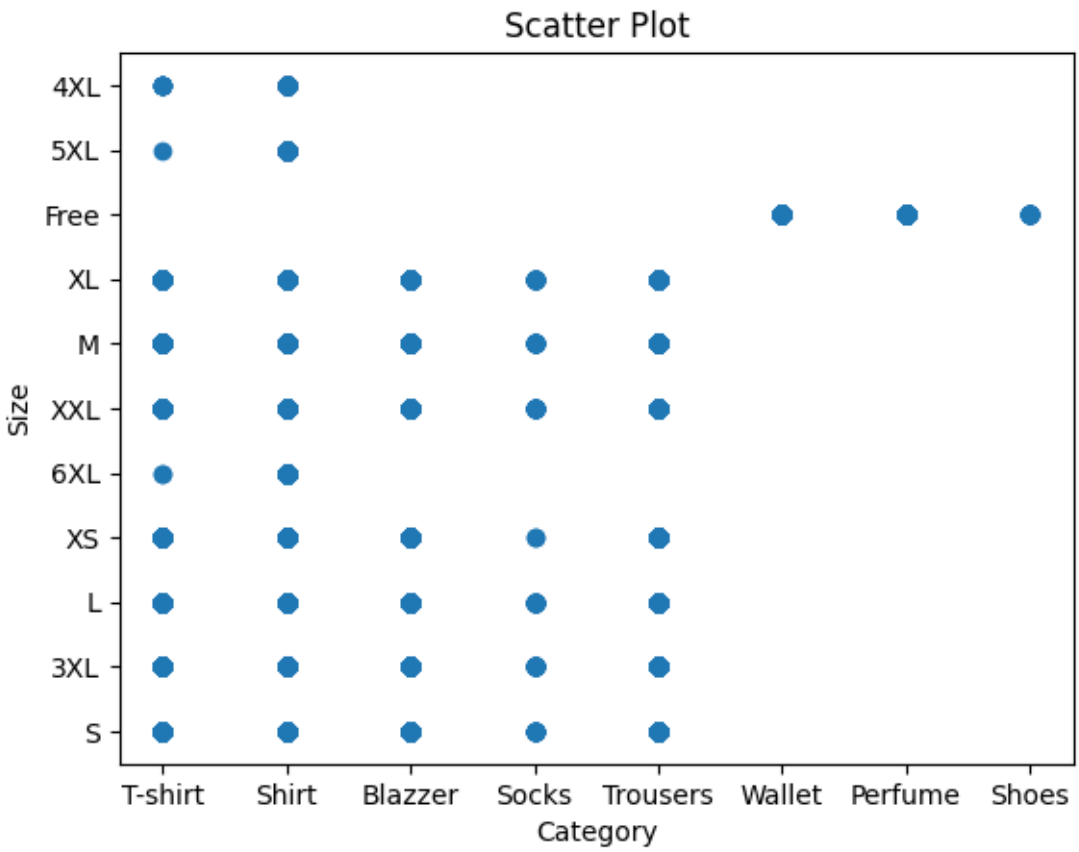


[129]:
```
#Checking B2B data by usinig pie chart
B2B_check = df['B2B'].value_counts()

#Plot the pie chart
plt.pie(B2B_check, labels=B2B_check.index, autopct='%1.1f%%')
plt.axis('equal')
plt.show()
```

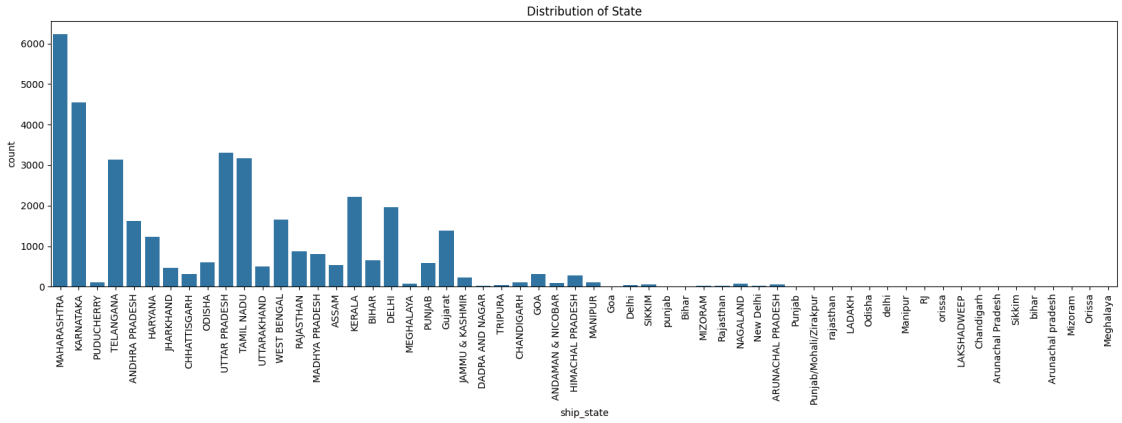


Note: From the above chart we can see that maximum buyers are retailers 99.2% and 0.8 are B2B buyers

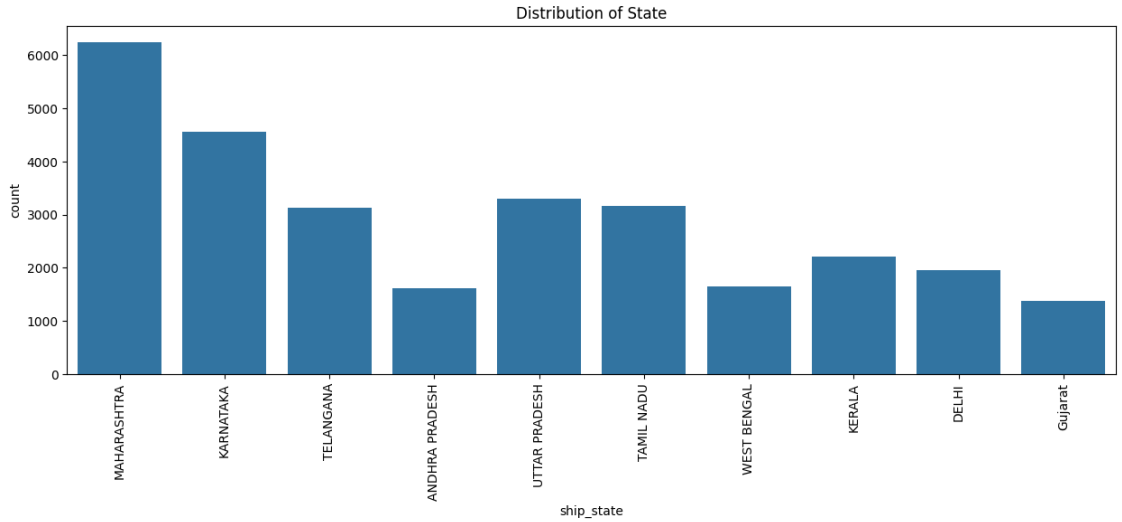
[130]:
```
#Prepare data for scatter plot
x_data = df['Category']
y_data = df['Size']

#Plot the scatter plot
plt.scatter(x_data, y_data)
plt.xlabel('Category')
plt.ylabel('Size')
plt.title('Scatter Plot')
plt.show()
```



[136]:
```
#Plot count of cities by state

plt.figure(figsize=(20,5))
sns.countplot(data=df, x='ship-state')
plt.xlabel('ship_state')
plt.ylabel('count')
plt.title('Distribution of State')
plt.xticks(rotation=90)
plt.show()
```



[138]:
```
#top 10 states
top_10_states = df['ship-state'].value_counts().head(10)

#plot count of cities by state
plt.figure(figsize=(15,5))
sns.countplot(data=df[df['ship-state'].isin(top_10_states.index)],␣
 ↪x='ship-state')
plt.xlabel('ship_state')
plt.ylabel('count')
plt.title('Distribution of State')
plt.xticks(rotation=90)
plt.show()
```



Note: From the above graph we can see that most of the buyers are from Maharashtra state.

Conclusion

The data analysis reveals that the business has a significant base in maharashtra state, mainly serves retailers, fulfills orders through amazon, experience high demand for t shiort, and M sized as the preferred choice among buyers.