In [1]:
```
#Importing Libraries
!pip install textblob
!pip install WordCloud
!pip install collections
import tweepy
from textblob import TextBlob
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import re
import nltk
nltk.download('stopwords')
from nltk.corpus import stopwords
from nltk.stem.porter import PorterStemmer
from wordcloud import WordCloud
import json
from collections import Counter
```

```
Requirement already satisfied: textblob in c:\users\user\anaconda3\lib\site-packages
(0.15.3)
Requirement already satisfied: nltk>=3.1 in c:\users\user\anaconda3\lib\site-packages
(from textblob) (3.5)
Requirement already satisfied: tqdm in c:\users\user\anaconda3\lib\site-packages (from
nltk>=3.1->textblob) (4.47.0)
Requirement already satisfied: regex in c:\users\user\anaconda3\lib\site-packages (fro
m nltk>=3.1->textblob) (2020.6.8)
Requirement already satisfied: click in c:\users\user\anaconda3\lib\site-packages (fro
m nltk>=3.1->textblob) (7.1.2)
Requirement already satisfied: joblib in c:\users\user\anaconda3\lib\site-packages (fr
om nltk>=3.1->textblob) (0.16.0)
Requirement already satisfied: WordCloud in c:\users\user\anaconda3\lib\site-packages
(1.8.1)
Requirement already satisfied: pillow in c:\users\user\anaconda3\lib\site-packages (fr
om WordCloud) (7.2.0)
Requirement already satisfied: numpy>=1.6.1 in c:\users\user\anaconda3\lib\site-packag
es (from WordCloud) (1.18.5)
Requirement already satisfied: matplotlib in c:\users\user\anaconda3\lib\site-packages
(from WordCloud) (3.2.2)
Requirement already satisfied: cycler>=0.10 in c:\users\user\anaconda3\lib\site-packag
es (from matplotlib->WordCloud) (0.10.0)
Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.1 in c:\users\us
er\anaconda3\lib\site-packages (from matplotlib->WordCloud) (2.4.7)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\user\anaconda3\lib\site-p
ackages (from matplotlib->WordCloud) (1.2.0)
Requirement already satisfied: python-dateutil>=2.1 in c:\users\user\anaconda3\lib\sit
e-packages (from matplotlib->WordCloud) (2.8.1)
Requirement already satisfied: six in c:\users\user\anaconda3\lib\site-packages (from
cycler>=0.10->matplotlib->WordCloud) (1.15.0)

ERROR: Could not find a version that satisfies the requirement collections (from versi
ons: none)
ERROR: No matching distribution found for collections
[nltk_data] Downloading package stopwords to
[nltk_data]     C:\Users\user\AppData\Roaming\nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
```

In [2]:
```
#Authorization and Search tweets
#Getting authorization
consumer_key = 'CQDPDzbOMjXKcbZgbxcBXTcEX'
consumer_key_secret = 'bMB5F5Y2lqSOA8DQuBmC8iqWjfZYsdIbnmW4U5tfTFHFNmknjs'
access_token = '1360589615392907265-pAaOVrbPVYGgMUDelW3jV6v81J2ckc'
access_token_secret = 'bohKtuls7fBgQ3QDu65oaetBLvDaPRm2aaSEJjXc6LvS1'
auth = tweepy.OAuthHandler(consumer_key, consumer_key_secret)
auth.set_access_token(access_token, access_token_secret)
api = tweepy.API(auth, wait_on_rate_limit=True)
```

In [3]:
```
#Defining Search keyword and number of tweets and searching tweets
query = 'covaxin'
max_tweets = 100
searched_tweets = [status for status in tweepy.Cursor(api.search, q=query).items(max_twe
```

In [4]:
```
#Creating Dataframe of Tweets
#Cleaning searched tweets and converting into Dataframe
my_list_of_dicts = []
for each_json_tweet in searched_tweets:
    my_list_of_dicts.append(each_json_tweet._json)


with open('tweet_json_Data5.txt', 'w') as file:
        file.write(json.dumps(my_list_of_dicts, indent=4))


my_demo_list = []
with open('tweet_json_Data5.txt', encoding='utf-8') as json_file:
    all_data = json.load(json_file)
    for each_dictionary in all_data:
        tweet_id = each_dictionary['id']
        text = each_dictionary['text']
        favorite_count = each_dictionary['favorite_count']
        retweet_count = each_dictionary['retweet_count']
        created_at = each_dictionary['created_at']
        my_demo_list.append({'tweet_id': str(tweet_id),
                             'text': str(text),
                             'favorite_count': int(favorite_count),
                             'retweet_count': int(retweet_count),
                             'created_at': created_at,
                            })

        tweet_dataset = pd.DataFrame(my_demo_list, columns =
                                     ['tweet_id', 'text',
                                      'favorite_count', 'retweet_count',
                                      'created_at'])

 #Writing tweet dataset ti csv file for future reference
tweet_dataset.to_csv('tweet_data5.csv')
```

In [5]:
```
tweet_dataset.shape
```

Out[5]:
```
(100, 5)
```

In [6]:
```
tweet_dataset.head()
```

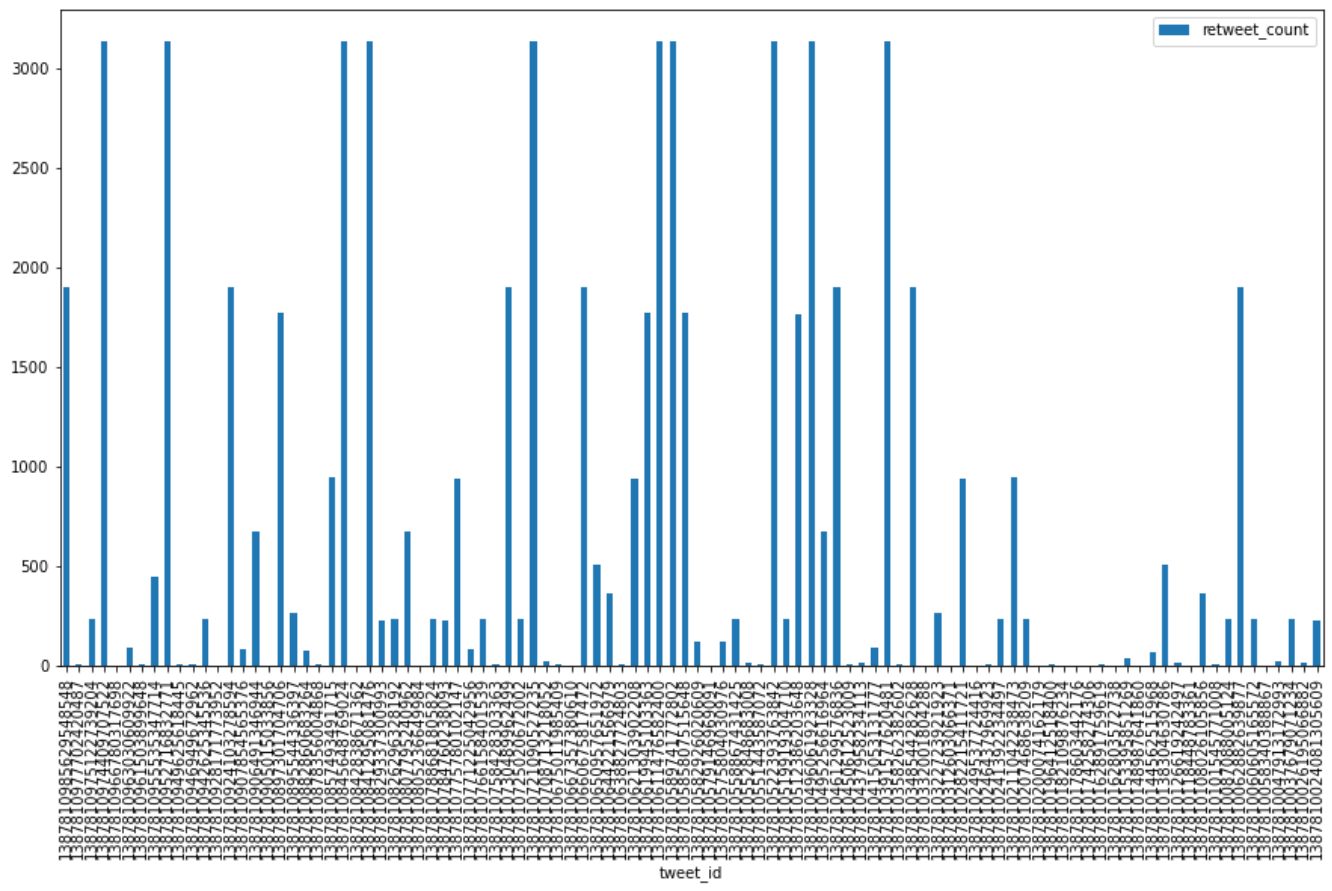
Out[6]:

	tweet_id	text	favorite_count	retweet_count	created_at
0	1387810985629548548	RT @BharatBiotech: Bharat Biotech - COVAXIN® A...	0	1902	Thu Apr 29 16:48:17 +0000 2021
1	1387810977702420487	RT @larazon_es: La alarmante advertencia de un...	0	3	Thu Apr 29 16:48:16 +0000 2021
2	1387810975122739204	RT @ANI: We had placed orders for purchase Cov...	0	236	Thu Apr 29 16:48:15 +0000 2021
3	1387810974409707522	RT @nsitharaman: “ Covaxin, India's home-grown...	0	3137	Thu Apr 29 16:48:15 +0000 2021
4	1387810966780317698	@ChouhanShivraj Mama shree agar vaccin nhi den...	1	0	Thu Apr 29 16:48:13 +0000 2021

In [2]:
```
import pandas as pd
import matplotlib.pyplot as plt
data = pd.read_csv("tweet_data5.csv")
```

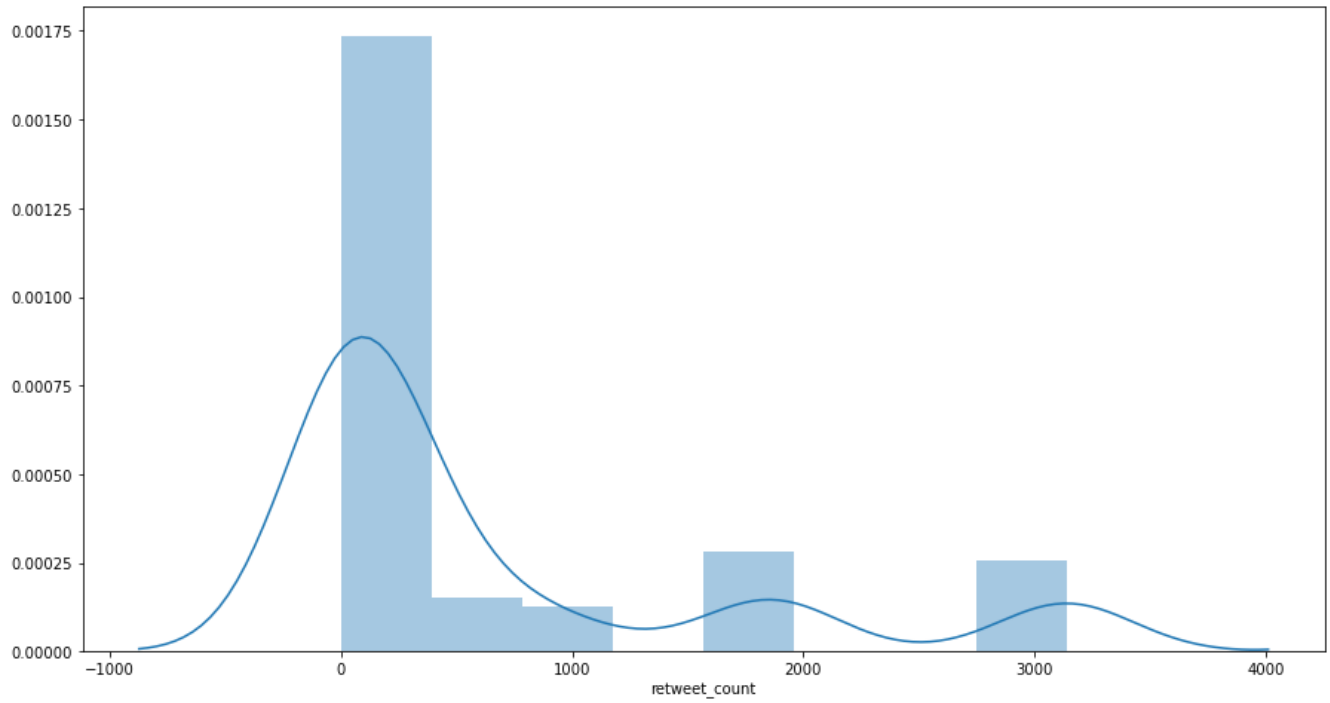
In [3]:
```
data = pd.read_csv("tweet_data5.csv")
plt.rcParams['figure.figsize'] = [15,8]
data.plot.bar('tweet_id','retweet_count')
```

Out[3]:
```
<matplotlib.axes._subplots.AxesSubplot at 0xbbad868>
```



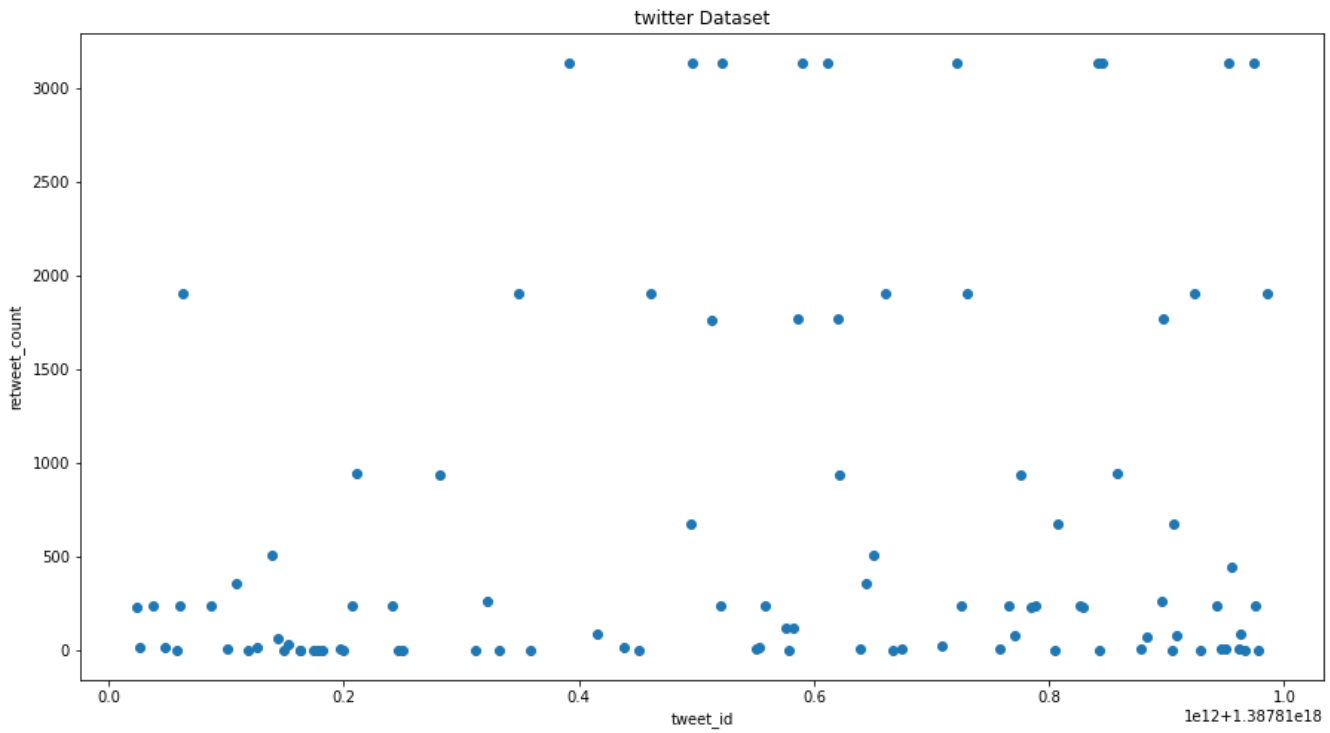
In [5]:
```
import seaborn as sns
sns.distplot(data.retweet_count)
```

Out[5]:
```
<matplotlib.axes._subplots.AxesSubplot at 0xed94328>
```



In [4]:
```
fig, ax = plt.subplots()
ax.scatter(data['tweet_id'], data['retweet_count'])
ax.set_title('twitter Dataset')
ax.set_xlabel('tweet_id')
ax.set_ylabel('retweet_count')
```

Out[4]:
```
Text(0, 0.5, 'retweet_count')
```



In [12]:
```
#Cleaning Data
#Removing @ handle
def remove_pattern(input_txt, pattern):
    r = re.findall(pattern, input_txt)
    for i in r:
        input_txt = re.sub(i, '', input_txt)

    return input_txt

tweet_dataset['text'] = np.vectorize(remove_pattern)(tweet_dataset['text'], "@[\w]*")

tweet_dataset.head()
```

Out[12]:

	tweet_id	text	favorite_count	retweet_count	created_at
0	1387810985629548548	RT : Bharat Biotech - COVAXIN® Announcement - ...	0	1902	Thu Apr 29 16:48:17 +0000 2021
1	1387810977702420487	RT : La alarmante advertencia de una doctora d...	0	3	Thu Apr 29 16:48:16 +0000 2021
2	1387810975122739204	RT : We had placed orders for purchase Covishi...	0	236	Thu Apr 29 16:48:15 +0000 2021
3	1387810974409707522	RT : “ Covaxin, India's home-grown COVID-19 va...	0	3137	Thu Apr 29 16:48:15 +0000 2021
4	1387810966780317698	Mama shree agar vaccin nhi dena cahate to man...	1	0	Thu Apr 29 16:48:13 +0000 2021

In [13]:
```
tweet_dataset.head()
```

Out[13]:

	tweet_id	text	favorite_count	retweet_count	created_at
0	1387810985629548548	RT : Bharat Biotech - COVAXIN® Announcement - ...	0	1902	Thu Apr 29 16:48:17 +0000 2021
1	1387810977702420487	RT : La alarmante advertencia de una doctora d...	0	3	Thu Apr 29 16:48:16 +0000 2021
2	1387810975122739204	RT : We had placed orders for purchase Covishi...	0	236	Thu Apr 29 16:48:15 +0000 2021
3	1387810974409707522	RT : “ Covaxin, India's home-grown COVID-19 va...	0	3137	Thu Apr 29 16:48:15 +0000 2021
4	1387810966780317698	Mama shree agar vaccin nhi dena cahate to man...	1	0	Thu Apr 29 16:48:13 +0000 2021

In [14]:
```
tweet_dataset['text'].head()
```

Out[14]:
```
0    RT : Bharat Biotech - COVAXIN® Announcement - ...
1    RT : La alarmante advertencia de una doctora d...
2    RT : We had placed orders for purchase Covishi...
3    RT : “ Covaxin, India's home-grown COVID-19 va...
4     Mama shree agar vaccin nhi dena cahate to man...
Name: text, dtype: object
```

In [15]:
```
compare_list=tweet_dataset['text'].head()
```

In [16]:
```
from nltk.tokenize import word_tokenize
word_tokens = []
for sent in compare_list:
    print(word_tokenize(sent))
    word_tokens.append(word_tokenize(sent))
```

```
['RT', ':', 'Bharat', 'Biotech', '-', 'COVAXIN®', 'Announcement', '-', 'April', '29',
',', '2021', 'https', ':', '//t.co/RgnROIfUCe']
['RT', ':', 'La', 'alarmante', 'advertencia', 'de', 'una', 'doctora', 'desde', 'Indi
a', ':', '“', 'Vacunados', 'con', 'AstraZeneca', 'se', 'contagian', 'de', 'la', 'nuev
a', 'variante', '”', '➡', '“', 'Comen…']
['RT', ':', 'We', 'had', 'placed', 'orders', 'for', 'purchase', 'Covishield', '&', 'am
p', ';', 'Covaxin', 'vaccines', '.', 'But', 'manufacturers', 'of', 'both', 'vaccines',
'have', 'said', 'that', 'they', 'wo', "n't", 'be', 'a…']
['RT', ':', '“', 'Covaxin', ',', 'India', "'s", 'home-grown', 'COVID-19', 'vaccine',
',', 'has', 'been', 'found', 'to', 'neutralise', 'the', '617', 'variant', 'of', 'the',
'deadly', 'virus', '...', '”', 'Dr.', 'F…']
['Mama', 'shree', 'agar', 'vaccin', 'nhi', 'dena', 'cahate', 'to', 'mana', 'kar', 'dij
iye', '...', 'Pahale', 'register', 'nhi', 'ho', 'rha', 'tha', 'aab', 'jab…', 'https',
':', '//t.co/4BNWg1RxRr']
```

In [17]:
```
from nltk.tokenize import WordPunctTokenizer
punct_tokenizer = WordPunctTokenizer()
punct_tokens = []
for sent in compare_list:
    print(punct_tokenizer.tokenize(sent))
    punct_tokens.append(punct_tokenizer.tokenize(sent))
```

```
['RT', ':', 'Bharat', 'Biotech', '-', 'COVAXIN', '®', 'Announcement', '-', 'April', '2
9', ',', '2021', 'https', '://', 't', '.', 'co', '/', 'RgnROIfUCe']
['RT', ':', 'La', 'alarmante', 'advertencia', 'de', 'una', 'doctora', 'desde', 'Indi
a', ':', '“', 'Vacunados', 'con', 'AstraZeneca', 'se', 'contagian', 'de', 'la', 'nuev
a', 'variante', '”', '➡', '“', 'Comen', '…']
['RT', ':', 'We', 'had', 'placed', 'orders', 'for', 'purchase', 'Covishield', '&', 'am
p', ';', 'Covaxin', 'vaccines', '.', 'But', 'manufacturers', 'of', 'both', 'vaccines',
'have', 'said', 'that', 'they', 'won', "'", 't', 'be', 'a', '…']
['RT', ':', '“', 'Covaxin', ',', 'India', "'", 's', 'home', '-', 'grown', 'COVID', '-
', '19', 'vaccine', ',', 'has', 'been', 'found', 'to', 'neutralise', 'the', '617', 'va
riant', 'of', 'the', 'deadly', 'virus', '...”', 'Dr', '.', 'F', '…']
['Mama', 'shree', 'agar', 'vaccin', 'nhi', 'dena', 'cahate', 'to', 'mana', 'kar', 'dij
iye', '...', 'Pahale', 'register', 'nhi', 'ho', 'rha', 'tha', 'aab', 'jab', '…', 'http
s', '://', 't', '.', 'co', '/', '4BNWg1RxRr']
```

In [18]:
```
from nltk.tokenize import RegexpTokenizer
match_tokenizer = RegexpTokenizer("[\w']+")
match_tokens = []
for sent in compare_list:
    print(match_tokenizer.tokenize(sent))
    match_tokens.append(match_tokenizer.tokenize(sent))
```

```
['RT', 'Bharat', 'Biotech', 'COVAXIN', 'Announcement', 'April', '29', '2021', 'https',
't', 'co', 'RgnROIfUCe']
['RT', 'La', 'alarmante', 'advertencia', 'de', 'una', 'doctora', 'desde', 'India', 'Va
cunados', 'con', 'AstraZeneca', 'se', 'contagian', 'de', 'la', 'nueva', 'variante', 'C
omen']
['RT', 'We', 'had', 'placed', 'orders', 'for', 'purchase', 'Covishield', 'amp', 'Covax
in', 'vaccines', 'But', 'manufacturers', 'of', 'both', 'vaccines', 'have', 'said', 'th
at', 'they', "won't", 'be', 'a']
['RT', 'Covaxin', "India's", 'home', 'grown', 'COVID', '19', 'vaccine', 'has', 'been',
'found', 'to', 'neutralise', 'the', '617', 'variant', 'of', 'the', 'deadly', 'virus',
'Dr', 'F']
['Mama', 'shree', 'agar', 'vaccin', 'nhi', 'dena', 'cahate', 'to', 'mana', 'kar', 'dij
iye', 'Pahale', 'register', 'nhi', 'ho', 'rha', 'tha', 'aab', 'jab', 'https', 't', 'c
o', '4BNWg1RxRr']
```

In [19]:
```
space_tokenizer = RegexpTokenizer("\s+", gaps=True)
space_tokens = []
for sent in compare_list:

    print(space_tokenizer.tokenize(sent))
    space_tokens.append(space_tokenizer.tokenize(sent))
```

```
['RT', ':', 'Bharat', 'Biotech', '-', 'COVAXIN®', 'Announcement', '-', 'April', '29,',
'2021', 'https://t.co/RgnROIfUCe']
['RT', ':', 'La', 'alarmante', 'advertencia', 'de', 'una', 'doctora', 'desde', 'Indi
a:', '“Vacunados', 'con', 'AstraZeneca', 'se', 'contagian', 'de', 'la', 'nueva', 'vari
ante”', '➡', '“Comen…']
['RT', ':', 'We', 'had', 'placed', 'orders', 'for', 'purchase', 'Covishield', '&amp;',
'Covaxin', 'vaccines.', 'But', 'manufacturers', 'of', 'both', 'vaccines', 'have', 'sai
d', 'that', 'they', "won't", 'be', 'a…']
['RT', ':', '“', 'Covaxin,', "India's", 'home-grown', 'COVID-19', 'vaccine,', 'has',
'been', 'found', 'to', 'neutralise', 'the', '617', 'variant', 'of', 'the', 'deadly',
'virus...”', 'Dr.', 'F…']
['Mama', 'shree', 'agar', 'vaccin', 'nhi', 'dena', 'cahate', 'to', 'mana', 'kar', 'dij
iye...', 'Pahale', 'register', 'nhi', 'ho', 'rha', 'tha', 'aab', 'jab…', 'https://t.c
o/4BNWg1RxRr']
```

In [20]:
```
import pandas as pd
tokenizers = {'word_tokenize': word_tokens,
              'WordPunctTokenize':punct_tokens,
              'RegrexTokenizer for matching':match_tokens,
              'RegrexTokenizer for white space': space_tokens}

df = pd.DataFrame.from_dict(tokenizers)
df
```

Out[20]:

	word_tokenize	WordPunctTokenize	RegrexTokenizer for matching	RegrexTokenizer for white space
0	[RT, :, Bharat, Biotech, -, COVAXIN®, Announce...	[RT, :, Bharat, Biotech, -, COVAXIN, ®, Announ...	[RT, Bharat, Biotech, COVAXIN, Announcement, A...	[RT, :, Bharat, Biotech, -, COVAXIN®, Announce...
1	[RT, :, La, alarmante, advertencia, de, una, d...	[RT, :, La, alarmante, advertencia, de, una, d...	[RT, La, alarmante, advertencia, de, una, doct...	[RT, :, La, alarmante, advertencia, de, una, d...
2	[RT, :, We, had, placed, orders, for, purchase...	[RT, :, We, had, placed, orders, for, purchase...	[RT, We, had, placed, orders, for, purchase, C...	[RT, :, We, had, placed, orders, for, purchase...
3	[RT, :, “, Covaxin, ,, India, 's, home-grown, ...	[RT, :, “, Covaxin, ,, India, ', s, home, -, g...	[RT, Covaxin, India's, home, grown, COVID, 19,...	[RT, :, “, Covaxin,, India's, home-grown, COVI...
4	[Mama, shree, agar, vaccin, nhi, dena, cahate,...	[Mama, shree, agar, vaccin, nhi, dena, cahate,...	[Mama, shree, agar, vaccin, nhi, dena, cahate,...	[Mama, shree, agar, vaccin, nhi, dena, cahate,...

In [31]:
```
match_tokens
```

Out[31]:
```
[['RT',
  'Bharat',
  'Biotech',
  'COVAXIN',
  'Announcement',
  'April',
  '29',
  '2021',
  'https',
  't',
  'co',
  'RgnROIfUCe'],
 ['RT',
  'La',
  'alarmante',
  'advertencia',
  'de',
  'una',
  'doctora',
  'desde',
  'India',
  'Vacunados',
  'con',
  'AstraZeneca',
  'se',
  'contagian',
  'de',
  'la',
  'nueva',
  'variante',
  'Comen'],
 ['RT',
  'We',
  'had',
  'placed',
  'orders',
  'for',
  'purchase',
  'Covishield',
  'amp',
  'Covaxin',
  'vaccines',
  'But',
  'manufacturers',
  'of',
  'both',
  'vaccines',
  'have',
  'said',
  'that',
  'they',
  "won't",
  'be',
  'a'],
 ['RT',
  'Covaxin',
  "India's",
  'home',
  'grown',
  'COVID',
  '19',
```

```
 'vaccine',
 'has',
 'been',
 'found',
 'to',
 'neutralise',
 'the',
 '617',
 'variant',
 'of',
 'the',
 'deadly',
 'virus',
 'Dr',
 'F'],
['Mama',
 'shree',
 'agar',
 'vaccin',
 'nhi',
 'dena',
 'cahate',
 'to',
 'mana',
 'kar',
 'dijiye',
 'Pahale',
 'register',
 'nhi',
 'ho',
 'rha',
 'tha',
 'aab',
 'jab',
 'https',
 't',
 'co',
 '4BNWg1RxRr']]
```

In [ ]:

In [22]:
```
#python3 -m pip install collections
!pip install --pre --upgrade collection==0.1.6
!pip install collections-extended
!pip install Counter
!pip install more-itertools
import collections
from collections import Counter
import warnings
warnings.filterwarnings("ignore")
import itertools
def plot_confusion_matrix(cm, classes,
                          normalize=False,
                          title='Confusion matrix',
                          cmap=plt.cm.Blues):
        import itertools
        plt.imshow(cm, interpolation='nearest', cmap=cmap)
        plt.title(title)
        plt.colorbar()
        tick_marks = np.arange(len(classes))
        plt.xticks(tick_marks, classes, rotation=45)
        plt.yticks(tick_marks, classes)

        if normalize:
            cm = cm.astype('float') / cm.sum(axis=1)[:, np.newaxis]
            print("Normalized confusion matrix")
        else:
            print('Confusion matrix, without normalization')

        print(cm)

        thresh = cm.max() / 2.
        for i, j in itertools.product(range(cm.shape[0]), range(cm.shape[1])):
            plt.text(j, i, cm[i, j],
                     horizontalalignment="center",
                     color="white" if cm[i, j] > thresh else "black")

        plt.tight_layout()
        plt.ylabel('True label')
        plt.xlabel('Predicted label')

# List of all words across tweets

all_words_no_urls = list(itertools.chain(*space_tokens))

# Create counter
counts_no_urls = collections.Counter(all_words_no_urls)

counts_no_urls.most_common(15)
```

```
Requirement already up-to-date: collection==0.1.6 in c:\users\user\anaconda3\lib\site-
packages (0.1.6)
Requirement already satisfied: collections-extended in c:\users\user\anaconda3\lib\sit
e-packages (1.0.3)
Requirement already satisfied: setuptools in c:\users\user\anaconda3\lib\site-packages
(from collections-extended) (49.2.0.post20200714)
Requirement already satisfied: Counter in c:\users\user\anaconda3\lib\site-packages
(1.0.0)
Requirement already satisfied: more-itertools in c:\users\user\anaconda3\lib\site-pack
ages (8.4.0)
```

Out[22]:
```
[('RT', 4),
 (':', 4),
```

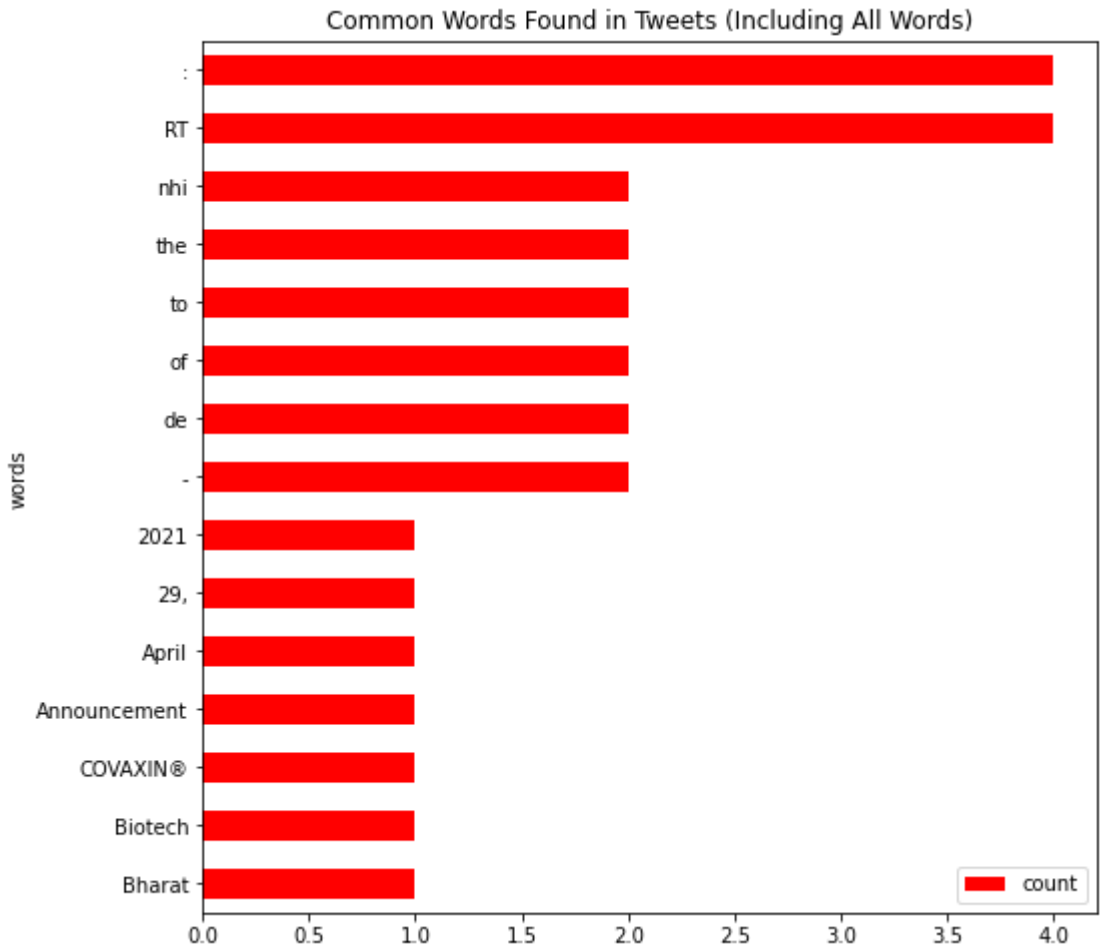
```
('-', 2),
('de', 2),
('of', 2),
('to', 2),
('the', 2),
('nhi', 2),
('Bharat', 1),
('Biotech', 1),
('COVAXIN®', 1),
('Announcement', 1),
('April', 1),
('29,', 1),
('2021', 1)]
```

In [23]:
```
clean_tweets_no_urls = pd.DataFrame(counts_no_urls.most_common(15),
                                    columns=['words', 'count'])

clean_tweets_no_urls.head(15)
```

Out[23]:

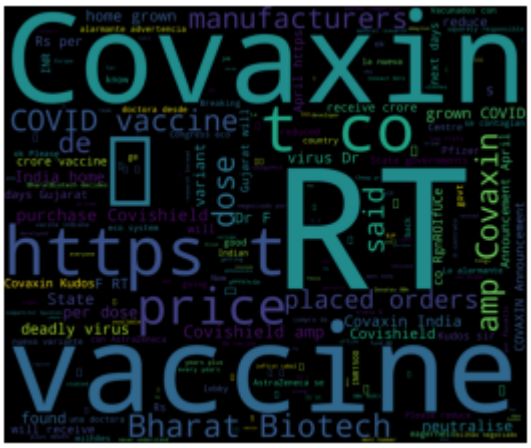
	words	count
0	RT	4
1	:	4
2	-	2
3	de	2
4	of	2
5	to	2
6	the	2
7	nhi	2
8	Bharat	1
9	Biotech	1
10	COVAXIN®	1
11	Announcement	1
12	April	1
13	29,	1
14	2021	1

In [24]:
```
fig, ax = plt.subplots(figsize=(8, 8))

# Plot horizontal bar graph
clean_tweets_no_urls.sort_values(by='count').plot.barh(x='words',
                        y='count',
                        ax=ax,
                        color="red")

ax.set_title("Common Words Found in Tweets (Including All Words)")

plt.show()
```



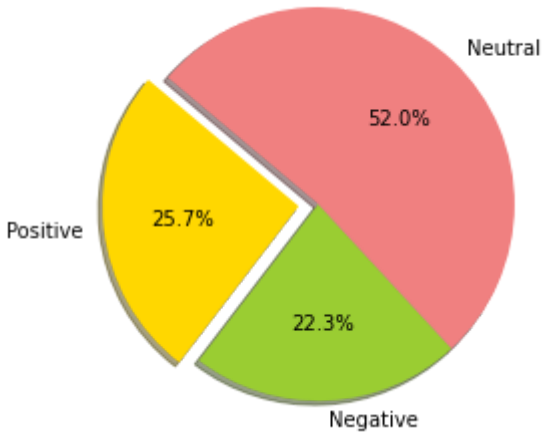
In [28]:
```
from wordcloud import WordCloud, STOPWORDS
words = ' '.join(tweet_dataset['text'])
wordcloud = WordCloud(stopwords =
                      STOPWORDS, background_color='black',
                      height = 2500, width = 3000).generate(words)
plt.imshow(wordcloud)
plt.axis('off')
```

Out[28]: (-0.5, 2999.5, 2499.5, -0.5)



In [30]:
```
#Sentiment Analysis Report
#Finding sentiment analysis (+ve, -ve and neutral)
pos = 0
neg = 0
neu = 0
for tweet in searched_tweets:
    analysis = TextBlob(tweet.text)
    if analysis.sentiment[0]>0:
        pos = pos +1
    elif analysis.sentiment[0]<0:
        neg = neg + 1
    else:
        neu = neu + 1
print("Total Positive = ", pos)
print("Total Negative = ", neg)
print("Total Neutral = ", neu)

#Plotting sentiments
labels = 'Positive', 'Negative', 'Neutral'
sizes = [257, 223, 520]
colors = ['gold', 'yellowgreen', 'lightcoral']
explode = (0.1, 0, 0)  # explode 1st slice
plt.pie(sizes, explode=explode, labels=labels, colors=colors, autopct='%1.1f%%', shadow=
plt.axis('equal')
plt.show()
```

```
Total Positive =  16
Total Negative =  14
Total Neutral =  70
```



In [ ]:

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