Comcast_telecom_complaints_data Project1

June 22, 2023

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

```
Matplotlib is building the font cache; this may take a moment.
```

[3]:
```
data=pd.read_csv("Comcast_telecom_complaints_data.csv")
```

[4]:
```
data.head(5)
```

[4]:

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

[5]:
```
data.describe()
```

[5]:

	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
```

[6]:
```
data.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
```

[7]:
```
data.isnull().sum()
```

[7]:
```
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
```

[8]:
```
data.shape
```

[8]:
```
(2224, 11)
```

TASK 1 - Provide the trend chart for the number of complaints at monthly and daily granularity

levels.

[9]:
```
data["Month"]=pd.to_datetime(data["Date_month_year"]).dt.month_name()
```

[10]:
```
data.head(2)
```

[10]:
```
  Ticket #                           Customer Complaint      Date  \
0   250635                Comcast Cable Internet Speeds  22-04-15
1   223441  Payment disappear - service got disconnected  04-08-15

  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

   Zip code  Status Filing on Behalf of Someone   Month
0     21009  Closed                         No   April
1     30102  Closed                         No  August
```

[11]:
```
data["Date"]=pd.to_datetime(data["Date_month_year"]).dt.day
```

[12]:
```
data.head(2)
```

[12]:
```
  Ticket #                           Customer Complaint  Date  \
0   250635                Comcast Cable Internet Speeds    22
1   223441  Payment disappear - service got disconnected     4

  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

   Zip code  Status Filing on Behalf of Someone   Month
0     21009  Closed                         No   April
1     30102  Closed                         No  August
```

[14]:
```
data["day_of_week"]=pd.to_datetime(data["Date_month_year"]).dt.day_name()
```

[15]:
```
data.head(2)
```

[15]:
```
  Ticket #                           Customer Complaint  Date  \
0   250635                Comcast Cable Internet Speeds    22
1   223441  Payment disappear - service got disconnected     4

  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

   Zip code  Status Filing on Behalf of Someone   Month day_of_week
0     21009  Closed                         No   April   Wednesday
```

```
1     30102  Closed                          No  August     Tuesday
```

[13]:
```
data["Status"].value_counts()
```

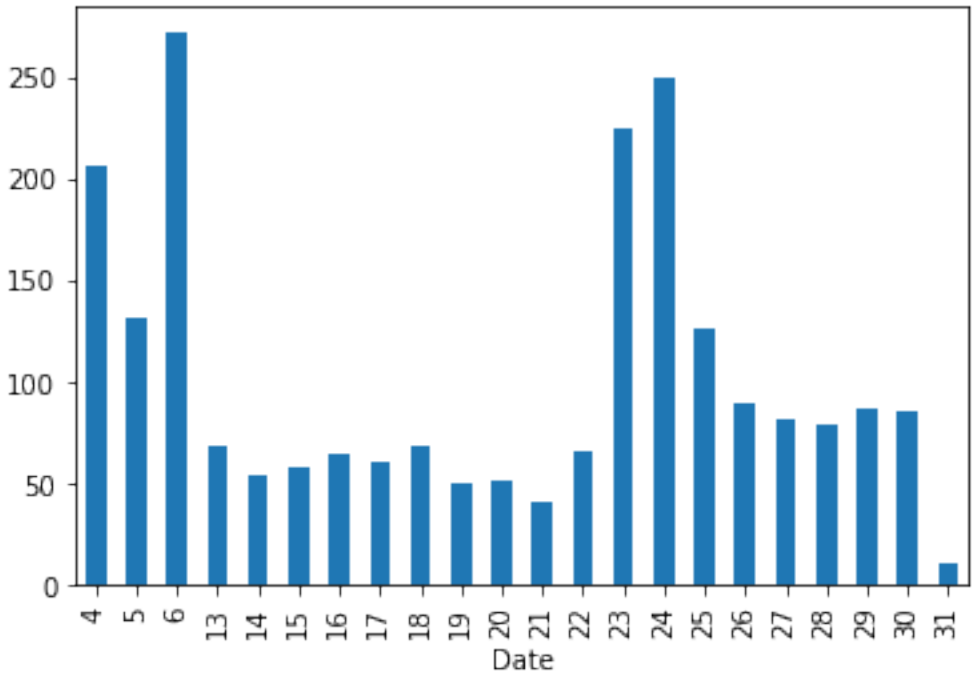
[13]:
```
Solved     973
Closed     734
Open       363
Pending    154
Name: Status, dtype: int64
```

[16]:
```
data.columns
```

[16]:
```
Index(['Ticket #', 'Customer Complaint', 'Date', 'Date_month_year', 'Time',
       'Received Via', 'City', 'State', 'Zip code', 'Status',
       'Filing on Behalf of Someone', 'Month', 'day_of_week'],
      dtype='object')
```

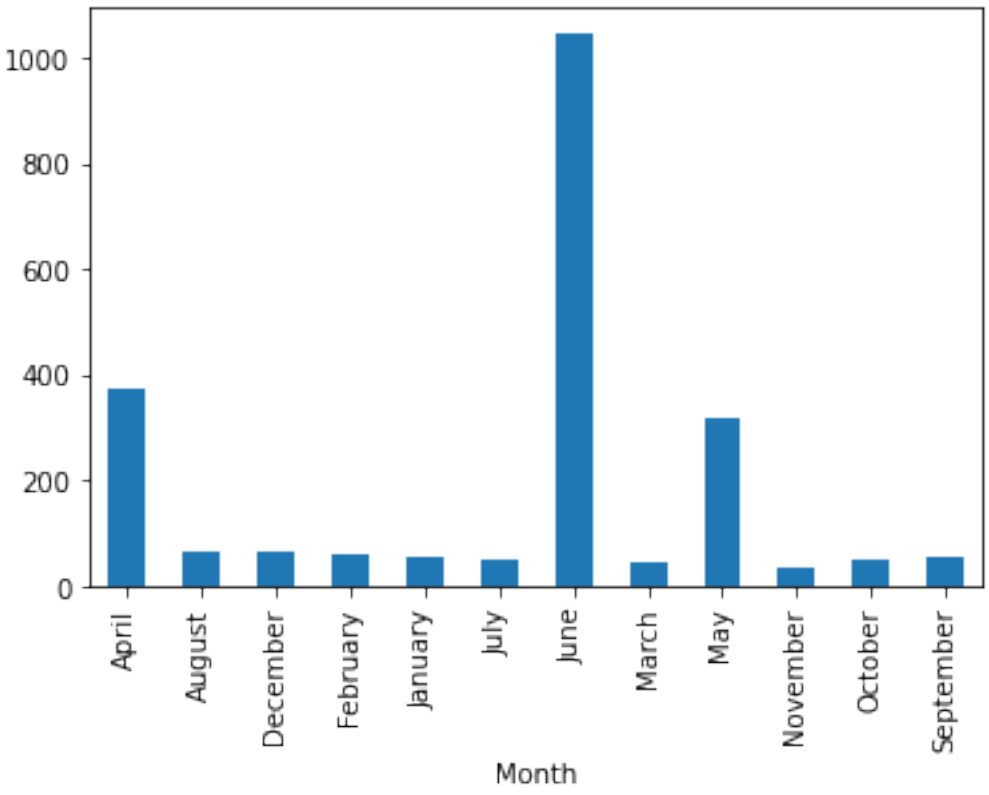
0.1 Graph for date wise

[17]:
```
data.groupby(['Date'])['Customer Complaint'].count().plot(kind='bar')
plt.show()
```



0.2 Graph for Month wise

[18]:
```
data.groupby(['Month'])['Customer Complaint'].count().plot(kind='bar')
plt.show()
```



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

[19]:
```
data['Customer Complaint'].value_counts()
```

[19]:
```
Comcast                                 83
Comcast Internet                        18
Comcast Data Cap                        17
comcast                                 13
Data Caps                               11
                                        ..
Comcast cable outage                     1
Internet connectivity and speed          1
Charged double/Speeds throttled          1
Comcast service levels                   1
```

```
Comcast Support Unable to Provide Accurate Information     1
Name: Customer Complaint, Length: 1841, dtype: int64
```

0.4 Provide a table with the frequency of complaint types.

[21]:
```
data['Customer Complaint'].value_counts().to_frame().reset_index()
```

[21]:

	index	Customer Complaint
0	Comcast	83
1	Comcast Internet	18
2	Comcast Data Cap	17
3	comcast	13
4	Data Caps	11
…	…	…
1836	Comcast cable outage	1
1837	Internet connectivity and speed	1
1838	Charged double/Speeds throttled	1
1839	Comcast service levels	1
1840	Comcast Support Unable to Provide Accurate Inf…	1

[1841 rows x 2 columns]

[22]:
```
data['Status_new']=data['Status'].apply(lambda x: 'Open' if ((x=='Open') |␣
↪(x=='Pending')) else 'Closed')
```

[23]:
```
data.head(3)
```

[23]:

	Ticket #	Customer Complaint	Date	\
0	250635	Comcast Cable Internet Speeds	22	
1	223441	Payment disappear - service got disconnected	4	
2	242732	Speed and Service	18	

	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	

	Zip code	Status	Filing on Behalf of Someone	Month	day_of_week	Status_new
0	21009	Closed	No	April	Wednesday	Closed
1	30102	Closed	No	August	Tuesday	Closed
2	30101	Closed	Yes	April	Saturday	Closed

[24]:
```
data["Status_new"].value_counts().to_frame().reset_index()
```

[24]:
```
     index  Status_new
0   Closed        1707
1     Open         517
```

[25]:
```
data["Status"].value_counts().to_frame().reset_index()
```

[25]:
```
      index  Status
0    Solved     973
1    Closed     734
2      Open     363
3   Pending     154
```

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

2 :Which state has the maximum complaints

[26]:
```
opn= data[data['Status_new']=='Open'].groupby(['State'])['Status_new'].count().
 ↪to_frame().reset_index()
clos=data[data['Status_new']=='Closed'].groupby(['State'])['Status_new'].
 ↪count().to_frame().reset_index()
```

[27]:
```
opn.head(3)
```

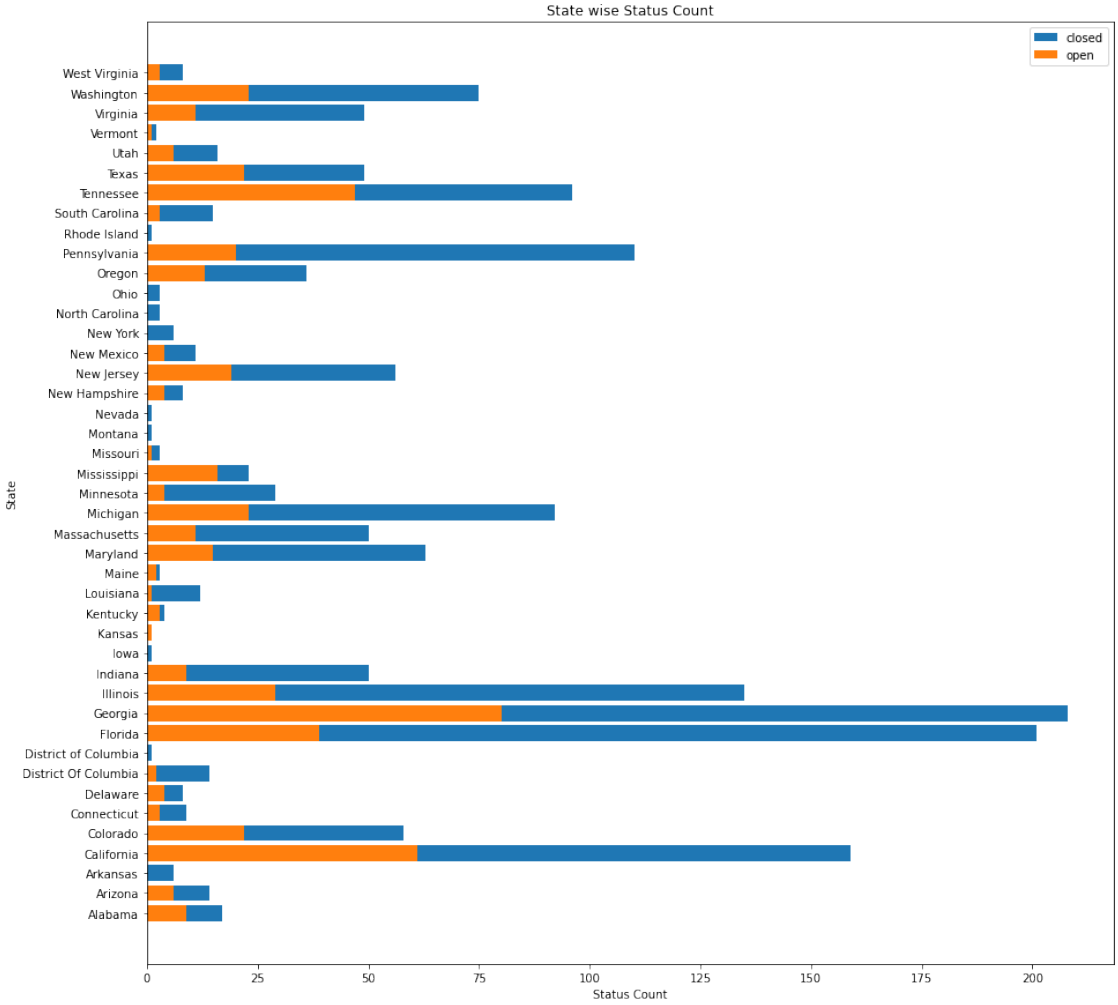
[27]:
```
         State  Status_new
0      Alabama           9
1      Arizona           6
2   California          61
```

[28]:
```
clos.head(3)
```

[28]:
```
       State  Status_new
0    Alabama          17
1    Arizona          14
2   Arkansas           6
```

[29]:
```
fig=plt.figure(figsize=(15,15))
plt.barh(clos.State, clos.Status_new)
plt.barh(opn.State, opn.Status_new)
plt.ylabel("State")
plt.xlabel("Status Count")
plt.legend(["closed", "open"])
plt.title("State wise Status Count")
```

[29]: Text(0.5, 1.0, 'State wise Status Count')



2.1 Which state has the maximum complaints

[30]:
```
data.groupby("State")['Customer Complaint'].agg("count").
↪sort_values(ascending=False).head(1)
```

[30]:
```
State
Georgia    288
Name: Customer Complaint, dtype: int64
```

2.2 Which state has the highest percentage of unresolved complaints

[31]:
```
unresolved_state=data.loc[data['Status_new']=='Open',['State']].value_counts()
unresolved_state.head(1)/unresolved_state.sum()*100
```

[31]:
```
State
Georgia    15.473888
dtype: float64
```

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

[33]:
```
data["Received Via"].value_counts()
```

[33]:
```
Customer Care Call    1119
Internet              1105
Name: Received Via, dtype: int64
```

[34]:
```
data[data['Status_new']=='Closed'].groupby('Status')['Received Via'].
↪value_counts(normalize=True)*100
```

[34]:
```
Status  Received Via
Closed  Customer Care Call    52.724796
        Internet              47.275204
Solved  Internet              50.976362
        Customer Care Call    49.023638
Name: Received Via, dtype: float64
```

[ ]:
```

```