task4

June 22, 2024

[1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from datetime import datetime
```

[2]:
```
df=pd.read_csv("C:\\Users\\kumar\\Desktop\\DATA SETS\\USvideos.csv")
```

[3]:
```
df.head()
```

[3]:

	video_id	trending_date	title	channel_title	category_id	publish_time	tags	views	likes
0	2kyS6SvSYSE	17.14.11	WE WANT TO TALK ABOUT OUR MARRIAGE	CaseyNeistat	22	2017-11-13T17:13:01.000Z	SHANtell martin	748374	57527
1	1ZAPwfrtAFY	17.14.11	The Trump Presidency: Last Week Tonight with J…	LastWeekTonight	24	2017-11-13T07:30:00.000Z	last week tonight trump presidency|"last week …	2418783	97185
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"…	3191434	146033
3	puqaWrEC7tY	17.14.11	Nickelback Lyrics: Real or Fake?	Good Mythical Morning	24	2017-11-13T11:00:04.000Z	rhett and link|"gmm"|"good mythical morning"|"…	343168	10172
4	d380meD0W0M	17.14.11	I Dare You: GOING BALD!?	nigahiga	24	2017-11-12T18:01:41.000Z	ryan|"higa"|"higatv"|"nigahiga"|"i dare you"|"…	2095731	132235

```
   dislikes  comment_count                                thumbnail_link  \
0      2966          15954  https://i.ytimg.com/vi/2kyS6SvSYSE/default.jpg
1      6146          12703  https://i.ytimg.com/vi/1ZAPwfrtAFY/default.jpg
2      5339           8181  https://i.ytimg.com/vi/5qpjK5DgCt4/default.jpg
3       666           2146  https://i.ytimg.com/vi/puqaWrEC7tY/default.jpg
4      1989          17518  https://i.ytimg.com/vi/d380meD0W0M/default.jpg

   comments_disabled  ratings_disabled  video_error_or_removed  \
0              False             False                   False
1              False             False                   False
2              False             False                   False
3              False             False                   False
4              False             False                   False

                                         description
0  SHANTELL'S CHANNEL - https://www.youtube.com/s…
1  One year after the presidential election, John…
2  WATCH MY PREVIOUS VIDEO   \n\nSUBSCRIBE   http…
3  Today we find out if Link is a Nickelback amat…
4  I know it's been a while since we did this sho…
```

[4]:
```
df.shape
```

[4]:
```
(40949, 16)
```

[5]:
```
df=df.drop_duplicates()
df.shape
```

[5]:
```
(40901, 16)
```

[6]:
```
df.describe()
```

[6]:
```
        category_id         views         likes      dislikes  comment_count
count  40901.000000  4.090100e+04  4.090100e+04  4.090100e+04   4.090100e+04
mean      19.970588  2.360678e+06  7.427173e+04  3.711722e+03   8.448567e+03
std        7.569362  7.397719e+06  2.289999e+05  2.904624e+04   3.745139e+04
min        1.000000  5.490000e+02  0.000000e+00  0.000000e+00   0.000000e+00
25%       17.000000  2.419720e+05  5.416000e+03  2.020000e+02   6.130000e+02
50%       24.000000  6.810640e+05  1.806900e+04  6.300000e+02   1.855000e+03
75%       25.000000  1.821926e+06  5.533800e+04  1.936000e+03   5.752000e+03
max       43.000000  2.252119e+08  5.613827e+06  1.674420e+06   1.361580e+06
```

[7]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 40901 entries, 0 to 40948
```

```
Data columns (total 16 columns):
 #   Column                  Non-Null Count  Dtype
---  ------                  --------------  -----
 0   video_id                40901 non-null  object
 1   trending_date           40901 non-null  object
 2   title                   40901 non-null  object
 3   channel_title           40901 non-null  object
 4   category_id             40901 non-null  int64
 5   publish_time            40901 non-null  object
 6   tags                    40901 non-null  object
 7   views                   40901 non-null  int64
 8   likes                   40901 non-null  int64
 9   dislikes                40901 non-null  int64
 10  comment_count           40901 non-null  int64
 11  thumbnail_link          40901 non-null  object
 12  comments_disabled       40901 non-null  bool
 13  ratings_disabled        40901 non-null  bool
 14  video_error_or_removed  40901 non-null  bool
 15  description             40332 non-null  object
dtypes: bool(3), int64(5), object(8)
memory usage: 4.5+ MB
```

[8]:
```
columns_to_remove=['thumbnail_link','description']
df=df.drop(columns=columns_to_remove)
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 40901 entries, 0 to 40948
Data columns (total 14 columns):
 #   Column                  Non-Null Count  Dtype
---  ------                  --------------  -----
 0   video_id                40901 non-null  object
 1   trending_date           40901 non-null  object
 2   title                   40901 non-null  object
 3   channel_title           40901 non-null  object
 4   category_id             40901 non-null  int64
 5   publish_time            40901 non-null  object
 6   tags                    40901 non-null  object
 7   views                   40901 non-null  int64
 8   likes                   40901 non-null  int64
 9   dislikes                40901 non-null  int64
 10  comment_count           40901 non-null  int64
 11  comments_disabled       40901 non-null  bool
 12  ratings_disabled        40901 non-null  bool
 13  video_error_or_removed  40901 non-null  bool
dtypes: bool(3), int64(5), object(6)
memory usage: 3.9+ MB
```

[9]:
```
from datetime import datetime
```

[10]:
```
import datetime
```

[11]:
```
df["trending_date"] = df["trending_date"].apply(lambda x : datetime.datetime.
 ↪strptime(x, '%y.%d.%m'))
df.head(3)
```

[11]:
```
      video_id trending_date  \
0  2kyS6SvSYSE    2017-11-14
1  1ZAPwfrtAFY    2017-11-14
2  5qpjK5DgCt4    2017-11-14

                                               title    channel_title  \
0                WE WANT TO TALK ABOUT OUR MARRIAGE     CaseyNeistat
1  The Trump Presidency: Last Week Tonight with J…  LastWeekTonight
2  Racist Superman | Rudy Mancuso, King Bach & Le…     Rudy Mancuso

   category_id              publish_time  \
0           22  2017-11-13T17:13:01.000Z
1           24  2017-11-13T07:30:00.000Z
2           23  2017-11-12T19:05:24.000Z

                                           tags    views   likes  \
0                                SHANtell martin   748374   57527
1  last week tonight trump presidency|"last week …  2418783   97185
2  racist superman|"rudy"|"mancuso"|"king"|"bach"…  3191434  146033

   dislikes  comment_count  comments_disabled  ratings_disabled  \
0      2966          15954              False             False
1      6146          12703              False             False
2      5339           8181              False             False

   video_error_or_removed
0                   False
1                   False
2                   False
```

[12]:
```
df['publish_time']=pd.to_datetime(df['publish_time'])
df.head(3)
```

[12]:
```
      video_id trending_date  \
0  2kyS6SvSYSE    2017-11-14
1  1ZAPwfrtAFY    2017-11-14
2  5qpjK5DgCt4    2017-11-14

                                               title    channel_title  \
```

```
0                WE WANT TO TALK ABOUT OUR MARRIAGE     CaseyNeistat
1  The Trump Presidency: Last Week Tonight with J…  LastWeekTonight
2  Racist Superman | Rudy Mancuso, King Bach & Le…     Rudy Mancuso

   category_id              publish_time  \
0           22 2017-11-13 17:13:01+00:00
1           24 2017-11-13 07:30:00+00:00
2           23 2017-11-12 19:05:24+00:00

                                                tags    views   likes  \
0                                    SHANtell martin   748374   57527
1  last week tonight trump presidency|"last week …  2418783   97185
2  racist superman|"rudy"|"mancuso"|"king"|"bach"…  3191434  146033

   dislikes  comment_count  comments_disabled  ratings_disabled  \
0      2966          15954              False             False
1      6146          12703              False             False
2      5339           8181              False             False

   video_error_or_removed
0                   False
1                   False
2                   False
```

[13]:
```
df['publish_month']=df['publish_time'].dt.month
df['publish_day']=df['publish_time'].dt.day
df['publish_hour']=df['publish_time'].dt.hour
df.head(3)
```

[13]:
```
       video_id trending_date  \
0  2kyS6SvSYSE    2017-11-14
1  1ZAPwfrtAFY    2017-11-14
2  5qpjK5DgCt4    2017-11-14

                                               title    channel_title  \
0                WE WANT TO TALK ABOUT OUR MARRIAGE     CaseyNeistat
1  The Trump Presidency: Last Week Tonight with J…  LastWeekTonight
2  Racist Superman | Rudy Mancuso, King Bach & Le…     Rudy Mancuso

   category_id              publish_time  \
0           22 2017-11-13 17:13:01+00:00
1           24 2017-11-13 07:30:00+00:00
2           23 2017-11-12 19:05:24+00:00

                                                tags    views   likes  \
0                                    SHANtell martin   748374   57527
1  last week tonight trump presidency|"last week …  2418783   97185
```

```
2  racist superman|"rudy"|"mancuso"|"king"|"bach"…  3191434  146033

   dislikes  comment_count  comments_disabled  ratings_disabled  \
0      2966          15954              False             False
1      6146          12703              False             False
2      5339           8181              False             False

   video_error_or_removed  publish_month  publish_day  publish_hour
0                   False             11           13            17
1                   False             11           13             7
2                   False             11           12            19
```

[14]:
```
print(sorted(df["category_id"].unique()))
```
```
[1,2,10,15,17,19,20,22,23,24,25,26,27,28,29,30,43]
```

```
[1, 2, 10, 15, 17, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 43]
```

[14]:
```
[1, 2, 10, 15, 17, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 43]
```

[15]:
```
df['category_name']=np.nan
df.loc[(df["category_id"]==1), "category_name"]='film and animation'
df.loc[(df["category_id"]==2), "category_name"]='autos and vehicles'
df.loc[(df["category_id"]==10), "category_name"]='music'
df.loc[(df["category_id"]==15), "category_name"]='pets and animals'
df.loc[(df["category_id"]==17), "category_name"]='sports'
df.loc[(df["category_id"]==19), "category_name"]='travel and events'
df.loc[(df["category_id"]==20), "category_name"]='gaming'
df.loc[(df["category_id"]==22), "category_name"]='people and blogs'
df.loc[(df["category_id"]==23), "category_name"]='comedy'
df.loc[(df["category_id"]==24), "category_name"]='entertainment'
df.loc[(df["category_id"]==25), "category_name"]='news and politics'
df.loc[(df["category_id"]==26), "category_name"]='how to and style'
df.loc[(df["category_id"]==27), "category_name"]='education'
df.loc[(df["category_id"]==28), "category_name"]='science and technology'
df.loc[(df["category_id"]==29), "category_name"]='non profit and activism'
df.loc[(df["category_id"]==30), "category_name"]='movies'
df.loc[(df["category_id"]==43), "category_name"]='shows'
df.head()
```

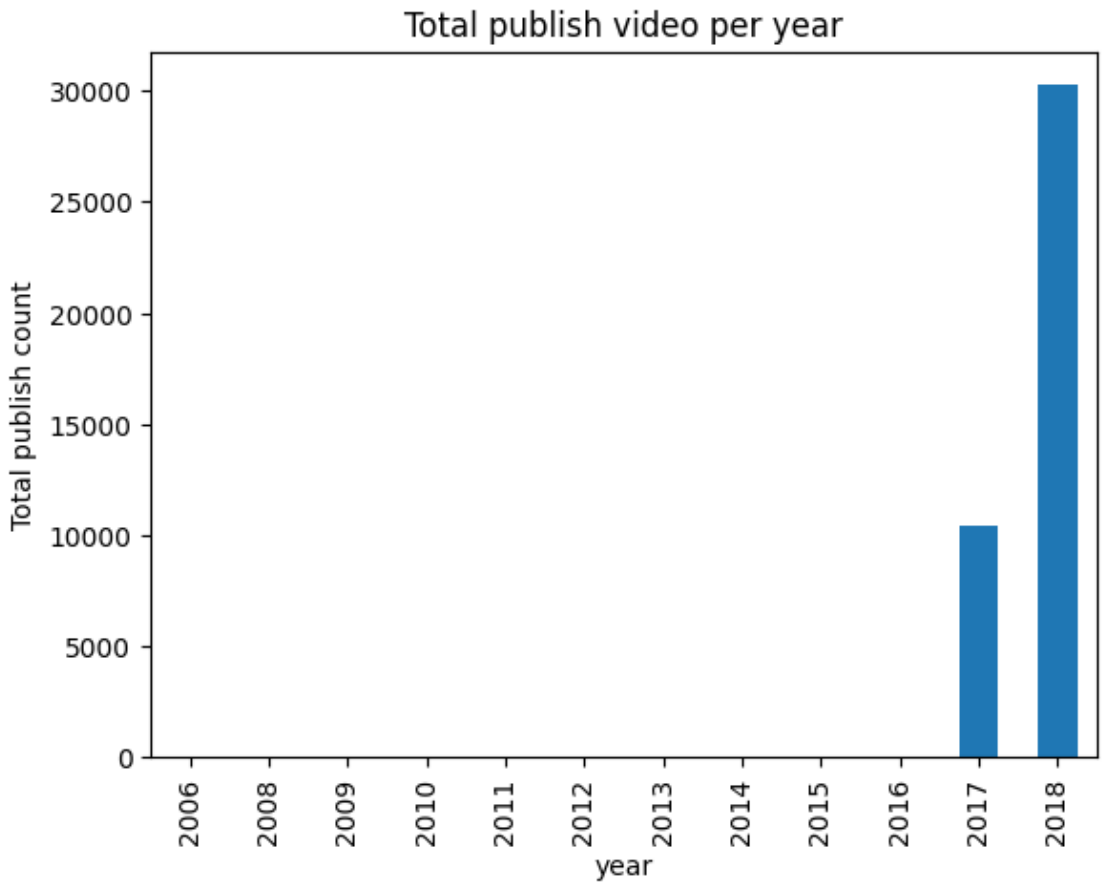
```
C:\Users\kumar\AppData\Local\Temp\ipykernel_22912\1573994590.py:2:
FutureWarning: Setting an item of incompatible dtype is deprecated and will
raise an error in a future version of pandas. Value 'film and animation' has
dtype incompatible with float64, please explicitly cast to a compatible dtype
first.
  df.loc[(df["category_id"]==1), "category_name"]='film and animation'
```

[15]:

```
      video_id trending_date  \
0  2kyS6SvSYSE    2017-11-14
1  1ZAPwfrtAFY    2017-11-14
2  5qpjK5DgCt4    2017-11-14
3  puqaWrEC7tY    2017-11-14
4  d380meD0W0M    2017-11-14

                                                title          channel_title  \
0                    WE WANT TO TALK ABOUT OUR MARRIAGE           CaseyNeistat
1  The Trump Presidency: Last Week Tonight with J…        LastWeekTonight
2  Racist Superman | Rudy Mancuso, King Bach & Le…           Rudy Mancuso
3                      Nickelback Lyrics: Real or Fake?  Good Mythical Morning
4                              I Dare You: GOING BALD!?               nigahiga

   category_id              publish_time  \
0           22 2017-11-13 17:13:01+00:00
1           24 2017-11-13 07:30:00+00:00
2           23 2017-11-12 19:05:24+00:00
3           24 2017-11-13 11:00:04+00:00
4           24 2017-11-12 18:01:41+00:00

                                                 tags    views   likes  \
0                                    SHANtell martin   748374   57527
1  last week tonight trump presidency|"last week …  2418783   97185
2  racist superman|"rudy"|"mancuso"|"king"|"bach"…  3191434  146033
3  rhett and link|"gmm"|"good mythical morning"|"…   343168   10172
4  ryan|"higa"|"higatv"|"nigahiga"|"i dare you"|"…  2095731  132235

   dislikes  comment_count  comments_disabled  ratings_disabled  \
0      2966          15954              False             False
1      6146          12703              False             False
2      5339           8181              False             False
3       666           2146              False             False
4      1989          17518              False             False

   video_error_or_removed  publish_month  publish_day  publish_hour  \
0                   False             11           13            17
1                   False             11           13             7
2                   False             11           12            19
3                   False             11           13            11
4                   False             11           12            18

      category_name
0  people and blogs
1     entertainment
2            comedy
3     entertainment
```

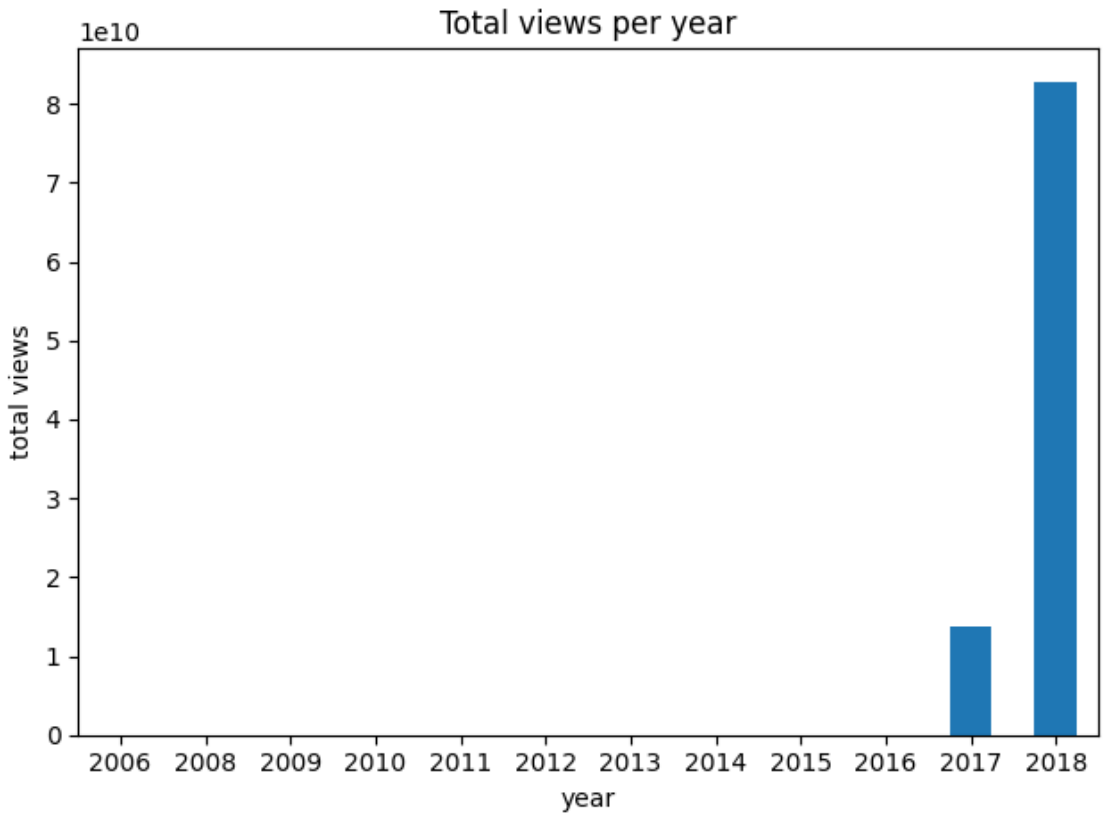
```
4     entertainment
```

[16]:
```
df['year']=df['publish_time'].dt.year
yearly_counts=df.groupby('year')['video_id'].count()

#create a bar chat
yearly_counts.plot(kind='bar',xlabel='year', ylabel='Total publish count',␣
 ↪title='Total publish video per year')

#show the chat
plt.show()
```

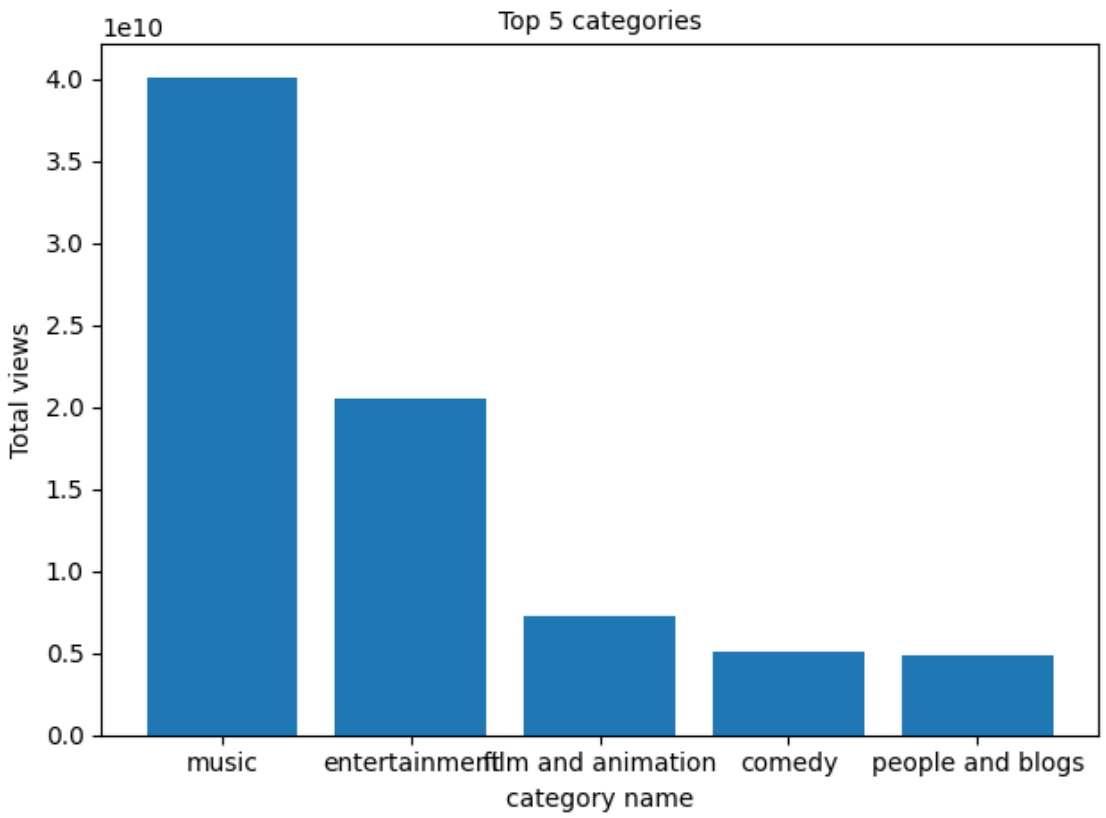


[17]:
```
yearly_views=df.groupby('year')['views'].sum()

#create a bar chat
yearly_views.plot(kind='bar',xlabel='year', ylabel='total views', title='Total␣
 ↪views per year')
plt.xticks(rotation=0)
plt.tight_layout()
```

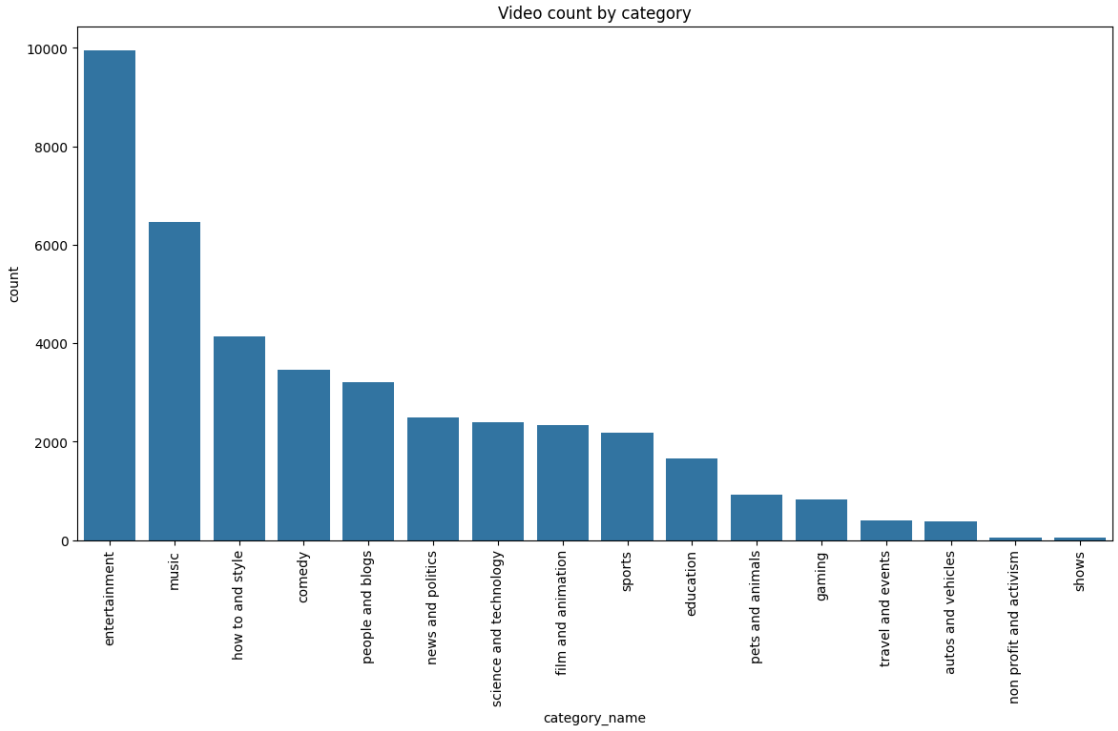
```
#show the chat
plt.show()
```



[25]:
```
#group the data by 'category name' and calculate the sum of 'views' in each␣
 ↪category
category_views=df.groupby('category_name')['views'].sum().reset_index()

#sort categories by video in decreasing order
top_categories=category_views.sort_values(by='views', ascending = False ).
 ↪head(5)

#create a bar plot to visualize the top 5 categories
plt.bar(top_categories['category_name'],top_categories['views'])
plt.xlabel('category name',fontsize=10)
plt.ylabel('Total views',fontsize=10)
plt.title('Top 5 categories',fontsize=10)
plt.tight_layout()
plt.show()
```

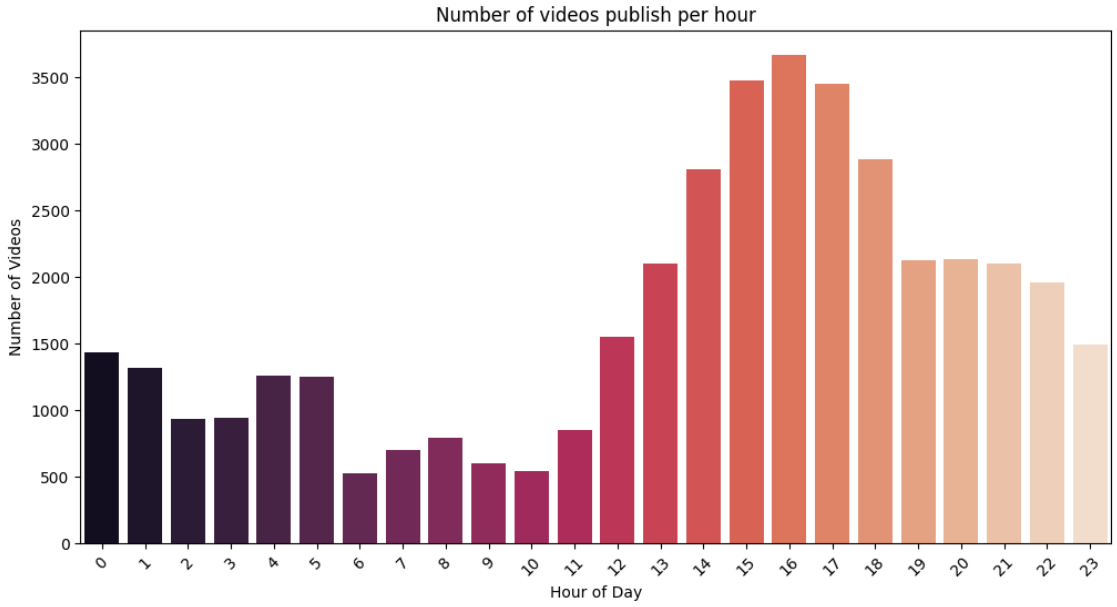


[26]:
```
plt.figure(figsize=(14,7))
sns.countplot(x='category_name',data=df, order=df['category_name'].
 ↪value_counts().index)
plt.xticks(rotation=90)
plt.title('Video count by category')
plt.show()
```

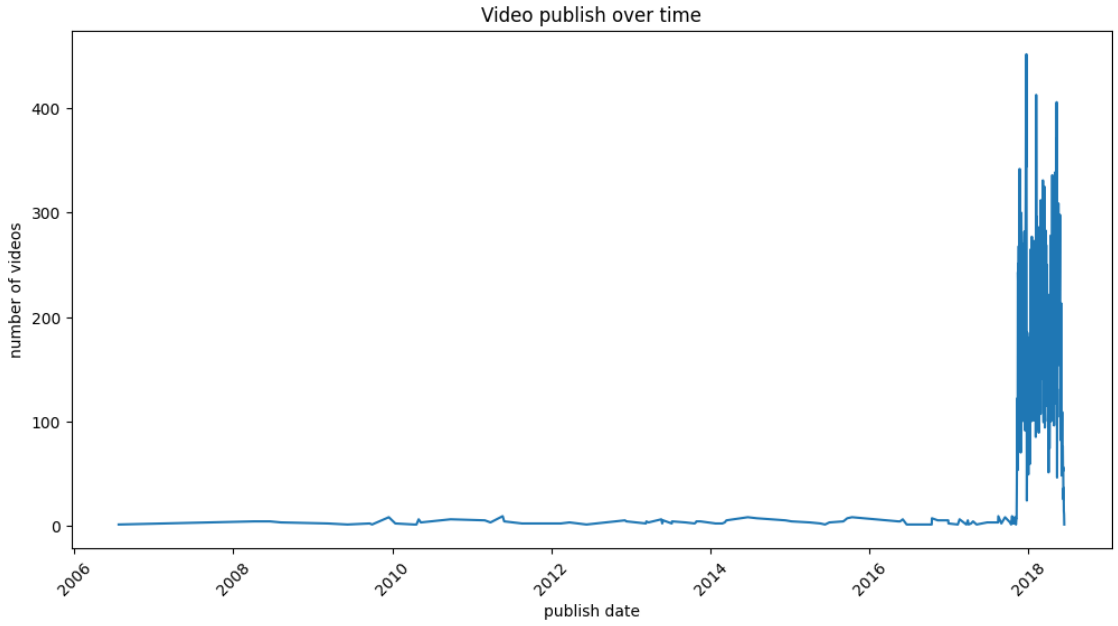


[27]:
```
#count the number of videos published per hour
videos_per_hour=df['publish_hour'].value_counts().sort_index()

#create a bar plot
plt.figure(figsize=(12,6))
sns.barplot(x=videos_per_hour.index, y=videos_per_hour.values, palette='rocket')
plt.title('Number of videos publish per hour')
plt.xlabel('Hour of Day')
plt.ylabel('Number of Videos')
plt.xticks(rotation=45)
plt.show()
```

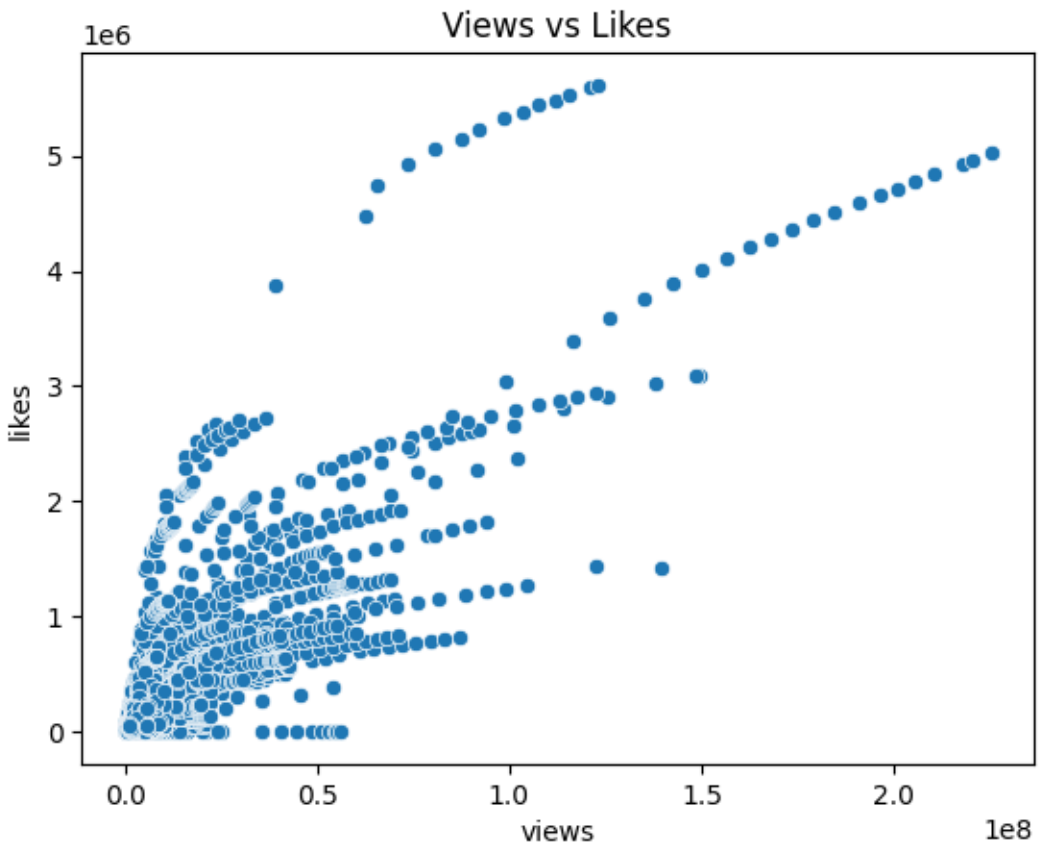
```
C:\Users\kumar\AppData\Local\Temp\ipykernel_22912\962695835.py:6: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in
v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same
effect.

  sns.barplot(x=videos_per_hour.index, y=videos_per_hour.values,
palette='rocket')
```



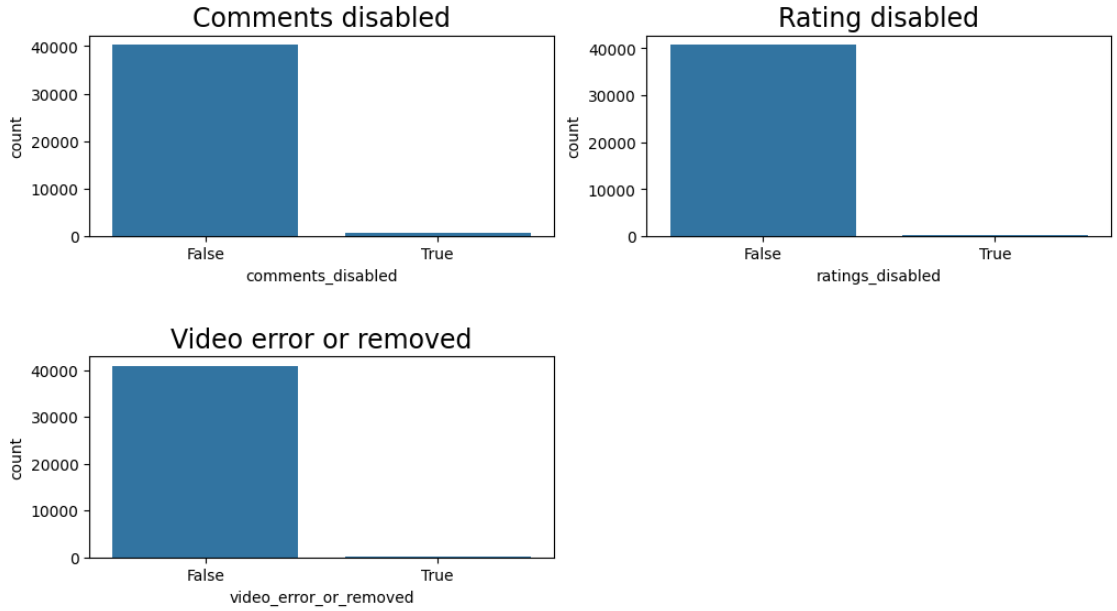
[28]:
```
df['publish_time']=pd.to_datetime(df['publish_time'])
df['publish_date']=df['publish_time'].dt.date
video_count_by_date=df.groupby('publish_date').size()
plt.figure(figsize=(12,6))
sns.lineplot(data=video_count_by_date)
plt.title("Video publish over time")
plt.xlabel('publish date')
plt.ylabel('number of videos')
plt.xticks(rotation=45)
plt.show()
```



[31]:
```
#scatter plot between 'views' and 'likes'
sns.scatterplot(data=df,x='views',y='likes')
plt.title('Views vs Likes')
plt.xlabel('views')
plt.ylabel('likes')
plt.show()
```



[30]:
```
plt.figure(figsize=(12,6))
plt.subplots_adjust(wspace=0.2, hspace=0.6, top=0.9)
plt.subplot(2,2,1)
g=sns.countplot(x='comments_disabled', data=df)
g.set_title("Comments disabled", fontsize=17)
plt.subplot(2,2,2)
g1=sns.countplot(x='ratings_disabled', data=df)
g1.set_title("Rating disabled", fontsize=17)
plt.subplot(2,2,3)
g2=sns.countplot(x='video_error_or_removed', data=df)
g2.set_title("Video error or removed", fontsize=17)
plt.show()
```



[24]:
```
corr_matrix=df['views'].corr(df['likes'])
corr_matrix
```

[24]: 0.8491785476230503

[ ]:
```

```