In [1]:

```
!pip install nltk
import pandas as pd
import numpy as np
from nltk.tokenize import sent_tokenize, word_tokenize
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.datasets import fetch_20newsgroups
from nltk.corpus import stopwords
import string
from nltk import pos_tag
from nltk.stem import WordNetLemmatizer
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.naive_bayes import MultinomialNB
from sklearn.ensemble import RandomForestClassifier
from sklearn.svm import SVC
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn import preprocessing
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline
```

```
Requirement already satisfied: nltk in c:\users\dheek\anaconda3\lib\site-packages (3.8.1)
Requirement already satisfied: click in c:\users\dheek\anaconda3\lib\site-packages (from nltk) (8.1.7)
Requirement already satisfied: joblib in c:\users\dheek\anaconda3\lib\site-packages (from nltk) (1.2.0)
Requirement already satisfied: regex>=2021.8.3 in c:\users\dheek\anaconda3\lib\site-packages (from nltk) (2023.10.3)
Requirement already satisfied: tqdm in c:\users\dheek\anaconda3\lib\site-packages (from nltk) (4.65.0)
Requirement already satisfied: colorama in c:\users\dheek\anaconda3\lib\site-packages (from click->nltk) (0.4.6)
```

In [2]:

```
import nltk
nltk.download('stopwords')
```

```
[nltk_data] Downloading package stopwords to
[nltk_data]     C:\Users\dheek\AppData\Roaming\nltk_data...
[nltk_data]   Unzipping corpora\stopwords.zip.
```

Out[2]:

```
True
```

In [3]:

```
!pip install fsspec
```

```
Requirement already satisfied: fsspec in c:\users\dheek\anaconda3\lib\site-packages (2023.10.0)
```

In [5]:

```
data = pd.read_csv('C:\\Users\\dheek\\Documents\\twitter_training.csv')
v_data = pd.read_csv('C:\\Users\\dheek\\Documents\\twitter_validation.csv')
```

In [6]:

```
data
```

Out[6]:

	2401	Borderlands	Positive	im getting on borderlands and i will murder you all ,
0	2401	Borderlands	Positive	I am coming to the borders and I will kill you...
1	2401	Borderlands	Positive	im getting on borderlands and i will kill you ...
2	2401	Borderlands	Positive	im coming on borderlands and i will murder you...
3	2401	Borderlands	Positive	im getting on borderlands 2 and i will murder ...
4	2401	Borderlands	Positive	im getting into borderlands and i can murder y...
...	...	...	...	...
74676	9200	Nvidia	Positive	Just realized that the Windows partition of my...
74677	9200	Nvidia	Positive	Just realized that my Mac window partition is ...
74678	9200	Nvidia	Positive	Just realized the windows partition of my Mac ...
74679	9200	Nvidia	Positive	Just realized between the windows partition of...
74680	9200	Nvidia	Positive	Just like the windows partition of my Mac is l...

74681 rows × 4 columns

In [7]:

```
v_data
```

Out[7]:

	3364	Facebook	Irrelevant	I mentioned on Facebook that I was struggling for motivation to go for a run the other day, which has been translated by Tom’s great auntie as ‘Hayley can’t get out of bed’ and told to his grandma, who now thinks I’m a lazy, terrible person 🤣
0	352	Amazon	Neutral	BBC News - Amazon boss Jeff Bezos rejects clai...
1	8312	Microsoft	Negative	@Microsoft Why do I pay for WORD when it funct...
2	4371	CS-GO	Negative	CSGO matchmaking is so full of closet hacking,...
3	4433	Google	Neutral	Now the President is slapping Americans in the...
4	6273	FIFA	Negative	Hi @EAHelp I’ve had Madeleine McCann in my cel...
...	...	...	...	...
994	4891	GrandTheftAuto(GTA)	Irrelevant	⭐️ Toronto is the arts and culture capital of ...
995	4359	CS-GO	Irrelevant	tHIS IS ACTUALLY A GOOD MOVE TOT BRING MORE VI...
996	2652	Borderlands	Positive	Today sucked so it’s time to drink wine n play...
997	8069	Microsoft	Positive	Bought a fraction of Microsoft today. Small wins.
998	6960	johnson&johnson	Neutral	Johnson & Johnson to stop selling talc baby po...

999 rows × 4 columns

In [8]:

```
data.columns = ['id', 'game', 'sentiment', 'text']
v_data.columns = ['id', 'game', 'sentiment', 'text']
```

In [9]:

```
data
```

Out[9]:

	id	game	sentiment	text
0	2401	Borderlands	Positive	I am coming to the borders and I will kill you...
1	2401	Borderlands	Positive	im getting on borderlands and i will kill you ...
2	2401	Borderlands	Positive	im coming on borderlands and i will murder you...
3	2401	Borderlands	Positive	im getting on borderlands 2 and i will murder ...
4	2401	Borderlands	Positive	im getting into borderlands and i can murder y...
...	...	...	...	...
74676	9200	Nvidia	Positive	Just realized that the Windows partition of my...
74677	9200	Nvidia	Positive	Just realized that my Mac window partition is ...
74678	9200	Nvidia	Positive	Just realized the windows partition of my Mac ...
74679	9200	Nvidia	Positive	Just realized between the windows partition of...
74680	9200	Nvidia	Positive	Just like the windows partition of my Mac is l...

74681 rows × 4 columns

In [10]:

```
v_data
```

Out[10]:

	id	game	sentiment	text
0	352	Amazon	Neutral	BBC News - Amazon boss Jeff Bezos rejects clai...
1	8312	Microsoft	Negative	@Microsoft Why do I pay for WORD when it funct...
2	4371	CS-GO	Negative	CSGO matchmaking is so full of closet hacking,...
3	4433	Google	Neutral	Now the President is slapping Americans in the...
4	6273	FIFA	Negative	Hi @EAHelp I've had Madeleine McCann in my cel...
...	...	...	...	...
994	4891	GrandTheftAuto(GTA)	Irrelevant	⭐️ Toronto is the arts and culture capital of ...
995	4359	CS-GO	Irrelevant	tHIS IS ACTUALLY A GOOD MOVE TOT BRING MORE VI...
996	2652	Borderlands	Positive	Today sucked so it's time to drink wine n play...
997	8069	Microsoft	Positive	Bought a fraction of Microsoft today. Small wins.
998	6960	johnson&johnson	Neutral	Johnson & Johnson to stop selling talc baby po...

999 rows × 4 columns

In [11]:

```
data.shape
```

Out[11]:

```
(74681, 4)
```

In [12]:

```
data.columns
```

Out[12]:

```
Index(['id', 'game', 'sentiment', 'text'], dtype='object')
```

In [13]:

```
data.describe(include='all')
```

Out[13]:

	id	game	sentiment	text
count	74681.000000	74681	74681	73995
unique	NaN	32	4	69490
top	NaN	TomClancysRainbowSix	Negative	
freq	NaN	2400	22542	172
mean	6432.640149	NaN	NaN	NaN
std	3740.423819	NaN	NaN	NaN
min	1.000000	NaN	NaN	NaN
25%	3195.000000	NaN	NaN	NaN
50%	6422.000000	NaN	NaN	NaN
75%	9601.000000	NaN	NaN	NaN
max	13200.000000	NaN	NaN	NaN

In [14]:

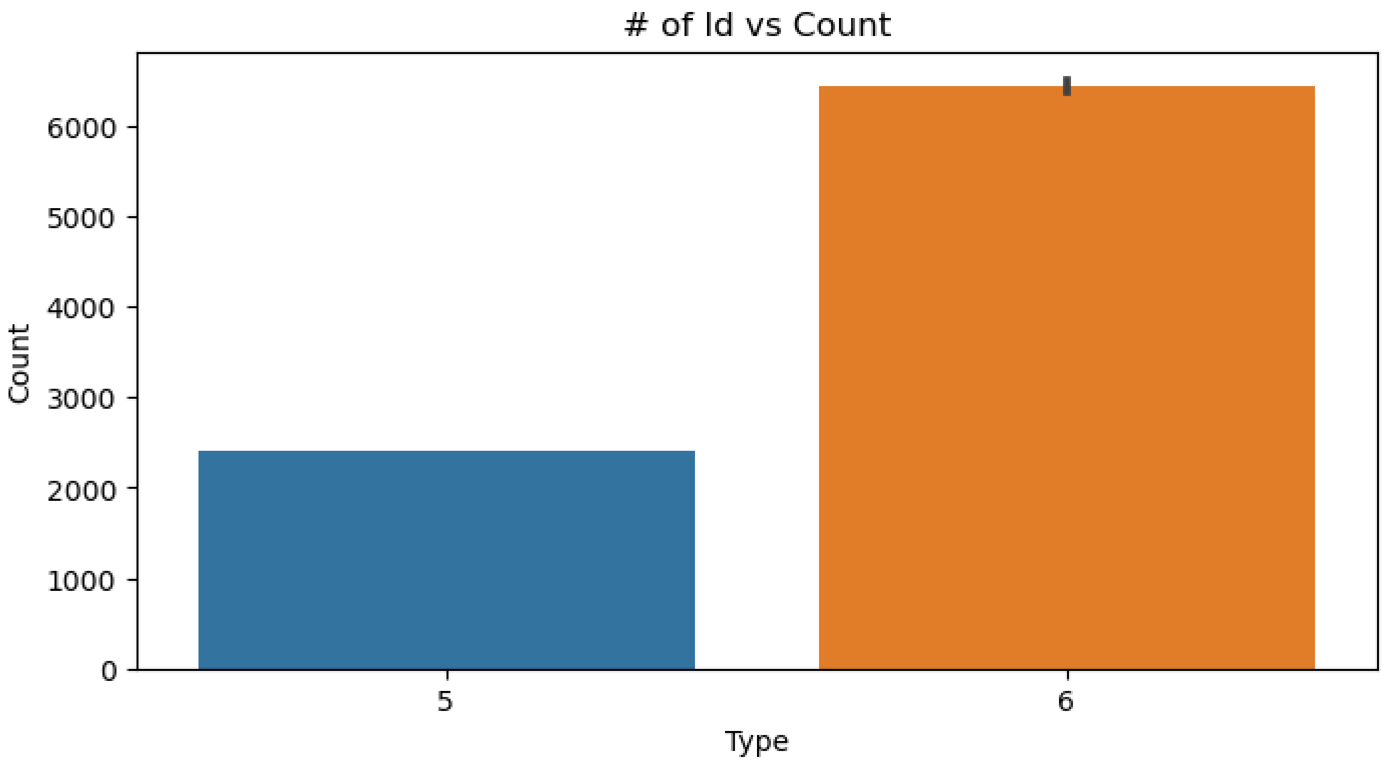
```python
id_types = data['id'].value_counts()
id_types
```

Out[14]:

```
id
5203    6
6164    6
6141    6
6142    6
6143    6
       ..
4678    6
4679    6
4680    6
4681    6
2401    5
Name: count, Length: 12447, dtype: int64
```

In [15]:

```
plt.figure(figsize=(8,4))
sns.barplot(y=id_types.index, x=id_types.values)
plt.xlabel('Type')
plt.ylabel('Count')
plt.title('# of Id vs Count')
plt.show()
```

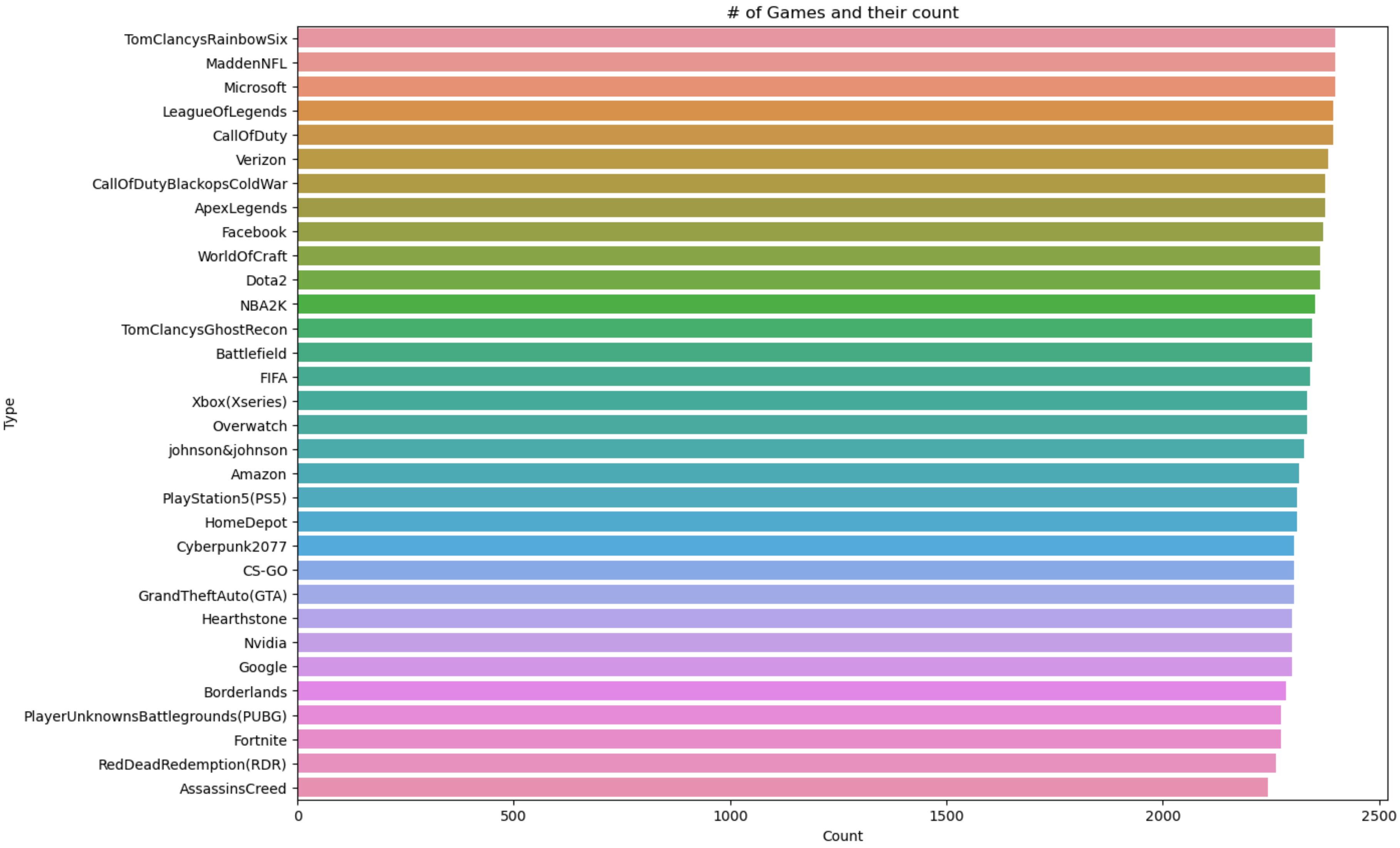


In [16]:

```
game_types = data['game'].value_counts()
game_types
```

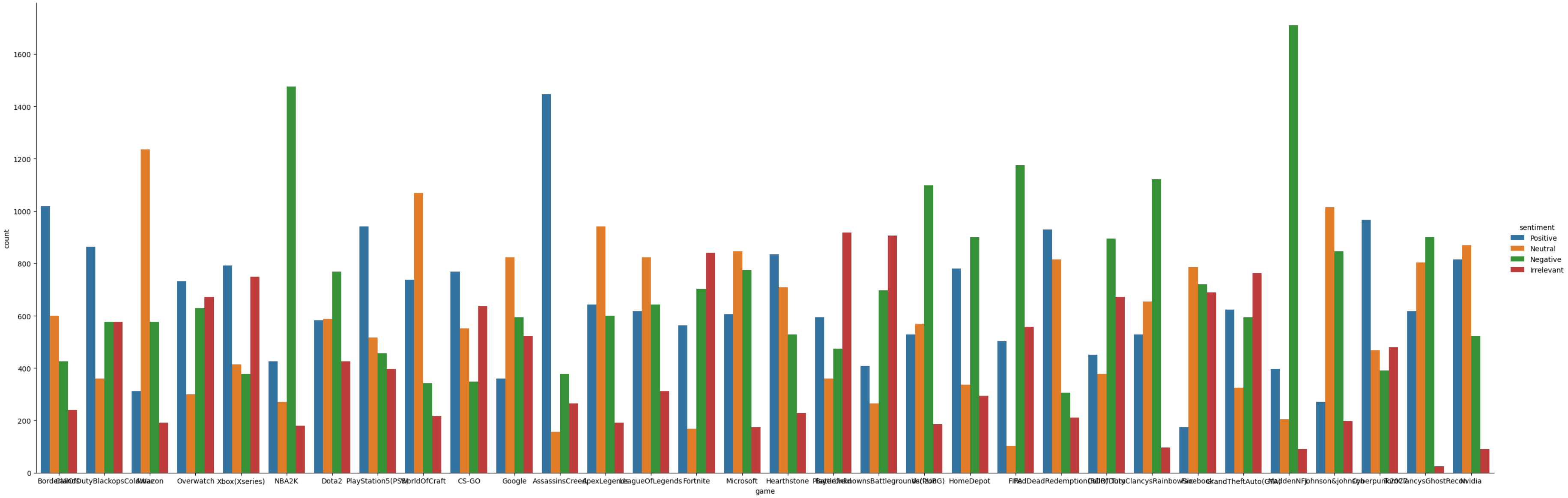
```
Out[16]: game
TomClancysRainbowSix                 2400
MaddenNFL                            2400
Microsoft                            2400
LeagueOfLegends                      2394
CallOfDuty                           2394
Verizon                              2382
CallOfDutyBlackopsColdWar            2376
ApexLegends                          2376
Facebook                             2370
WorldOfCraft                         2364
Dota2                                2364
NBA2K                                2352
TomClancysGhostRecon                 2346
Battlefield                          2346
FIFA                                 2340
Xbox(Xseries)                        2334
Overwatch                            2334
johnson&johnson                      2328
Amazon                               2316
PlayStation5(PS5)                    2310
HomeDepot                            2310
Cyberpunk2077                        2304
CS-GO                                2304
GrandTheftAuto(GTA)                  2304
Hearthstone                          2298
Nvidia                               2298
Google                               2298
Borderlands                          2285
PlayerUnknownsBattlegrounds(PUBG)    2274
Fortnite                             2274
RedDeadRedemption(RDR)               2262
AssassinsCreed                       2244
Name: count, dtype: int64
```

```
In [17]: plt.figure(figsize=(14,10))

sns.barplot(x=game_types.values,y=game_types.index)
plt.title('# of Games and their count')
plt.ylabel('Type')
plt.xlabel('Count')

plt.show()
```



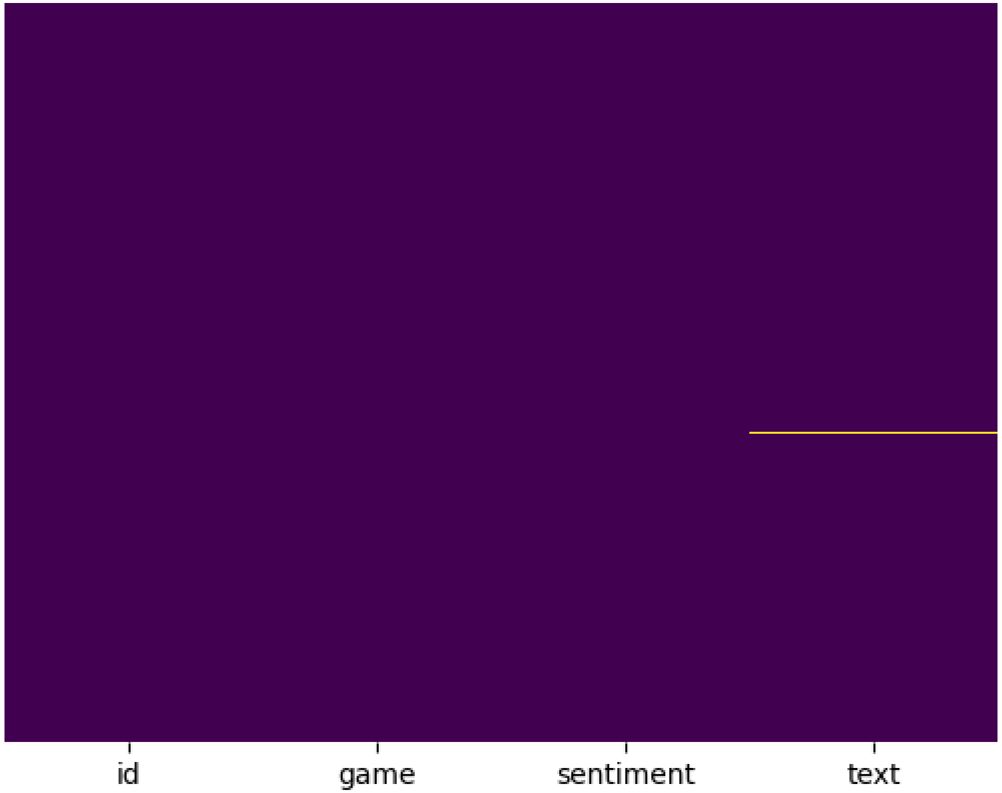
In [18]:
```
sns.catplot(x="game",hue="sentiment", kind="count",height=10,aspect=3, data=data)
```

Out[18]:
```
<seaborn.axisgrid.FacetGrid at 0x170f18503d0>
```



In [19]:
```
sns.heatmap(data.isnull(),yticklabels=False,cbar=False,cmap='viridis')
```

Out[19]:
```
<Axes: >
```



In [20]:

```
total_null=data.isnull().sum().sort_values(ascending=False)
percent = ((data.isnull().sum()/data.isnull().count())*100).sort_values(ascending = False)
print("Total records = ", data.shape[0])
missing_data = pd.concat([total_null,percent.round(2)],axis=1,keys=['Total Missing','In Percent'])
missing_data.head(10)
```

```
Total records =  74681
```

Out[20]:

	Total Missing	In Percent
text	686	0.92
id	0	0.00
game	0	0.00
sentiment	0	0.00

In [21]:

```
data.dropna(subset=['text'],inplace=True)

total_null=data.isnull().sum().sort_values(ascending=False)
percent = ((data.isnull().sum()/data.isnull().count())*100).sort_values(ascending = False)
print("Total records = ", data.shape[0])
missing_data = pd.concat([total_null,percent.round(2)],axis=1,keys=['Total Missing','In Percent'])
missing_data.head(10)
```

```
Total records =  73995
```

Out[21]:

	Total Missing	In Percent
id	0	0.0
game	0	0.0
sentiment	0	0.0
text	0	0.0

In [22]:

```
train0=data[data['sentiment']=="Negative"]
train1=data[data['sentiment']=="Positive"]
train2=data[data['sentiment']=="Irrelevant"]
train3=data[data['sentiment']=="Neutral"]
```

In [23]:

```
train0.shape, train1.shape, train2.shape, train3.shape
```

Out[23]:

```
((22358, 4), (20654, 4), (12875, 4), (18108, 4))
```

In [24]:

```
train0.shape, train1.shape, train2.shape, train3.shape
```

Out[24]:
```
((22358, 4), (20654, 4), (12875, 4), (18108, 4))
```

In [25]:
```
data=pd.concat([train0,train1,train2,train3],axis=0)
data
```

Out[25]:

	id	game	sentiment	text
23	2405	Borderlands	Negative	the biggest dissappoinment in my life came out...
24	2405	Borderlands	Negative	The biggest disappointment of my life came a y...
25	2405	Borderlands	Negative	The biggest disappointment of my life came a y...
26	2405	Borderlands	Negative	the biggest dissappoinment in my life coming o...
27	2405	Borderlands	Negative	For the biggest male dissappoinment in my life...
...	...	...	...	...
74658	9197	Nvidia	Neutral	Nvidia plans to release its 2017 "Crypto Craze...
74659	9197	Nvidia	Neutral	Nvidia does not want to give up its "cryptoins...
74660	9197	Nvidia	Neutral	Nvidia doesn’t intend to give away its 2017 ad...
74661	9197	Nvidia	Neutral	Nvidia therefore doesn ’ t want to give up its...
74662	9197	Nvidia	Neutral	is doesn’t should I give up its password ‘cryp...

73995 rows × 4 columns

In [26]:
```
id_types = data['id'].value_counts()
id_types
```

Out[26]:

```
id
2405     6
6649     6
6619     6
6631     6
6632     6
        ..
6784     3
3268     3
13004    3
10250    3
12919    3
Name: count, Length: 12447, dtype: int64
```

In [27]:

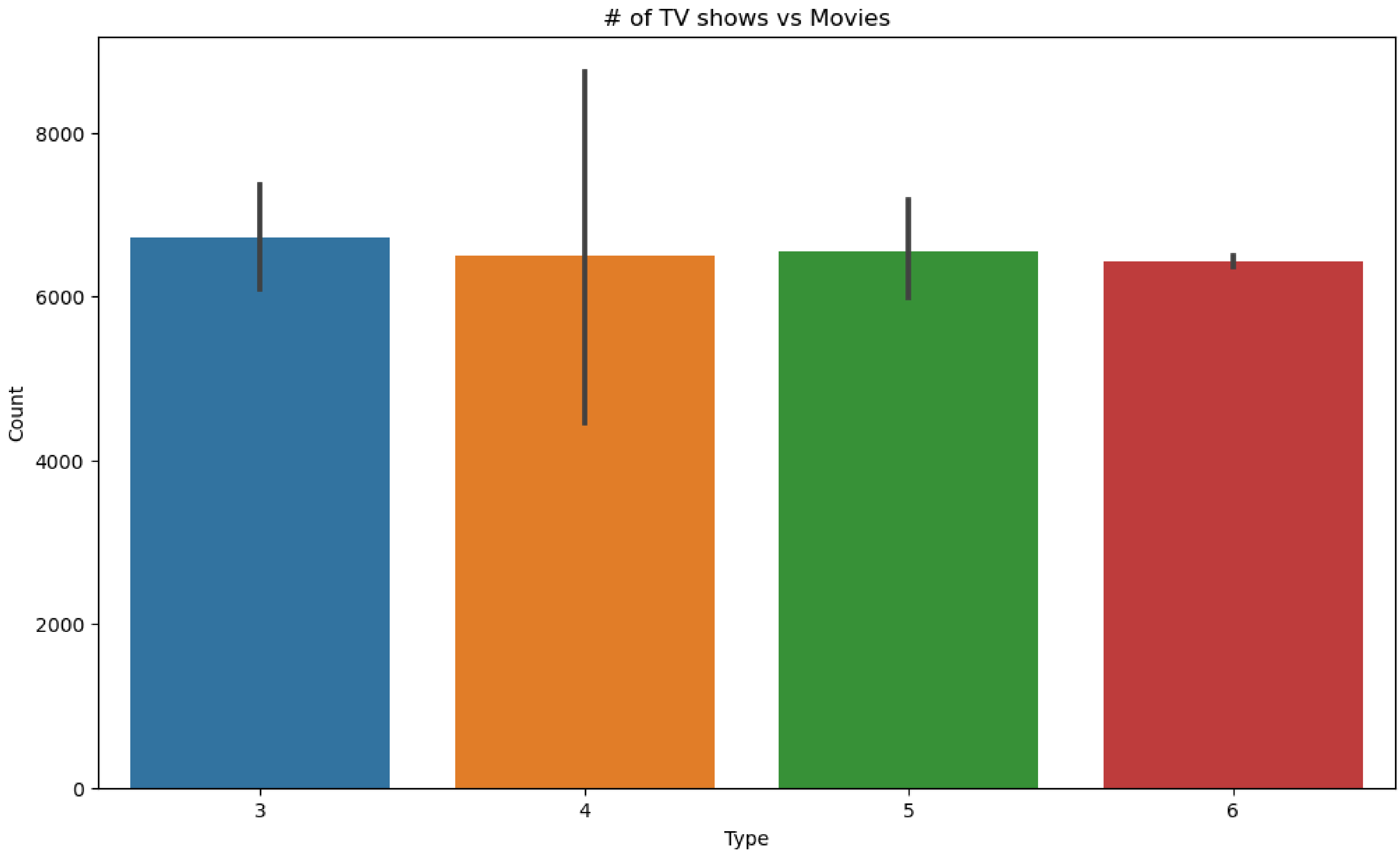
```
id_types = data['id'].value_counts()
id_types
```

Out[27]:

```
id
2405     6
6649     6
6619     6
6631     6
6632     6
        ..
6784     3
3268     3
13004    3
10250    3
12919    3
Name: count, Length: 12447, dtype: int64
```

In [28]:

```
plt.figure(figsize=(12,7))
sns.barplot(x=id_types.values,y=id_types.index)

plt.xlabel('Type')
plt.ylabel('Count')
plt.title('# of TV shows vs Movies')
plt.show()
```



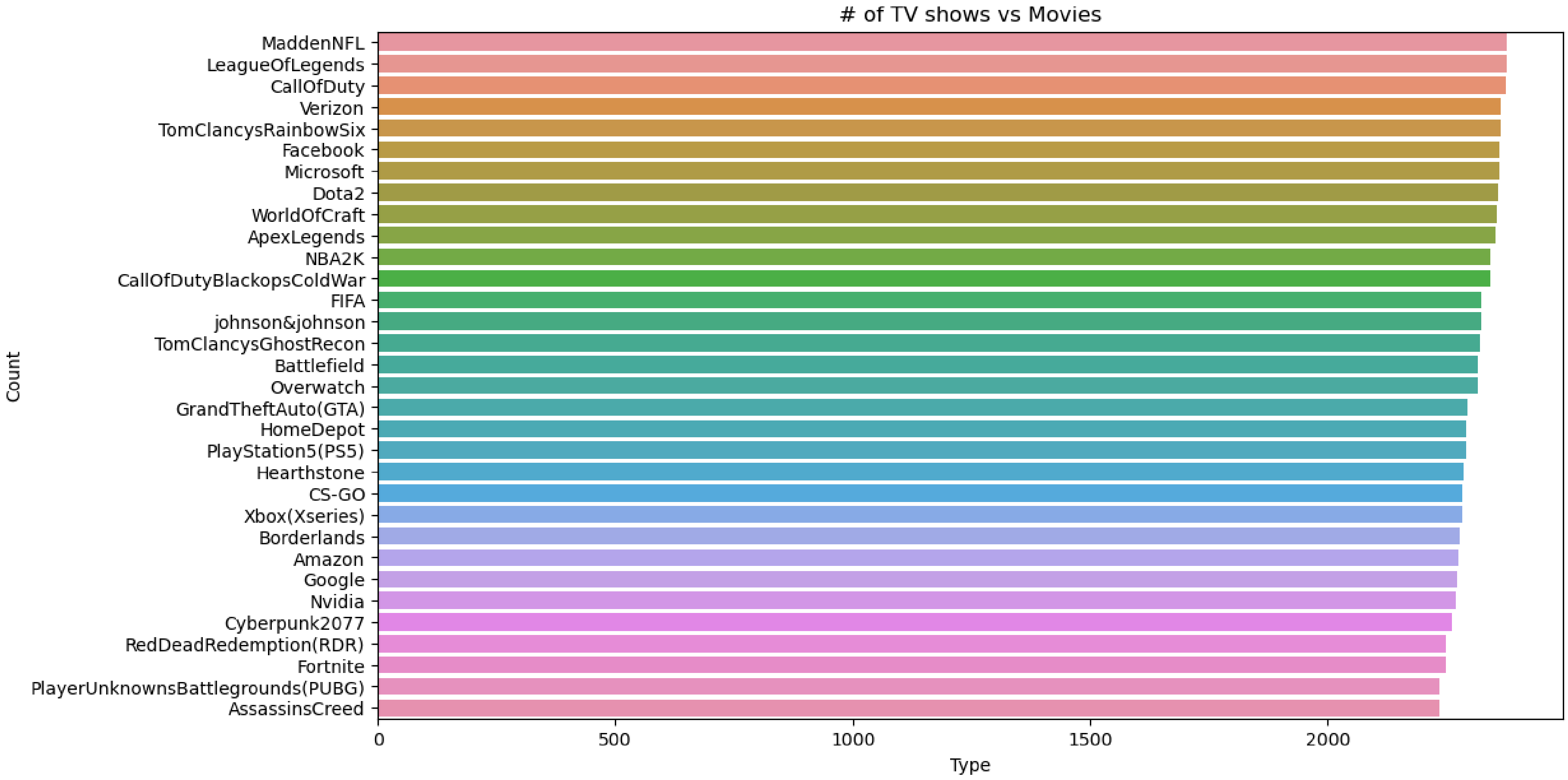
In [30]:
```
game_types = data['game'].value_counts()
game_types
```

Out[30]:

```
game
MaddenNFL                            2377
LeagueOfLegends                      2377
CallOfDuty                           2376
Verizon                              2365
TomClancysRainbowSix                 2364
Facebook                             2362
Microsoft                            2361
Dota2                                2359
WorldOfCraft                         2357
ApexLegends                          2353
NBA2K                                2343
CallOfDutyBlackopsColdWar            2343
FIFA                                 2324
johnson&johnson                      2324
TomClancysGhostRecon                 2321
Battlefield                          2316
Overwatch                            2316
GrandTheftAuto(GTA)                  2293
HomeDepot                            2292
PlayStation5(PS5)                    2291
Hearthstone                          2286
CS-GO                                2284
Xbox(Xseries)                        2283
Borderlands                          2279
Amazon                               2276
Google                               2274
Nvidia                               2271
Cyberpunk2077                        2262
RedDeadRedemption(RDR)               2249
Fortnite                             2249
PlayerUnknownsBattlegrounds(PUBG)    2234
AssassinsCreed                       2234
Name: count, dtype: int64
```

In [32]:

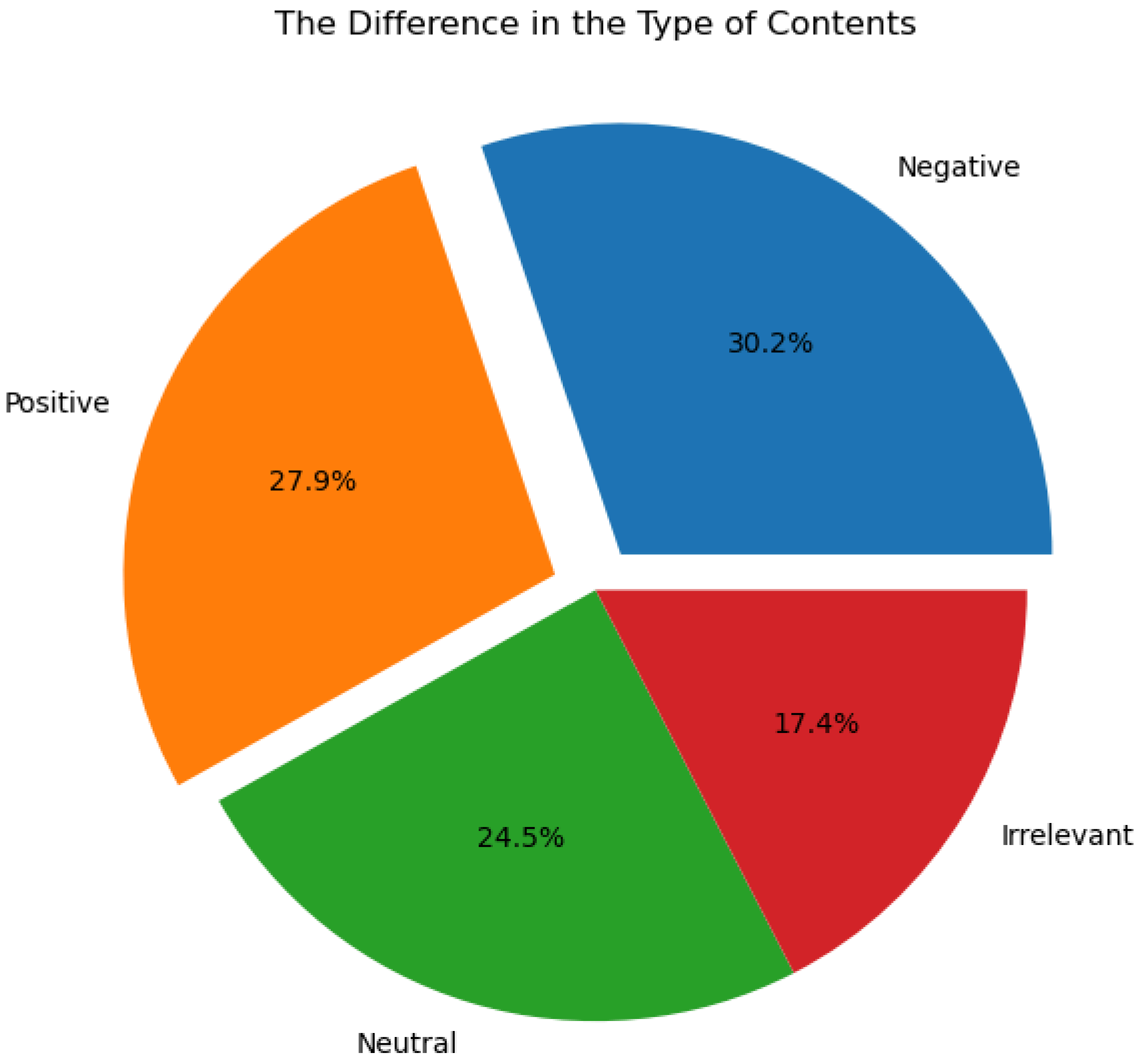
```python
plt.figure(figsize=(12,7))
sns.barplot(x=game_types.values,y=game_types.index)

plt.xlabel('Type')
plt.ylabel('Count')
plt.title('# of TV shows vs Movies')
plt.show()
```



In [33]:
```
sentiment_types = data['sentiment'].value_counts()
sentiment_types
```

Out[33]:
```
sentiment
Negative      22358
Positive      20654
Neutral       18108
Irrelevant    12875
Name: count, dtype: int64
```

```
In [34]: plt.figure(figsize=(12,7))
         plt.pie(x=sentiment_types.values, labels=sentiment_types.index, autopct='%.1f%%', explode=[0.1, 0.1,0,0])
         plt.title('The Difference in the Type of Contents')
         plt.show()
```

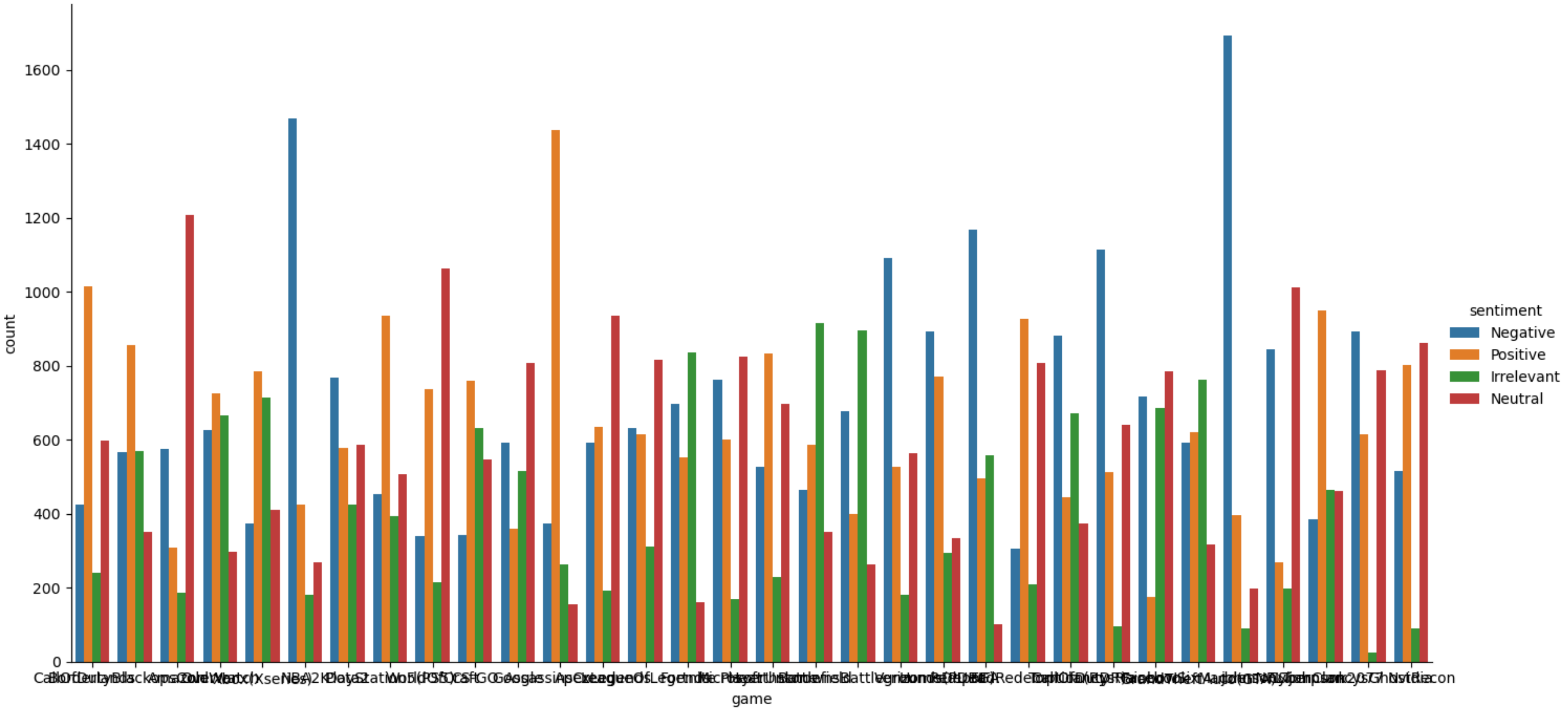


In [35]:

```
sns.catplot(x='game',hue='sentiment',kind='count',height=7,aspect=2,data=data)
```

Out[35]:

```
<seaborn.axisgrid.FacetGrid at 0x170f1dd83d0>
```



In [36]:

```
from sklearn import preprocessing
label_encoder = preprocessing.LabelEncoder()
```

In [37]:

```
data['sentiment']=label_encoder.fit_transform(data['sentiment'])
data['game']=label_encoder.fit_transform(data['game'])
v_data['sentiment']=label_encoder.fit_transform(v_data['sentiment'])
v_data['game']=label_encoder.fit_transform(v_data['game'])
```

In [38]:

```
data = data.drop(['id'],axis=1)
```

```
data
```

Out[38]:

	game	sentiment	text
23	4	1	the biggest dissappoinment in my life came out...
24	4	1	The biggest disappointment of my life came a y...
25	4	1	The biggest disappointment of my life came a y...
26	4	1	the biggest dissappoinment in my life coming o...
27	4	1	For the biggest male dissappoinment in my life...
...	...	...	...
74658	21	2	Nvidia plans to release its 2017 "Crypto Craze...
74659	21	2	Nvidia does not want to give up its "cryptoins...
74660	21	2	Nvidia doesn’t intend to give away its 2017 ad...
74661	21	2	Nvidia therefore doesn ’ t want to give up its...
74662	21	2	is doesn’t should I give up its password ‘cryp...

73995 rows × 3 columns

In [39]:

```
data.nunique()
```

Out[39]:

```
game             32
sentiment         4
text          69490
dtype: int64
```

In [40]:

```
v_data.nunique()
```

Out[40]:

```
id           999
game          32
sentiment      4
text         998
dtype: int64
```

In [ ]:

In [ ]: