In [1]:
```
import numpy as np # linear algebra
import pandas as pd
```

In [2]:
```
import os
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))
```

In [3]:
```
import pandas as pd
df = pd.read_csv('data_science.csv')
```

```
/tmp/ipykernel_7518/3628501462.py:2: DtypeWarning: Columns (9) have mixed types. Specify dtype option on import or set low_memory=False.
  df = pd.read_csv('data_science.csv')
```

In [4]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 241386 entries, 0 to 241385
Data columns (total 36 columns):
 #   Column          Non-Null Count   Dtype  
---  ------          --------------   -----  
 0   id              241386 non-null  int64  
 1   conversation_id 241386 non-null  int64  
 2   created_at      241386 non-null  object 
 3   date            241386 non-null  object 
 4   time            241386 non-null  object 
 5   timezone        241386 non-null  int64  
 6   user_id         241386 non-null  int64  
 7   username        241386 non-null  object 
 8   name            241386 non-null  object 
 9   place           354 non-null     object 
 10  tweet           241386 non-null  object 
 11  language        241386 non-null  object 
 12  mentions        241386 non-null  object 
 13  urls            241386 non-null  object 
 14  photos          241386 non-null  object 
 15  replies_count   241386 non-null  int64  
 16  retweets_count  241386 non-null  int64  
 17  likes_count     241386 non-null  int64  
 18  hashtags        241386 non-null  object 
 19  cashtags        241386 non-null  object 
 20  link            241386 non-null  object 
 21  retweet         241386 non-null  bool   
 22  quote_url       10321 non-null   object 
 23  video           241386 non-null  int64  
 24  thumbnail       110338 non-null  object 
 25  near            0 non-null       float64
 26  geo             0 non-null       float64
 27  source          0 non-null       float64
 28  user_rt_id      0 non-null       float64
 29  user_rt         0 non-null       float64
 30  retweet_id      0 non-null       float64
 31  reply_to        241386 non-null  object 
 32  retweet_date    0 non-null       float64
 33  translate       0 non-null       float64
 34  trans_src       0 non-null       float64
 35  trans_dest      0 non-null       float64
dtypes: bool(1), float64(10), int64(8), object(17)
memory usage: 64.7+ MB
```

In [5]:
```
df['tweet'][10]
```

Out[5]:
```
'Trends in #AI for next 5 years, including revenue, applications, and talent (#INFOGRAPHIC) ——— #BigData #DataScience #MachineLearning #DeepLearning #ComputerVision #NLProc #DataLiteracy #AIStrategy #DigitalTransformation #EdgeAI #Edge #IoT #IIoT #IoTPL #IoTCommunity  https://t.co/mn7vFSpyvv'
```

In [6]:
```
import nltk
nltk.download('vader_lexicon')
from nltk.sentiment.vader import SentimentIntensityAnalyzer

sid = SentimentIntensityAnalyzer()

import re
import pandas as pd
import nltk
nltk.download('words')
words = set(nltk.corpus.words.words())
```

```
[nltk_data] Downloading package vader_lexicon to
[nltk_data]     /home/ubuntu/nltk_data...
[nltk_data]   Package vader_lexicon is already up-to-date!
[nltk_data] Downloading package words to /home/ubuntu/nltk_data...
[nltk_data]   Package words is already up-to-date!
```

In [7]:
```
sentence = df['tweet'][0]
sid.polarity_scores(sentence)['compound']
```

Out[7]:
```
-0.1783
```

In [8]:
```
def cleaner(tweet):
    tweet = re.sub("@[A-Za-z0-9]+","",tweet) #Remove @ sign
    tweet = re.sub("(?:\@|http?\://|https?\://|www)\S+", "", tweet) #Remove http links
    tweet = " ".join(tweet.split())
    tweet = tweet.replace("#", "").replace("_", " ") #Remove hashtag sign but keep the text
    tweet = " ".join(w for w in nltk.wordpunct_tokenize(tweet)
         if w.lower() in words or not w.isalpha())
    return tweet
```

In [9]:
```
df['tweet_clean'] = df['tweet'].apply(cleaner)
```

In [10]:
```
word_dict = {'manipulate':-1,'manipulative':-1,'jamescharlesiscancelled':-1,'jamescharlesisoverparty':-1,
             'pedophile':-1,'pedo':-1,'cancel':-1,'cancelled':-1,'cancel culture':0.4,'teamtati':-1,'teamjames':1,
             'teamjamescharles':1,'liar':-1}

import nltk
nltk.download('vader_lexicon')
from nltk.sentiment.vader import SentimentIntensityAnalyzer

sid = SentimentIntensityAnalyzer()
sid.lexicon.update(word_dict)

list1 = []
for i in df['tweet_clean']:
    list1.append((sid.polarity_scores(str(i)))['compound'])
```

```
[nltk_data] Downloading package vader_lexicon to
[nltk_data]     /home/ubuntu/nltk_data...
[nltk_data]   Package vader_lexicon is already up-to-date!
```

In [11]:
```
df['sentiment'] = pd.Series(list1)

def sentiment_category(sentiment):
    label = ''
    if(sentiment>0):
        label = 'positive'
    elif(sentiment == 0):
        label = 'neutral'
    else:
        label = 'negative'
    return(label)

df['sentiment_category'] = df['sentiment'].apply(sentiment_category)
```

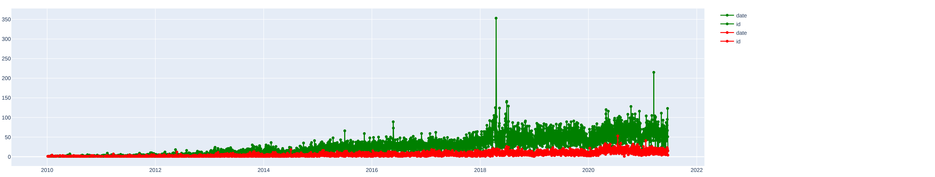
In [12]:
```
df = df[['tweet','date','id','sentiment','sentiment_category']]
df.head()
```

Out[12]:

	tweet	date	id	sentiment	sentiment_category
0	What can be done? - Never blindly trust an ab...	2021-06-20	1406400408545804288	-0.4592	negative
1	"We need a paradigm shift from model-centric t...	2021-06-20	1406390341176016897	-0.3535	negative
2	Using high-resolution satellite data and compu...	2021-06-20	1406386311481774083	0.0000	neutral
3	.@Stephenson_Data shares four steps that will ...	2021-06-20	1406383545153638402	0.6249	positive
4	"Curricula is inherently brittle in a world wh...	2021-06-20	1406358632648818689	0.2960	positive

In [13]:
```
neg = df[df['sentiment_category']=='negative']
neg = neg.groupby(['date'],as_index=False).count()

pos = df[df['sentiment_category']=='positive']
pos = pos.groupby(['date'],as_index=False).count()

pos = pos[['date','id']]
neg = neg[['date','id']]
```

In [14]:
```
import plotly.graph_objs as go

fig = go.Figure()
for col in pos.columns:
    fig.add_trace(go.Scatter(x=pos['date'], y=pos['id'],
                             name = col,
                             mode = 'markers+lines',
                             line=dict(shape='linear'),
                             connectgaps=True,
                             line_color='green'
                             )
                  )

for col in neg.columns:
    fig.add_trace(go.Scatter(x=neg['date'], y=neg['id'],
                             name = col,
                             mode = 'markers+lines',
                             line=dict(shape='linear'),
                             connectgaps=True,
                             line_color='red'
                             )
                  )
fig.show()
```



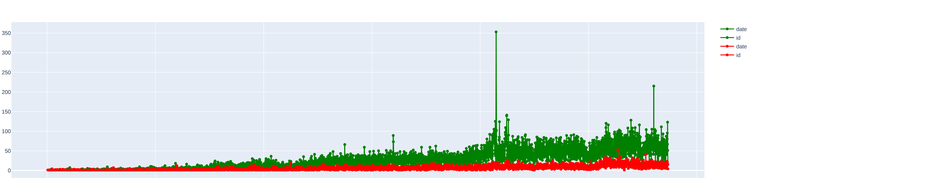
In [15]:
```
print(df[df['sentiment_category']=='positive'])
```

```
                                                    tweet        date  \
3       .@Stephenson_Data shares four steps that will ...  2021-06-20   
4       "Curricula is inherently brittle in a world wh...  2021-06-20   
6       @LinkLabsInc @IoTchannel Wow! Wonderful! Cong...  2021-06-20   
9       Demystifying #AI with 10 top applications:  ht...  2021-06-20   
10      Trends in #AI for next 5 years, including reve...  2021-06-20   
...                                                   ...         ...   
241370  Four short links: 15 January 2010 - Best Scien...  2010-01-15   
241375  Anti-science disinformers to media:  Please ma...  2010-01-13   
241377  @Sheril_ I'd love to see some empirical data o...  2010-01-12   
241380  Top nations in computer science:  http://bit.l...  2010-01-10   
241382  RT @filiber: Have a Computer Science backgroun...  2010-01-06   

                 id  sentiment sentiment_category  
3       1406383545153638402     0.6249           positive  
4       1406358632648818689     0.2960           positive  
6       1406344023254634499     0.9036           positive  
9       1406234476905500679     0.2023           positive  
10      1406333930551324673     0.4215           positive  
...                     ...        ...                ...  
241370          7794185676     0.6369           positive  
241375          7707597565     0.4215           positive  
241377          7671245065     0.6369           positive  
241380          7590823198     0.3182           positive  
241382          7445162404     0.0767           positive  

[113285 rows x 5 columns]
```

In [16]:
```
print(df[df['sentiment_category']=='negative'])
```

```
                                                    tweet        date  \
0       What can be done? - Never blindly trust an ab...  2021-06-20   
1       "We need a paradigm shift from model-centric t...  2021-06-20   
5       Many common colour maps distort data through u...  2021-06-20   
19      ApolloScape (world's largest open-source datas...  2021-06-20   
36      Disruption defines our world, and the latest h...  2021-06-19   
...                                                   ...         ...   
241355  @DanaKCTV5 We think Phil now studies weather d...  2010-02-02   
241366  @GrahamHill And to be really consequent: not o...  2010-01-21   
241371  @andrewbarnett you could, note that iphones mo...  2010-01-15   
241373  CARPE DIEM BLOG: "Structural Barriers" Discour...  2010-01-14   
241384  All in the....data RT @noahWG Dr. Petra provid...  2010-01-05   

                 id  sentiment sentiment_category  
0       1406400408545804288    -0.4592           negative  
1       1406390341176016897    -0.3535           negative  
5       1406350577756524555    -0.0772           negative  
19      1406332752815869955    -0.4215           negative  
36      1406312471521601920    -0.7650           negative  
...                     ...        ...                ...  
241355          8540493580    -0.4019           negative  
241366          8020770355    -0.3612           negative  
241371          7764817738    -0.5043           negative  
241373          7748404739    -0.4215           negative  
241384          7376226272    -0.2960           negative  

[23782 rows x 5 columns]
```

In [17]:
```
import plotly.graph_objs as go

fig = go.Figure()
for col in pos.columns:
    fig.add_trace(go.Scatter(x=pos['date'], y=pos['id'],
                             name = col,
                             mode = 'markers+lines',
                             line=dict(shape='linear'),
                             connectgaps=True,
                             line_color='green'
                             )
                  )

for col in neg.columns:
    fig.add_trace(go.Scatter(x=neg['date'], y=neg['id'],
                             name = col,
                             mode = 'markers+lines',
                             line=dict(shape='linear'),
                             connectgaps=True,
                             line_color='red'
                             )
                  )
fig.show()
```



In [ ]: