In [524]:
```
import tweepy
import pandas as pd
import json
import re
import warnings
warnings.filterwarnings("ignore")
from nltk.corpus import stopwords
from nltk.stem.wordnet import WordNetLemmatizer
import gensim
from gensim import corpora
import seaborn as sns
import matplotlib.pyplot as plt
from textblob import TextBlob
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.datasets import make_blobs
from sklearn.decomposition import PCA
from sklearn.preprocessing import normalize
from sklearn.metrics import pairwise_distances
import nltk
import string
import numpy as np
from wordcloud import WordCloud, STOPWORDS
from sklearn.feature_extraction.text import TfidfVectorizer
from nltk import sent_tokenize, word_tokenize, pos_tag
from PIL import Image
import gensim
from gensim import corpora
from nltk.stem.wordnet import WordNetLemmatizer
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.decomposition import LatentDirichletAllocation
```

In [65]:
```
pd.set_option('display.max_rows', None)
pd.set_option('display.max_columns', None)
pd.set_option('display.width', None)
pd.set_option('display.max_colwidth', None)
```

In [21]:
```
%run ./key.ipynb
auth = tw.OAuthHandler(consumer_key,consumer_secret)
auth.set_access_token(access_token,access_secret)
```

In [25]:
```
output_file = 'tweeter.csv'
tweets_to_capture = 20000
```

In [26]:
```
tweet_list=[]
class MyStreamListener(tweepy.StreamListener):
    def __init__(self,api=None):
        super(MyStreamListener,self).__init__()
        self.num_tweets=0
        self.file=open(output_file,"w")
    def on_status(self,status):
        tweet=status._json
        self.file.write(json.dumps(tweet)+ '\n')
        tweet_list.append(status)
        self.num_tweets+=1
        if self.num_tweets<= tweets_to_capture:
            return True
        else:
            return False
        self.file.close()
```

In [27]:
```
%%time
l = MyStreamListener()
stream =tweepy.Stream(auth,l)
#this line filters twiiter streams to capture data by keywords
stream.filter(track=['Bangladesh'])
```

```
Wall time: 2h 36min 15s
```

In [ ]:
```

```

In [543]:
```
df=pd.read_csv('C:\\Users\\MESSI\\Documents\\tweeter.csv',encoding='latin1',
```

In [547]:
```
1 df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 20000 entries, 0 to 19999
Data columns (total 17 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   Unnamed: 0     20000 non-null  int64  
 1   text           20000 non-null  object 
 2   favorited      20000 non-null  bool   
 3   favoriteCount  20000 non-null  int64  
 4   replyToSN      1225 non-null   object 
 5   created        20000 non-null  object 
 6   truncated      20000 non-null  bool   
 7   replyToSID     1171 non-null   float64
 8   id             20000 non-null  int64  
 9   replyToUID     1225 non-null   float64
 10  statusSource   20000 non-null  object 
 11  screenName     20000 non-null  object 
 12  retweetCount   20000 non-null  int64  
 13  isRetweet      20000 non-null  bool   
 14  retweeted      20000 non-null  bool   
 15  longitude      1 non-null      float64
 16  latitude       1 non-null      float64
dtypes: bool(4), float64(4), int64(4), object(5)
memory usage: 2.1+ MB
```

In [548]:
```
1 df.describe()
```

Out[548]:

	Unnamed: 0	favoriteCount	replyToSID	id	replyToUID	retweetCount	longit
count	20000.000000	20000.000000	1.171000e+03	2.000000e+04	1.225000e+03	20000.000000	1.(
mean	10000.500000	0.582100	1.440683e+18	1.450593e+18	5.024448e+17	1088.191600	90.4
std	5773.647028	23.777835	8.254990e+16	3.279439e+13	5.857636e+17	1400.126043	
min	1.000000	0.000000	7.193971e+09	1.450543e+18	1.200000e+01	0.000000	90.4
25%	5000.750000	0.000000	1.450359e+18	1.450561e+18	1.407433e+08	47.000000	90.4
50%	10000.500000	0.000000	1.450518e+18	1.450591e+18	2.876471e+09	383.000000	90.4
75%	15000.250000	0.000000	1.450565e+18	1.450625e+18	1.084767e+18	2016.000000	90.4
max	20000.000000	2243.000000	1.450641e+18	1.450641e+18	1.450618e+18	9177.000000	90.4

In [549]:
```
1 len(df)
```

Out[549]: 20000

In [550]:
```
1 df.tail(4)
```

Out[550]:

	Unnamed: 0	text	favorited	favoriteCount	replyToSN	created	trunc
19996	19997	RT @upadhyayabhii: Big--<U+092C> <U+0921><U+093C> <U+093E> <U+0938> <U+091A> <U+0906> <U+092F><U+093E> <U+0938><U+093E> <U+092E><U+0928> <U+0947><U+0964> <U+092C><U+093E> <U+0902><U+0917> <U+094D><U+0932> <U+093E><U+0926> <U+0947><U+0936> <U+0915><U+0947> <U+0917><U+0943> <U+0939> <U+092E> <U+0902><U+0924> <U+094D><U+0930> <U+0940> <U+0915> <U+093E> <U+092C> <U+0921><U+093C> <U+093E> <U+092C> <U+092F><U+093E> <U+0928>- <U+0926> <U+0941><U+0930> <U+094D><U+0917> <U+093E> <U+092A> <U+0942><U+091C> <U+093E> <U+092A> <U+0902><U+0921> <U+093E><U+0932> <U+094B><U+0902> <U+092A><U+0930> <U+0939><U+092E> <U+0932><U+0947> <U+0915><U+0947> <U+0932><U+093F> <U+090F> <U+092A> <U+0939><U+0932> <U+0947> <U+0938> <U+0947> <U+0930> <U+091A><U+0940> <U+0917><U+0908> <U+0925><U+0940> <U+0938><U+093E>	False	0	NaN	2021-10-19 19:22:28	F
19997	19998	Breaking news. @SuPriyoBabul is planning to go to Bangladesh, he may have a better opportunity for a cabinate minis https://t.co/1XFmYjnKqd	False	51	dasgobardhan	2021-10-19 19:22:28	

	Unnamed: 0	text	favorited	favoriteCount	replyToSN	created	trunc
19998	19999	RT @ManMundra: It has gone beyond a point of no return. You can t stop it. It has happened in Afganistan, happening in Pakistan and will ha	False	0	NaN	2021-10-19 19:22:27	F
19999	20000	RT @AskAnshul: After 'Rohingya football club', here is 'Bangladesh Youth'. And, later they changed it to 'Miya Bhai Youth' due to outrage.	False	0	NaN	2021-10-19 19:22:27	F

Cleaning

In [551]:

```
def cleaner(tweet):
    tweet = re.sub("@[A-Za-z0-9]+","",tweet) #Remove @ sign
    tweet = re.sub(r"(?:\@|http?\://|https?\://|www)\S+", "", tweet) #Remove
    tweet = " ".join(tweet.split())
    #tweet = ''.join(c for c in tweet if c not in emoji.UNICODE_EMOJI) #Remo
    tweet = tweet.replace("#", "").replace("_", " ") #Remove hashtag sign bu
    tweet = re.sub(r'[RT:]+','',tweet)#replace RT-tags
    tweet = re.sub('<[^>]+>', '', tweet)

    return tweet
df['text'] = df['text'].map(lambda x: cleaner(x))
```

In [552]:
```
1 df.head(6)
```

Out[552]:

	Unnamed: 0	text	favorited	favoriteCount	replyToSN	created	truncated	replyToSID
0	1	BIG At the request of the Bangladesh Govt. witter deletes Bangladesh Hindu Unity Council's twitter ha	False	0	NaN	2021-10-20 01:52:15	False	NaN
1	2	Hundreds protest in Bangladesh over religious violence	False	0	NaN	2021-10-20 01:52:14	False	NaN
2	3	We are appalled by recent reports of deadly attacks on the Hindu community in Bangladesh. All, including members of religious	False	0	NaN	2021-10-20 01:52:13	False	NaN
3	4	Now, protests in USA against the violence on emples & Hindus in Bangladesh.	False	0	NaN	2021-10-20 01:52:12	False	NaN
4	5	in	False	0	NaN	2021-10-20 01:52:11	False	NaN
5	6	Bangladesh 27 20WorldCup2021 Mahmudullah	False	0	NaN	2021-10-20 01:52:11	True	NaN

In [553]:
```
1 df = df.drop(['replyToSN','longitude','latitude','replyToSID','replyToUID','
```

In [554]:
```
1 df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 20000 entries, 0 to 19999
Data columns (total 7 columns):
 #   Column        Non-Null Count  Dtype 
---  ------        --------------  ----- 
 0   text          20000 non-null  object
 1   created       20000 non-null  object
 2   id            20000 non-null  int64 
 3   statusSource  20000 non-null  object
 4   screenName    20000 non-null  object
 5   retweetCount  20000 non-null  int64 
 6   isRetweet     20000 non-null  bool  
dtypes: bool(1), int64(2), object(4)
memory usage: 957.2+ KB
```

In [555]:
```
1 def clear(tweet):
2     tweet = re.sub('<[^>]+>', '', tweet)
3     return tweet
4 df['statusSource'] = df['statusSource'].map(lambda x: clear(x))
```

In [556]:
```
df.head(4)
```

Out[556]:

	text	created	id	statusSource	screenName	retweetCount	isRetwe
0	BIG At the request of the Bangladesh Govt. witter deletes Bangladesh Hindu Unity Council's twitter ha	2021-10-20 01:52:15	1450640978625236992	Twitter for iPhone	arvind291	292	Tr
1	Hundreds protest in Bangladesh over religious violence	2021-10-20 01:52:14	1450640973856317445	Twitter Web App	gojharan	280	Tr
2	We are appalled by recent reports of deadly attacks on the Hindu community in Bangladesh. All, including members of religious	2021-10-20 01:52:13	1450640971083907073	Twitter for Android	amodbhardwaj	898	Tr
3	Now, protests in USA against the violence on emples & Hindus in Bangladesh.	2021-10-20 01:52:12	1450640963878096901	Twitter for Android	VamsiKandula2	4260	Tr

In [557]:
```
df['text'] = df['text'].str.encode('ascii', 'ignore').str.decode('ascii')
```

In [558]:
```
df.text
```

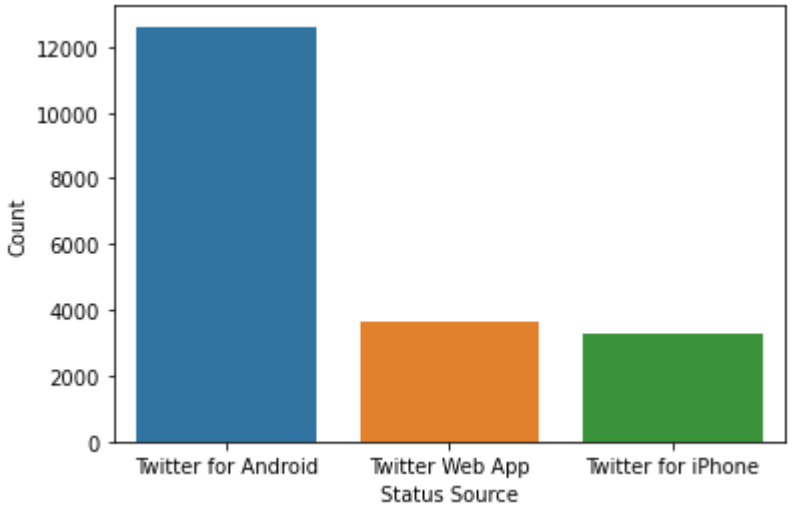
```
46                                                                  Now, pr
otests in USA against the violence on emples &amp;amp; Hindus in Bangladesh.
47                                headache for Bangladesh.. but Bangladesh is
gonna facing png so easy win on cards for ban.. oman needs to cross the
48                  gs Exactly a week ago, this picture triggered a wave of
anti-hindu violence in Bangladesh (book planted by suspected Jamaat-e-Is
49                nazmul Media in Bangladesh have grown a habit of censoring
news. Some covered the anti-Hindu violence so timidly that it almost fe
50
in
51
Hyderabad  Bangladesh  .. Pakistan
52                                Oman simply have to show up and give it the
ir all, as they have been - bludgeoning PNG and running Bangladesh close
53                          he communal violence initiated after purported re
ports of desecration of the Holy Quran at a Durga Puja venue on the bank
54
in
55                     woke  Bangladesh Hindu Unity Council twitter account
```

In [559]:
```
df["statusSource_count"] = 1
df_statusSource = df.groupby(['statusSource'], as_index=False, sort=False)[[
df_statusSource = df_statusSource.sort_values("statusSource_count", axis = 0
df_statusSource
```

Out[559]:

	statusSource	statusSource_count
2	Twitter for Android	12617
1	Twitter Web App	3661
0	Twitter for iPhone	3288

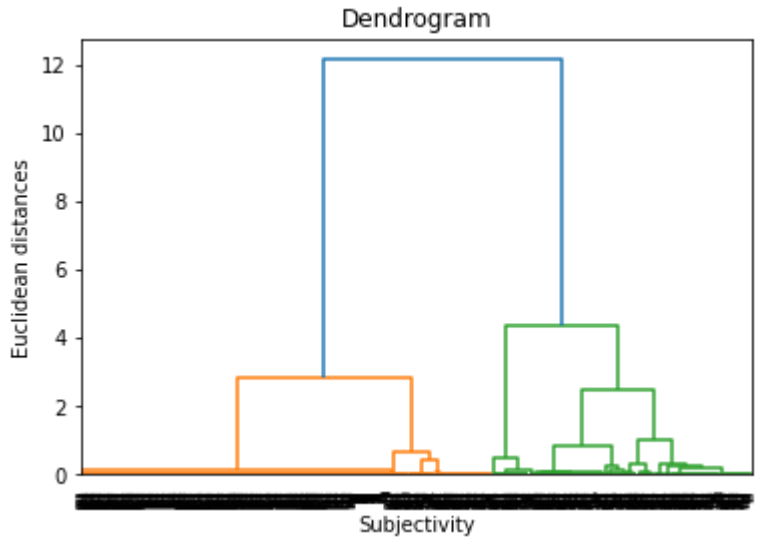
In [560]:
```
sns.barplot(df_statusSource.statusSource,df_statusSource.statusSource_count)
plt.xlabel("Status Source")
plt.ylabel("Count")
plt.show()
```



Clustering

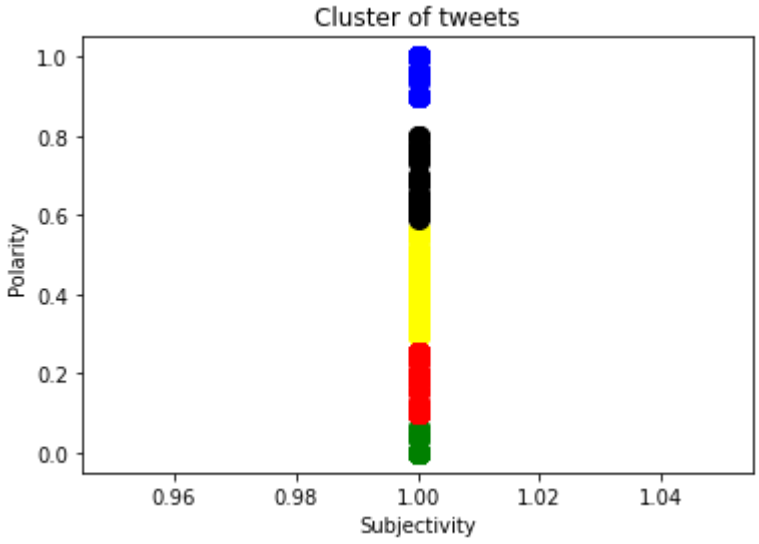
In [561]:
```
def subjectivity_check(tweet):
    return TextBlob(tweet).sentiment.subjectivity
def polarity_check(tweet):
    return TextBlob(tweet).sentiment.polarity

#Applying the values of subjectivity_check and polarity_check to our newly a
df['subjectivity']=df['text'].apply(subjectivity_check)
df['polarity']=df['text'].apply(polarity_check)
```

In [562]:
```
data=df.iloc[0:1000, [7,8]].values
import scipy.cluster.hierarchy as sch
dendogram = sch.dendrogram(sch.linkage(data, method = 'ward'))
plt.title('Dendrogram')
plt.xlabel('Subjectivity')
plt.ylabel('Euclidean distances')
plt.show()
```



In [563]:
```
from sklearn.cluster import AgglomerativeClustering
clusters = AgglomerativeClustering(n_clusters=5, affinity='euclidean', linka
p_clusters=clusters.fit_predict(data)
```

In [564]:
```
plt.scatter(data[p_clusters == 0,0], data[p_clusters == 0,1], s=100, c='yell
plt.scatter(data[p_clusters == 1,0], data[p_clusters == 1,1], s=100, c='blac
plt.scatter(data[p_clusters == 2,0], data[p_clusters == 2,1], s=100, c='blue
plt.scatter(data[p_clusters == 3,0], data[p_clusters == 3,1], s=100, c='gree
plt.scatter(data[p_clusters == 4,0], data[p_clusters == 4,1], s=100, c='red'
plt.title("Cluster of tweets")
plt.xlabel('Subjectivity')
plt.ylabel('Polarity')
plt.show()
```



K Means Clustering

In [565]:
```
data = df['text']
data.head()
```

Out[565]:
```
0                                BIG At the request of the Bangladesh Govt. witte
r deletes Bangladesh Hindu Unity Council's twitter ha
1                                                                              H
undreds protest in Bangladesh over religious violence
2      We are appalled by recent reports of deadly attacks on the Hindu communi
ty in Bangladesh. All, including members of religious
3                                                  Now, protests in USA again
st the violence on emples &amp;amp; Hindus in Bangladesh.
4
in
Name: text, dtype: object
```

Converting text to TF-IDF

In [566]:
```
tf_idf_vectorizor = TfidfVectorizer(stop_words = 'english',
                                    max_features = 5000)
%time tf_idf = tf_idf_vectorizor.fit_transform(data.values.astype('U')) #ast
tf_idf_norm = normalize(tf_idf)
tf_idf_array = tf_idf_norm.toarray()
```

```
Wall time: 385 ms
```

In [567]:
```
pd.DataFrame(tf_idf_array, columns=tf_idf_vectorizor.get_feature_names()).he
```

Out[567]:

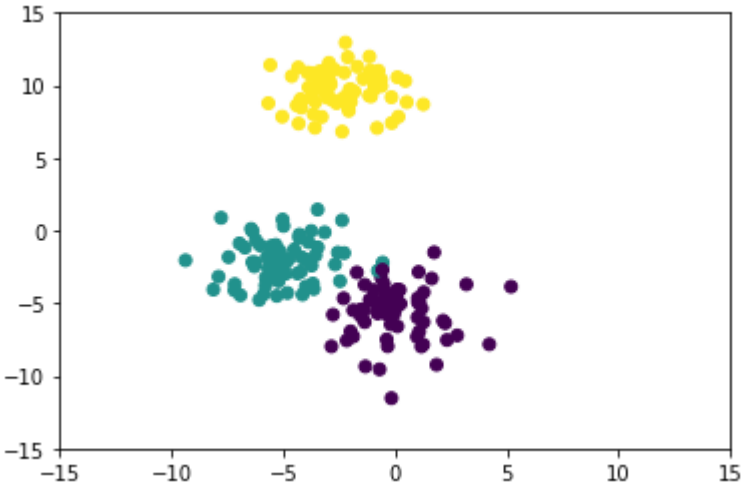
	000	007	01	034	04	07	070	0774	08	0mar	10	100	1000	1000s	101	101st	105	1(
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0

In [568]:

```
class Kmeans:
    def __init__(self, k, seed = None, max_iter = 200):
        self.k = k
        self.seed = seed
        if self.seed is not None:
            np.random.seed(self.seed)
        self.max_iter = max_iter

 ##Randomly initialising centroids which returns array of k centroids chosen
    def initialise_centroids(self, data):
        initial_centroids = np.random.permutation(data.shape[0])[:self.k]
        self.centroids = data[initial_centroids]

        return self.centroids

 ##Compute distance of data from clusters and assign data pointto closest cl
    def assign_clusters(self, data):
        if data.ndim == 1:
            data = data.reshape(-1, 1)

        dist_to_centroid =  pairwise_distances(data, self.centroids, metric
        self.cluster_labels = np.argmin(dist_to_centroid, axis = 1)

        return  self.cluster_labels

##Computes average of all data points in cluster and assigns new centroids a

    def update_centroids(self, data):
        self.centroids = np.array([data[self.cluster_labels == i].mean(axis
        return self.centroids
##to Predict which cluster data point belongs to
    def predict(self, data):
        return self.assign_clusters(data)

## contains the main loop to fit the algorithm Implements initialise centroi
## Returns instance of kmeans class

    def fit_kmeans(self, data):
        self.centroids = self.initialise_centroids(data)

        for iter in range(self.max_iter):

            self.cluster_labels = self.assign_clusters(data)
            self.centroids = self.update_centroids(data)
            if iter % 100 == 0:
                print("Running Model Iteration %d " %iter)
        print("Model finished running")
        return self
```

In [569]:
```
# create blobs
data = make_blobs(n_samples=200, n_features=2, centers=3, cluster_std=1.6, r
# create np array for data
points = data[0]
# create scatter plot
plt.scatter(data[0][:,0], data[0][:,1], c=data[1], cmap='viridis')
plt.xlim(-15,15)
plt.ylim(-15,15)

X = data[0]
X[2]
```

Out[569]:
```
array([-3.58040006,  7.08578225])
```



In [570]:
```
temp_k  = Kmeans(3, 1, 600)
temp_fitted  = temp_k.fit_kmeans(X)
new_data = np.array([[1.066, -8.66],
                     [1.87876, -6.516],
                     [-1.59728965,  8.45369045],
                     [1.87876, -6.516]])
temp_fitted.predict(new_data)
```

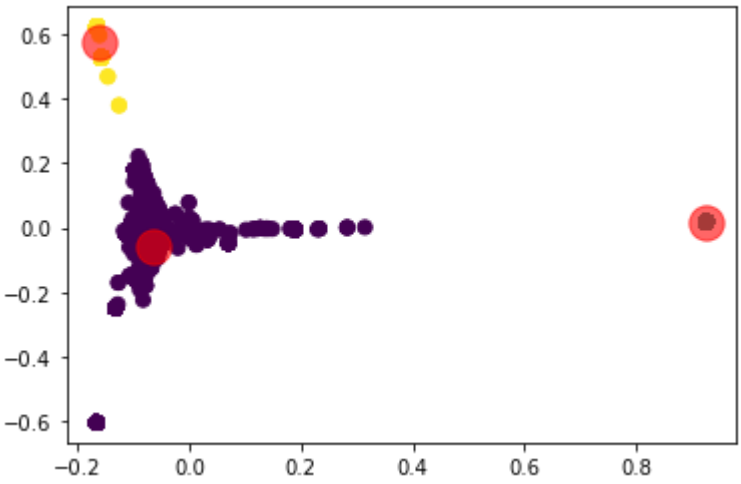
```
Running Model Iteration 0
Running Model Iteration 100
Running Model Iteration 200
Running Model Iteration 300
Running Model Iteration 400
Running Model Iteration 500
Model finished running
```

Out[570]:
```
array([0, 0, 1, 0], dtype=int64)
```

In [571]:

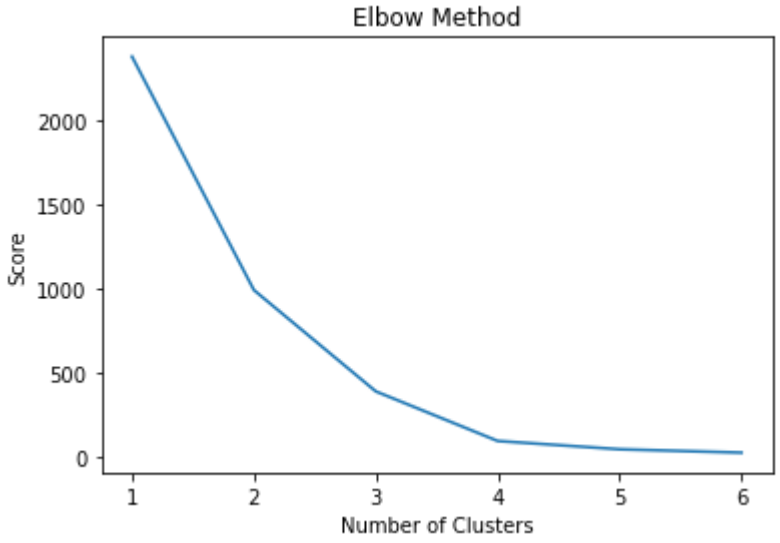
```
from sklearn.cluster import KMeans
n_clusters = 3
sklearn_pca = PCA(n_components = 2)
Y_sklearn = sklearn_pca.fit_transform(tf_idf_array)
kmeans = KMeans(n_clusters= n_clusters, max_iter=600, algorithm = 'auto')
%time fitted = kmeans.fit(Y_sklearn)
prediction = kmeans.predict(Y_sklearn)

plt.scatter(Y_sklearn[:, 0], Y_sklearn[:, 1],c=prediction ,s=50, cmap='virid

centers2 = fitted.cluster_centers_
plt.scatter(centers2[:, 0], centers2[:, 1],c='red', s=300, alpha=0.6);
```

```
Wall time: 80.8 ms
```



Choosing optimal clusters using Elbow method

In [572]:
```
number_clusters = range(1, 7)

kmeans = [KMeans(n_clusters=i, max_iter = 600) for i in number_clusters]
kmeans

score = [kmeans[i].fit(Y_sklearn).score(Y_sklearn) for i in range(len(kmeans
score = [i*-1 for i in score]

plt.plot(number_clusters, score)
plt.xlabel('Number of Clusters')
plt.ylabel('Score')
plt.title('Elbow Method')
plt.show()
```



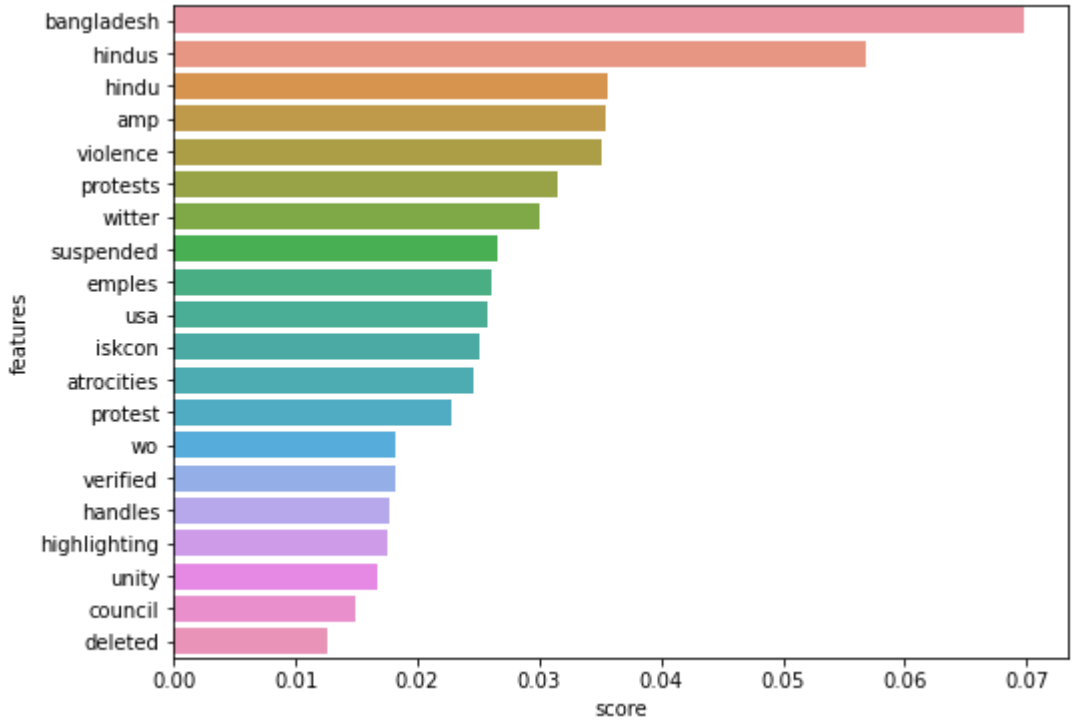
Extracting top features

In [573]:
```
def get_top_features_cluster(tf_idf_array, prediction, n_feats):
    labels = np.unique(prediction)
    dfs = []
    for label in labels:
        id_temp = np.where(prediction==label) # indices for each cluster
        x_means = np.mean(tf_idf_array[id_temp], axis = 0) # returns average
        sorted_means = np.argsort(x_means)[::-1][:n_feats] # indices with to
        features = tf_idf_vectorizor.get_feature_names()
        best_features = [(features[i], x_means[i]) for i in sorted_means]
        df1 = pd.DataFrame(best_features, columns = ['features', 'score'])
        dfs.append(df1)
    return dfs
dfs = get_top_features_cluster(tf_idf_array, prediction, 20)
```

Cluster 1

In [574]:
```
1 import seaborn as sns
2 plt.figure(figsize=(8,6))
3 sns.barplot(x = 'score' , y = 'features', orient = 'h' , data = dfs[0][:20])
```

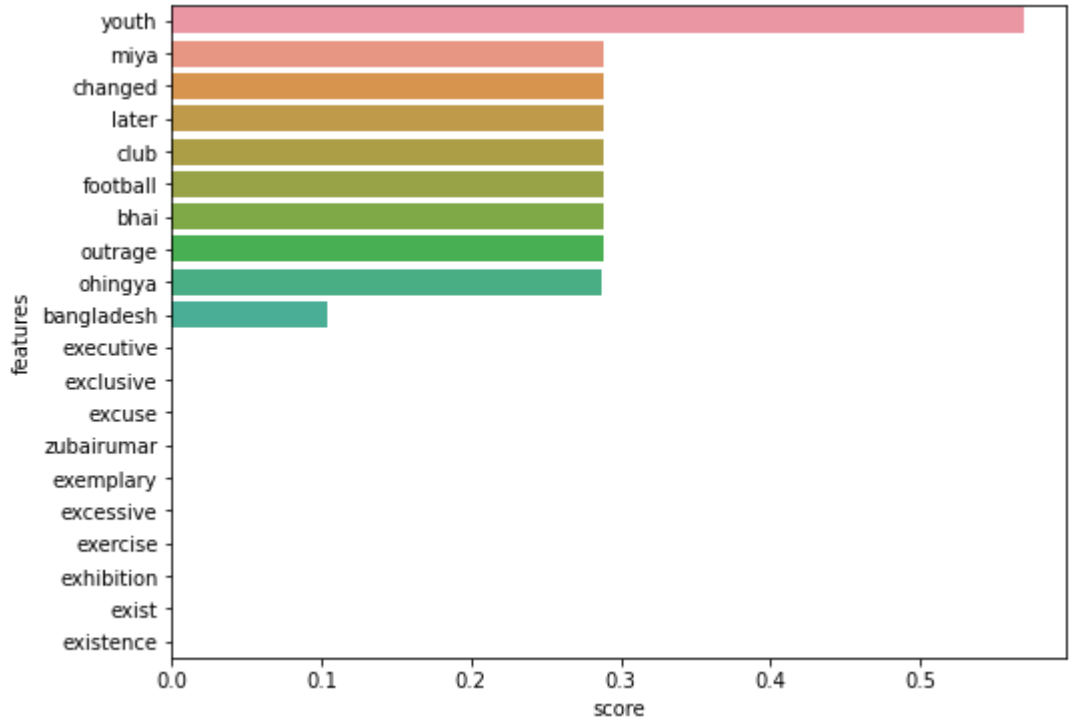
Out[574]: <AxesSubplot:xlabel='score', ylabel='features'>



Cluster 2

In [575]:
```
plt.figure(figsize=(8,6))
sns.barplot(x = 'score' , y = 'features', orient = 'h' , data = dfs[1][:20])
```

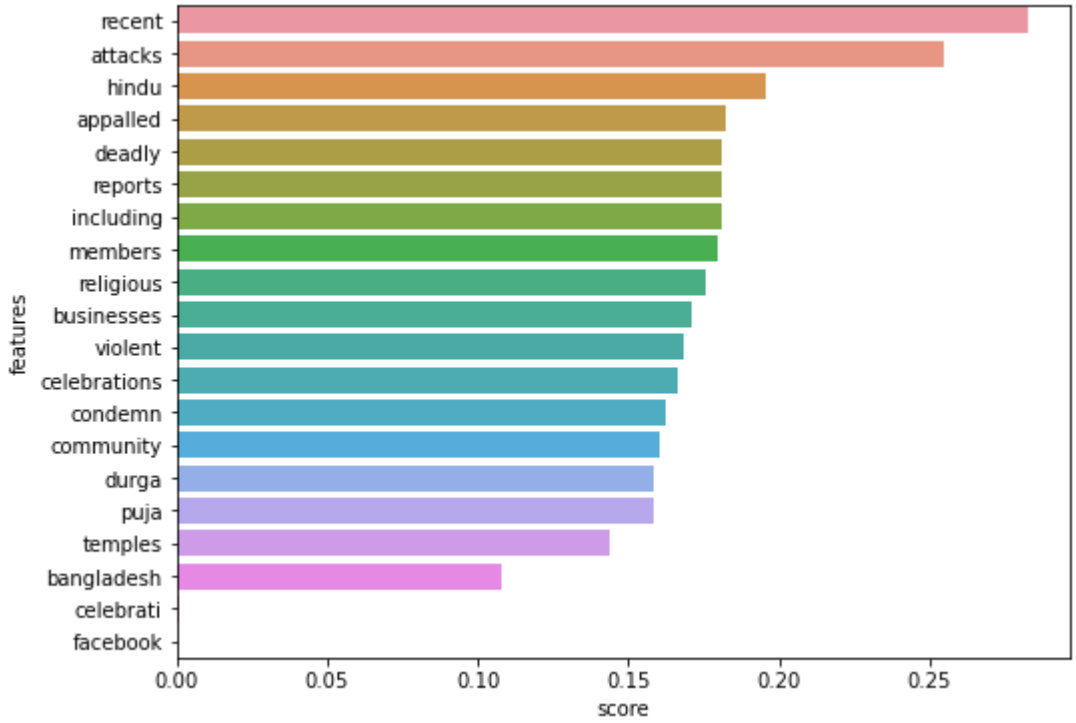
Out[575]: <AxesSubplot:xlabel='score', ylabel='features'>



Cluster 3

In [576]:
```
plt.figure(figsize=(8,6))
sns.barplot(x = 'score' , y = 'features', orient = 'h' , data = dfs[2][:20])
```

Out[576]: <AxesSubplot:xlabel='score', ylabel='features'>

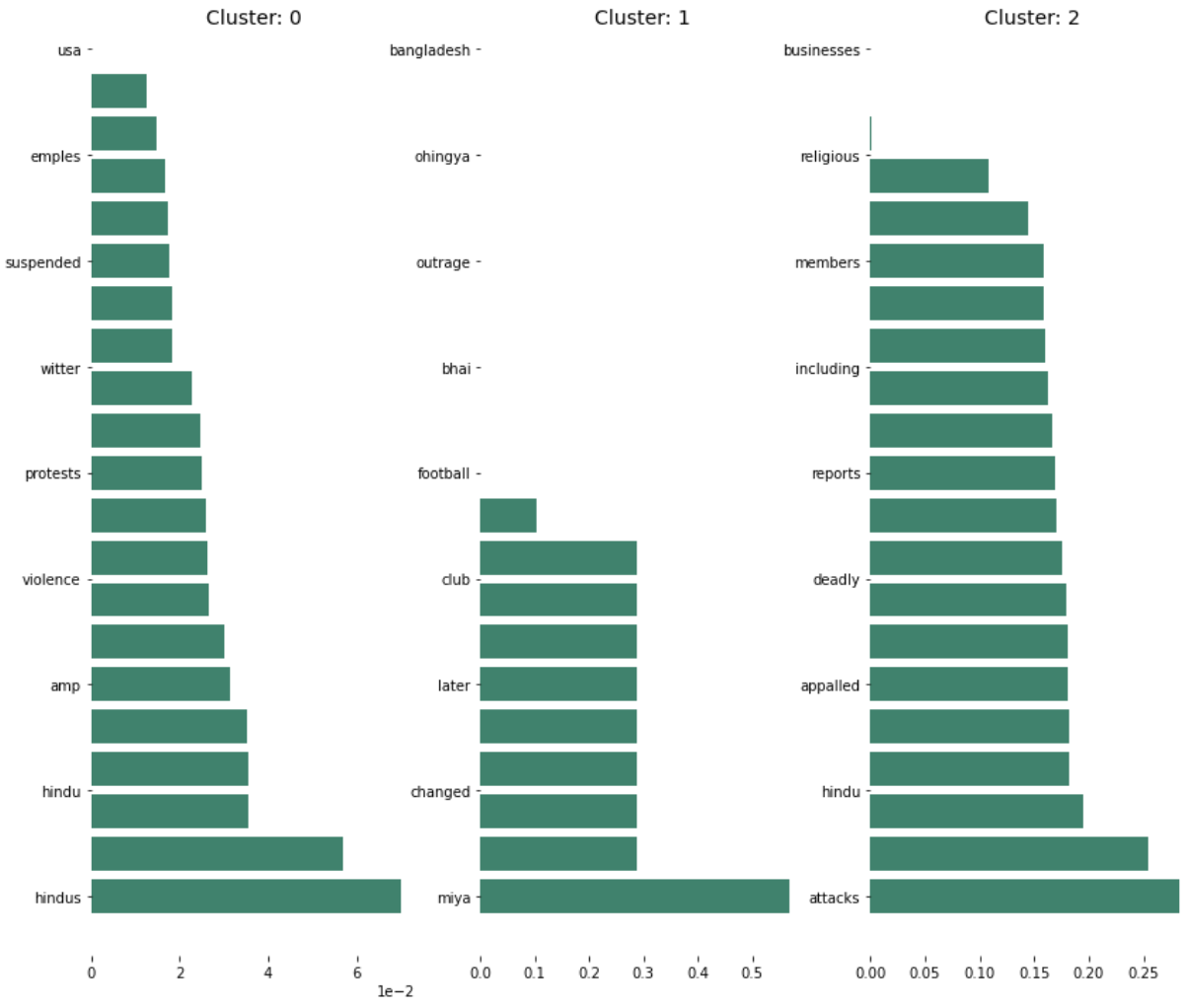


Cluster visualization

In [577]:
```
for i, df1 in enumerate(dfs):
    df1.to_csv('df_'+str(i)+'.csv')
```

In [578]:

```
def plot_features(dfs):
    fig = plt.figure(figsize=(14,12))
    x = np.arange(len(dfs[0]))
    for i, df1 in enumerate(dfs):
        ax = fig.add_subplot(1, len(dfs), i+1)
        ax.set_title("Cluster: "+ str(i), fontsize = 14)
        ax.spines["top"].set_visible(False)
        ax.spines["right"].set_visible(False)
        ax.set_frame_on(False)
        ax.get_xaxis().tick_bottom()
        ax.get_yaxis().tick_left()
        ax.ticklabel_format(axis='x', style='sci', scilimits=(-2,2))
        ax.barh(x, df1.score, align='center', color='#40826d')
        yticks = ax.set_yticklabels(df1.features)
    plt.show();
plot_features(dfs)
```



Word Cloud

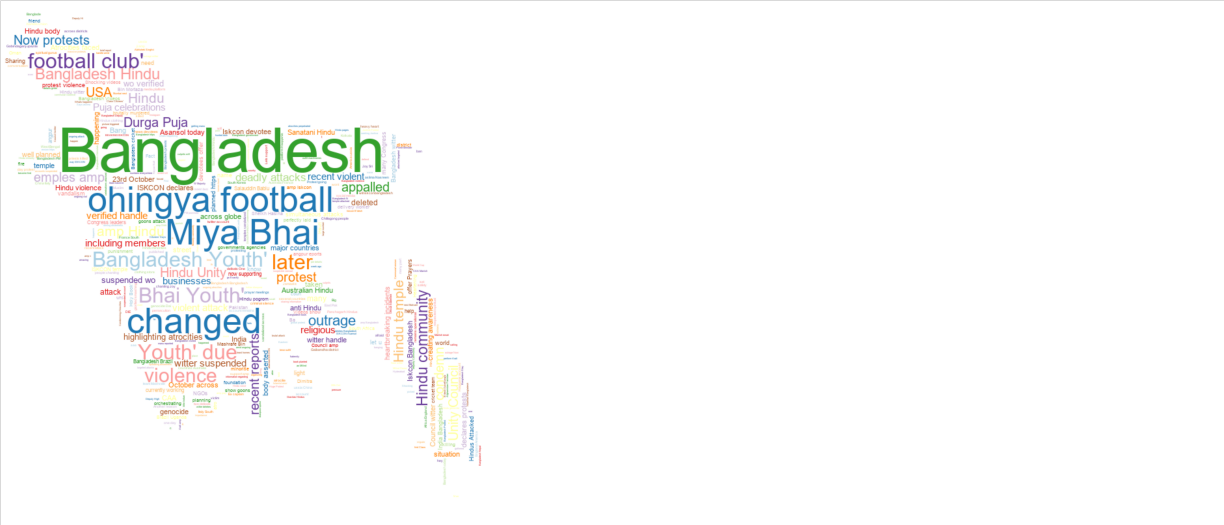
In [579]:
```
stopwords = set(STOPWORDS)
```

In [580]:
```
mask = np.array(Image.open("yoyo.png"))
```

In [581]:
```
1 mask
```

Out[581]:
```
array([[[255, 255, 255],
        [255, 255, 255],
        [255, 255, 255],
        ...,
        [255, 255, 255],
        [255, 255, 255],
        [255, 255, 255]],

       [[255, 255, 255],
        [255, 255, 255],
        [255, 255, 255],
        ...,
        [255, 255, 255],
        [255, 255, 255],
        [255, 255, 255]],

       [[255, 255, 255],
        [255, 255, 255],
        [255, 255, 255],
        ...,
        [255, 255, 255],
        [255, 255, 255],
        [255, 255, 255]],

       ...,

       [[255, 255, 255],
        [255, 255, 255],
        [255, 255, 255],
        ...,
        [255, 255, 255],
        [255, 255, 255],
        [255, 255, 255]],

       [[255, 255, 255],
        [255, 255, 255],
        [255, 255, 255],
        ...,
        [255, 255, 255],
        [255, 255, 255],
        [255, 255, 255]],

       [[255, 255, 255],
        [255, 255, 255],
        [255, 255, 255],
        ...,
        [255, 255, 255],
        [255, 255, 255],
        [255, 255, 255]]], dtype=uint8)
```

In [582]:
```
wordcloud = WordCloud(max_font_size=200,random_state = 42,
width = mask.shape[1],
height = mask.shape[0], background_color="white", max_words=2000000,
mask=mask,font_path = 'arial',colormap="Paired").generate(' '.join(df.text))
plt.figure( figsize=(100,100) )
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis("off")
plt.show()
```



Sentiment Analysis

In [583]:
```
def Analysis_score(score):
    if score < 0:
        return 'Negative'
    elif score == 0:
        return 'Neutral'
    else:
        return 'Positive'
df['Analysis']=df['polarity'].apply(Analysis_score)
```

In [584]:

```
# Printing positive tweets
print("Printing positive tweets:\n")
j=1
sortedDF = df.sort_values (by=[ 'polarity']) #Sort the tweets
for i in range(0, sortedDF.shape[0] ):
    if( sortedDF['Analysis'][i] == 'Positive'):
        print(str(j) + ') '+ sortedDF['text'][i])
    print()
j= j+1
```

```
1)  gs Exactly a week ago, this picture triggered a wave of anti-Hindu Viol
ence in Bangladesh (book planted by suspected Jamaat-e-Is

1)  Protest going in many parts of the world. We are planning a one-day pro
test and prayer meetings for the victims in Bangladesh, on

1)  com Sheikh Hasina is playing fast and loose on the genocide of Banglade
```

In [585]:
```
# Printing negative tweets
print("Printing negative tweets:\n")
j=1
sortedDF = df.sort_values (by=[ 'polarity'],ascending=False) #Sort the tweet
for i in range(0, sortedDF.shape[0] ):
    if( sortedDF['Analysis'][i] == 'Negative'):
        print(str(j) + ') '+ sortedDF['text'][i])
    print()
j= j+1
```

```
ity in Bangladesh. All, including members of religious

1)   Isckon devote of Bangladesh has organized iftar party to Muslim brother
and recently he was killed. Pray f

1)   salam ights of minorities are inviolable. Sheikh Hasina citing Muslim p
ersecutions in India as an excuse for the attack on Hindus




1)   We are appalled by recent reports of deadly attacks on the Hindu commun
ity in Bangladesh. All, including members of religious



1)   Hindus are forced to migrate from Bangladesh and Kashmir. Understand th
e importance of demography. Understand the ta
```

In [586]:
```
# Print the percentage of positive tweets
ptweets = df[df.Analysis == 'Positive']
ptweets = ptweets['text']
ptweets
round( (ptweets.shape[0] / df.shape[0]) * 100,1)
```

Out[586]: 19.9

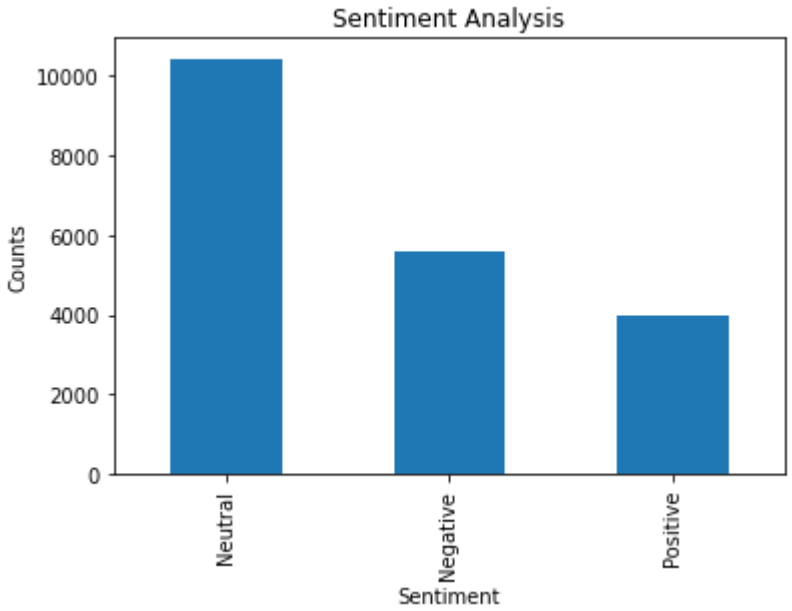
In [587]:
```
# Print the percentage of negative tweets
ntweets = df [df.Analysis == 'Negative']
ntweets = ntweets['text']
ntweets
round ((ntweets.shape[0] / df.shape[0]) * 100, 1)
```

Out[587]: 27.9

In [588]:
```
df['Analysis'].value_counts()
```

Out[588]:
```
Neutral     10430
Negative     5587
Positive     3983
Name: Analysis, dtype: int64
```

In [589]:
```
# PLotting and visuaLizing the counts
plt.title('Sentiment Analysis')
plt.xlabel('Sentiment')
plt.ylabel('Counts')
df['Analysis'].value_counts().plot(kind = 'bar')
plt.show()
```



Topic Model

In [590]:
```
cv = CountVectorizer(max_df=0.95, min_df=2 , stop_words = 'english')
dtm = cv.fit_transform(df.text)
dtm
```

Out[590]:
```
<20000x4494 sparse matrix of type '<class 'numpy.int64'>'
        with 186894 stored elements in Compressed Sparse Row format>
```

In [591]:
```
LDA = LatentDirichletAllocation(n_components=7,random_state=42)
LDA.fit(dtm)
```

Out[591]:
```
LatentDirichletAllocation(n_components=7, random_state=42)
```

In [592]:
```
len(cv.get_feature_names())
```

Out[592]:
```
4494
```

In [593]:
```
import random
```

In [594]:
```
for i in range(10):
    random_word_id = random.randint(0,4494)
    print(cv.get_feature_names()[random_word_id])
```

```
iss
cricfreak
manik
foreign
event
alam
acadmy
cases
shopee
maqsood
```

In [595]:
```
len(LDA.components_)
```

Out[595]: 7

In [596]:
```
LDA.components_
```

Out[596]:
```
array([[ 0.14295631,  0.14297732,  0.14285716, ...,  0.14285718,
         0.14285717,  0.14285716],
       [ 0.14285725,  0.14285728,  0.14285717, ...,  0.1428572 ,
         0.14285718,  0.14285717],
       [ 0.14287411,  0.14285728,  0.14285717, ...,  0.1428572 ,
         3.14273036,  0.14285717],
       ...,
       [ 0.14286319,  0.14296415,  0.14285719, ...,  0.14285724,
         0.14298375,  0.1428572 ],
       [ 3.26392242,  0.14285727,  0.14285717, ...,  0.14294099,
         0.14285718,  3.14285695],
       [46.02147272,  0.14290996,  0.14285716, ...,  0.14287758,
         0.14285717,  0.14285717]])
```

In [597]:
```
len(LDA.components_[0])
```

Out[597]: 4494

In [598]:
```
single_topic = LDA.components_[0]
```

In [599]:
```
single_topic.argsort()
single_topic[4094]
single_topic[4456]

single_topic.argsort()[-10:]
top_word_indices = single_topic.argsort()[-10:]


```

In [600]:
```
for index in top_word_indices:
    print(cv.get_feature_names()[index])
```

```
miya
changed
later
club
football
bhai
outrage
ohingya
youth
bangladesh
```

In [601]:
```
for index, topic in enumerate(LDA.components_):
    print(f'THE TOP 15 WORDS FOR TOPIC #{index}')
    print([cv.get_feature_names()[i] for i in topic.argsort()[-15:]])
    print('\n')
```

```
THE TOP 15 WORDS FOR TOPIC #0
['handles', 'wo', 'witter', 'suspended', 'hindus', 'miya', 'changed', 'later',
'club', 'football', 'bhai', 'outrage', 'ohingya', 'youth', 'bangladesh']


THE TOP 15 WORDS FOR TOPIC #1
['worker', 'bablu', 'salauddin', 'need', 'help', 'know', 'district', 'south',
'usa', 'emples', 'violence', 'amp', 'protests', 'hindus', 'bangladesh']


THE TOP 15 WORDS FOR TOPIC #2
['october', 'incidents', 'today', 'council', 'protests', 'iskcon', 'unity', 'at
rocities', 'taken', 'protest', 'community', 'genocide', 'hindus', 'hindu', 'ban
gladesh']


THE TOP 15 WORDS FOR TOPIC #3
['victims', 'working', 'going', 'offer', 'ban', 'ussia', 'amp', 'devotees', 'pr
ayers', 'violence', 'iskcon', 'hindus', 'india', 'protest', 'bangladesh']


THE TOP 15 WORDS FOR TOPIC #4
['hindus', 'simultaneous', 'asserted', 'australian', 'body', 'planned', 'com',
'attacks', 'https', 'temples', '17', 'amp', 'like', 'bangladesh', 'hindu']


THE TOP 15 WORDS FOR TOPIC #5
['unity', 'iskcon', 'witter', 'appalled', 'deadly', 'reports', 'including', 'me
mbers', 'community', 'hindus', 'religious', 'recent', 'attacks', 'hindu', 'bang
ladesh']


THE TOP 15 WORDS FOR TOPIC #6
['hindus', 'violence', 'iskcon', 'amp', 'businesses', 'recent', 'condemn', 'vio
lent', 'celebrations', 'temples', 'attacks', 'durga', 'puja', 'hindu', 'banglad
esh']
```

In [602]:
```
dtm.shape
```

Out[602]: (20000, 4494)

In [603]:
```
topic_results = LDA.transform(dtm)
topic_results.shape
```

Out[603]: (20000, 7)

In [604]:
```
1 topic_results[0:10]
```

Out[604]:
```
array([[0.01102874, 0.01099436, 0.01102568, 0.01100621, 0.01100623,
        0.9339299 , 0.01100889],
       [0.0238539 , 0.02399315, 0.02388642, 0.02401353, 0.02385474,
        0.8565171 , 0.02388116],
       [0.01190975, 0.01190838, 0.0119149 , 0.01190897, 0.01191327,
        0.92852337, 0.01192136],
       [0.01788423, 0.89270404, 0.01788151, 0.01788782, 0.01787331,
        0.01788509, 0.017884  ],
       [0.14285714, 0.14285714, 0.14285714, 0.14285714, 0.14285714,
        0.14285714, 0.14285714],
       [0.82809848, 0.02880152, 0.02859439, 0.02860095, 0.02860074,
        0.02860636, 0.02869756],
       [0.01190975, 0.01190838, 0.0119149 , 0.01190897, 0.01191327,
        0.92852337, 0.01192136],
       [0.92844933, 0.01190946, 0.01194992, 0.01191212, 0.01193029,
        0.01192721, 0.01192166],
       [0.9141727 , 0.01430631, 0.01431343, 0.01430167, 0.01429274,
        0.01431449, 0.01429866],
       [0.14285714, 0.14285714, 0.14285714, 0.14285714, 0.14285714,
        0.14285714, 0.14285714]])
```

In [605]:
```
1 df.head()
```

Out[605]:

	text	created	id	statusSource	screenName	retweetCount	isRetwe
0	BIG At the request of the Bangladesh Govt. witter deletes Bangladesh Hindu Unity Council's twitter ha	2021-10-20 01:52:15	1450640978625236992	Twitter for iPhone	arvind291	292	Tr
1	Hundreds protest in Bangladesh over religious violence	2021-10-20 01:52:14	1450640973856317445	Twitter Web App	gojharan	280	Tr
2	We are appalled by recent reports of deadly attacks on the Hindu community in Bangladesh. All, including members of religious	2021-10-20 01:52:13	1450640971083907073	Twitter for Android	amodbhardwaj	898	Tr
3	Now, protests in USA against the violence on emples & Hindus in Bangladesh.	2021-10-20 01:52:12	1450640963878096901	Twitter for Android	VamsiKandula2	4260	Tr
4	in	2021-10-20 01:52:11	1450640962468737024	Twitter for Android	Karan_Hu_Mei	2012	Tr

In [ ]:
```
1
```

In [ ]:
```
1
```

In [ ]:
```
1
```

In [ ]:
```
1
```