Comcast telecome project

December 2, 2021

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

[2]:
```
df=pd.read_csv("Comcast_telecome_complaints_data.csv")
```

[3]:
```
df.head()
```

[3]:
```
  Ticket #                                  Customer Complaint      Date  \
0   250635                       Comcast Cable Internet Speeds  22-04-15
1   223441       Payment disappear - service got disconnected  04-08-15
2   242732                                    Speed and Service  18-04-15
3   277946  Comcast Imposed a New Usage Cap of 300GB that …  05-07-15
4   307175         Comcast not working and no service to boot  26-05-15

  Date_month_year         Time        Received Via      City     State  \
0       22-Apr-15   3:53:50 PM  Customer Care Call  Abingdon  Maryland
1       04-Aug-15  10:22:56 AM            Internet   Acworth   Georgia
2       18-Apr-15   9:55:47 AM            Internet   Acworth   Georgia
3       05-Jul-15  11:59:35 AM            Internet   Acworth   Georgia
4       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
```

[4]:
```
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
```

[5]:
```
df['Date']=pd.to_datetime(df['Date'])
```

[6]:
```
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   datetime64[ns]
 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: datetime64[ns](1), int64(1), object(9)
memory usage: 191.2+ KB
```

[7]:
```
#get the month using date
df['month']=df['Date'].dt.month_name()
```

[8]:
```
df.head()
```

[8]:

	Ticket #	Customer Complaint	Date	\
0	250635	Comcast Cable Internet Speeds	2015-04-22	
1	223441	Payment disappear - service got disconnected	2015-04-08	
2	242732	Speed and Service	2015-04-18	
3	277946	Comcast Imposed a New Usage Cap of 300GB that …	2015-05-07	
4	307175	Comcast not working and no service to boot	2015-05-26	

```
  Date_month_year         Time        Received Via      City     State  \
0       22-Apr-15   3:53:50 PM  Customer Care Call  Abingdon  Maryland
1       04-Aug-15  10:22:56 AM            Internet   Acworth   Georgia
2       18-Apr-15   9:55:47 AM            Internet   Acworth   Georgia
3       05-Jul-15  11:59:35 AM            Internet   Acworth   Georgia
4       26-May-15   1:25:26 PM            Internet   Acworth   Georgia

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

[9]:
```
#Provide the trend chart for the number of complaints at monthly and daily granularity levels.
#daily complaints levels
```

[10]:
```
df['Date'].value_counts()
```

[10]:
```
2015-06-24    218
2015-06-23    190
2015-06-25     98
2015-06-26     55
2015-06-30     53
              ...
2015-05-24      7
2015-05-02      7
2015-04-05      6
2015-04-11      5
2015-05-03      5
Name: Date, Length: 91, dtype: int64
```

[11]:
```
#or
dates=df.groupby(by=['Date']).count()['Ticket #']
```

[12]:
```
dates
```

[12]:
```
Date
2015-04-01    18
2015-04-02    27
2015-04-03    15
2015-04-04    12
2015-04-05     6
              ..
2015-06-26    55
```

```
2015-06-27    39
2015-06-28    27
2015-06-29    51
2015-06-30    53
Name: Ticket #, Length: 91, dtype: int64
```

[13]:
```
daily=pd.DataFrame(dates)
```

[14]:
```
daily.head()
```

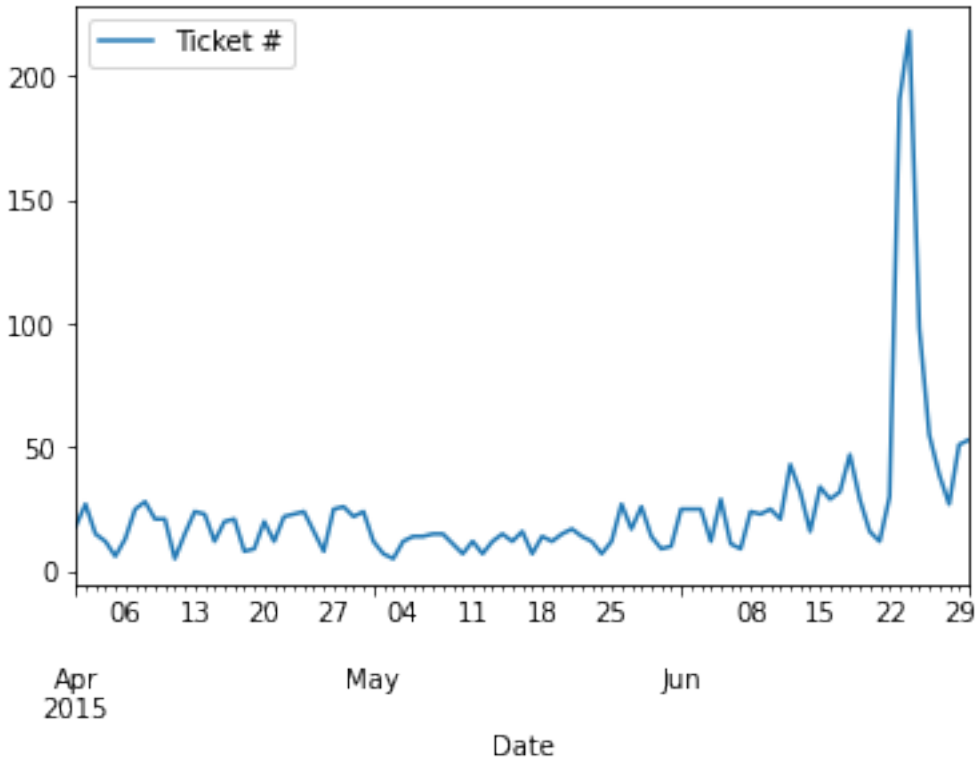
[14]:
```
            Ticket #
Date
2015-04-01        18
2015-04-02        27
2015-04-03        15
2015-04-04        12
2015-04-05         6
```

[15]:
```
daily=pd.DataFrame(dates).reset_index()
```

[16]:
```
daily.sort_values(by= ['Ticket #'],ascending = False)
```

[16]:
```
          Date  Ticket #
84 2015-06-24       218
83 2015-06-23       190
85 2015-06-25        98
86 2015-06-26        55
90 2015-06-30        53
..         …       …
46 2015-05-17         7
41 2015-05-12         7
4  2015-04-05         6
10 2015-04-11         5
32 2015-05-03         5

[91 rows x 2 columns]
```

[17]:
```
daily.plot(x='Date',y='Ticket #',kind='line')
plt.show()
```



[18]:
```
#monthly complaint levels
```

[19]:
```
mnth=df.groupby(by=['month']).count()['Ticket #']
```

[20]:
```
mnth
```

[20]:
```
month
April     545
June     1280
May       399
Name: Ticket #, dtype: int64
```

[21]:
```
daily.sort_values(by=['Ticket #'],ascending=False)
```

[21]:
```
          Date  Ticket #
84 2015-06-24       218
83 2015-06-23       190
85 2015-06-25        98
86 2015-06-26        55
90 2015-06-30        53
..         …       …
46 2015-05-17         7
```

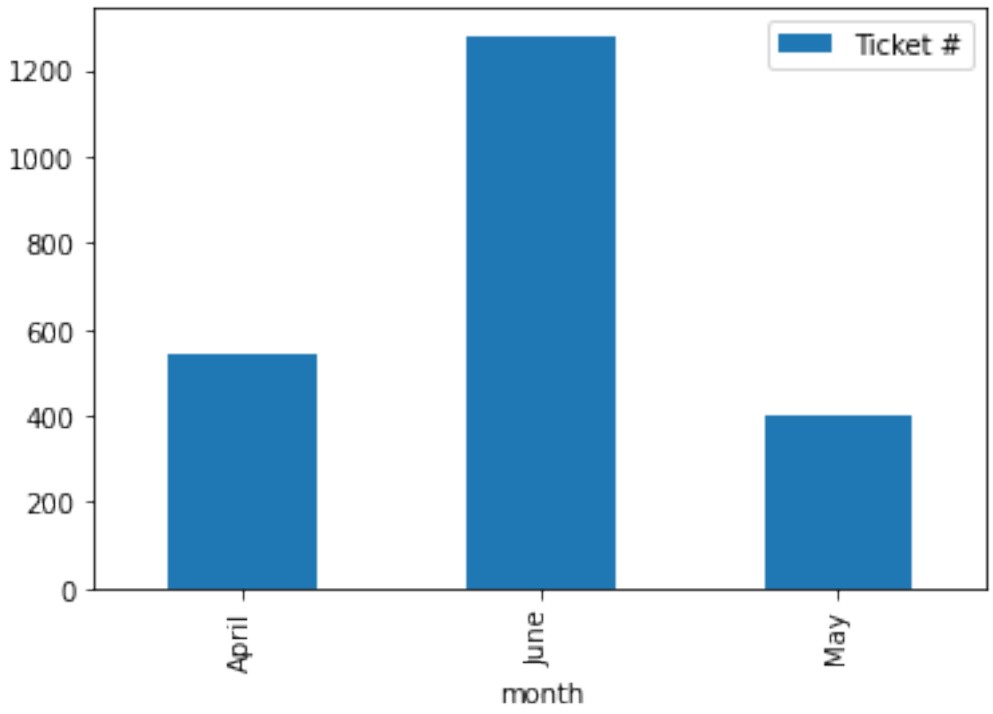
```
41 2015-05-12         7
4  2015-04-05         6
10 2015-04-11         5
32 2015-05-03         5

[91 rows x 2 columns]
```

[22]:
```
month_chart=pd.DataFrame(mnth).reset_index()
```

[23]:
```
month_chart
```

[23]:
```
    month  Ticket #
0   April       545
1    June      1280
2     May       399
```

[24]:
```
month_chart.plot(x='month',y='Ticket #',kind='bar')
plt.show()
```



[25]:
```
df['Customer Complaint'].value_counts()
```

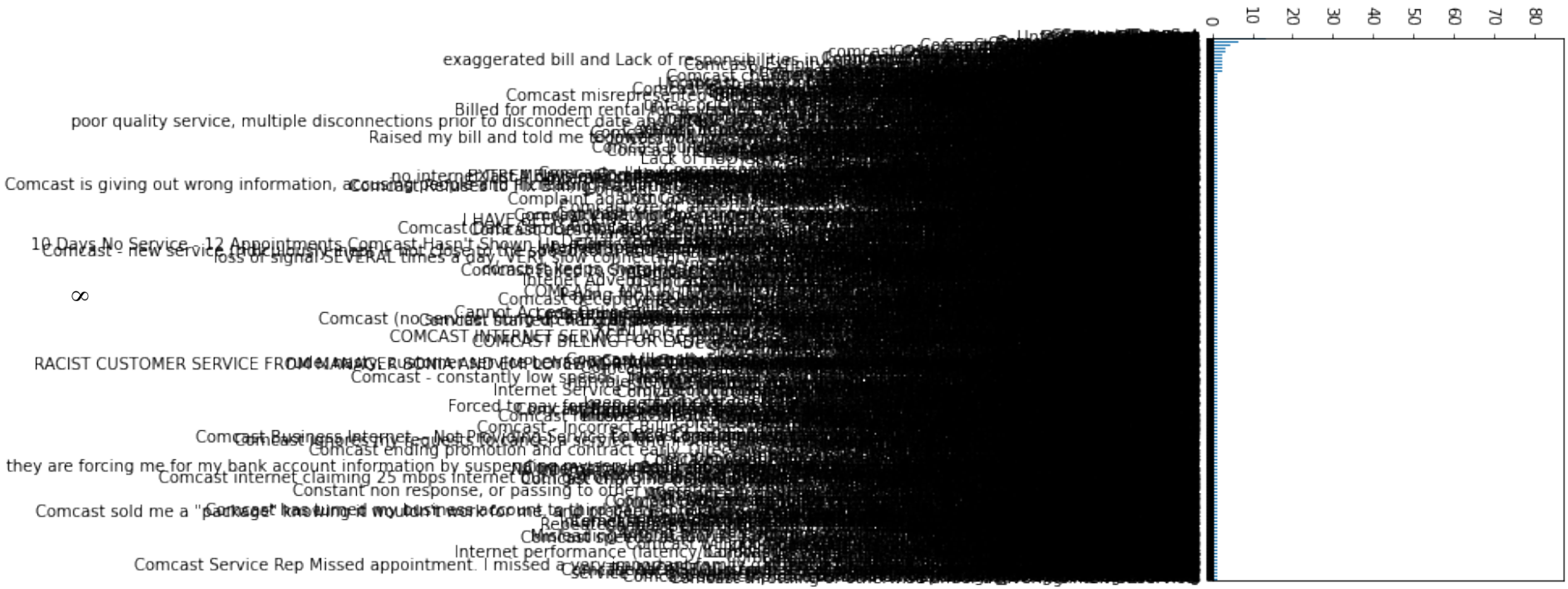
[25]:
```
Comcast                                                    83
Comcast Internet                                           18
Comcast Data Cap                                           17
```

```
comcast                                                                 13
Data Caps                                                               11
                                                                        ..
comcast is not providing service for bad internet                        1
MONTHLY BILL                                                             1
Erroneous charges on Comcast bill                                        1
Comcast service problems for months; charging without fixng the issue    1
Comcast throttling or otherwise under-delivering internet service.       1
Name: Customer Complaint, Length: 1841, dtype: int64
```

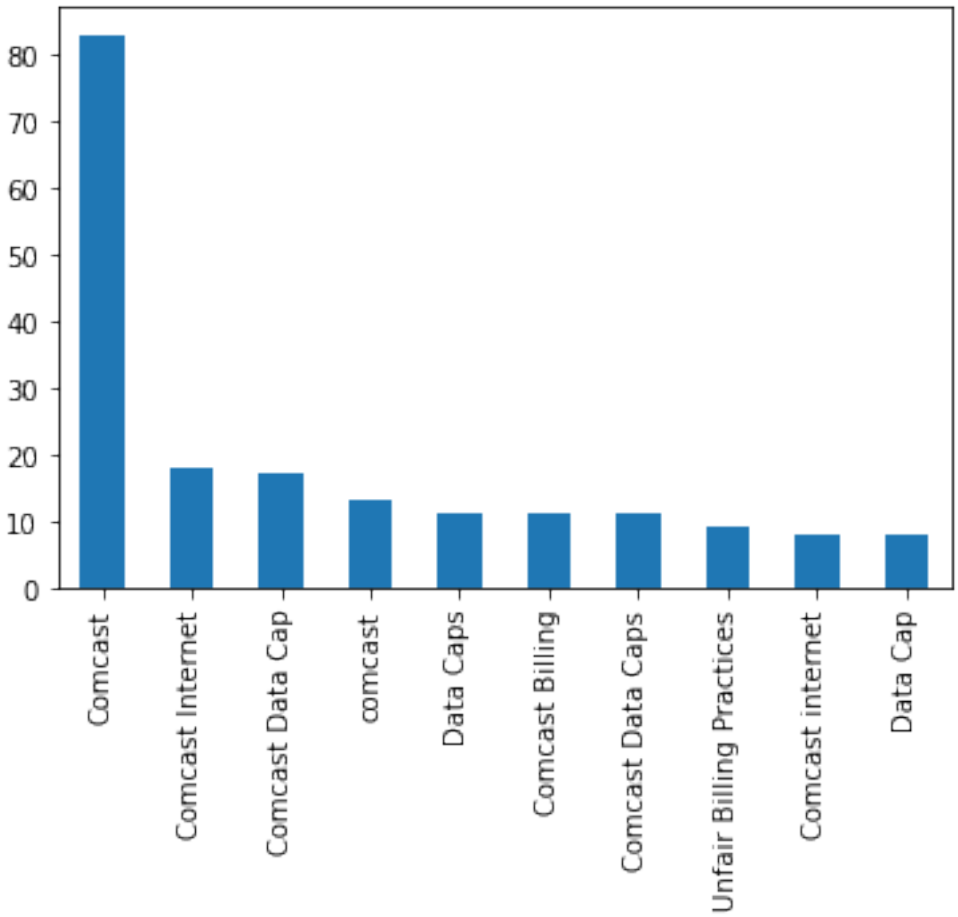
[26]:
```
len(df['Customer Complaint'].value_counts())
```

[26]:
```
1841
```

[27]:
```
df['Customer Complaint'].value_counts().plot(kind='bar')
plt.show()
```


0
10
20
30
40
50
60
70
80
exaggerated bill and Lack of responsibilities in
Comcast misrepresented
Billed for modem rental
poor quality service, multiple disconnections prior to disconnect date
Raised my bill and told me
Lack of
Comcast is giving out wrong information,
Complaint
10 Days No Service - 12 Appointments Comcast Hasn't Shown Up
Comcast - new service
loss of signal SEVERAL times a day, VERY
Internet Advertised
∞
Comcast (no
COMCAST BILLING FOR
RACIST CUSTOMER SERVICE FROM
Comcast - constantly low speeds
Internet Service
Comcast - Incorrect
Comcast Business Internet - Not Providing Service
Comcast ending promotion and contract early
they are forcing me for my bank account information by
Comcast internet claiming 25 mbps Internet
Constant non response, or passing to other
Comcast sold me a "package"
Comcast has turned my business account
Internet performance (latency/
Comcast Service Rep Missed appointment. I missed a very

[28]:
```
df['Customer Complaint'].value_counts()[:10].plot(kind='bar')
plt.show()
```



[29]:
```
#Which complaint types are maximum i.e., around internet, network issues, or␣
↪across any other domains.
```

[30]:
```
internet_issue1=df[df['Customer Complaint'].str.contains('net work')].count()
```

[31]:
```
internet_issue2=df[df['Customer Complaint'].str.contains('speed')].count()
```

[32]:
```
internet_issue3=df[df['Customer Complaint'].str.contains('internet')].count()
```

[33]:
```
billing_issue1=df[df['Customer Complaint'].str.contains('billing')].count()
```

[34]:
```
billing_issue2=df[df['Customer Complaint'].str.contains('Charges')].count()
```

[35]:
```
service_issue1=df[df['Customer Complaint'].str.contains('service')].count()
```

[36]:
```
service_issue2=df[df['Customer Complaint'].str.contains('customer')].count()
```

[37]:
```
df['Customer Complaint']  #: NLP...> THIS kind of process called nlp
```

[37]:
```
0                            Comcast Cable Internet Speeds
1              Payment disappear - service got disconnected
2                                           Speed and Service
3       Comcast Imposed a New Usage Cap of 300GB that …
4                Comcast not working and no service to boot
                                  …
2219                                     Service Availability
2220             Comcast Monthly Billing for Returned Modem
2221                                  complaint about comcast
2222                 Extremely unsatisfied Comcast customer
2223                   Comcast, Ypsilanti MI Internet Speed
Name: Customer Complaint, Length: 2224, dtype: object
```

[38]:
```
total_internet_issue=internet_issue1+internet_issue2+internet_issue3
```

[39]:
```
total_billing_issue=billing_issue1+billing_issue2
```

[40]:
```
total_service_issue=service_issue1+service_issue2
```

[41]:
```
total_internet_issue
```

[41]:
```
Ticket #                        309
Customer Complaint              309
Date                            309
Date_month_year                 309
Time                            309
Received Via                    309
City                            309
State                           309
Zip code                        309
Status                          309
Filing on Behalf of Someone     309
month                           309
dtype: int64
```

[42]:
```
total_billing_issue
```

[42]:
```
Ticket #                        157
Customer Complaint              157
Date                            157
Date_month_year                 157
```

```
Time                            157
Received Via                    157
City                            157
State                           157
Zip code                        157
Status                          157
Filing on Behalf of Someone     157
month                           157
dtype: int64
```

[43]:
```
total_service_issue
```

[43]:
```
Ticket #                        360
Customer Complaint              360
Date                            360
Date_month_year                 360
Time                            360
Received Via                    360
City                            360
State                           360
Zip code                        360
Status                          360
Filing on Behalf of Someone     360
month                           360
dtype: int64
```

[44]:
```
other_issue=2224-(total_internet_issue+total_billing_issue+total_service_issue)
```

[45]:
```
other_issue
```

[45]:
```
Ticket #                        1398
Customer Complaint              1398
Date                            1398
Date_month_year                 1398
Time                            1398
Received Via                    1398
City                            1398
State                           1398
Zip code                        1398
Status                          1398
Filing on Behalf of Someone     1398
month                           1398
dtype: int64
```

[46]:
```
#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.
```

[47]:
```
df['Status'].unique()
```

[47]:
```
array(['Closed', 'Open', 'Solved', 'Pending'], dtype=object)
```

[48]:
```
df['newstatus']=["Open" if st=='Open'  or  st=='Pending' else  st=='Closed' for␣
↪st in df['Status']]
```

[49]:
```
df.head()
```

[49]:

	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received Via	City	State	Zip code	Status	Filing on Behalf of Someone	month	newstatus
0	250635	Comcast Cable Internet Speeds	2015-04-22	22-Apr-15	3:53:50 PM	Customer Care Call	Abingdon	Maryland	21009	Closed	No	April	True
1	223441	Payment disappear - service got disconnected	2015-04-08	04-Aug-15	10:22:56 AM	Internet	Acworth	Georgia	30102	Closed	No	April	True
2	242732	Speed and Service	2015-04-18	18-Apr-15	9:55:47 AM	Internet	Acworth	Georgia	30101	Closed	Yes	April	True
3	277946	Comcast Imposed a New Usage Cap of 300GB that …	2015-05-07	05-Jul-15	11:59:35 AM	Internet	Acworth	Georgia	30101	Open	Yes	May	Open
4	307175	Comcast not working and no service to boot	2015-05-26	26-May-15	1:25:26 PM	Internet	Acworth	Georgia	30101	Solved	No	May	False

[50]:
```
#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
```

[51]:
```
df.groupby(by='State').size().sort_values(ascending=False)
```

[51]:
```
State
Georgia                 288
Florida                 240
California              220
Illinois                164
Tennessee               143
Pennsylvania            130
Michigan                115
Washington               98
```

```
Colorado                80
Maryland                78
New Jersey              75
Texas                   71
Massachusetts           61
Virginia                60
Indiana                 59
Oregon                  49
Mississippi             39
Minnesota               33
Alabama                 26
Utah                    22
Arizona                 20
South Carolina          18
District Of Columbia    16
New Mexico              15
Louisiana               13
New Hampshire           12
Connecticut             12
Delaware                12
West Virginia           11
Kentucky                 7
New York                 6
Arkansas                 6
Maine                    5
Missouri                 4
North Carolina           3
Vermont                  3
Ohio                     3
Kansas                   2
District of Columbia     1
Rhode Island             1
Montana                  1
Iowa                     1
Nevada                   1
dtype: int64
```

[52]:
```
df.groupby(by='State').size().sort_values(ascending=False)[:5]
```

[52]:
```
State
Georgia       288
Florida       240
California    220
Illinois      164
Tennessee     143
dtype: int64
```

[53]:
```
#Provide state wise status of complaints in a stacked bar chart.
```

[54]:
```
State_complain=df.groupby(by=['State','newstatus']).size()
```

[55]:
```
State_complain
```

[55]:
```
State          newstatus
Alabama        False         9
               True          8
               Open          9
Arizona        False         8
               True          6
                            ..
Washington     True         35
               Open         23
West Virginia  False         2
               True          6
               Open          3
Length: 113, dtype: int64
```

[56]:
```
State_complain=df.groupby(by=['State','newstatus']).size().unstack()
```

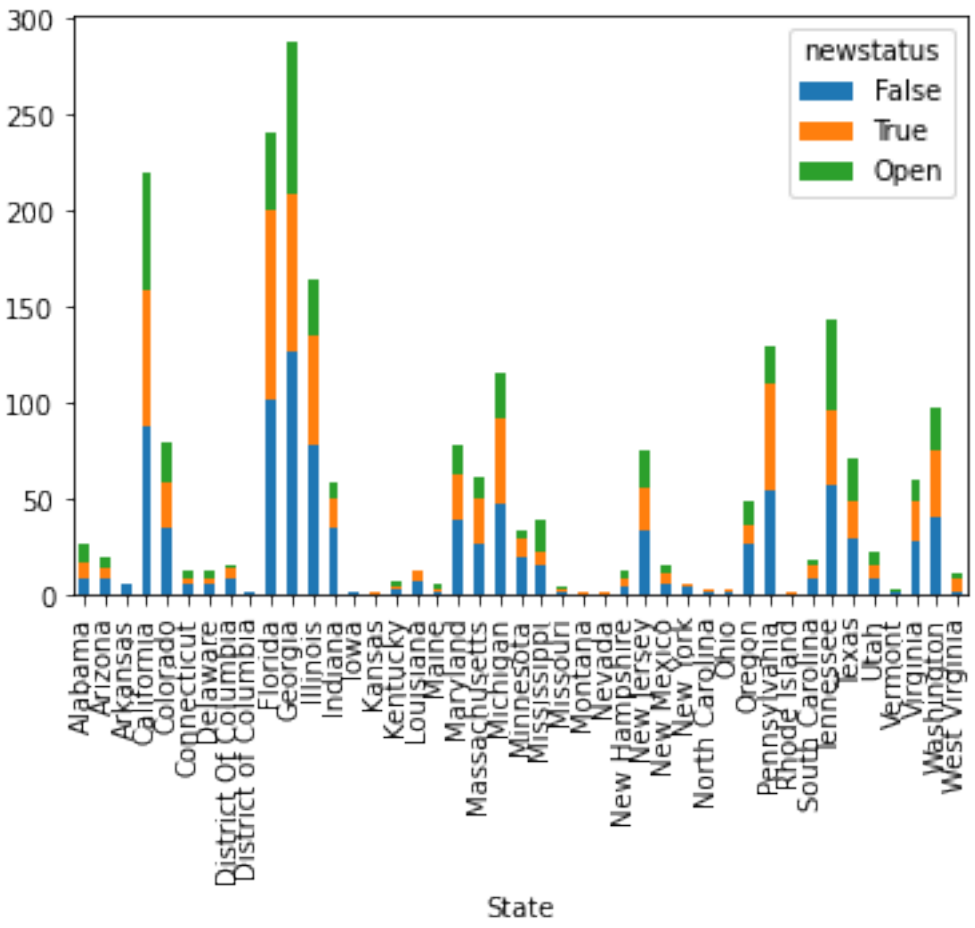
[57]:
```
State_complain
```

[57]:

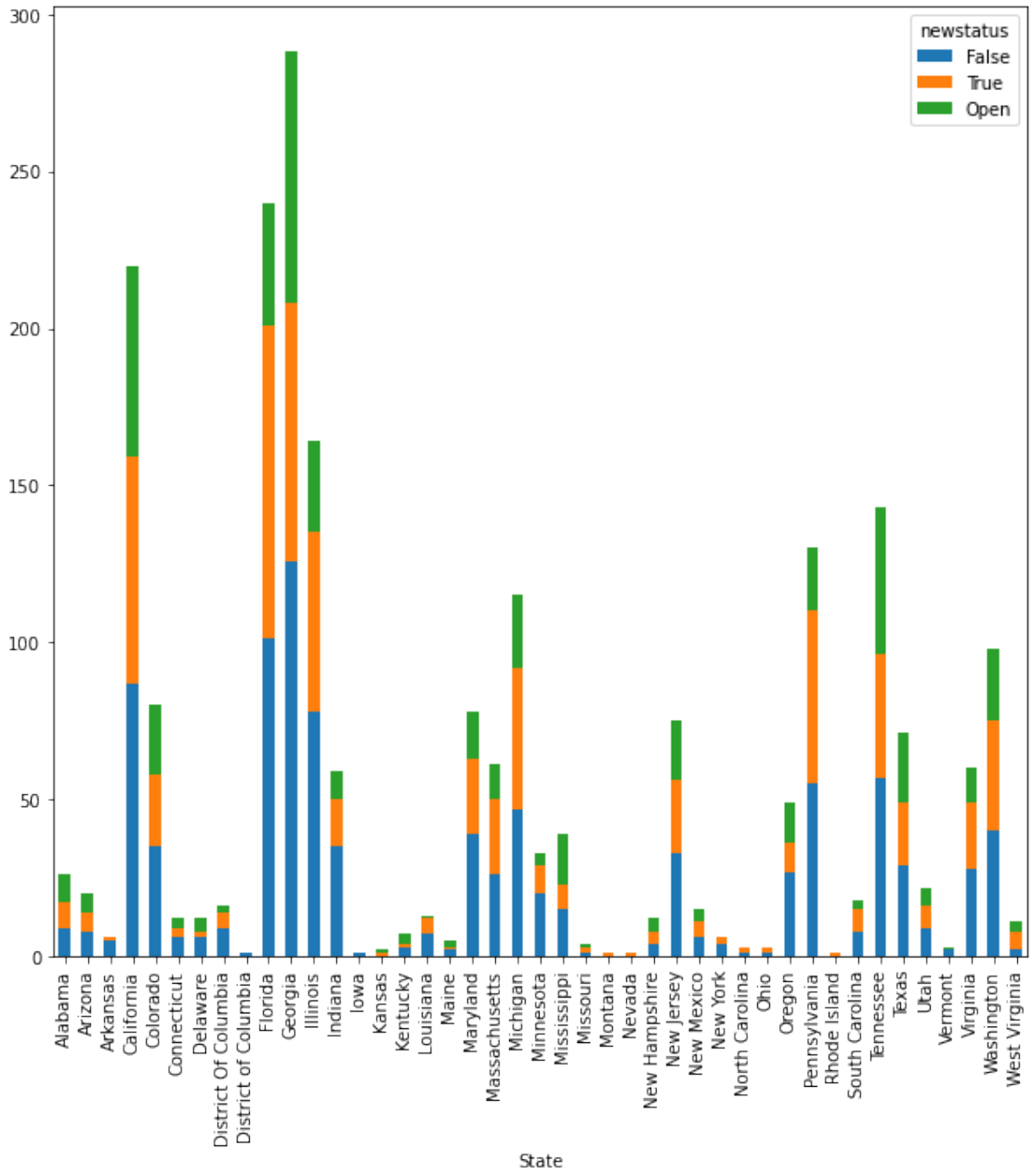
newstatus	False	True	Open
State			
Alabama	9.0	8.0	9.0
Arizona	8.0	6.0	6.0
Arkansas	5.0	1.0	NaN
California	87.0	72.0	61.0
Colorado	35.0	23.0	22.0
Connecticut	6.0	3.0	3.0
Delaware	6.0	2.0	4.0
District Of Columbia	9.0	5.0	2.0
District of Columbia	1.0	NaN	NaN
Florida	101.0	100.0	39.0
Georgia	126.0	82.0	80.0
Illinois	78.0	57.0	29.0
Indiana	35.0	15.0	9.0
Iowa	1.0	NaN	NaN
Kansas	NaN	1.0	1.0
Kentucky	3.0	1.0	3.0
Louisiana	7.0	5.0	1.0
Maine	2.0	1.0	2.0
Maryland	39.0	24.0	15.0
Massachusetts	26.0	24.0	11.0
Michigan	47.0	45.0	23.0

```
Minnesota              20.0    9.0   4.0
Mississippi            15.0    8.0  16.0
Missouri                1.0    2.0   1.0
Montana                 NaN    1.0   NaN
Nevada                  NaN    1.0   NaN
New Hampshire           4.0    4.0   4.0
New Jersey             33.0   23.0  19.0
New Mexico              6.0    5.0   4.0
New York                4.0    2.0   NaN
North Carolina          1.0    2.0   NaN
Ohio                    1.0    2.0   NaN
Oregon                 27.0    9.0  13.0
Pennsylvania           55.0   55.0  20.0
Rhode Island            NaN    1.0   NaN
South Carolina          8.0    7.0   3.0
Tennessee              57.0   39.0  47.0
Texas                  29.0   20.0  22.0
Utah                    9.0    7.0   6.0
Vermont                 2.0    NaN   1.0
Virginia               28.0   21.0  11.0
Washington             40.0   35.0  23.0
West Virginia           2.0    6.0   3.0
```

[58]:
```
State_complain.plot.bar(stacked=True)
plt.show()
```



[59]:
```
State_complain.plot.bar(figsize=(10,10),stacked=True)
plt.show()
```



[60]:
```
#Which state has the highest percentage of unresolved complaints
```

[61]:
```
df.newstatus.value_counts()
```

[61]:
```
False    973
True     734
Open     517
Name: newstatus, dtype: int64
```

[62]:
```
unresolved_data=df.groupby(by=['State','newstatus']).size().unstack()
```

[63]:
```
unresolved_data
```

[63]:

newstatus	False	True	Open
State			
Alabama	9.0	8.0	9.0
Arizona	8.0	6.0	6.0
Arkansas	5.0	1.0	NaN
California	87.0	72.0	61.0
Colorado	35.0	23.0	22.0
Connecticut	6.0	3.0	3.0
Delaware	6.0	2.0	4.0
District Of Columbia	9.0	5.0	2.0
District of Columbia	1.0	NaN	NaN
Florida	101.0	100.0	39.0
Georgia	126.0	82.0	80.0
Illinois	78.0	57.0	29.0
Indiana	35.0	15.0	9.0
Iowa	1.0	NaN	NaN
Kansas	NaN	1.0	1.0
Kentucky	3.0	1.0	3.0
Louisiana	7.0	5.0	1.0
Maine	2.0	1.0	2.0
Maryland	39.0	24.0	15.0
Massachusetts	26.0	24.0	11.0
Michigan	47.0	45.0	23.0
Minnesota	20.0	9.0	4.0
Mississippi	15.0	8.0	16.0
Missouri	1.0	2.0	1.0
Montana	NaN	1.0	NaN
Nevada	NaN	1.0	NaN
New Hampshire	4.0	4.0	4.0
New Jersey	33.0	23.0	19.0
New Mexico	6.0	5.0	4.0
New York	4.0	2.0	NaN
North Carolina	1.0	2.0	NaN
Ohio	1.0	2.0	NaN
Oregon	27.0	9.0	13.0
Pennsylvania	55.0	55.0	20.0
Rhode Island	NaN	1.0	NaN
South Carolina	8.0	7.0	3.0
Tennessee	57.0	39.0	47.0
Texas	29.0	20.0	22.0
Utah	9.0	7.0	6.0
Vermont	2.0	NaN	1.0
Virginia	28.0	21.0	11.0

```
Washington              40.0   35.0  23.0
West Virginia            2.0    6.0   3.0
```

[64]:
```
unresolved_data=df.groupby(by=['State','newstatus']).size().unstack().fillna(0)
```

[65]:
```
unresolved_data
```

[65]:
```
newstatus             False   True  Open
State
Alabama                 9.0    8.0   9.0
Arizona                 8.0    6.0   6.0
Arkansas                5.0    1.0   0.0
California             87.0   72.0  61.0
Colorado               35.0   23.0  22.0
Connecticut             6.0    3.0   3.0
Delaware                6.0    2.0   4.0
District Of Columbia    9.0    5.0   2.0
District of Columbia    1.0    0.0   0.0
Florida               101.0  100.0  39.0
Georgia               126.0   82.0  80.0
Illinois               78.0   57.0  29.0
Indiana                35.0   15.0   9.0
Iowa                    1.0    0.0   0.0
Kansas                  0.0    1.0   1.0
Kentucky                3.0    1.0   3.0
Louisiana               7.0    5.0   1.0
Maine                   2.0    1.0   2.0
Maryland               39.0   24.0  15.0
Massachusetts          26.0   24.0  11.0
Michigan               47.0   45.0  23.0
Minnesota              20.0    9.0   4.0
Mississippi            15.0    8.0  16.0
Missouri                1.0    2.0   1.0
Montana                 0.0    1.0   0.0
Nevada                  0.0    1.0   0.0
New Hampshire           4.0    4.0   4.0
New Jersey             33.0   23.0  19.0
New Mexico              6.0    5.0   4.0
New York                4.0    2.0   0.0
North Carolina          1.0    2.0   0.0
Ohio                    1.0    2.0   0.0
Oregon                 27.0    9.0  13.0
Pennsylvania           55.0   55.0  20.0
Rhode Island            0.0    1.0   0.0
South Carolina          8.0    7.0   3.0
Tennessee              57.0   39.0  47.0
Texas                  29.0   20.0  22.0
```

```
Utah                   9.0    7.0   6.0
Vermont                2.0    0.0   1.0
Virginia              28.0   21.0  11.0
Washington            40.0   35.0  23.0
West Virginia          2.0    6.0   3.0
```

[66]:
```
unresolved_data=df.groupby(by=['State','newstatus']).size().unstack().fillna(0).
↪sort_values(by='Open',ascending=False)
```

[67]:
```
unresolved_data['unresolved_cmp_prect']=unresolved_data['Open']/
↪unresolved_data['Open'].sum()*100
```

[68]:
```
unresolved_data
```

[68]:

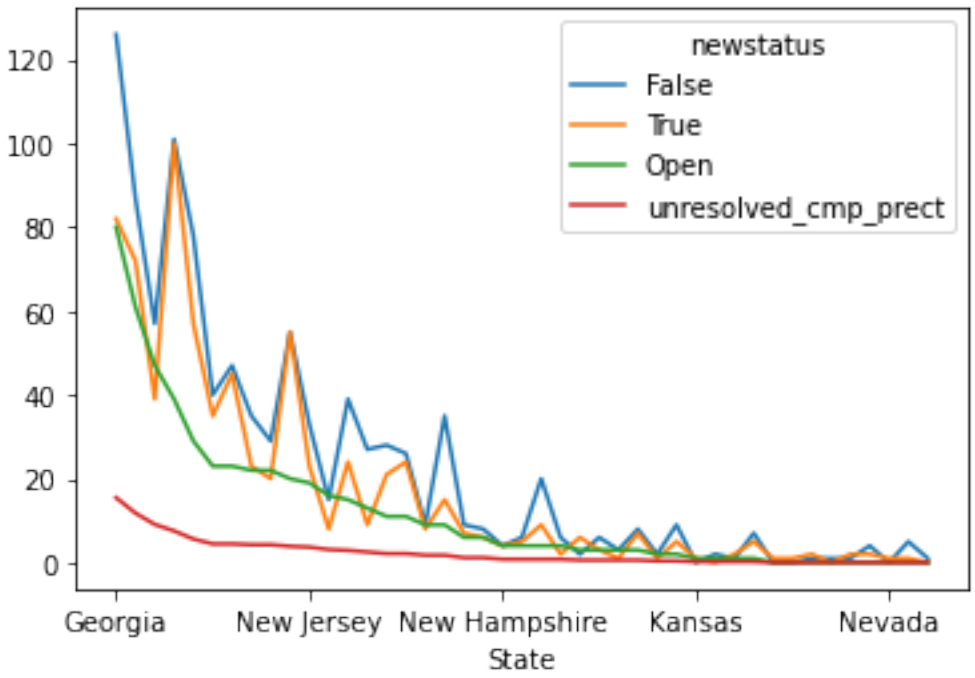
newstatus	False	True	Open	unresolved_cmp_prect
State				
Georgia	126.0	82.0	80.0	15.473888
California	87.0	72.0	61.0	11.798839
Tennessee	57.0	39.0	47.0	9.090909
Florida	101.0	100.0	39.0	7.543520
Illinois	78.0	57.0	29.0	5.609284
Washington	40.0	35.0	23.0	4.448743
Michigan	47.0	45.0	23.0	4.448743
Colorado	35.0	23.0	22.0	4.255319
Texas	29.0	20.0	22.0	4.255319
Pennsylvania	55.0	55.0	20.0	3.868472
New Jersey	33.0	23.0	19.0	3.675048
Mississippi	15.0	8.0	16.0	3.094778
Maryland	39.0	24.0	15.0	2.901354
Oregon	27.0	9.0	13.0	2.514507
Virginia	28.0	21.0	11.0	2.127660
Massachusetts	26.0	24.0	11.0	2.127660
Alabama	9.0	8.0	9.0	1.740812
Indiana	35.0	15.0	9.0	1.740812
Utah	9.0	7.0	6.0	1.160542
Arizona	8.0	6.0	6.0	1.160542
New Hampshire	4.0	4.0	4.0	0.773694
New Mexico	6.0	5.0	4.0	0.773694
Minnesota	20.0	9.0	4.0	0.773694
Delaware	6.0	2.0	4.0	0.773694
West Virginia	2.0	6.0	3.0	0.580271
Connecticut	6.0	3.0	3.0	0.580271
Kentucky	3.0	1.0	3.0	0.580271
South Carolina	8.0	7.0	3.0	0.580271
Maine	2.0	1.0	2.0	0.386847
District Of Columbia	9.0	5.0	2.0	0.386847
Kansas	0.0	1.0	1.0	0.193424

Vermont	2.0	0.0	1.0	0.193424
Missouri	1.0	2.0	1.0	0.193424
Louisiana	7.0	5.0	1.0	0.193424
Montana	0.0	1.0	0.0	0.000000
Rhode Island	0.0	1.0	0.0	0.000000
Ohio	1.0	2.0	0.0	0.000000
District of Columbia	1.0	0.0	0.0	0.000000
North Carolina	1.0	2.0	0.0	0.000000
New York	4.0	2.0	0.0	0.000000
Nevada	0.0	1.0	0.0	0.000000
Arkansas	5.0	1.0	0.0	0.000000
Iowa	1.0	0.0	0.0	0.000000

[69]:
```
unresolved_data.plot()
```

```
/usr/local/lib/python3.7/site-packages/pandas/plotting/_matplotlib/core.py:1192:
UserWarning: FixedFormatter should only be used together with FixedLocator
  ax.set_xticklabels(xticklabels)
```

[69]: <AxesSubplot:xlabel='State'>



[70]:
```
#Provide the percentage of complaints resolved till date, which were received␣
↪through the Internet and customer care calls.
```

[71]:
```
resolved_data=df.groupby(by=['Received Via','newstatus']).size().unstack()
```

[72]:
```
resolved_data
```

[72]:
```
newstatus           False  True  Open
Received Via
Customer Care Call    477   387   255
Internet              496   347   262
```

[ ]:
```

```