

Credit Card Spending Habits in India

This dataset contains insights into a collection of credit card transactions made in India, offering a comprehensive look at the spending habits of Indians across the nation. From the Gender and Card type used to carry out each transaction, to which city saw the highest amount of spending and even what kind of expenses were made, this dataset paints an overall picture about how money is being spent in India today.

Problem Statement

To analyze consumer trends and interests by looking at the type of purchases people make based on their gender and city.

Data Dictionary

- **City** The city in which the transaction took place. (String)
- **Date** The date of the transaction. (Date)
- **Card Type** The type of credit card used for the transaction. (String)
- **Exp Type** The type of expense associated with the transaction. (String)
- **Gender** The gender of the cardholder. (String)
- **Amount** The amount of the transaction. (Number)

Concepts Used

- **Exploratory Data Analysis**

```
In [1]: # Importing Libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

import os
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))

import warnings
warnings.filterwarnings('ignore')
```

```
In [2]: df = pd.read_csv("Credit card transactions - India - Simple.csv")
df.head()
```

```
Out[2]:
```

	index	City	Date	Card Type	Exp Type	Gender	Amount
0	0	Delhi, India	29-Oct-14	Gold	Bills	F	82475
1	1	Greater Mumbai, India	22-Aug-14	Platinum	Bills	F	32555
2	2	Bengaluru, India	27-Aug-14	Silver	Bills	F	101738
3	3	Greater Mumbai, India	12-Apr-14	Signature	Bills	F	123424
4	4	Bengaluru, India	5-May-15	Gold	Bills	F	171574

```
In [3]: df.shape
```

```
Out[3]: (26052, 7)
```

Our dataset has 26052 rows and 7 features.

```
In [4]: df.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 26052 entries, 0 to 26051
Data columns (total 7 columns):
#   Column      Non-Null Count  Dtype  
---  -
0   index       26052 non-null  int64  
1   City        26052 non-null  object  
2   Date        26052 non-null  object  
3   Card Type   26052 non-null  object  
4   Exp Type    26052 non-null  object  
5   Gender      26052 non-null  object  
6   Amount      26052 non-null  int64  
dtypes: int64(2), object(5)
memory usage: 1.4+ MB
```

```
In [5]: df.tail()
```

```
Out[5]:
```

	index	City	Date	Card Type	Exp Type	Gender	Amount
26047	26047	Kolkata, India	22-Jun-14	Silver	Travel	F	128191
26048	26048	Pune, India	3-Aug-14	Signature	Travel	M	246316
26049	26049	Hyderabad, India	16-Jan-15	Silver	Travel	M	265019
26050	26050	Kanpur, India	14-Sep-14	Silver	Travel	M	88174
26051	26051	Hyderabad, India	19-Oct-13	Signature	Bills	M	184410

```
In [6]: df.drop(columns='index',inplace=True) # Removing the irrelevent Column
df=df.replace(' ', 'India','', regex=True) # India is common
```

```
In [7]: df.isna().sum() # No missing values in dataset
```

```
Out[7]: City      0
Date      0
Card Type  0
Exp Type  0
Gender     0
Amount    0
dtype: int64
```

```
In [8]: # Descriptive analysis of categorical columns
df.describe(include = "object").T
```

```
Out[8]:
```

	count	unique	top	freq
City	26052	986	Bengaluru	3552
Date	26052	600	20-Sep-14	65
Card Type	26052	4	Silver	6840
Exp Type	26052	6	Food	5463
Gender	26052	2	F	13680

```
In [9]: # Statistical summary for numerical variables.
df.describe().T
```

```
Out[9]:
```

	count	mean	std	min	25%	50%	75%	max
Amount	26052.0	156411.537425	103063.254287	1005.0	77120.25	153106.5	228050.0	998077.0

```
In [10]: df.dtypes
```

```
Out[10]: City      object
Date      object
Card Type  object
Exp Type  object
Gender     object
Amount    int64
dtype: object
```

Observations

From the categorical features, we observe that:

- Bengaluru is most frequent in transactions.
- Silver is the most used card Category type.
- Most of the transactions are done in food Category.
- Female does the most no of transactions.

From the numerical column (Amount), we observe that:

- The amount spent is ranging from 1k to 998k.
- 25% of transactions amount lies between 1005 to 77k.
- 50 % of transactions lies between 77k to 228k.
- 25 % of transaction lies between 228k to 998k.

```
In [11]: df.nunique()
```

```
Out[11]: City      986
Date      600
Card Type    4
Exp Type     6
Gender       2
Amount     24972
dtype: int64
```

```
In [12]: df.columns
```

```
Out[12]: Index(['City', 'Date', 'Card Type', 'Exp Type', 'Gender', 'Amount'], dtype='object')
```

```
In [13]: for x in ['City', 'Date', 'Card Type', 'Exp Type', 'Gender']:
df[x] = df[x].astype("category")
```

```
In [14]: # Examine the unique values in categorical column
col_names = ['City', 'Date', 'Card Type', 'Exp Type', 'Gender']
for x in col_names :
    print(x.upper(), " : ",df[x].unique())
    print("-"*25)
    print('\033[1m'+ "Value counts : " + '\033[0m')

    print(df[x].value_counts())
    print("-"*30)
    print('\033[1m'+ "Normalised Value counts : " + '\033[0m')
    print(df[x].value_counts(normalize=True).round(2))
    print("-"*80)
```

CITY : ['Delhi', 'Greater Mumbai', 'Bengaluru', 'Ahmedabad', 'Markapur', ..., 'Changanassery', 'Tirun', 'Srikalahasti', 'Wanaparthy', 'Fazilka']

Length: 986

Categories (986, object): ['Achalpur', 'Adilabad', 'Adityapur', 'Adoni', ..., 'Zamania', 'Zira', 'Zirakpur', 'Zunheboto']

Value counts :

Bengaluru	3552
Greater Mumbai	3493
Ahmedabad	3491
Delhi	3482
Hyderabad	784

...	
Tirur	1
Mahbubnagar	1
Alirajpur	1
Varanasi	1
Vellore	1

Name: City, Length: 986, dtype: int64

Normalised Value counts :

Bengaluru	0.14
Greater Mumbai	0.13
Ahmedabad	0.13
Delhi	0.13
Hyderabad	0.03

...	
Tirur	0.00
Mahbubnagar	0.00
Alirajpur	0.00
Varanasi	0.00
Vellore	0.00

Name: City, Length: 986, dtype: float64

DATE : ['29-Oct-14', '22-Aug-14', '27-Aug-14', '12-Apr-14', '5-May-15', ..., '13-Dec-14', '22-Mar-15', '25-Jan-14', '9-May-14', '10-Jul-14']

Length: 600

Categories (600, object): ['1-Apr-14', '1-Apr-15', '1-Aug-14', '1-Dec-13', ..., '9-Nov-14', '9-Oct-13', '9-Oct-14', '9-Sep-14']

Value counts :

20-Sep-14	65
15-Nov-14	61
11-Aug-14	61
21-Dec-13	61
12-Jan-15	60

..	
29-Aug-14	27
9-May-14	26
28-Feb-14	25
30-Jul-14	24
11-Apr-15	23

Name: Date, Length: 600, dtype: int64

Normalised Value counts :

20-Sep-14	0.0
15-Nov-14	0.0
11-Aug-14	0.0
21-Dec-13	0.0
12-Jan-15	0.0

...	
29-Aug-14	0.0
9-May-14	0.0
28-Feb-14	0.0
30-Jul-14	0.0
11-Apr-15	0.0

Name: Date, Length: 600, dtype: float64

CARD TYPE : ['Gold', 'Platinum', 'Silver', 'Signature']

Categories (4, object): ['Gold', 'Platinum', 'Signature', 'Silver']

Value counts :

Silver	6840
Signature	6447
Platinum	6398
Gold	6367

Name: Card Type, dtype: int64

Normalised Value counts :

Silver	0.26
Signature	0.25
Platinum	0.25
Gold	0.24

Name: Card Type, dtype: float64

EXP TYPE : ['Bills', 'Food', 'Entertainment', 'Grocery', 'Fuel', 'Travel']

Categories (6, object): ['Bills', 'Entertainment', 'Food', 'Fuel', 'Grocery', 'Travel']

Value counts :

Food	5463
Fuel	5257
Bills	5078
Entertainment	4762
Grocery	4754
Travel	738

Name: Exp Type, dtype: int64

Normalised Value counts :

Food	0.21
Fuel	0.20
Bills	0.19
Entertainment	0.18

```
Grocery      0.18
Travel       0.03
Name: Exp Type, dtype: float64
-----
GENDER : ['F', 'M']
Categories (2, object): ['F', 'M']
-----
Value counts :
F    13680
M    12372
Name: Gender, dtype: int64
-----
Normalised Value counts :
F     0.53
M     0.47
Name: Gender, dtype: float64
-----
```

```
In [15]: df.groupby(['Exp Type', 'Card Type', 'Gender']).agg(['count', 'mean', 'median', 'max', 'min']).round(2)
```

Out[15]:

			Amount				
			count	mean	median	max	min
Exp Type	Card Type	Gender					
Bills	Gold	F	695	206586.36	167044.0	996754	1056
		M	561	146089.88	145463.0	298960	1103
	Platinum	F	688	207965.25	176750.5	998077	2119
		M	541	145928.84	148125.0	299967	2333
	Signature	F	699	206795.96	173456.0	994537	1026
		M	560	145651.96	141371.5	299980	1274
	Silver	F	778	191294.95	167166.5	955468	1078
		M	556	152100.69	154846.0	299981	1169
	Entertainment	F	576	146714.27	147689.5	299495	1061
		M	567	156897.78	164133.0	299610	1575
	Platinum	F	568	155525.51	154872.0	299017	1133
		M	619	157140.95	158829.0	299140	1388
	Signature	F	589	152166.29	153348.0	299936	1533
		M	581	153223.82	157616.0	299481	1240
	Silver	F	651	147759.57	142921.0	299794	1074
		M	611	151423.69	151449.0	299906	1610
	Food	F	723	144768.96	144369.0	299641	1066
		M	599	148728.71	146464.0	299162	1171
	Platinum	F	738	153366.44	153875.5	298838	1243
		M	633	153450.83	153032.0	299751	1175
	Signature	F	706	155011.03	156681.5	299689	1265
		M	623	155393.30	160069.0	299641	1289
	Silver	F	845	148552.78	150995.0	299699	1028
		M	596	149117.17	148371.5	299837	1018
	Fuel	F	657	146744.58	146550.0	299642	1038
		M	658	148833.94	146666.5	298784	1182
	Platinum	F	615	148317.62	149397.0	299568	2181
		M	687	149714.74	149480.0	299796	1332
	Signature	F	644	144849.31	142765.5	299664	1207
		M	642	147218.89	141871.5	299613	1678
	Silver	F	701	158877.23	166601.0	298637	1845
		M	653	155516.25	156947.0	299905	1161
	Grocery	F	533	148773.87	150204.0	299920	1105
		M	586	148379.49	152467.0	299431	1099
	Platinum	F	550	150947.84	156921.0	298417	1005
		M	580	152309.50	151697.5	299353	1506
	Signature	F	632	151779.73	152048.0	299510	1024
		M	592	153391.09	151829.0	299550	1578
	Silver	F	713	150637.34	148447.0	298259	1104
		M	568	152224.49	154539.0	299052	1139
	Travel	F	103	140501.17	145059.0	291788	1070
		M	109	153378.68	167896.0	293767	1200
	Platinum	F	93	140866.27	136851.0	299582	1496
		M	86	129687.56	114880.0	297137	3364
	Signature	F	98	154931.54	154779.0	296138	7743
		M	81	152046.23	147630.0	297354	6875
	Silver	F	85	154235.95	138545.0	299618	5769
		M	83	159071.45	167229.0	297660	4762

```
In [16]: city=pd.DataFrame({'count' : df.groupby("City").size()}).reset_index()
df['City Name']=np.where(df.City.isin(city.nlargest(5,'count')['City'].tolist()), df.City, 'Other')
set_ord=city.nlargest(5,'count')['City'].tolist()
set_ord.append("Other")

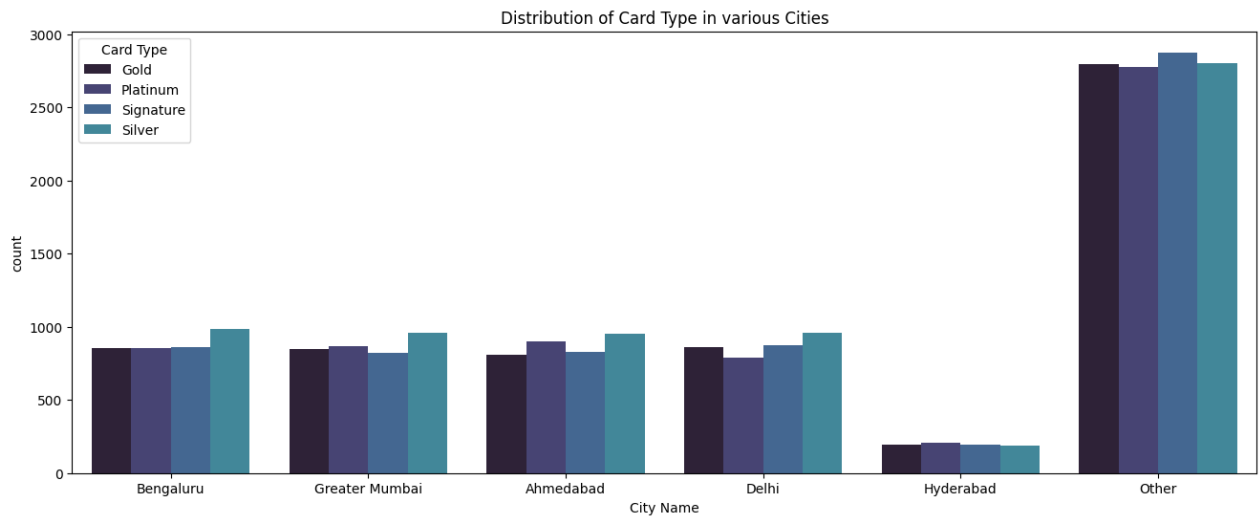
In [17]: df.groupby(["City Name", 'Card Type']).size()
```

```
Out[17]: City Name    Card Type    count
Ahmedabad    Gold         809
             Platinum    900
             Signature   828
             Silver     954
Bengaluru    Gold         857
             Platinum    853
             Signature   859
             Silver     983
Delhi        Gold         863
             Platinum    791
             Signature   872
             Silver     956
Greater Mumbai    Gold         848
                 Platinum    868
                 Signature   820
                 Silver     957
Hyderabad    Gold         194
             Platinum    210
             Signature   192
             Silver     188
Other        Gold         2796
             Platinum    2776
             Signature   2876
             Silver     2802

dtype: int64
```

```
In [18]: plt.figure(figsize = (16,6))
sns.countplot(x=df["City Name"],hue=df['Card Type'],order=set_ord,palette=sns.color_palette("mako"))
plt.title("Distribution of Card Type in various Cities")
```

```
Out[18]: Text(0.5, 1.0, 'Distribution of Card Type in various Cities')
```



- Silver is the most used card type in top 4 city(with most txns) ['Bengaluru', 'Greater Mumbai', 'Ahmedabad','Delhi']
- Platinum card user does the most no of transactions in hyderabad
- While in rest of the city "Other" signature is the most and platinum the least used card.

```
In [19]: df.groupby(["City Name", 'Exp Type']).size()
```

```
Out[19]: City Name      Exp Type      count
Ahmedabad      Bills          680
              Entertainment  622
              Food          801
              Fuel          760
              Grocery       628
              Travel         0
Bengaluru      Bills          735
              Entertainment  624
              Food          805
              Fuel          780
              Grocery       608
              Travel         0
Delhi          Bills          701
              Entertainment  594
              Food          784
              Fuel          782
              Grocery       621
              Travel         0
Greater Mumbai Bills          728
              Entertainment  614
              Food          742
              Fuel          762
              Grocery       647
              Travel         0
Hyderabad      Bills          142
              Entertainment  134
              Food          138
              Fuel          129
              Grocery       142
              Travel         99
Other          Bills        2092
              Entertainment  2174
              Food          2193
              Fuel          2044
              Grocery       2108
              Travel         639

dtype: int64
```

```
In [20]: plt.figure(figsize = (16,6))
sns.countplot(x=df["City Name"],hue=df['Exp Type'],order=set_ord,palette=sns.color_palette("mako"))
plt.title("Distribution of Expense Type in various Cities")
```

```
Out[20]: Text(0.5, 1.0, 'Distribution of Expense Type in various Cities')
```



- Food is most frequent expense category in "OTHERS" and 3 out of top 4 city(with most txns)
- In Hyderabad Bills and Grocery exceeds food category with minor difference of 4
- In Greater Mumbai fuel category has the most frequent transactions
- There is no transactions done in top 4 city for travel category.

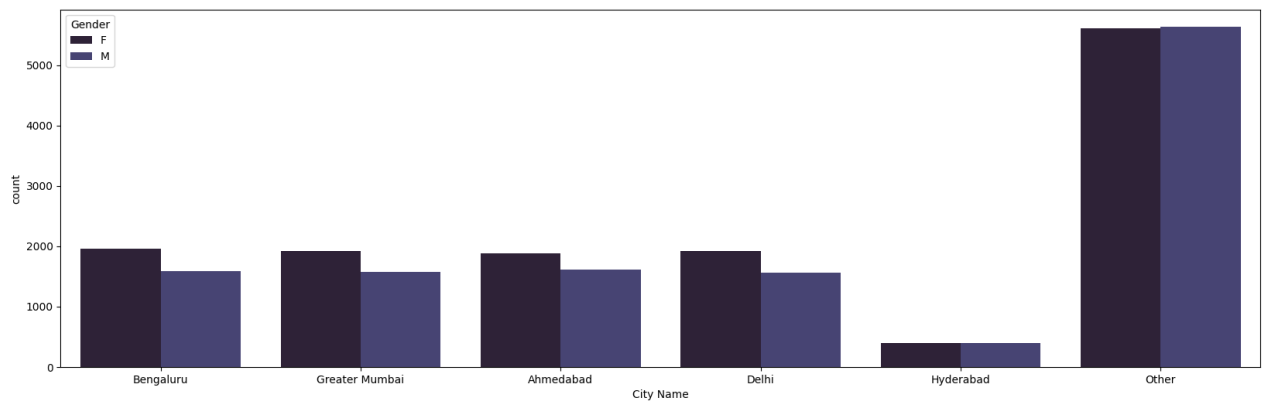
```
In [21]: df.groupby(["City Name", 'Gender']).size()
```

```
Out[21]: City Name      Gender      count
Ahmedabad      F          1876
              M          1615
Bengaluru      F          1960
              M          1592
Delhi          F          1923
              M          1559
Greater Mumbai F          1922
              M          1571
Hyderabad      F          389
              M          395
Other          F          5610
              M          5640

dtype: int64
```

```
In [22]: plt.figure(figsize = (20,6))
sns.countplot(x=df["City Name"],hue=df['Gender'],order=set_ord,palette=sns.color_palette("mako"))
```

```
Out[22]: <Axes: xlabel='City Name', ylabel='count'>
```



- In top 4 city ['Bengaluru', 'Greater Mumbai', 'Ahmedabad', 'Delhi'] females dominates no of transactions
- The difference in no of transactions for female over man ranges from 200 to 400 in each of the city
- Male dominates over Hyderabad with minor difference of 6
- Male dominates over "Other" (rest of city combined) with few no's around to 30-40

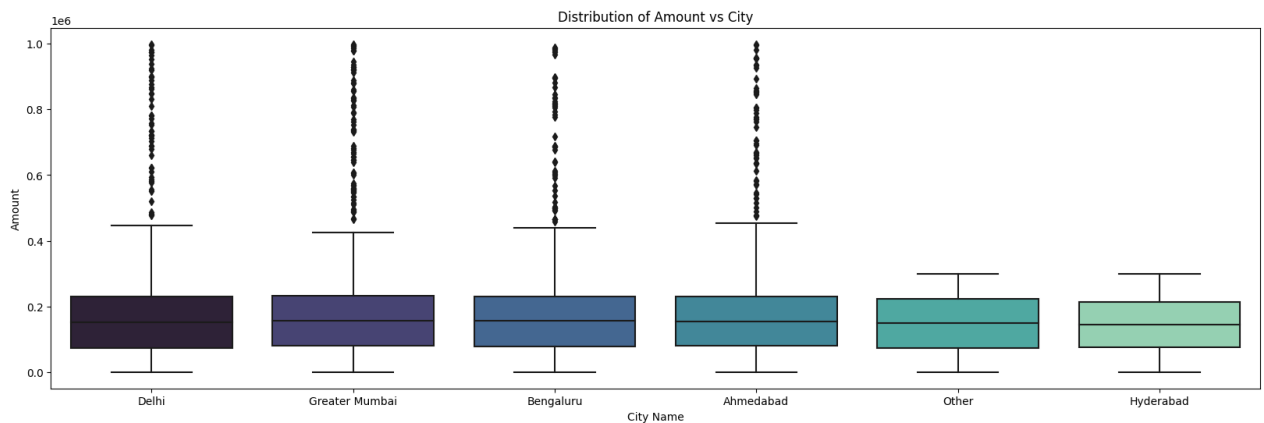
In [23]: `df.groupby('City Name').describe() # Top 5 cities`

Out[23]:

		count	mean	std	min	25%	50%	75%	max
City Name									
	Ahmedabad	3491.0	162645.176167	114120.339438	1024.0	80439.00	155813.0	231673.50	996291.0
	Bengaluru	3552.0	161128.023367	110598.455781	1074.0	78969.75	158051.0	229747.00	987935.0
	Delhi	3482.0	159945.207352	115475.932554	1005.0	73174.75	152373.5	231531.75	996754.0
	Greater Mumbai	3493.0	165116.368737	120265.126185	1056.0	81374.00	158108.0	233161.00	998077.0
	Hyderabad	784.0	146037.598214	84837.804389	1070.0	75278.00	144765.5	212849.25	299751.0
	Other	11250.0	149914.503022	86508.250250	1018.0	74889.00	150772.5	224664.25	299980.0

In [24]: `plt.figure(figsize = (20,6))
sns.boxplot(data=df,x='City Name',y='Amount',palette=sns.color_palette("mako"))
plt.title("Distribution of Amount vs City")`

Out[24]: Text(0.5, 1.0, 'Distribution of Amount vs City')



- Mean amount for transaction lies around 150k (approx)
- Minimum amount spent and Median amount spent among all city category lies close to each other.

In [25]: `plt.subplots(2,3,figsize=(24,12))

plt.subplot(2,3,1)
sns.countplot(x=df["Gender"],palette=sns.color_palette("mako"))
plt.title("Distribution of Gender in transactions")

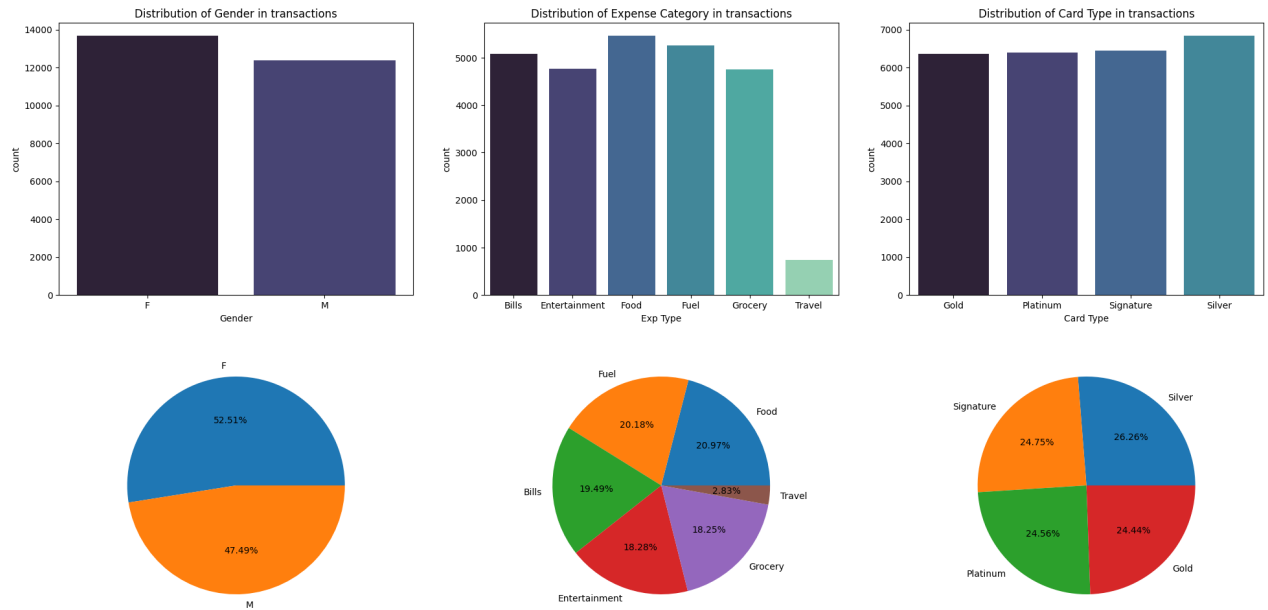
plt.subplot(2,3,2)
sns.countplot(x=df["Exp Type"],palette=sns.color_palette("mako"))
plt.title("Distribution of Expense Category in transactions")

plt.subplot(2,3,3)
sns.countplot(x=df["Card Type"],palette=sns.color_palette("mako"))
plt.title("Distribution of Card Type in transactions")

plt.subplot(2,3,4)
plt.pie(x=df["Gender"].value_counts(),labels=df["Gender"].value_counts().index,autopct="%0.2f%%")

plt.subplot(2,3,5)
plt.pie(x=df["Exp Type"].value_counts(),labels=df["Exp Type"].value_counts().index,autopct="%0.2f%%")`


```
plt.subplot(2,3,6)
plt.pie(x=df["Card Type"].value_counts(),labels=df["Card Type"].value_counts().index,autopct="%0.2f%%")
plt.show()
```



- The no of transactions done by female is 5 % more then the male.
- We have 6 different expense categories in transactions.
- Food has the highest 20.97%.
- We can see most of Exp type categories (5 out of 6) has transaction share between 18.25 to 20.97
- We have (travel) 1 out of 6 category which has the least share with 2.83 %
- We have 4 different card type categories
- All 4 transaction share lie between 24.44 % to 26.26 %
- Silver is the most used card type in transactions

Non Graphical Analysis

```
In [26]: df.groupby(['Card Type', 'Gender']).describe()
```

```
Out[26]:
```

		Amount							
		count	mean	std	min	25%	50%	75%	max
Card Type	Gender								
Gold	F	3287.0	159091.020079	121538.044533	1038.0	73667.50	149418.0	224995.00	996754.0
	M	3080.0	149872.517208	85645.824151	1099.0	74966.00	150944.0	223809.25	299610.0
Platinum	F	3252.0	163573.256150	115396.940061	1005.0	81216.75	157449.0	230606.00	998077.0
	M	3146.0	151207.498411	85676.176116	1175.0	78069.25	151100.5	224513.25	299967.0
Signature	F	3368.0	162709.367280	117954.072330	1024.0	77200.00	156323.0	232875.50	994537.0
	M	3079.0	151034.737252	86767.996243	1240.0	76314.00	150418.0	226617.50	299980.0
Silver	F	3773.0	159669.618076	109501.051441	1028.0	77400.00	155283.0	231830.00	955468.0
	M	3067.0	152324.826867	87071.732783	1018.0	79104.50	152958.0	227985.00	299981.0

```
In [27]: df.groupby(['Exp Type', 'Gender']).describe()
```

Out[27]:

		Amount							
		count	mean	std	min	25%	50%	75%	max
Exp Type	Gender								
Bills	F	2860.0	202809.604545	183838.739960	1026.0	84692.75	170763.0	251943.50	998077.0
	M	2218.0	147446.800721	86743.067538	1103.0	70693.50	148405.0	222329.25	299981.0
Entertainment	F	2384.0	150446.028943	87349.917747	1061.0	72821.75	150158.5	227840.25	299936.0
	M	2378.0	154656.939865	85866.032975	1240.0	81314.00	157918.5	228704.00	299906.0
Food	F	3012.0	150337.742032	86359.783304	1028.0	75275.25	151941.5	225124.50	299699.0
	M	2451.0	151736.731946	86666.914908	1018.0	76354.00	151201.0	225563.50	299837.0
Fuel	F	2617.0	149897.753535	86303.779979	1038.0	75897.00	151512.0	223706.00	299664.0
	M	2640.0	150323.257576	85572.373878	1161.0	79129.75	148679.0	225832.50	299905.0
Grocery	F	2428.0	150595.962932	86758.040202	1005.0	74531.00	151854.5	224839.75	299920.0
	M	2326.0	151573.914445	86123.306959	1099.0	77559.50	152680.5	226511.75	299550.0
Travel	F	379.0	147402.453826	84138.286902	1070.0	79449.00	142755.0	213139.50	299618.0
	M	359.0	148718.888579	89292.822418	1200.0	68352.50	149433.0	226564.00	297660.0

```
In [28]: plt.subplots(2,3,figsize=(24,10))

plt.subplot(2,3,1)
sns.barplot(x=df["Gender"],y=df["Amount"],palette=sns.color_palette("mako"))
plt.title("Distribution of Gender in transactions")

plt.subplot(2,3,2)
sns.barplot(x=df["Exp Type"],y=df["Amount"],palette=sns.color_palette("mako"))
plt.title("Distribution of Expense Category in transactions")

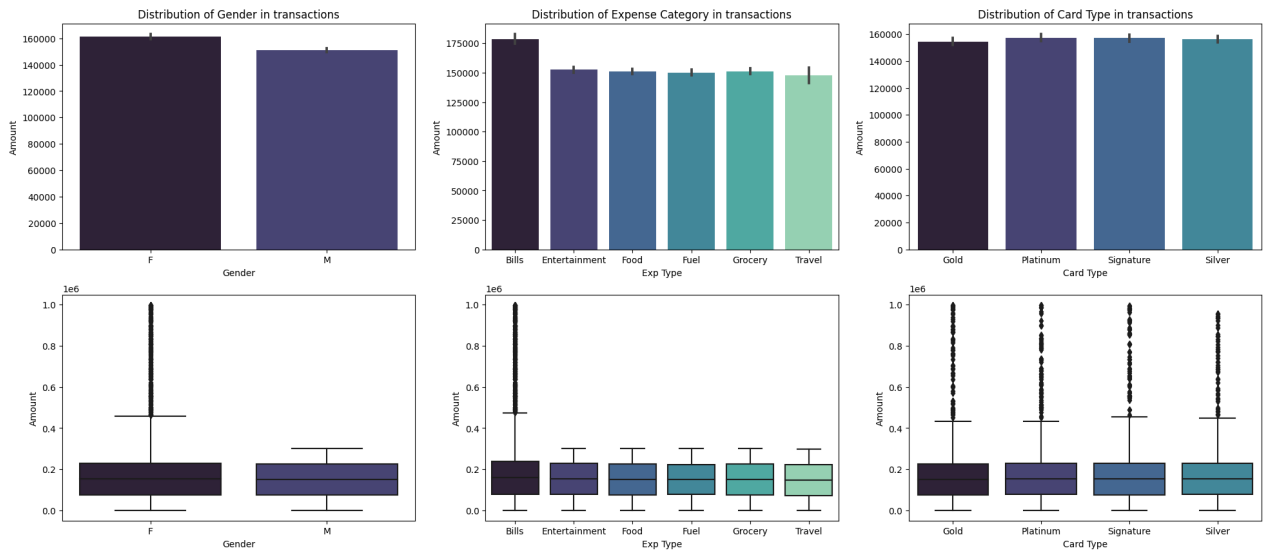
plt.subplot(2,3,3)
sns.barplot(x=df["Card Type"],y=df["Amount"],palette=sns.color_palette("mako"))
plt.title("Distribution of Card Type in transactions")

plt.subplot(2,3,4)
sns.boxplot(data=df,x='Gender',y='Amount',palette=sns.color_palette("mako"))

plt.subplot(2,3,5)
sns.boxplot(data=df,x='Exp Type',y='Amount',palette=sns.color_palette("mako"))

plt.subplot(2,3,6)
sns.boxplot(data=df,x='Card Type',y='Amount',palette=sns.color_palette("mako"))

plt.show()
```

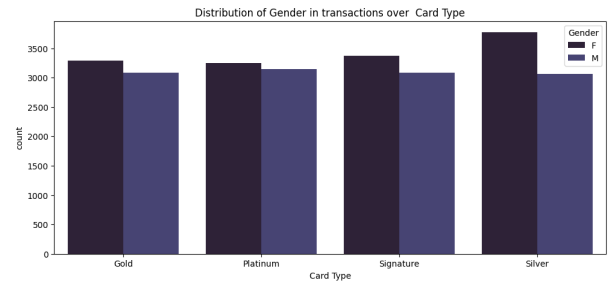
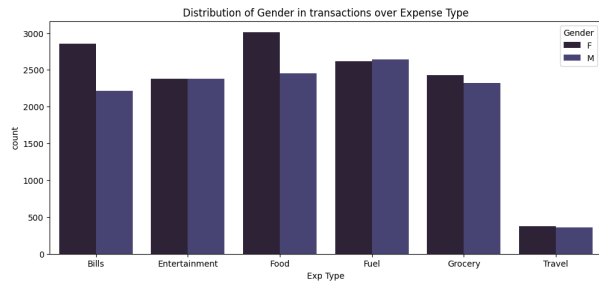


```
In [29]: plt.subplots(1,2,figsize=(26,5))

plt.subplot(1,2,1)
sns.countplot(x=df["Exp Type"],hue=df["Gender"],palette=sns.color_palette("mako"))
plt.title("Distribution of Gender in transactions over Expense Type")

plt.subplot(1,2,2)
sns.countplot(x=df["Card Type"],hue=df["Gender"],palette=sns.color_palette("mako"))
plt.title("Distribution of Gender in transactions over Card Type")

plt.show()
```

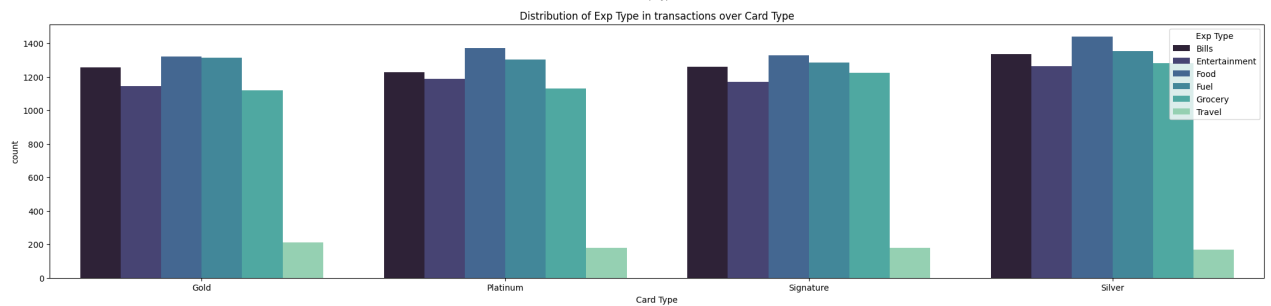
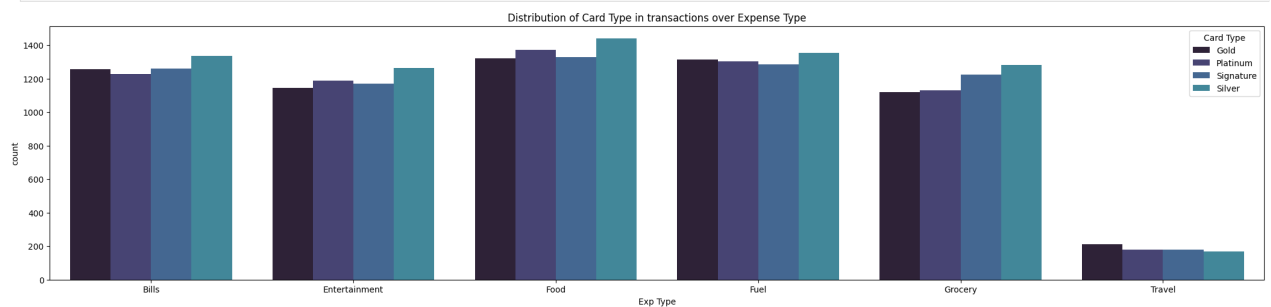


- Female has high no transactions in almost all exp category except fuel.
- Female has high no transactions in all Card type

```
In [30]: plt.subplots(2,1,figsize=(26,12))

plt.subplot(2,1,1)
sns.countplot(x=df["Exp Type"],hue=df["Card Type"],palette=sns.color_palette("mako"))
plt.title("Distribution of Card Type in transactions over Expense Type")

plt.subplot(2,1,2)
sns.countplot(x=df["Card Type"],hue=df["Exp Type"],palette=sns.color_palette("mako"))
plt.title("Distribution of Exp Type in transactions over Card Type")
plt.show()
```



Conclusions

- Top 3 City having highest no of transactions are Bengaluru, Greater Mumbai and Ahmedabad
- Last 3 City having lowest no of transactions are Alirajpur, Bagaha and Changanassery
- Silver is the highest used card & Gold is the least used card type.
- Food has the highest no of transactions whereas Travel has the lowest no of transactions.
- Females has the most no of transactions than Males.
- Silver has the highest overall amount while gold is least contribution to total amount.
- Bills has the highest overall amount while travel is least contribution to total amount.
- Female has the highest overall amount than men who contributes to total amount
- Only in Fuel expense subcategory no of transactions dominates for men.
- All subcategories in Card type dominated by womens
- Silver card holder dominates in all sub categories except Travel.
- Gold card holder has most transactions in travel sector
- Food is the most frequent category in all card types & travel being the least