In [217]:

```
import numpy as np
import pandas as pd
import glob, os, json
import seaborn as sns
import json
import matplotlib.pyplot as plt
%matplotlib inline
```

1.1 Merging all json files in one dataframe then display information about the structure of the df. We see which columns it contains, how many records have a non-empty value for each column and its data type (object usually corresponds to string) and a representation of the dataset

In [116]:

```
json_dir = 'C:/Users/Katerina/anaconda3/envs/tweets'

json_pattern = os.path.join(json_dir, '*.json')
file_list = glob.glob(json_pattern)

dfs = []
for file in file_list:
 with open(file) as f:
    json_data = pd.json_normalize(json.loads(f.read()))
    json_data['site'] = file.rsplit("/", 1)[-1]
    dfs.append(json_data)
df = pd.concat(dfs)
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 271342 entries, 0 to 27220
Data columns (total 24 columns):
 #   Column             Non-Null Count   Dtype  
---  ------             --------------   -----  
 0   full_text          271331 non-null  object 
 1   text_translation   271328 non-null  object 
 2   created_at         271334 non-null  object 
 3   screen_name        271333 non-null  object 
 4   description        223646 non-null  object 
 5   desc_translation   223621 non-null  object 
 6   weekofyear         271328 non-null  float64
 7   weekday            271322 non-null  float64
 8   day                271328 non-null  float64
 9   month              271322 non-null  float64
 10  year               271322 non-null  float64
 11  location           151361 non-null  object 
 12  point_info         134445 non-null  object 
 13  point              134445 non-null  object 
 14  latitude           134445 non-null  float64
 15  longitude          134445 non-null  float64
 16  altitude           254425 non-null  float64
 17  province           268237 non-null  object 
 18  hisco_standard     69482 non-null   object 
 19  hisco_code         69482 non-null   object 
 20  industry           271342 non-null  bool   
 21  sentiment_pattern  271342 non-null  float64
 22  subjective_pattern 271342 non-null  float64
 23  site               271342 non-null  object 
dtypes: bool(1), float64(10), object(13)
memory usage: 49.9+ MB
```

In [118]:

```
pd.set_option('display.max_columns', 24)
pd.set_option('display.max_rows', 100)
df
```

Out[118]:

	full_text	text_translation	created_at	screen_name	descrip
0	@pflegearzt @Friedelkorn @LAguja44 Pardon, wol...	@pflegearzt @Friedelkorn @ LAguja44 Pardon wol...	1583756789000	TheoRettich	I ❤️ scie therefc Commi FALGSC
1	RT @grantshapps: Aviation demand is reduced du...	RT @grantshapps: Aviation demand is reduced du...	1583756794000	davidiwanow	I tweet a lot but to engag converse
2	RT @DDStandaard: De droom van D66 wordt werkel...	RT @DDStandaard: The D66 dream come true: COVI...	1583756797000	EricL65	N
3	RT @DDStandaard: De droom van D66 wordt werkel...	RT @DDStandaard: The D66 dream come true: COVI...	1583756797000	EricL65	N
4	De droom van D66 wordt werkelijkheid: COVID-19...	The D66 dream becomes reality: COVID-19 super ...	1583756807000	EhrErwin	Budget-Life Co Time manager Coaching
...	...	...	...	...	
27216	RT @GuityMohebbi: Medeverantwoordelijk en voll...	RT @GuityMohebbi: Jointly responsible and full...	1599762803000	laAckxtra	While we v sleeping you fou @laAckxt
27217	RT @GuityMohebbi: Medeverantwoordelijk en voll...	RT @GuityMohebbi: Jointly responsible and full...	1599762803000	laAckxtra	While we v sleeping you fou @laAckxt
27218	RT @ntvkenya: Covid? What Covid? Scam?\n\nPres...	RT @ntvkenya: Covid? What Covid? Scam? \n\nPres...	1599762814000	Leahs_Daughter	THE BEE's KNE
27219	@mauricedehond @covid Volgens mij krijgt Mauri...	@mauricedehond @covid gets to me Maurice pay p...	1599762824000	BruggeXander	Wielerfar Andersder Kritisch\n\nCoro
27220	@mauricedehond @covid Volgens mij krijgt Mauri...	@mauricedehond @covid gets to me Maurice pay p...	1599762824000	BruggeXander	Wielerfar Andersder Kritisch\n\nCoro

271342 rows × 24 columns

1.2 Below are listed:

1. the most active months of the year
2. most active days of the week
3. most active weeks of the year
4. some visualisations

all in descending order (from largest value to smallest), count = number of occurrences in the dataset, percent = percentage of occurances in the tota dataset

In [107]:

```
responders_month = df['month'].value_counts()
responders_month_per = df['month'].value_counts(normalize=True).mul(100).round(1).astype
month_df = pd.concat([responders_month, responders_month_per], axis='columns', sort=Fals
month_df.columns = ['Count','Percent']
month_df
```

Out[107]:

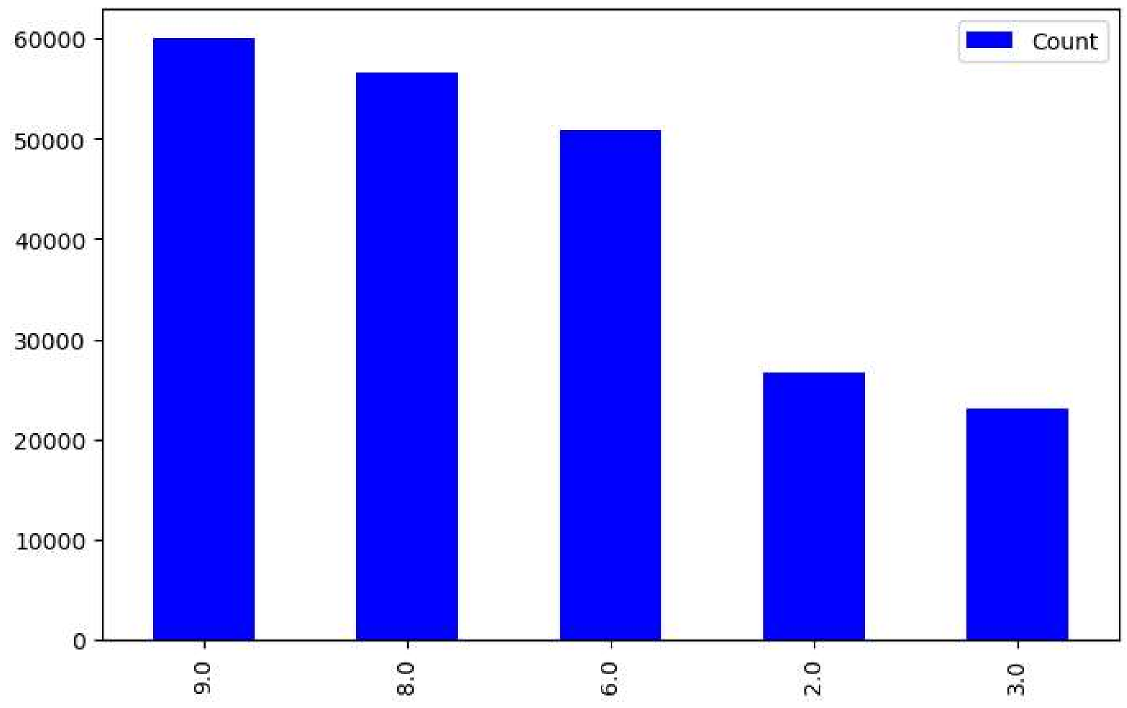
	Count	Percent
9.0	59936	22.1%
8.0	56626	20.9%
6.0	50811	18.7%
2.0	26738	9.9%
3.0	23151	8.5%
7.0	19098	7.0%
4.0	17692	6.5%
5.0	12944	4.8%
1.0	4324	1.6%
2020.0	2	0.0%

In [108]:

```
month_df.head(n=5).plot(y = "Count", kind="bar", figsize=(8,5), color="blue")
```

Out[108]:

```
<AxesSubplot:>
```



In [148]:

```
responders_day = df['weekday'].value_counts()
responders_day_per = df['weekday'].value_counts(normalize=True).mul(100).round(1).astype
day_df = pd.concat([responders_day, responders_day_per], axis='columns', sort=False)
day_df.columns = ['Count','Percent']
day_df # the most popular days of the week Monday=0….Sunday = 6
```

Out[148]:

	Count	Percent
2.0	46125	17.0%
0.0	45737	16.9%
3.0	45406	16.7%
1.0	37113	13.7%
4.0	36000	13.3%
5.0	30697	11.3%
6.0	30244	11.1%

In [111]:

```
responders_week = df['weekofyear'].value_counts()
responders_week_per = df['weekofyear'].value_counts(normalize=True).mul(100).round(1).as
week_df = pd.concat([responders_week, responders_week_per], axis='columns', sort=False)
week_df.columns = ['Count','Percent']
week_df
```

Out[111]:

	Count	Percent
36.0	24708	9.1%
25.0	19698	7.3%
34.0	16924	6.2%
26.0	16614	6.1%
38.0	15655	5.8%
35.0	13632	5.0%
37.0	12883	4.7%
32.0	12300	4.5%
39.0	10846	4.0%
9.0	8500	3.1%
31.0	8188	3.0%
23.0	7238	2.7%
10.0	6902	2.5%
27.0	6616	2.4%
14.0	6393	2.4%
33.0	6195	2.3%
6.0	5951	2.2%
18.0	5726	2.1%
12.0	5682	2.1%
8.0	5546	2.0%
11.0	5494	2.0%
7.0	5357	2.0%
5.0	5162	1.9%
30.0	5117	1.9%
24.0	4883	1.8%
21.0	4221	1.6%
13.0	3821	1.4%
16.0	3649	1.3%
15.0	2957	1.1%
28.0	2777	1.0%
22.0	2520	0.9%
19.0	2437	0.9%
17.0	2311	0.9%
29.0	2203	0.8%
20.0	1674	0.6%
4.0	548	0.2%

In [172]:

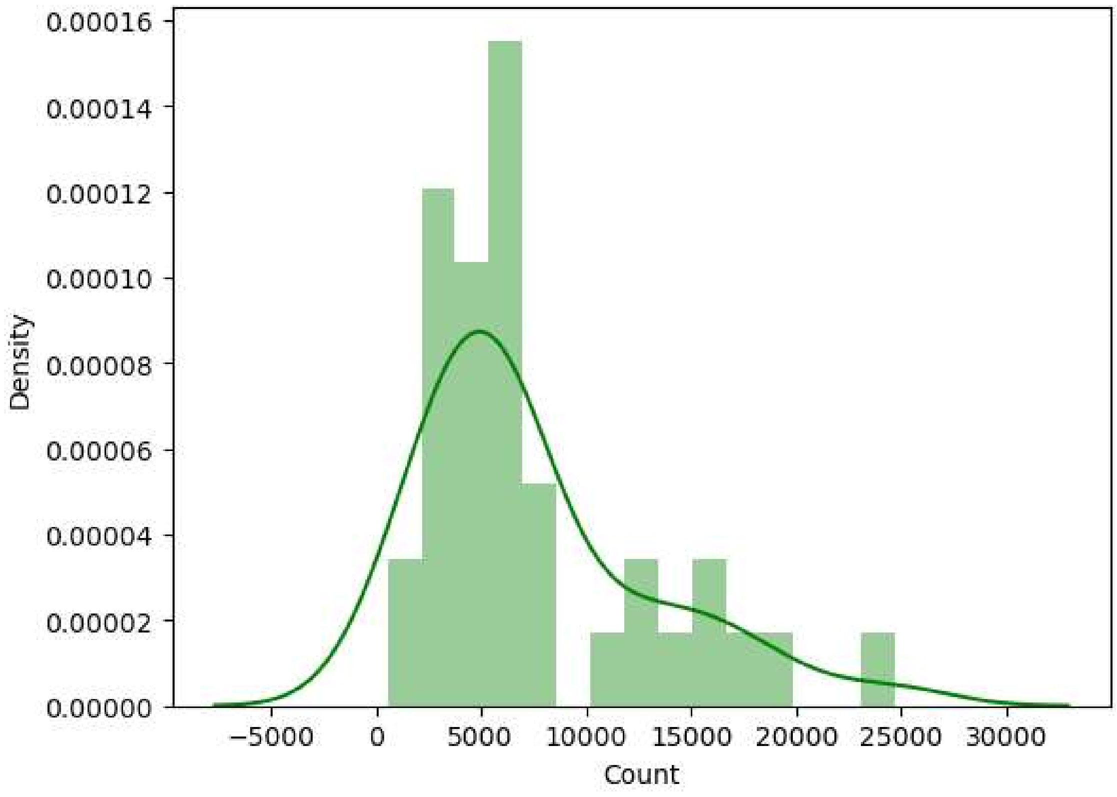
```
sns.distplot(week_df['Count'], bins=15, color='green')
#week distribution curve
```

```
C:\Users\Katerina\anaconda3\lib\site-packages\seaborn\distributions.py:26
19: FutureWarning:

`distplot` is a deprecated function and will be removed in a future versi
on. Please adapt your code to use either `displot` (a figure-level functi
on with similar flexibility) or `histplot` (an axes-level function for hi
stograms).
```

Out[172]:

```
<AxesSubplot:xlabel='Count', ylabel='Density'>
```

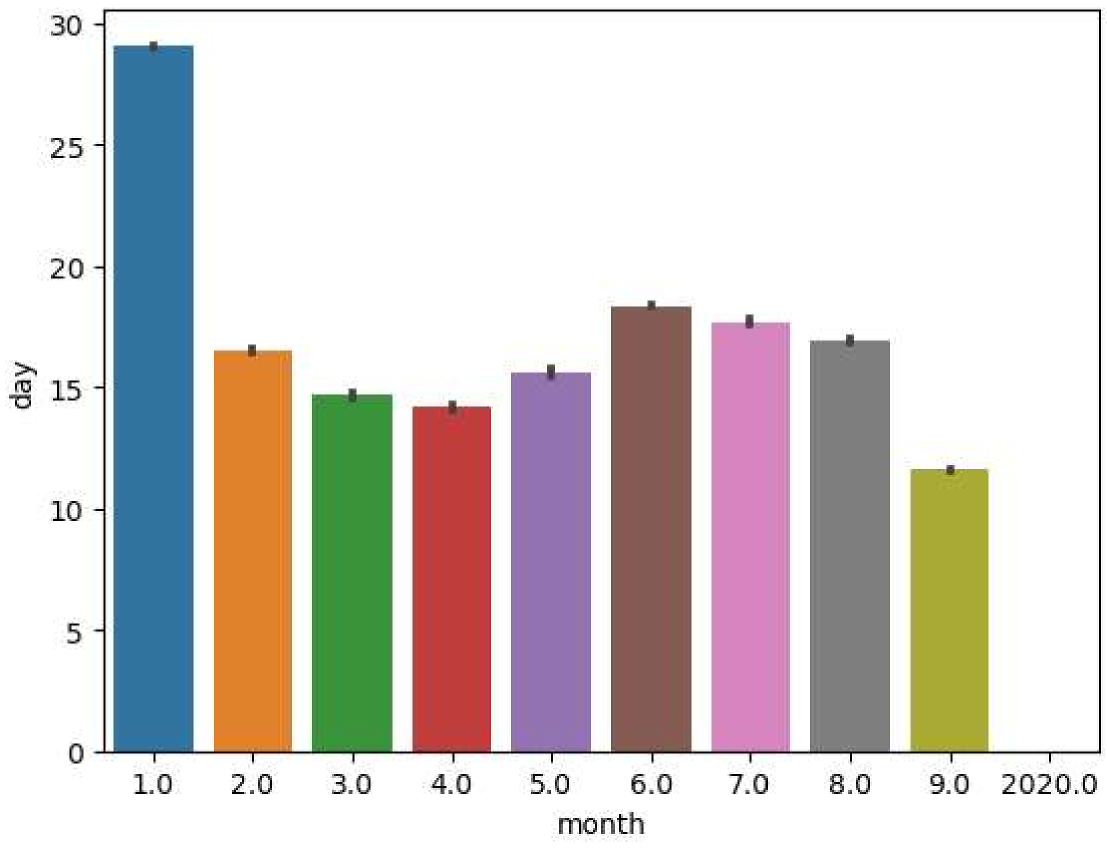


In [113]:

```
xaxis = df['month']
yaxis = df['day']
res = sns.barplot(x=xaxis,y=yaxis)
plt.show
# barplot = trend estimation diagram (x axis: category y axis: numerical value. )
# Black bars are the degree of uncertainty around the estimate
```

Out[113]:

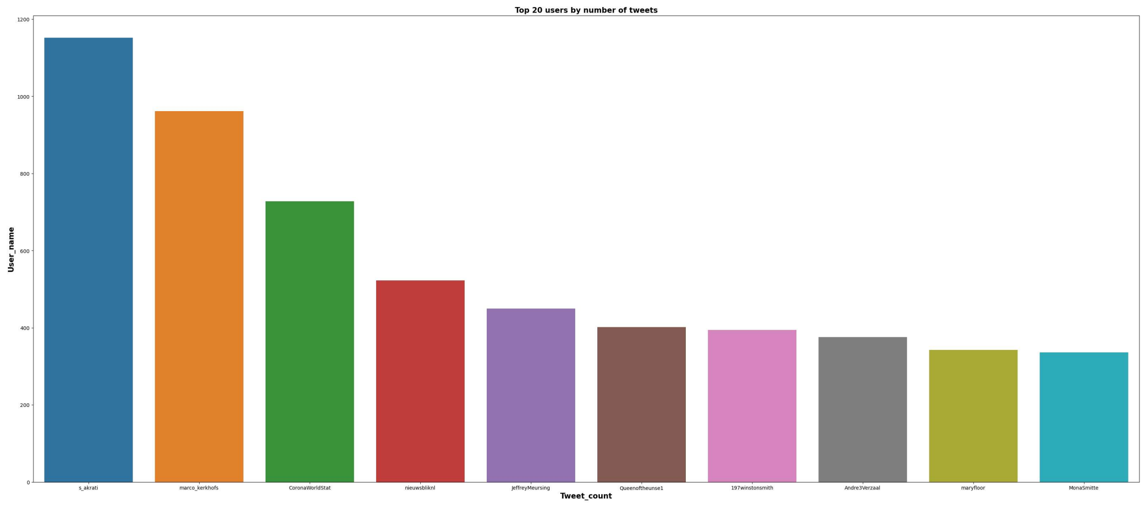
```
<function matplotlib.pyplot.show(close=None, block=None)>
```



1.3 Top 10 users based on tweets, covid references, province, industry reference

In [143]:

```
tweets_screenname_count = df['screen_name'].value_counts().reset_index()
plt.figure(figsize=(40,17))
sns.barplot(x='index', y='screen_name', data= tweets_screenname_count.head(10))
plt.title('Top 20 users by number of tweets', weight='bold', size=15)
plt.ylabel('User_name', size=15, weight='bold')
plt.xlabel('Tweet_count', size=15, weight='bold')
plt.show() #top 10 'tweeters'
#from https://www.kaggle.com/code/iqraddfkldf/duch-social-media-tweets-analysis
```



In [135]:

```
covid = df['text_translation'].str.contains('covid', case = False).sum()
covid #number of tweets containing the word covid
```

Out[135]:

```
38843
```

In [138]:

```
responders_province = df['province'].value_counts()
responders_province_per = df['province'].value_counts(normalize=True).mul(100).round(1).
province_df = pd.concat([responders_province, responders_province_per], axis='columns',
province_df.columns = ['Count','Percent']
province_df # the province of responders (count & percentage)
```

Out[138]:

	Count	Percent
False	161110	60.1%
Noord-Holland	33959	12.7%
Flevoland	31424	11.7%
Zuid-Holland	15254	5.7%
Utrecht	5628	2.1%
Noord-Brabant	4928	1.8%
Gelderland	4724	1.8%
Overijssel	2879	1.1%
Groningen	2343	0.9%
Limburg	1990	0.7%
Friesland (Fryslân)	1912	0.7%
Drenthe	1365	0.5%
Zeeland	721	0.3%

In [150]:

```
responders_industry = df['industry'].value_counts()
responders_industry_per = df['industry'].value_counts(normalize=True).mul(100).round(1).
industry_df = pd.concat([responders_industry, responders_industry_per], axis='columns',
industry_df.columns = ['Count','Percent']
industry_df #whether the tweets talks about indusrty
```

Out[150]:

	Count	Percent
False	201860	74.4%
True	69482	25.6%

Sentiment Score - Categorising - Same can be done for Subjectivity Score

In [199]:

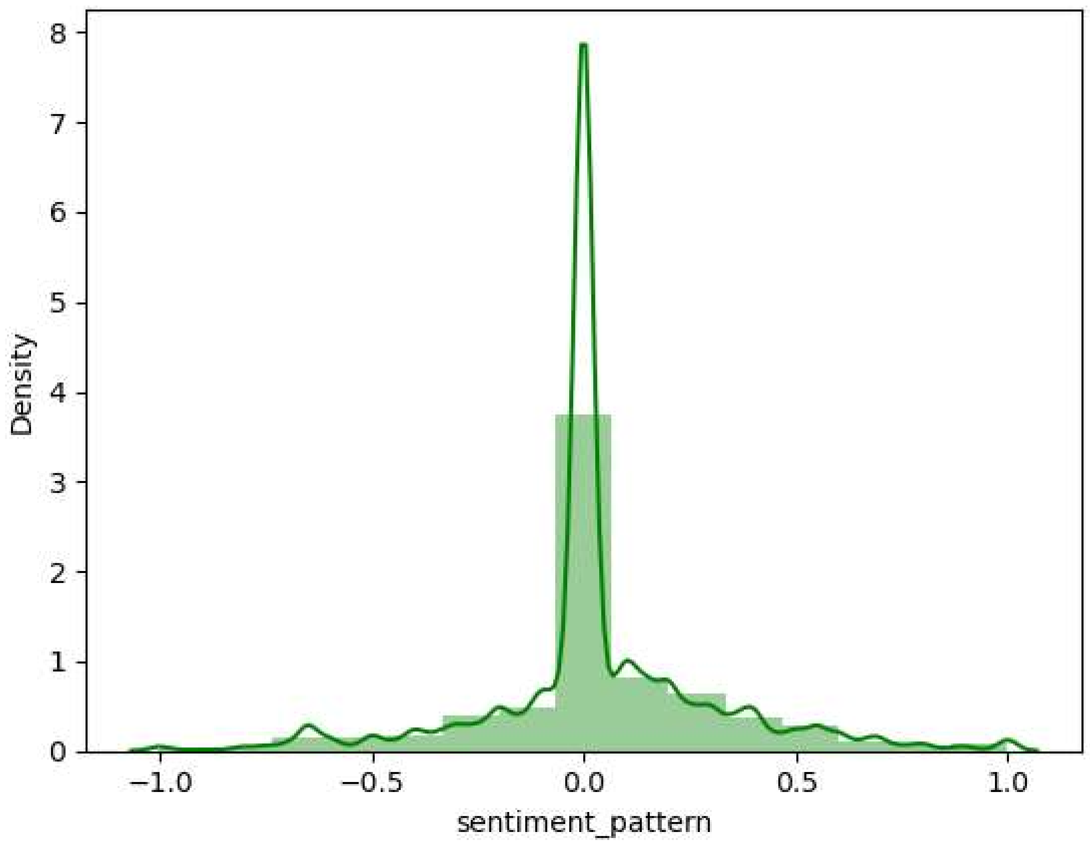
```
sns.distplot(df['sentiment_pattern'], bins=15, color='green')
```

```
C:\Users\Katerina\anaconda3\lib\site-packages\seaborn\distributions.py:26
19: FutureWarning:

`distplot` is a deprecated function and will be removed in a future versi
on. Please adapt your code to use either `displot` (a figure-level functi
on with similar flexibility) or `histplot` (an axes-level function for hi
stograms).
```

Out[199]:

```
<AxesSubplot:xlabel='sentiment_pattern', ylabel='Density'>
```



In [200]:

```
#categorising sentiment score
df.loc[df['sentiment_pattern']<= -0.5, 'sent_group'] = 'very negative'
df.loc[df['sentiment_pattern'].between(-0.501,-0.0001), 'sent_group'] = 'negative'
df.loc[df['sentiment_pattern']==0, 'sent_group']='neutral'
df.loc[df['sentiment_pattern'].between(0.01,0.5), 'sent_group'] = 'positive'
df.loc[df['sentiment_pattern']>0.51, 'sent_group'] = 'very_positive'

responders_sent = df['sent_group'].value_counts()
responders_sent_per = df['sent_group'].value_counts(normalize=True).mul(100).round(1).as
sent_df = pd.concat([responders_sent, responders_sent_per], axis='columns', sort=False)
sent_df.columns = ['Count','Percent']
sent_df

#sentiment score grouping
```

Out[200]:

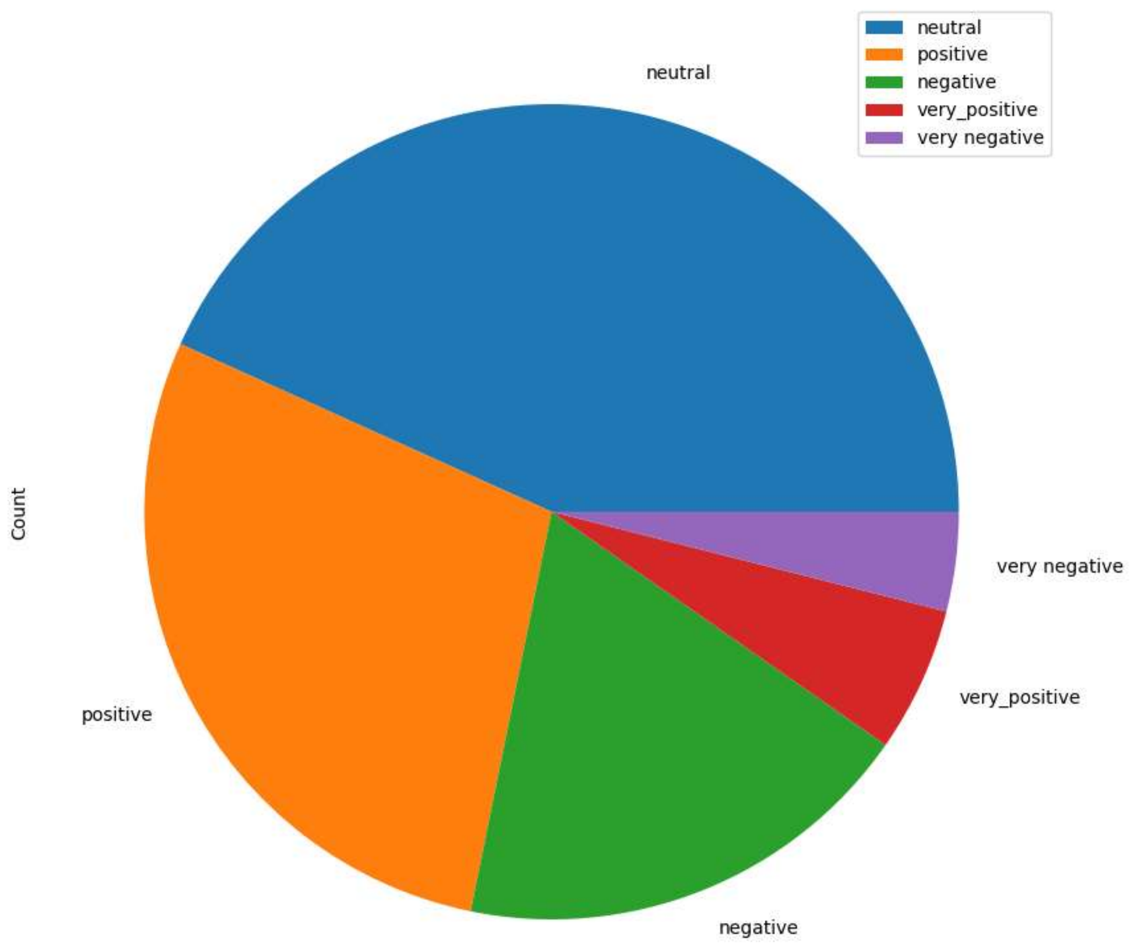
	Count	Percent
neutral	116973	43.3%
positive	77244	28.6%
negative	50004	18.5%
very_positive	15584	5.8%
very negative	10641	3.9%

In [177]:

```
sent_df.plot.pie(y='Count', figsize=(10, 10))
```

Out[177]:

```
<AxesSubplot:ylabel='Count'>
```



In [198]:

```
province_grp = df.groupby(['province'])
sent_grp = province_grp['sent_group'].value_counts()
sent = pd.concat([sent_grp], axis='columns', sort=False)

sent_per = province_grp['sent_group'].value_counts(normalize=True).mul(100).round(1).ast
sent_df_per= pd.concat([sent,sent_per], axis='columns', sort=False)

sent_df_per.columns=['Count', 'Percent']
sent_df_per #sentiment pattern grouping  for each  province
```

Out[198]:

province	sent_group	Count	Percent
False	neutral	59496	37.1%
	positive	50684	31.6%
	negative	33245	20.7%
	very_positive	9743	6.1%
	very negative	7328	4.6%
Drenthe	positive	463	34.1%
	neutral	460	33.8%
	negative	283	20.8%
	very_positive	91	6.7%
	very negative	62	4.6%
Flevoland	neutral	17704	56.4%
	positive	6855	21.9%
	negative	4372	13.9%
	very_positive	1553	5.0%
	very negative	885	2.8%
Friesland (Fryslân)	neutral	708	37.1%
	positive	602	31.6%
	negative	392	20.6%
	very_positive	116	6.1%
	very negative	88	4.6%
Gelderland	neutral	1778	37.7%
	positive	1510	32.0%
	negative	935	19.8%
	very_positive	299	6.3%
	very negative	191	4.1%
Groningen	neutral	925	39.6%
	positive	687	29.4%
	negative	476	20.4%
	very_positive	147	6.3%
	very negative	100	4.3%
Limburg	neutral	978	49.3%
	positive	505	25.5%
	negative	329	16.6%
	very_positive	109	5.5%
	very negative	61	3.1%

		Count	Percent
province	**sent_group**		
	neutral	2044	41.6%
	positive	1454	29.6%
Noord-Brabant	**negative**	960	19.5%
	very_positive	283	5.8%
	very negative	170	3.5%
	neutral	20650	60.9%
	positive	6577	19.4%
Noord-Holland	**negative**	4241	12.5%
	very_positive	1621	4.8%
	very negative	804	2.4%
	neutral	1052	36.8%
	positive	967	33.8%
Overijssel	**negative**	536	18.7%
	very_positive	181	6.3%
	very negative	123	4.3%
	neutral	2285	40.8%
	positive	1745	31.1%
Utrecht	**negative**	985	17.6%
	very_positive	381	6.8%
	very negative	207	3.7%
	neutral	275	38.3%
	positive	240	33.4%
Zeeland	**negative**	142	19.8%
	very_positive	38	5.3%
	very negative	23	3.2%
	neutral	7203	47.4%
	positive	4129	27.2%
Zuid-Holland	**negative**	2584	17.0%
	very_positive	818	5.4%
	very negative	472	3.1%

In [211]:

```
industry_grp = df.groupby(['industry'])

ind_grp = industry_grp['sent_group'].value_counts()
ind = pd.concat([ind_grp], axis='columns', sort=False)

ind_per = industry_grp['sent_group'].value_counts(normalize=True).mul(100).round(1).asty
ind_df_per= pd.concat([ind,ind_per], axis='columns', sort=False)

ind_df_per.columns=['Count', 'Percent']
ind_df_per
```

Out[211]:

		Count	**Percent**
industry	**sent_group**		
False	**neutral**	92475	46.0%
	positive	54470	27.1%
	negative	34733	17.3%
	very_positive	11772	5.9%
	very negative	7760	3.9%
True	**neutral**	24498	35.4%
	positive	22774	32.9%
	negative	15271	22.1%
	very_positive	3812	5.5%
	very negative	2881	4.2%

In [215]:

```
hisco = df['hisco_standard'].value_counts()
hisco_per = df['hisco_standard'].value_counts(normalize=True).mul(100).round(1).astype(
hisco_df = pd.concat([hisco, hisco_per], axis='columns', sort=False)
hisco_df.columns = ['Count','Percent']
hisco_df.head(15)#top 15 hisco standar key words count & percent
```

Out[215]:

	Count	Percent
min	9427	13.6%
graaf	2756	4.0%
arts	1926	2.8%
min, minister	1925	2.8%
meter	1847	2.7%
ober	1751	2.5%
waard	1745	2.5%
patiënte, patiënt	1607	2.3%
ijker	1144	1.6%
expert	1132	1.6%
witter	909	1.3%
werker, medewerker	888	1.3%
student, studente	781	1.1%
huisarts, arts	726	1.0%
gemeente	715	1.0%