Project 4 - Comcast Telecom Consumer Complaints

December 19, 2022

1 1. To perform these tasks, you can use any of the different Python libraries such as NumPy, SciPy, Pandas, scikit-learn, matplotlib, and BeautifulSoup.

1. Import data into Python environment.
2. Provide the trend chart for the number of complaints at monthly and daily granularity levels.
3. Provide a table with the frequency of complaint types.

[14]:
```
# import the library
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import bs4
from bs4 import BeautifulSoup as bs
from scipy import stats
import sklearn
```

1.0.1 1) 1) Import data into Python environment

[15]:
```
df = pd.read_csv('Comcast_telecom_complaints_data.csv')
```

[16]:
```
df.head()
```

[16]:

	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received Via	City	State
0	250635	Comcast Cable Internet Speeds	22-04-15	22-Apr-15	3:53:50 PM	Customer Care Call	Abingdon	Maryland
1	223441	Payment disappear - service got disconnected	04-08-15	04-Aug-15	10:22:56 AM	Internet	Acworth	Georgia
2	242732	Speed and Service	18-04-15	18-Apr-15	9:55:47 AM	Internet	Acworth	Georgia
3	277946	Comcast Imposed a New Usage Cap of 300GB that …	05-07-15	05-Jul-15	11:59:35 AM	Internet	Acworth	Georgia
4	307175	Comcast not working and no service to boot	26-05-15	26-May-15	1:25:26 PM	Internet	Acworth	Georgia

```
   Zip code  Status Filing on Behalf of Someone
0     21009  Closed                          No
1     30102  Closed                          No
2     30101  Closed                         Yes
3     30101    Open                         Yes
4     30101  Solved                          No
```

[17]:
```
df.describe()
```

[17]:
```
           Zip code
count   2224.000000
mean   47994.393435
std    28885.279427
min     1075.000000
25%    30056.500000
50%    37211.000000
75%    77058.750000
max    99223.000000
```

[18]:
```
df.shape
```

[18]:
```
(2224, 11)
```

[19]:
```
df.isnull().sum()
```

[19]:
```
Ticket #                      0
Customer Complaint            0
Date                          0
Date_month_year               0
Time                          0
Received Via                  0
City                          0
State                         0
Zip code                      0
Status                        0
Filing on Behalf of Someone   0
dtype: int64
```

[20]:
```
df.dtypes
```

[20]:
```
Ticket #                      object
Customer Complaint            object
Date                          object
Date_month_year               object
Time                          object
Received Via                  object
City                          object
```

```
State                          object
Zip code                        int64
Status                         object
Filing on Behalf of Someone    object
dtype: object
```

1.0.2 1) 2) Provide the trend chart for the number of complaints at monthly and daily granularity levels.

[55]:
```
df['Month']=pd.to_datetime(df['Date_month_year']).dt.month_name()
df['Date']=pd.to_datetime(df['Date_month_year']).dt.day
```

[56]:
```
df.dtypes
```

[56]:
```
Ticket #                             object
Customer Complaint                   object
Date                                  int64
Month                                object
Date_month_year              datetime64[ns]
Time                                 object
Received Via                         object
City                                 object
State                                object
Zip code                              int64
Status                               object
Filing on Behalf of Someone          object
dtype: object
```

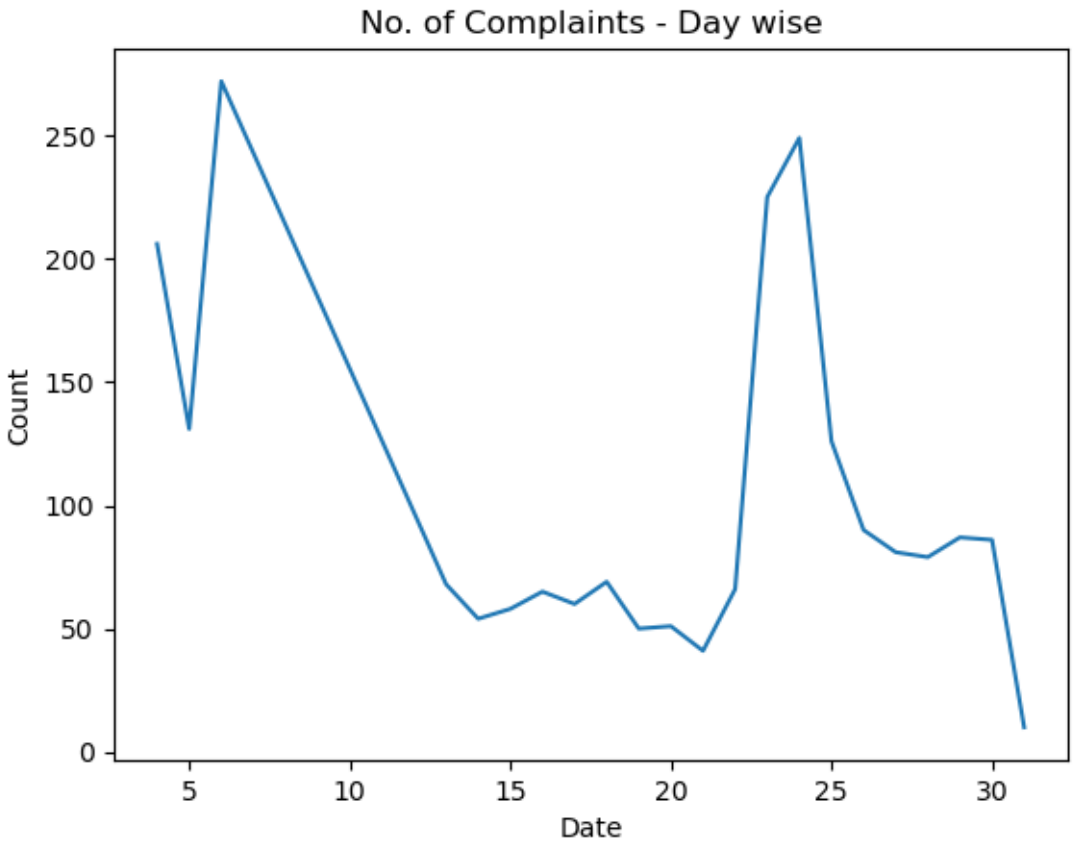
[57]:
```
df
```

[57]:

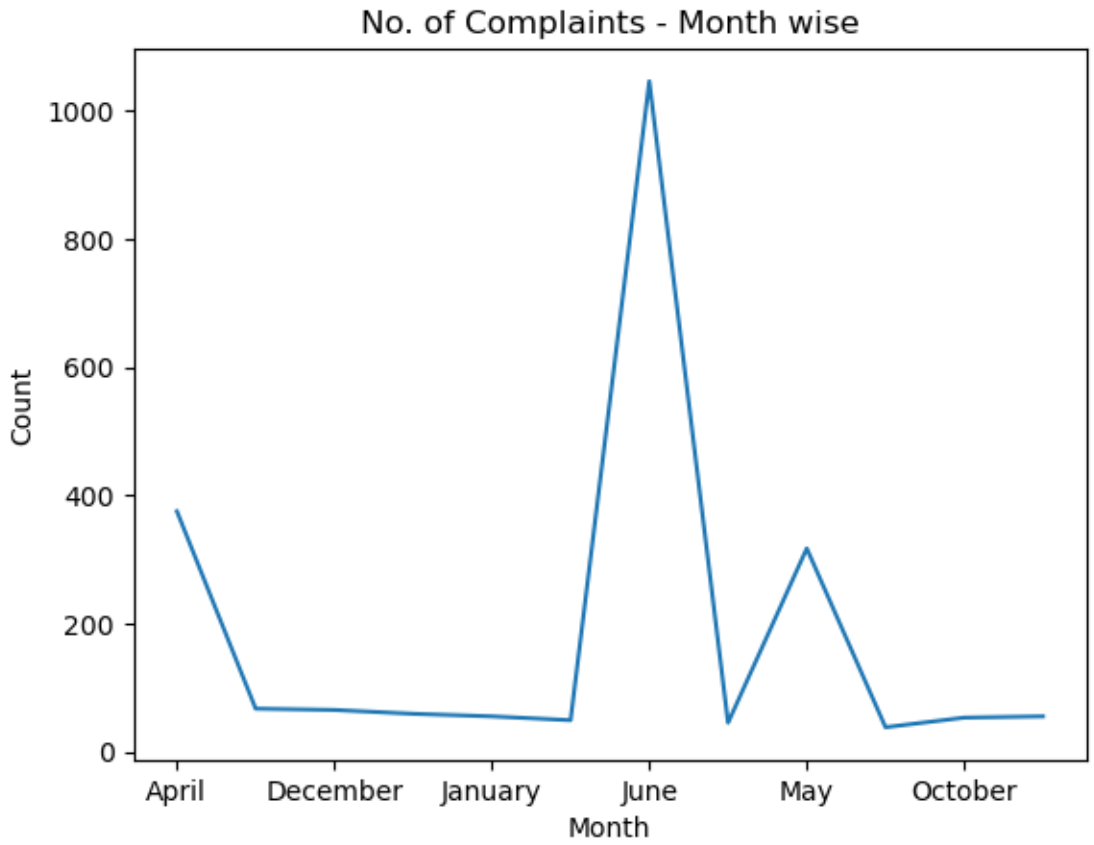
	Ticket #	Customer Complaint	Date	Month	Date_month_year	Time	Received Via	City
0	250635	Comcast Cable Internet Speeds	22	April	2015-04-22	3:53:50 PM	Customer Care Call	Abingdon
1	223441	Payment disappear - service got disconnected	4	August	2015-08-04	10:22:56 AM	Internet	Acworth
2	242732	Speed and Service	18	April	2015-04-18	9:55:47 AM	Internet	Acworth
3	277946	Comcast Imposed a New Usage Cap of 300GB that …	5					
4	307175	Comcast not working and no service to boot	26					
…	…	…	…					
2219	213550	Service Availability	4					
2220	318775	Comcast Monthly Billing for Returned Modem	6					
2221	331188	complaint about comcast	6					
2222	360489	Extremely unsatisfied Comcast customer	23					
2223	363614	Comcast, Ypsilanti MI Internet Speed	24					

```
3          July      2015-07-05  11:59:35 AM            Internet     Acworth
4           May      2015-05-26   1:25:26 PM            Internet     Acworth
…           …             …           …                    …          …
2219   February      2015-02-04   9:13:18 AM  Customer Care Call  Youngstown
2220   February      2015-02-06   1:24:39 PM  Customer Care Call   Ypsilanti
2221  September      2015-09-06   5:28:41 PM            Internet   Ypsilanti
2222       June      2015-06-23  11:13:30 PM  Customer Care Call   Ypsilanti
2223       June      2015-06-24  10:28:33 PM  Customer Care Call   Ypsilanti

         State  Zip code  Status Filing on Behalf of Someone
0     Maryland     21009  Closed                          No
1      Georgia     30102  Closed                          No
2      Georgia     30101  Closed                         Yes
3      Georgia     30101    Open                         Yes
4      Georgia     30101  Solved                          No
…        …       …     …                          …
2219   Florida     32466  Closed                          No
2220  Michigan     48197  Solved                          No
2221  Michigan     48197  Solved                          No
2222  Michigan     48197  Solved                          No
2223  Michigan     48198    Open                         Yes

[2224 rows x 12 columns]
```

[67]:
```
df.groupby(['Date'])['Customer Complaint'].count().plot()
plt.xlabel('Date')
plt.ylabel('Count')
plt.title('No. of Complaints - Day wise')
plt.show()
```



[69]:
```
df.groupby(['Month'])['Customer Complaint'].count().plot()
plt.xlabel('Month')
plt.ylabel('Count')
plt.title('No. of Complaints - Month wise')
plt.show()
```



1.0.3 1) 3) Provide a table with the frequency of complaint types

[79]:
```
df['Customer Complaint'].value_counts().to_frame().reset_index()
```

[79]:

	index	Customer Complaint
0	Comcast	83
1	Comcast Internet	18
2	Comcast Data Cap	17
3	comcast	13
4	Comcast Billing	11
…	…	…
1836	Improper Billing and non resolution of issues	1
1837	Deceptive trade	1
1838	intermittent internet	1
1839	Internet Speed on Wireless Connection	1
1840	Comcast, Ypsilanti MI Internet Speed	1

[1841 rows x 2 columns]

2 2. Which complaint types are maximum i.e., around internet, network issues, or across any other domains.

1. Create a new categorical variable with value as Open and Closed. Open & Pending is to be categorized as Open and Closed & Solved is to be categorized as Closed.
2. Provide state wise status of complaints in a stacked bar chart. Use the categorized variable from Q3. Provide insights on:

2.0.1 2) 1) Create a new categorical variable with value as Open and Closed. Open & Pending is to be categorized as Open and Closed & Solved is to be categorized as Closed.

[100]:
```
def func(x):
    if x=='Open':
        return 'Open'
    elif x=='Pending':
        return 'Open'
    else:
        return 'Closed'
```

[101]:
```
df['Status Type']=df['Status'].apply(func)
```

[104]:
```
df['Status Type'].to_frame()
```

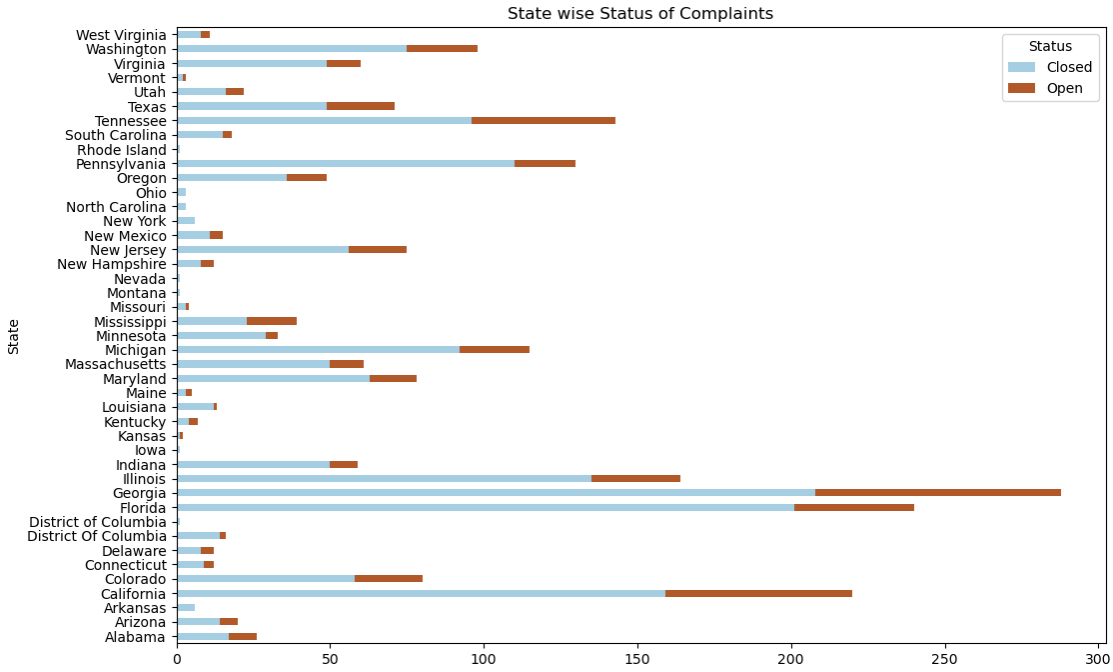
[104]:

	Status Type
0	Closed
1	Closed
2	Closed
3	Open
4	Closed
…	…
2219	Closed
2220	Closed
2221	Closed
2222	Closed
2223	Open

[2224 rows x 1 columns]

2.0.2 2) 2) Provide state wise status of complaints in a stacked bar chart. Use the categorized variable from Q3. Provide insights on:

[109]:
```
crosstab=pd.crosstab(index=df['State'],columns=df['Status'])
crosstab.plot(kind='barh',figsize=(12,8),stacked=True,colormap='Paired')
plt.title('State wise Status of Complaints')
plt.show()
```



3 3. Which state has the maximum complaints

[141]:
```
df.groupby('State')['Customer Complaint'].agg("count").
↪sort_values(ascending=False).head(1)
```

[141]:
```
State
Georgia    288
Name: Customer Complaint, dtype: int64
```

4 4. Which state has the highest percentage of unresolved complaints

1. Provide the percentage of complaints resolved till date, which were received through the Internet and customer care calls

[145]:
```
State_Unsolved = df.loc[df['Status']=='Open',['State']].value_counts()
State_Unsolved.head(1)/State_Unsolved.sum()*100
```

[145]:
```
State
Georgia    15.473888
dtype: float64
```

4.0.1 4) 1) Provide the percentage of complaints resolved till date, which were received through the Internet and customer care calls

[146]:
```
df[df['Status']=='Closed'].groupby('Status')['Received Via'].
↪value_counts(normalize=True)*100
```

[146]:
```
Status  Received Via
Closed  Customer Care Call    50.615114
        Internet              49.384886
Name: Received Via, dtype: float64
```

[ ]:
```

```