By Nitish Adhikari

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In [1]:

```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
```

In [ ]:

```
comments=pd.read_csv('UScomments.csv',error_bad_lines=False)
```

In [3]:

```
comments.head()
```

Out[3]:

	video_id	comment_text	likes	replies
0	XpVt6Z1Gjjo	Logan Paul it's yo big day ‼️‼️‼️	4	0
1	XpVt6Z1Gjjo	I've been following you from the start of your...	3	0
2	XpVt6Z1Gjjo	Say hi to Kong and maverick for me	3	0
3	XpVt6Z1Gjjo	MY FAN . attendance	3	0
4	XpVt6Z1Gjjo	trending 😉	3	0

In [4]:

```
#find out missing values in data
comments.isna().sum()
```

Out[4]:

```
video_id         0
comment_text    25
likes            0
replies          0
dtype: int64
```

In [5]:

```
##drop missing values as we have very few & update dataframe
comments.dropna(inplace=True)
```

In [6]:

```
comments.isna().sum()
```

Out[6]:

```
video_id        0
comment_text    0
likes           0
replies         0
dtype: int64
```

perform Sentiment Analysis

```
In short , Sentiment analysis is all about analyszing sentiments of Users
```

In [7]:

```
# sentiment analysis using TextBlob which is a NLP library built on top of NLTK )..
```

In [ ]:

```
!pip install textblob
```

In [9]:

```
from textblob import TextBlob
```

In [10]:

```
TextBlob('Logan Paul its yo big day ‼‼‼').sentiment.polarity
```

Out[10]:

```
0.0
```

In [11]:

```
df=comments[0:1000]
```

In [12]:

```
polarity=[]
for comment in comments['comment_text']:
    try:
        polarity.append(TextBlob(comment).sentiment.polarity)
    except:
        polarity.append(0)
```

In [13]:

```
print(polarity[0:50])
```

```
[0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.8, -0.13571428571428573, 0.0, 0.2, -0.023333333333333352, 0.5, 0.0, 0.8,
-0.2916666666666667, 0.0, 0.25, -0.8, 0.0, 0.0, 0.65, 0.0, 0.375, 0.0, 0.0, 0.5, -0.04999999999999999, 0.3444805194
8051944, 0.5, 0.6, 0.0, 0.0, -0.30625, 0.28828125, -0.36458333333333337, 0.5, 0.012499999999999997, 0.1190476190476
1905, 0.16666666666666666, 0.0, -0.4, -0.125, -0.07142857142857142, 0.40727272727272723, 0.0, 0.35, 0.0, -0.0341558
4415584416]
```

In [14]:

```
comments.shape
```

Out[14]:

```
(691375, 4)
```

In [15]:

```
comments.head(3)
```

Out[15]:

	video_id	comment_text	likes	replies
0	XpVt6Z1Gjjo	Logan Paul it's yo big day !!!!!	4	0
1	XpVt6Z1Gjjo	I've been following you from the start of your...	3	0
2	XpVt6Z1Gjjo	Say hi to Kong and maverick for me	3	0

In [16]:

```
comments['polarity']=polarity
```

In [17]:

```
comments.head(12)
```

Out[17]:

	video_id	comment_text	likes	replies	polarity
0	XpVt6Z1Gjjo	Logan Paul it's yo big day !!!!!	4	0	0.000000
1	XpVt6Z1Gjjo	I've been following you from the start of your...	3	0	0.000000
2	XpVt6Z1Gjjo	Say hi to Kong and maverick for me	3	0	0.000000
3	XpVt6Z1Gjjo	MY FAN . attendance	3	0	0.000000
4	XpVt6Z1Gjjo	trending 😉	3	0	0.000000
5	XpVt6Z1Gjjo	#1 on trending AYYEEEEE	3	0	0.000000
6	XpVt6Z1Gjjo	The end though 😭👍🏻❤️	4	0	0.000000
7	XpVt6Z1Gjjo	#1 trending!!!!!!!!	3	0	0.000000
8	XpVt6Z1Gjjo	Happy one year vlogaversary	3	0	0.800000
9	XpVt6Z1Gjjo	You and your shit brother may have single hand...	0	0	-0.135714
10	XpVt6Z1Gjjo	There should be a mini Logan Paul too!	0	0	0.000000
11	XpVt6Z1Gjjo	Dear Logan, I really wanna get your Merch but ...	0	0	0.200000

Wordcloud Analysis of data

In [1]:

```
### Lets perform EDA for the Positve sentences
```

In [19]:

```
comments_positive=comments[comments['polarity']==1]
```

In [20]:

```
comments_negative=comments[comments['polarity']==-1]
```

In [21]:

```
comments_negative.head(2)
```

Out[21]:

	video_id	comment_text	likes	replies	polarity
512	8wNr-NQImFg	BEN CARSON IS THE MAN!!!!! THEY HATE HIM CAUSE...	0	0	-1.0
562	8wNr-NQImFg	Well… The brain surgeon Ben Carson just proved...	0	0	-1.0

In [ ]:

```

```

In [22]:

```
!pip install wordcloud
```

In [23]:

```
from wordcloud import WordCloud , STOPWORDS
```

In [24]:

```
comments_negative['comment_text']
```

Out[24]:

```
512       BEN CARSON IS THE MAN!!!!! THEY HATE HIM CAUSE...
562       Well… The brain surgeon Ben Carson just proved...
952              WHY DID YOU MAKE FURRY FORCE?! SO NASTY!!!
1371                                        WTF BRUH!!!!!!
1391                         cheeseus christ thats insane!!!
                                ...
690788                                  Like Kelly she evil
690865                       R U FUCKING KIDDING ME?!?!?!?!
691073             This is horribly offensive please report
691180    Sink holes looks terrifying sinkholes sink you...
691224    Trump talked to the president of US Virgin Isl...
Name: comment_text, Length: 3508, dtype: object
```

In [25]:

```
total_comments=' '.join(comments_negative['comment_text'])
```

In [26]:

```
total_comments[0:100]
```

Out[26]:

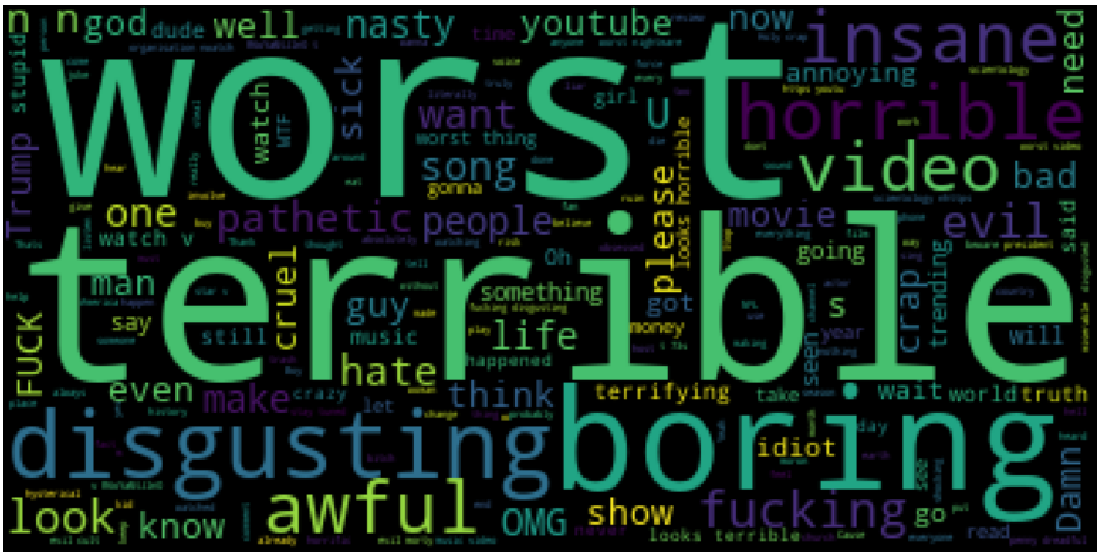
```
"BEN CARSON IS THE MAN!!!!! THEY HATE HIM CAUSE HE EXPOSED HITLARY'S RITUAL ABUSE ON CHILDREN!!!!!!! "
```

In [27]:

```
wordcloud=WordCloud(stopwords=set(STOPWORDS)).generate(total_comments)
plt.figure(figsize=(15,5))
plt.imshow(wordcloud)
plt.axis('off')
```

Out[27]:

```
(-0.5, 399.5, 199.5, -0.5)
```



In [28]:

```
# Conclusion-->> Users are emphasizing more on Terrible , worst ,horrible ,boring , disgusting etc
```

In [ ]:

```

```

In [29]:

```
# perform EDA for the Negative sentences
```

In [30]:

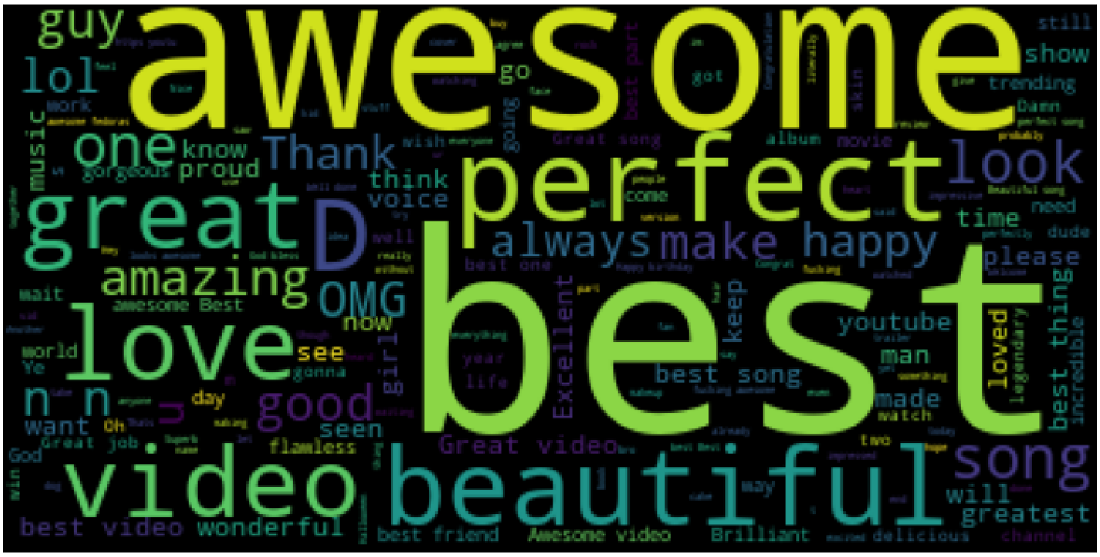
```
total_comments2=' '.join(comments_positive['comment_text'])
```

In [31]:

```
wordcloud=WordCloud(stopwords=set(STOPWORDS)).generate(total_comments2)
plt.figure(figsize=(15,5))
plt.imshow(wordcloud)
plt.axis('off')
```

Out[31]:

```
(-0.5, 399.5, 199.5, -0.5)
```



In [ ]:

```

```

3. Perform Emoji's Analysis

In [32]:

```
!pip install emoji
```

```
Requirement already satisfied: emoji in c:\users\ecotone11\appdata\local\programs\python\python37\lib\site-packages
(2.2.0)

WARNING: There was an error checking the latest version of pip.
```

In [33]:

```
import emoji
```

In [34]:

```
comments.head(14)
```

Out[34]:

	video_id	comment_text	likes	replies	polarity
0	XpVt6Z1Gjjo	Logan Paul it's yo big day !!!!!	4	0	0.000000
1	XpVt6Z1Gjjo	I've been following you from the start of your...	3	0	0.000000
2	XpVt6Z1Gjjo	Say hi to Kong and maverick for me	3	0	0.000000
3	XpVt6Z1Gjjo	MY FAN . attendance	3	0	0.000000
4	XpVt6Z1Gjjo	trending 😉	3	0	0.000000
5	XpVt6Z1Gjjo	#1 on trending AYYEEEEE	3	0	0.000000
6	XpVt6Z1Gjjo	The end though 😭👍🏻❤️	4	0	0.000000
7	XpVt6Z1Gjjo	#1 trending!!!!!!!!	3	0	0.000000
8	XpVt6Z1Gjjo	Happy one year vlogaversary	3	0	0.800000
9	XpVt6Z1Gjjo	You and your shit brother may have single hand...	0	0	-0.135714
10	XpVt6Z1Gjjo	There should be a mini Logan Paul too!	0	0	0.000000
11	XpVt6Z1Gjjo	Dear Logan, I really wanna get your Merch but ...	0	0	0.200000
12	XpVt6Z1Gjjo	Honestly Evan is so annoying. Like its not fun...	0	0	-0.023333
13	XpVt6Z1Gjjo	Casey is still better then logan	0	0	0.500000

In [ ]:

```

```

In [35]:

```
#list of emojis in all comments
emoji_list=[]
for comment in comments['comment_text']:
    for char in comment:
        if char in emoji.EMOJI_DATA:
            emoji_list.append(char)
```

In [36]:

```
len(emoji_list) #total items in emoji_list
```

Out[36]:

```
294549
```

In [37]:

```
len(pd.Series(emoji_list).unique()) #unique items in emoji_list
```

Out[37]:

```
1098
```

In [38]:

```
from collections import Counter
```

In [39]:

```
Counter(emoji_list) #generate dictionary of count of each emoji
```

Out[39]:

```
Counter({'‼': 211,
         '😉': 998,
         '😭': 8398,
         '👍': 5476,
         ' ': 3438,
         '❤': 31119,
         '😍': 33453,
         '💋': 968,
         '💙': 2831,
         '👈': 126,
         '😂': 36987,
         '🔥': 8694,
         '👻': 268,
         '💎': 316,
         '😆': 1149,
         '😁': 2220,
         '😒': 629,
         '👏': 5719,
```

In [40]:

```
Counter(emoji_list).most_common(10) #10 most common emojis
```

Out[40]:

```
[('😂', 36987),
 ('😍', 33453),
 ('❤', 31119),
 ('🔥', 8694),
 ('😭', 8398),
 ('👏', 5719),
 ('😘', 5545),
 ('👍', 5476),
 ('💖', 5359),
 ('💕', 5147)]
```

In [41]:

```
#accesing 1st element of list
Counter(emoji_list).most_common(10)[0]
```

Out[41]:

```
('😂', 36987)
```

In [42]:

```
#accesing 1st item of 1st element of list
Counter(emoji_list).most_common(10)[0][0]
```

Out[42]:

```
'😂'
```

In [43]:

```
#Extracting all the emoji from 10 most comman in a list
emojis = [Counter(emoji_list).most_common(10)[i][0] for i in range(10)]
emojis
```

Out[43]:

```
['😂', '😍', '❤', '🔥', '😭', '👏', '😘', '👍', '💖', '💕']
```

In [44]:

```
#Extracting frequenciesof emoji from 10 most comman in a list
freqs = [Counter(emoji_list).most_common(10)[i][1] for i in range(10)]
freqs
```

Out[44]:

```
[36987, 33453, 31119, 8694, 8398, 5719, 5545, 5476, 5359, 5147]
```

In [45]:

```
!pip install plotly
```

```
Requirement already satisfied: plotly in c:\users\ecotone11\appdata\local\programs\python\python37\lib\site-package
s (5.10.0)
Requirement already satisfied: tenacity>=6.2.0 in c:\users\ecotone11\appdata\local\programs\python\python37\lib\sit
e-packages (from plotly) (8.1.0)

WARNING: There was an error checking the latest version of pip.
```

In [46]:

```
import plotly.graph_objects as go
from plotly.offline import iplot
```

In [47]:

```
trace = go.Bar(x=emojis,y=freqs)
trace
```

Out[47]:

```
Bar({
    'x': [😂, 😍, ❤, 🔥, 😭, 👏, 😘, 👍, 💖, 💕],
    'y': [36987, 33453, 31119, 8694, 8398, 5719, 5545, 5476, 5359, 5147]
})
```

In [48]:

```
iplot([trace])
```

In [ ]:

```

```

Collect Entire Data of Youtube

In [49]:

```
import os
```

In [50]:

```
path = r'E:\Nitish\pd\PJT\Sentiment Analysis\additional_data'
```

In [51]:

```
files=os.listdir(path) #list of files in path
files
```

Out[51]:

```
['CAvideos.csv',
 'CA_category_id.json',
 'DEvideos.csv',
 'DE_category_id.json',
 'FRvideos.csv',
 'FR_category_id.json',
 'GBvideos.csv',
 'GB_category_id.json',
 'INvideos.csv',
 'IN_category_id.json',
 'JPvideos.csv',
 'JP_category_id.json',
 'KRvideos.csv',
 'KR_category_id.json',
 'MXvideos.csv',
 'MX_category_id.json',
 'RUvideos.csv',
 'RU_category_id.json',
 'USvideos.csv',
 'US_category_id.json']
```

extract list of only .csv files

In [52]:

```
#extract list of only .csv files
files_csv=[files[i] for i in range(0,len(files),2)]
files_csv
```

Out[52]:

```
['CAvideos.csv',
 'DEvideos.csv',
 'FRvideos.csv',
 'GBvideos.csv',
 'INvideos.csv',
 'JPvideos.csv',
 'KRvideos.csv',
 'MXvideos.csv',
 'RUvideos.csv',
 'USvideos.csv']
```

In [53]:

```
#Extract country name from file name
files_csv[0][0:2]
```

Out[53]:

```
'CA'
```

In [ ]:

```
#Creating a full dataframe using all the CSV files in the path
full_df = pd.DataFrame()

for file in files_csv:
    current_df=pd.read_csv(path+'/'+file,encoding='iso-8859-1',error_bad_lines=False)

    current_df['country'] = file[0:2]
    full_df = pd.concat([full_df,current_df])
```

In [55]:

```
#Created full dataframe
full_df.head()
```

Out[55]:

	video_id	trending_date	title	channel_title	category_id	publish_time	tags	view
0	n1WpP7iowLc	17.14.11	Eminem - Walk On Water (Audio) ft. BeyoncÃ©	EminemVEVO	10	2017-11-10T17:00:03.000Z	Eminem|"Walk"|"On"|"Water"|"Aftermath/Shady/In...	1715857
1	0dBIkQ4Mz1M	17.14.11	PLUSH - Bad Unboxing Fan Mail	iDubbbzTV	23	2017-11-13T17:00:00.000Z	plush|"bad unboxing"|"unboxing"|"fan mail"|"id...	101465
2	5qpjK5DgCt4	17.14.11	Racist Superman | Rudy Mancuso, King Bach & Le...	Rudy Mancuso	23	2017-11-12T19:05:24.000Z	racist superman|"rudy"|"mancuso"|"king"|"bach"...	319143
3	d380meD0W0M	17.14.11	I Dare You: GOING BALD!?	nigahiga	24	2017-11-12T18:01:41.000Z	ryan|"higa"|"higatv"|"nigahiga"|"i dare you"|"...	209582
4	2Vv-BfVoq4g	17.14.11	Ed Sheeran - Perfect (Official Music Video)	Ed Sheeran	10	2017-11-09T11:04:14.000Z	edsheeran|"ed sheeran"|"acoustic"|"live"|"cove...	3352362

In [56]:

```
full_df.shape
```

Out[56]:

```
(375942, 17)
```

Analysing the most liked Category

In [57]:

```
cat=pd.read_csv('category_file.txt', sep=':')
cat.head()
```

Out[57]:

	Category_id Category_name
1	Film & Animation
2	Autos & Vehicles
10	Music
15	Pets & Animals
17	Sports

In [58]:

```
cat.reset_index(inplace=True)
```

In [59]:

```
cat.columns =['Category_id', 'Category_name']
```

In [60]:

```
cat.set_index('Category_id',inplace=True)
```

In [61]:

```
cat
```

Out[61]:

	Category_name
Category_id	
1	Film & Animation
2	Autos & Vehicles
10	Music
15	Pets & Animals
17	Sports
18	Short Movies
19	Travel & Events
20	Gaming
21	Videoblogging
22	People & Blogs
23	Comedy
24	Entertainment
25	News & Politics
26	Howto & Style
27	Education
28	Science & Technology
29	Nonprofits & Activism
30	Movies
31	Anime/Animation
32	Action/Adventure
33	Classics
34	Comedy
35	Documentary
36	Drama
37	Family
38	Foreign
39	Horror
40	Sci-Fi/Fantasy
41	Thriller
42	Shorts
43	Shows
44	Trailers

In [62]:

```
dct=cat.to_dict() #converting dataframe to dictonary
dct
```

Out[62]:

```
{'Category_name': {1: ' Film & Animation',
  2: ' Autos & Vehicles',
  10: ' Music',
  15: ' Pets & Animals',
  17: ' Sports',
  18: ' Short Movies',
  19: ' Travel & Events',
  20: ' Gaming',
  21: ' Videoblogging',
  22: ' People & Blogs',
  23: ' Comedy',
  24: ' Entertainment',
  25: ' News & Politics',
  26: ' Howto & Style',
  27: ' Education',
  28: ' Science & Technology',
  29: ' Nonprofits & Activism',
  30: ' Movies',
  31: ' Anime/Animation',
  32: ' Action/Adventure',
  33: ' Classics',
  34: ' Comedy',
  35: ' Documentary',
  36: ' Drama',
  37: ' Family',
  38: ' Foreign',
  39: ' Horror',
  40: ' Sci-Fi/Fantasy',
  41: ' Thriller',
  42: ' Shorts',
  43: ' Shows',
  44: ' Trailers            '}}
```

In [63]:

```
dct['Category_name'] #Access category name
```

Out[63]:

```
{1: ' Film & Animation',
 2: ' Autos & Vehicles',
 10: ' Music',
 15: ' Pets & Animals',
 17: ' Sports',
 18: ' Short Movies',
 19: ' Travel & Events',
 20: ' Gaming',
 21: ' Videoblogging',
 22: ' People & Blogs',
 23: ' Comedy',
 24: ' Entertainment',
 25: ' News & Politics',
 26: ' Howto & Style',
 27: ' Education',
 28: ' Science & Technology',
 29: ' Nonprofits & Activism',
 30: ' Movies',
 31: ' Anime/Animation',
 32: ' Action/Adventure',
 33: ' Classics',
 34: ' Comedy',
 35: ' Documentary',
 36: ' Drama',
 37: ' Family',
 38: ' Foreign',
 39: ' Horror',
 40: ' Sci-Fi/Fantasy',
 41: ' Thriller',
 42: ' Shorts',
 43: ' Shows',
 44: ' Trailers            '}
```

In [64]:

```
full_df['category_name']=full_df['category_id'].map(dct['Category_name'])
```

In [65]:

```
full df.head()
```

Out[65]:

	video_id	trending_date	title	channel_title	category_id	publish_time	tags	view
0	n1WpP7iowLc	17.14.11	Eminem - Walk On Water (Audio) ft. BeyoncÃ©	EminemVEVO	10	2017-11-10T17:00:03.000Z	Eminem|"Walk"|"On"|"Water"|"Aftermath/Shady/In...	1715857
1	0dBIkQ4Mz1M	17.14.11	PLUSH - Bad Unboxing Fan Mail	iDubbbzTV	23	2017-11-13T17:00:00.000Z	plush|"bad unboxing"|"unboxing"|"fan mail"|"id...	101465
2	5qpjK5DgCt4	17.14.11	Racist Superman | Rudy Mancuso, King Bach & Le...	Rudy Mancuso	23	2017-11-12T19:05:24.000Z	racist superman|"rudy"|"mancuso"|"king"|"bach"...	319143
3	d380meD0W0M	17.14.11	I Dare You: GOING BALD!?	nigahiga	24	2017-11-12T18:01:41.000Z	ryan|"higa"|"higatv"|"nigahiga"|"i dare you"|"...	209582
4	2Vv-BfVoq4g	17.14.11	Ed Sheeran - Perfect (Official Music Video)	Ed Sheeran	10	2017-11-09T11:04:14.000Z	edsheeran|"ed sheeran"|"acoustic"|"live"|"cove...	3352362

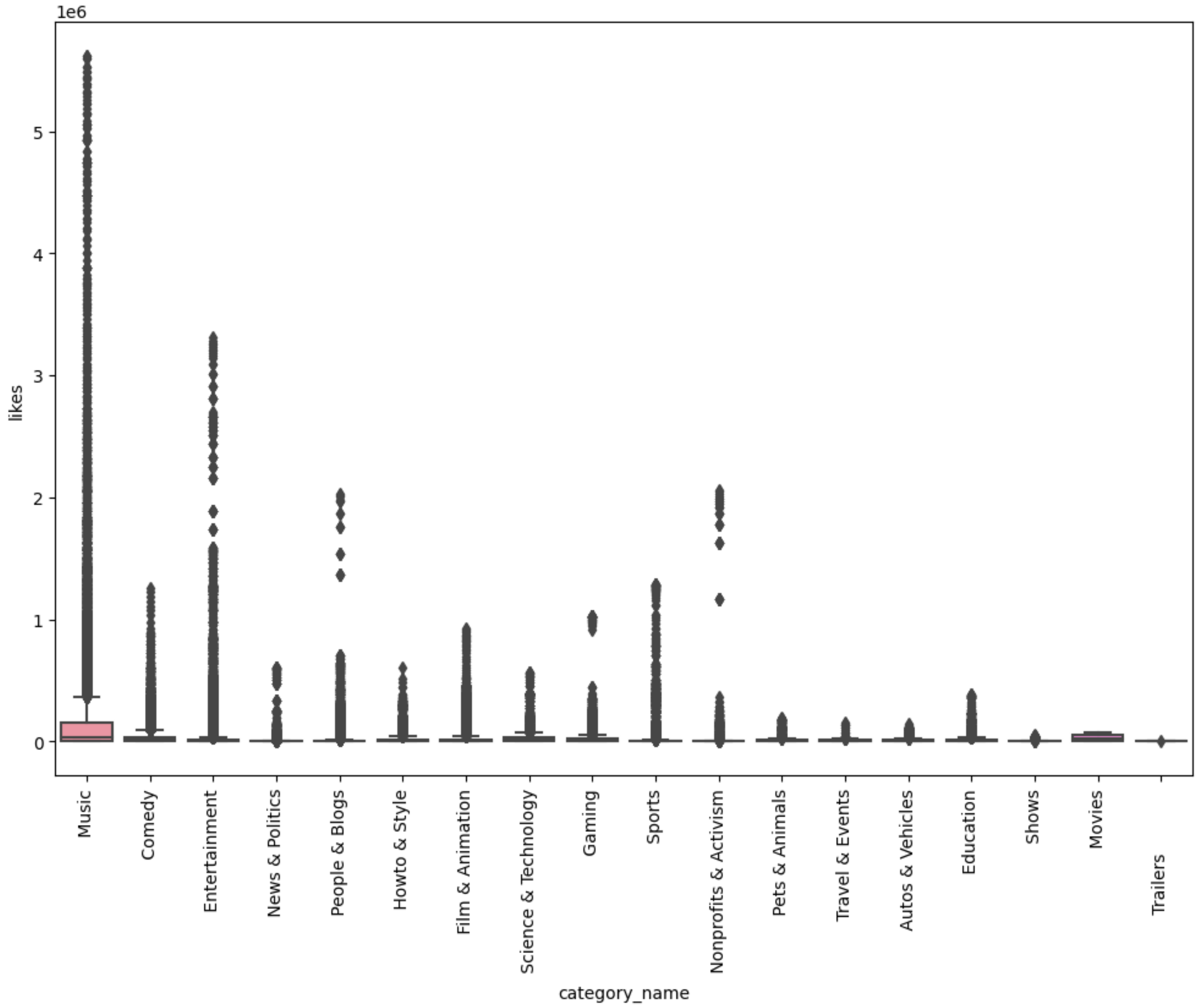
Analyse which category has maximum likes

In [66]:

```
plt.figure(figsize=(12,8))
sns.boxplot(x='category_name',y='likes',data=full_df)
plt.xticks(rotation='vertical')
```

Out[66]:

```
(array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16,
        17]),
 [Text(0, 0, ' Music'),
  Text(1, 0, ' Comedy'),
  Text(2, 0, ' Entertainment'),
  Text(3, 0, ' News & Politics'),
  Text(4, 0, ' People & Blogs'),
  Text(5, 0, ' Howto & Style'),
  Text(6, 0, ' Film & Animation'),
  Text(7, 0, ' Science & Technology'),
  Text(8, 0, ' Gaming'),
  Text(9, 0, ' Sports'),
  Text(10, 0, ' Nonprofits & Activism'),
  Text(11, 0, ' Pets & Animals'),
  Text(12, 0, ' Travel & Events'),
  Text(13, 0, ' Autos & Vehicles'),
  Text(14, 0, ' Education'),
  Text(15, 0, ' Shows'),
  Text(16, 0, ' Movies'),
  Text(17, 0, ' Trailers            ')])
```



Analye whether audience is engaged or not

In [67]:

```
full_df.columns
```

Out[67]:

```
Index(['video_id', 'trending_date', 'title', 'channel_title', 'category_id',
       'publish_time', 'tags', 'views', 'likes', 'dislikes', 'comment_count',
       'thumbnail_link', 'comments_disabled', 'ratings_disabled',
       'video_error_or_removed', 'description', 'country', 'category_name'],
      dtype='object')
```

In [68]:

```
#Features that inciates the engagement of audience
full_df[['views', 'likes', 'dislikes', 'comment_count']].head()
```

Out[68]:

	views	likes	dislikes	comment_count
0	17158579	787425	43420	125882
1	1014651	127794	1688	13030
2	3191434	146035	5339	8181
3	2095828	132239	1989	17518
4	33523622	1634130	21082	85067

In [69]:

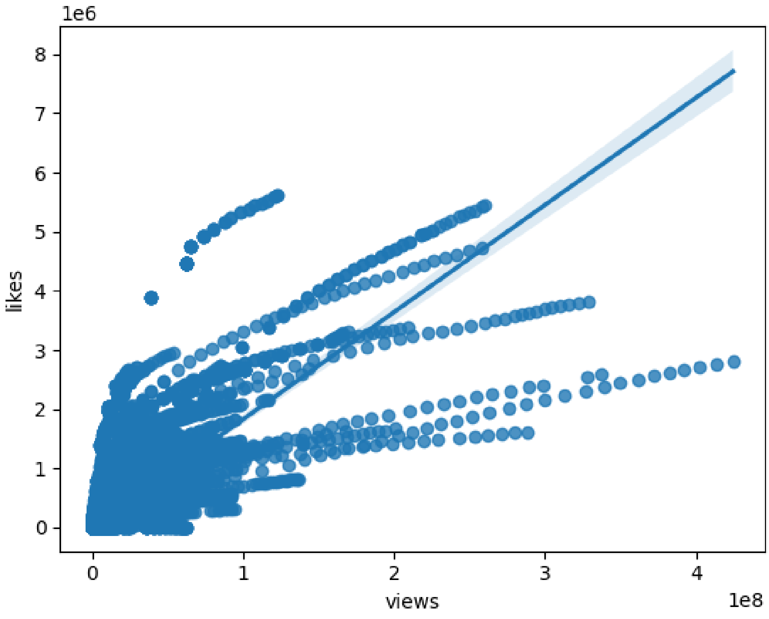
```
#Adding like rate, dislike rate, comment_count_rate to our dataframe
full_df['like_rate']=(full_df['likes']/full_df['views'])*100
full_df['dislike_rate']=(full_df['dislikes']/full_df['views'])*100
full_df['comment_count_rate']=(full_df['comment_count']/full_df['views'])*100
```

In [70]:

```
#regression plot for likes vs views
sns.regplot(data=full_df, x='views', y='likes')
```

Out[70]:

```
<AxesSubplot:xlabel='views', ylabel='likes'>
```

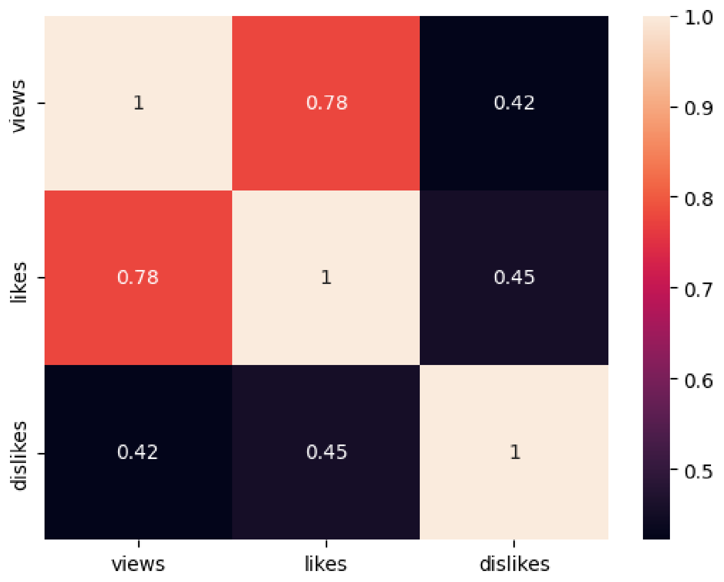


In [71]:

```
#Checking correlation between 'views', 'likes', 'dislikes'
sns.heatmap(full_df[['views', 'likes', 'dislikes']].corr(),annot=True)
```

Out[71]:

```
<AxesSubplot:>
```



In [ ]:

```

```

Which channel has largest number of trending videos

In [72]:

```
#Channels with highest video_id
full_df.groupby('channel_title')['video_id'].count().sort_values(ascending=False)
```

Out[72]:

```
channel_title
The Late Show with Stephen Colbert    984
WWE                                   804
Late Night with Seth Meyers           773
VikatanTV                             763
TheEllenShow                          743
                                     ...
LIGHTS - 001 jrny                       1
bangtanist                              1
LIGAMX Femenil                          1
LIGA COLOMBIANA OFICIAL                 1
Pavel Sidorik TV                        1
Name: video_id, Length: 37824, dtype: int64
```

In [73]:

```
# Making a dataframe and renaming video_id to total videos
cdf=full_df.groupby('channel_title')['video_id'].count().sort_values(ascending=False).to_frame().reset_index().rename(columns={'v
cdf
```

Out[73]:

	channel_title	total_videos
0	The Late Show with Stephen Colbert	984
1	WWE	804
2	Late Night with Seth Meyers	773
3	VikatanTV	763
4	TheEllenShow	743
...	...	...
37819	LIGHTS - 001 jrny	1
37820	bangtanist	1
37821	LIGAMX Femenil	1
37822	LIGA COLOMBIANA OFICIAL	1
37823	Pavel Sidorik TV	1

37824 rows × 2 columns

In [74]:

```
import plotly.express as px
```

In [75]:

```
px.bar(data_frame=cdf[0:20],x='channel_title',y='total_videos')
```

In [ ]:

```

```

Analyse if punctuations in title and tags have any relation with views,likes,dislikes,comments

In [76]:

```
import string
```

In [77]:

```
string.punctuation
```

Out[77]:

```
'!"#$%&\'()*+,-./:;<=>?@[\\]^_`{|}~'
```

In [78]:

```
def punc_count(x):
    return len([c for c in x if c in string.punctuation])
```

In [79]:

```
#Testing the function
punc_count('The Late Show & with Stephen Colbert')
```

Out[79]:

```
1
```

In [80]:

```
#Making a sample dataframe to speed up the comutation time
sample = full_df[0:10000]
```

In [ ]:

```
#Creating a feature of punctuation count on sample dataframe
sample['count_punc']=sample['title'].apply(punc_count)
sample['count_punc']
```

In [82]:

```
sample.head(2) #coun_punc column added to sample dataframe
```

Out[82]:

	video_id	trending_date	title	channel_title	category_id	publish_time	tags	views
0	n1WpP7iowLc	17.14.11	Eminem - Walk On Water (Audio) ft. BeyoncÃ©	EminemVEVO	10	2017-11-10T17:00:03.000Z	Eminem|"Walk"|"On"|"Water"|"Aftermath/Shady/In...	17158579
1	0dBIkQ4Mz1M	17.14.11	PLUSH - Bad Unboxing Fan Mail	iDubbbzTV	23	2017-11-13T17:00:00.000Z	plush|"bad unboxing"|"unboxing"|"fan mail"|"id...	1014651

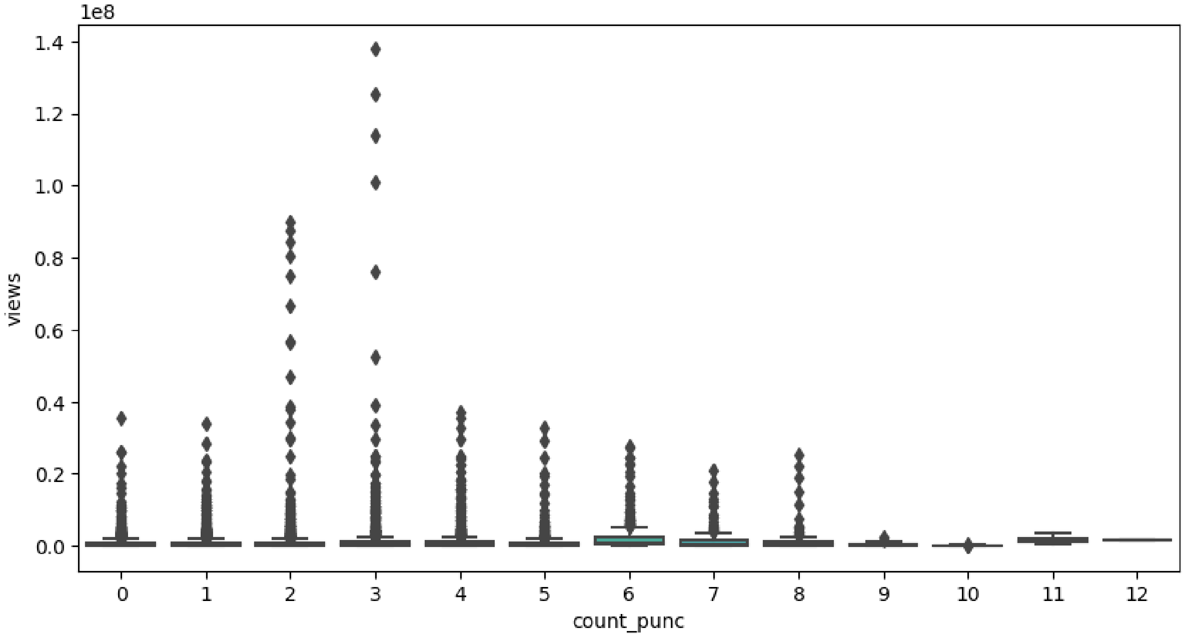
2 rows × 22 columns

```
In [88]:
```

```python
#creating boxplot for views vs count_puc
plt.figure(figsize=(10,5))
sns.boxplot(x='count_punc',y='views',data=sample)
```

```
Out[88]:

<AxesSubplot:xlabel='count_punc', ylabel='views'>
```



```
In [87]:
```

```python
sample['count_punc'].corr(sample['views'])
```

```
Out[87]:

0.0651000978304486
```

Above fig represents there is 0.06 correlation between puncuation count and views