Project - Comcast Telecom Consumer Complaints

DESCRIPTION

Comcast is an American global telecommunication company. The firm has been providing terrible customer service. They continue to fall short despite repeated promises to improve. Only last month (October 2016) the authority fined them a $2.3 million, after receiving over 1000 consumer complaints. The existing database will serve as a repository of public customer complaints filed against Comcast. It will help to pin down what is wrong with Comcast's customer service.

Data Dictionary

```
Ticket #: Ticket number assigned to each complaint
Customer Complaint: Description of complaint
Date: Date of complaint
Time: Time of complaint
Received Via: Mode of communication of the complaint
City: Customer city
State: Customer state
Zipcode: Customer zip
Status: Status of complaint
Filing on behalf of someone
```

Analysis Task

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

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

  Which complaint types are maximum i.e., around internet, network issues, or across any other domains.
- 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.
- Provide state wise status of complaints in a stacked bar chart. Use the categorized variable from Q3. Provide insights on:

  Which state has the maximum complaints Which state has the highest percentage of unresolved complaints
- Provide the percentage of complaints resolved till date, which were received through the Internet and customer care calls.

The analysis results to be provided with insights wherever applicable.

In [1]:
```python
# import required libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import datetime
import calendar
from time import strptime
import warnings
warnings.filterwarnings('ignore')

%matplotlib inline

import seaborn as s
```

In [2]:
```
df = pd.read_csv('E:\\Simplilearn\\Data Science with Python\\Projects\\Comcast\\
Comcast_telecom_complaints_data.csv')
df.head(2)
```

Out[2]:

	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received Via	City	State	Zip code	Status
0	250635	Comcast Cable Internet Speeds	22-04-15	22-Apr-15	3:53:50 PM	Customer Care Call	Abingdon	Maryland	21009	Closed
1	223441	Payment disappear - service got disconnected	04-08-15	04-Aug-15	10:22:56 AM	Internet	Acworth	Georgia	30102	Closed

In [3]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2224 entries, 0 to 2223
Data columns (total 11 columns):
 #   Column                       Non-Null Count  Dtype 
---  ------                       --------------  ----- 
 0   Ticket #                     2224 non-null   object
 1   Customer Complaint           2224 non-null   object
 2   Date                         2224 non-null   object
 3   Date_month_year              2224 non-null   object
 4   Time                         2224 non-null   object
 5   Received Via                 2224 non-null   object
 6   City                         2224 non-null   object
 7   State                        2224 non-null   object
 8   Zip code                     2224 non-null   int64 
 9   Status                       2224 non-null   object
 10  Filing on Behalf of Someone  2224 non-null   object
dtypes: int64(1), object(10)
memory usage: 191.2+ KB
```

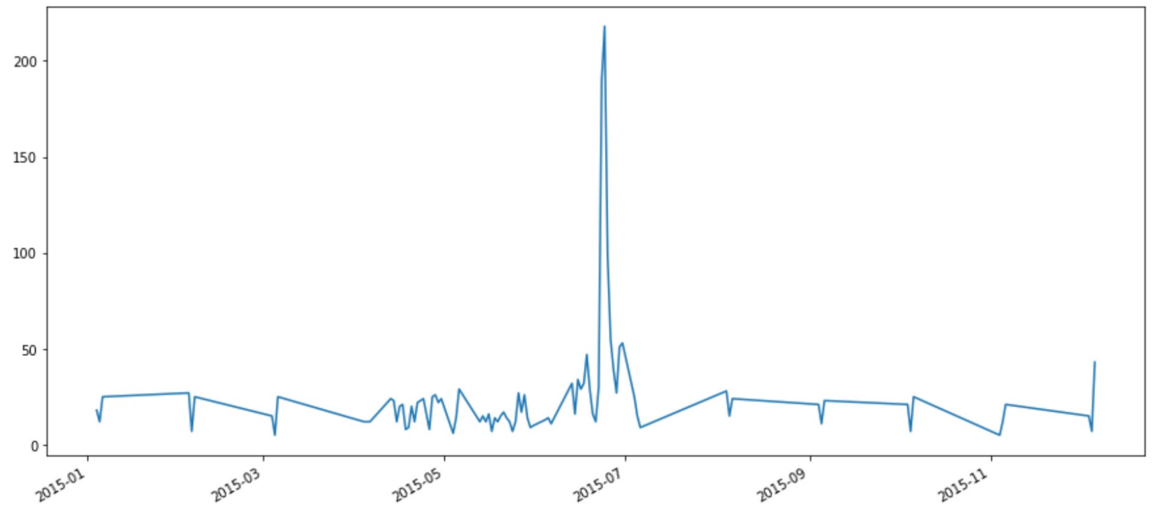
In [4]:
```
# date column is still a string, we need to parse it to a datetime format and se
tting a date index

df["date_index"] = df["Date_month_year"] + " " + df["Time"]
```

In [5]:
```
df["date_index"] = pd.to_datetime(df["date_index"])
df["Date_month_year"] = pd.to_datetime(df["Date_month_year"])

df = df.set_index(df["date_index"])
```

-Provide the trend chart for the number of complaints at monthly and daily granularity levels.

In [6]:
```
# Daily trend

plt.figure(figsize=(15,7))
print(df["Date_month_year"].value_counts()[:3])
df["Date_month_year"].value_counts().plot();
```

```
2015-06-24    218
2015-06-23    190
2015-06-25     98
Name: Date_month_year, dtype: int64
```

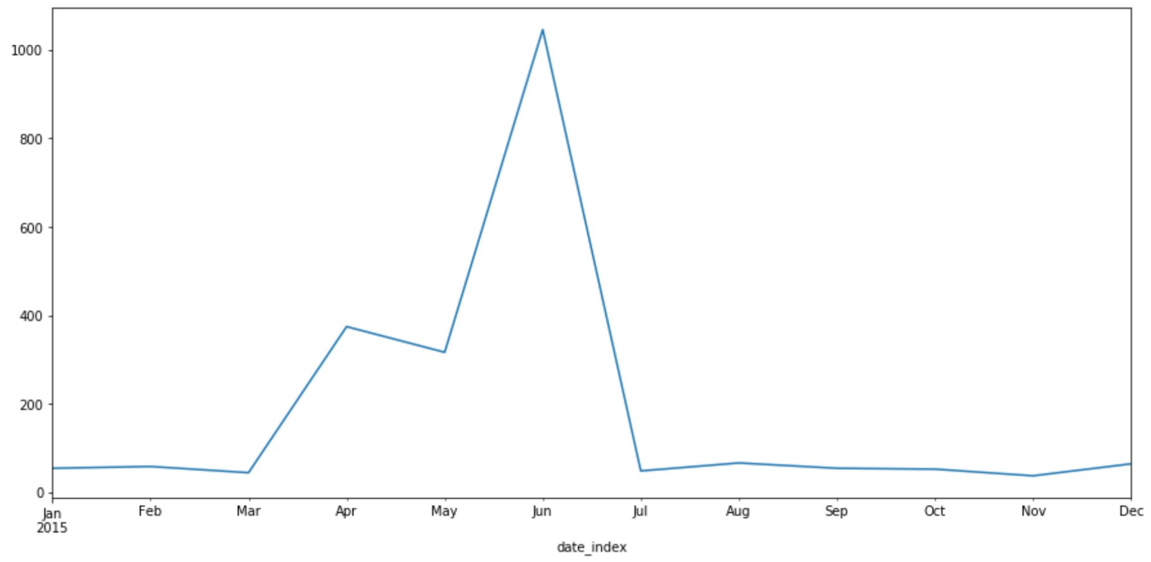


Jun 23rd and 24th received the highest number of complaints

In [7]:
```
# Monthly trend

plt.figure(figsize=(15,7))
print(df.groupby(pd.Grouper(freq="M")).size()[:3])
df.groupby(pd.Grouper(freq="M")).size().plot()
```

```
date_index
2015-01-31    55
2015-02-28    59
2015-03-31    45
Freq: M, dtype: int64
```

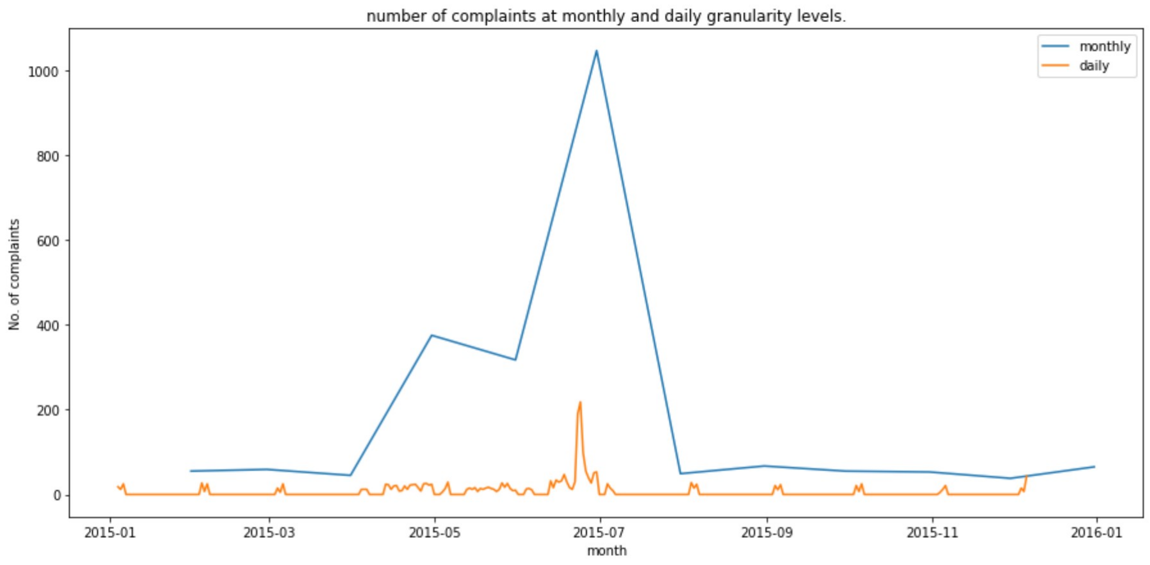
Out[7]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x900a2fd248>
```



The month of June received the maximum number of complaints

In [8]:
```
#Showing both Month and Daily trends in the same figure

month_vs_complaint = df['Customer Complaint'].resample('M').count()
date_vs_complaint = df['Customer Complaint'].resample('D').count()
plt.figure(figsize=(15,7))
plt.plot(month_vs_complaint, label = 'monthly')
plt.plot(date_vs_complaint, label = 'daily')
plt.title('number of complaints at monthly and daily granularity levels.')
plt.ylabel('No. of complaints')
plt.xlabel('month')
plt.legend()
```

Out[8]:
```
<matplotlib.legend.Legend at 0x900a337d88>
```



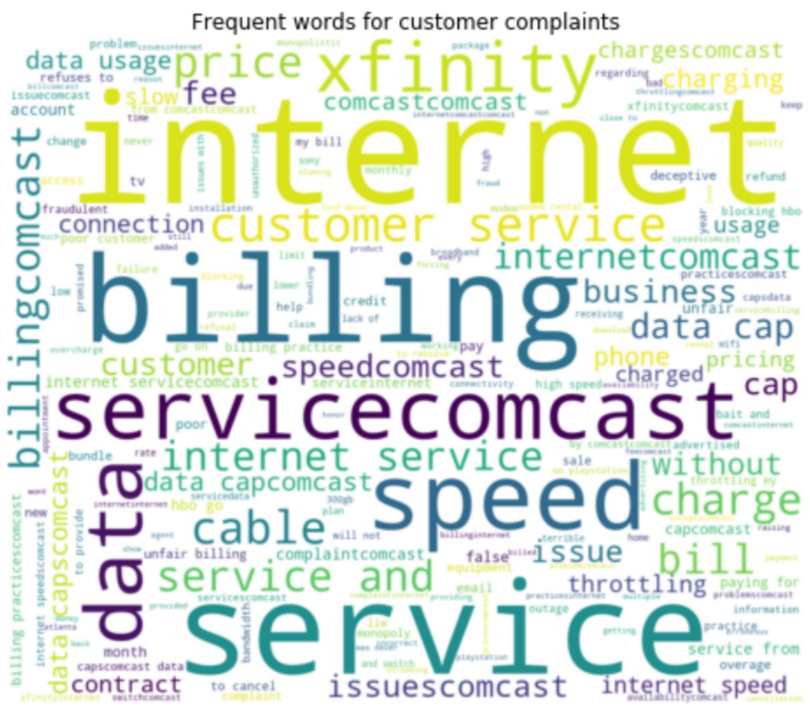
Provide a table with the frequency of complaint types.

In [9]:
```
complaints_type=df['Customer Complaint'].value_counts()
complaints_type=pd.DataFrame({'Customer Complaint Type':complaints_type.index,'F
req':complaints_type.values})
print(complaints_type)
```

```
                               Customer Complaint Type  Freq
0                                              Comcast    83
1                                     Comcast Internet    18
2                                     Comcast Data Cap    17
3                                              comcast    13
4                                            Data Caps    11
...                                                ...   ...
1836                         Comcast pricing practices     1
1837                                monthly data caps     1
1838  Comcast Support Unable to Provide Accurate Inf...     1
1839                          Comcast/Xfinity Internet     1
1840                        lack of service from comcast     1

[1841 rows x 2 columns]
```

Since complaints could be common but how they are put forward is different. We shall use the wordcloud to understand the frequency of complaints.

In [10]:
```
# Unigram wordcloud for reviews
# note: this is a rough way to estimate most common complaints

from wordcloud import WordCloud, STOPWORDS

common_complaints = list(df['Customer Complaint'].dropna())
common_complaints =''.join(common_complaints).lower()

list_stops = ('comcast','now','company','day','someone','thing','also','got','wa
y','call','called','one','said','tell')

for word in list_stops:
    STOPWORDS.add(word)


wordcloud = WordCloud(stopwords=STOPWORDS,
                      background_color='white',
                      width=1200,
                      height=1000).generate(common_complaints)

plt.figure(figsize=(15,7))
plt.imshow(wordcloud, interpolation = 'bilinear')
plt.title('Frequent words for customer complaints')
plt.axis('off')
plt.show()
```



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

By observing the above wordcloud, we can infer that most common issues appear to be with customer service, billing charges/prices , internet speed, and data limits according to the fcc complaints file.

- 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.

In [11]:
```
df.Status.value_counts()
```

Out[11]:
```
Solved     973
Closed     734
Open       363
Pending    154
Name: Status, dtype: int64
```

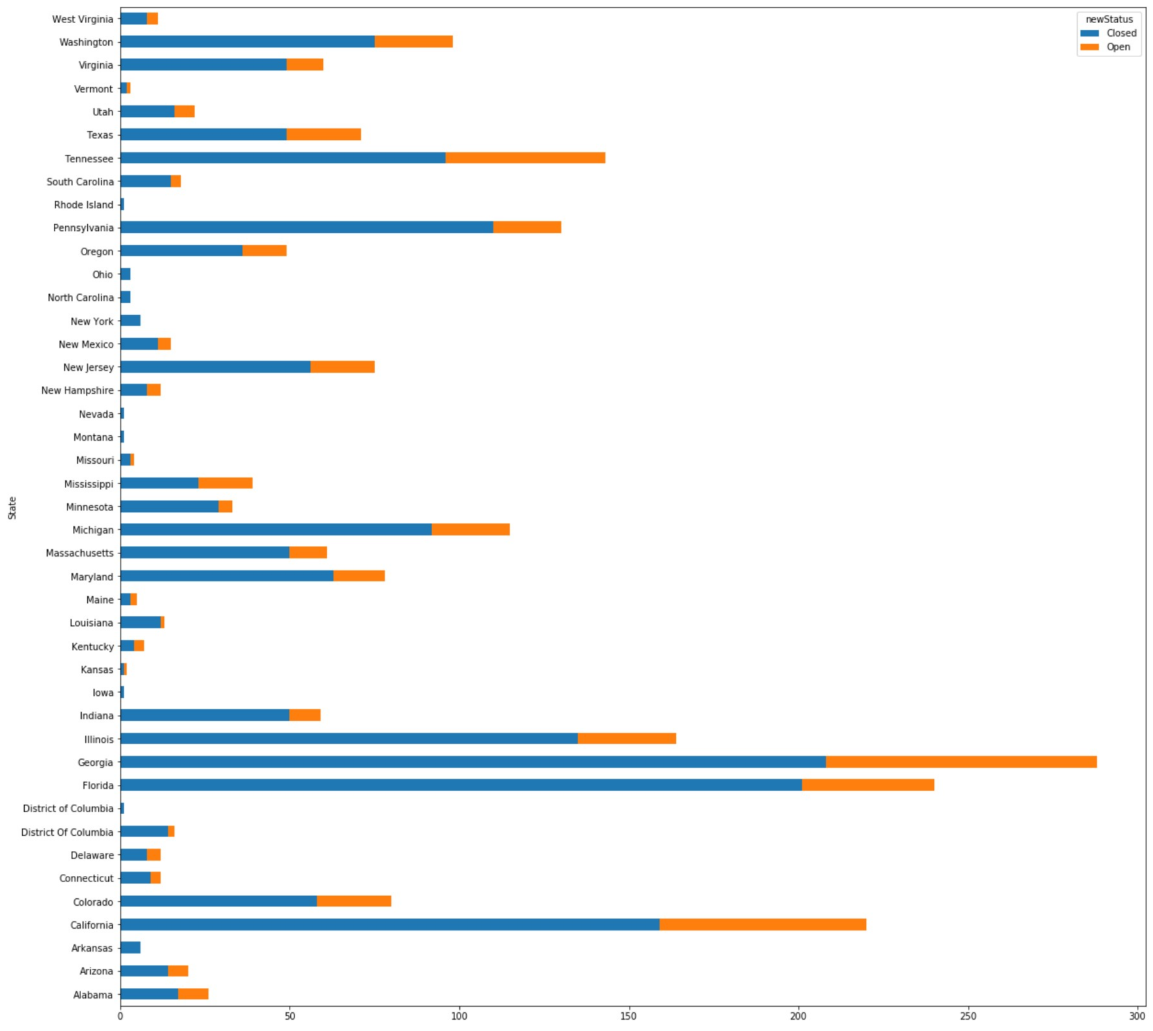
In [12]:
```
df["newStatus"]=["Open" if (Status=="Open" or Status=="Pending") else "Closed" f
or Status in df["Status"]]
df.head(2)
```

Out[12]:

	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received Via	City	State	Zi cod
date_index									
2015-04-22 15:53:50	250635	Comcast Cable Internet Speeds	22-04-15	2015-04-22	3:53:50 PM	Customer Care Call	Abingdon	Maryland	2100
2015-08-04 10:22:56	223441	Payment disappear - service got disconnected	04-08-15	2015-08-04	10:22:56 AM	Internet	Acworth	Georgia	3010

In [13]:
```
#Provide state wise status of complaints in a stacked bar chart.

df.groupby(['State', 'newStatus']).size().unstack().plot(kind='barh',figsize=(2
0,20), stacked=True)
```

Out[13]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x9006c0f688>
```



Provide insights on:

```
Which state has the maximum complaints - Georgia has the maximum Complaints followe
d by Florida and California.
Which state has the highest percentage of unresolved complaints - Kansas has the un
resolved Complaints.
```

In [14]:
```
#Retrievieng th state that has the maximum complaints

cs = pd.crosstab(index=df['State'], columns=df['newStatus'])
cs['tc']=cs['Closed']+cs['Open']
print(cs['tc'].idxmax())
```

```
Georgia
```

In [15]:
```
#Retrievieng th state that has the highest percentage of unresolved complaints
cs['URP']=((cs['Open'])/cs['tc'])*100
#print(cs)
print(cs['URP'].idxmax())
```

```
Kansas
```

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

In [16]:
```
#Percentage of Compliants resolved till date

np1 = df.groupby(['newStatus']).size()
np2 = df.groupby(['newStatus']).size().sum()

percentage_resolved = np1[0]/np2*100
percentage_resolved.round()
```

Out[16]:
```
77.0
```

Resolution rate is 77% for the complaints received.

In [17]:
```
ser1 = df[df['newStatus']=="Closed"].groupby('Received Via').count()['Ticket #']
ser2 = df.groupby('Received Via').count()['Ticket #']

Ptage = ser1/ser2
Ptage
```

Out[17]:
```
Received Via
Customer Care Call    0.772118
Internet              0.762896
Name: Ticket #, dtype: float64
```

Resolution rate is 77% and 76% respectively for the complaints received through Internet and customer care calls.