Evil Geniuses Engagement Data Analysis

January 13, 2024

[1]:
```
#Import relevant libraries
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
```

[47]:
```
#Read in .csv file from social_data.xlsx
social_data=pd.read_csv('C:/Users/jakey/OneDrive/Documents/personal projects/
 ↪evil geniuses/social_data.xlsx - Data.csv',parse_dates=['Published␣
 ↪Date'],index_col=['Published Date'])
#Sort dataset by chronological date
social_data=social_data.sort_index()
social_data
```

[47]:

Published Date	Account	Account Type	Campaign Name	Total Impressions	Total Engagements	Media Type
2023-01-01 14:59:00	General	FBPAGE	N/A	0	0	Photo
2023-01-03 10:34:00	CSGO	TWITTER	N/A	0	0	Link
2023-01-03 10:34:00	CSGO	TWITTER	N/A	2116	42	Text
2023-01-03 10:34:00	CSGO	TWITTER	N/A	0	0	Link
2023-01-03 10:35:00	CSGO	TWITTER	N/A	0	0	Link
…	…	…	…	…	…	…
2023-03-31 19:43:00	CSGO	TWITTER	Community Engagement	9517	1215	Video
2023-03-31 19:49:00	CSGO	TWITTER	N/A	0	0	Text
2023-03-31 19:49:00	CSGO	TWITTER	N/A	0	0	Text
2023-03-31 19:49:00	CSGO	TWITTER	N/A			
2023-03-31 19:55:00	CSGO	TWITTER	N/A			

```
2023-03-31 19:49:00                  0                  0       Text
2023-03-31 19:55:00                  0                  0       Text

[3479 rows x 6 columns]
```

[48]:
```
#Question 1
#Typical engagment rate=total engagements/total impressions
np.mean(social_data['Total Engagements']/social_data['Total Impressions'])
```

[48]:
```
0.4049262176120077
```

Commentary:
I calculate the typical engagement rate by dividing the "Total Engagements" column by the "Total Impressions" column. This gives me 3479 rows of information, one row per "Published Date" provided. In order to get the typical engagement rate expected, I take the mean of the column of quotients which gives me about a 40% typical engagement rate expected from the 3 months of data provided.

[49]:
```
social_data['Engagement Rate']=social_data['Total Engagements']/
 ↪social_data['Total Impressions']
social_data['Engagement Rate']=social_data['Engagement Rate'].fillna(0)
rows_greater_than_or_equal_15=len(social_data[social_data['Engagement Rate']>=.
 ↪15])
rows_greater_than_or_equal_15/len(social_data)
```

[49]:
```
0.06496119574590399
```

Commentary:
To calculate the likelihood that we can achieve a 15% engagement rate, I create a new column in the "social_data" dataframe called "Engagement Rate" which is the quotient of "Total Engagements" divided by "Total Impressions," or the engagement rate for each row. I create a subset of the social_data dataframe where the "Engagement Rate" is greater than or equal to .15 and call the length of this subset "rows_greater_than_or_equal_15". I find the length of it to be 226. This means there are 226 days where the engagement rate was greater than or equal to 15%. I divide 226 by the length of the "social_data" dataframe, which is 3479, to get the likelihood of an engagement rate of 15% or higher. This likelihood value is about 6.5%.

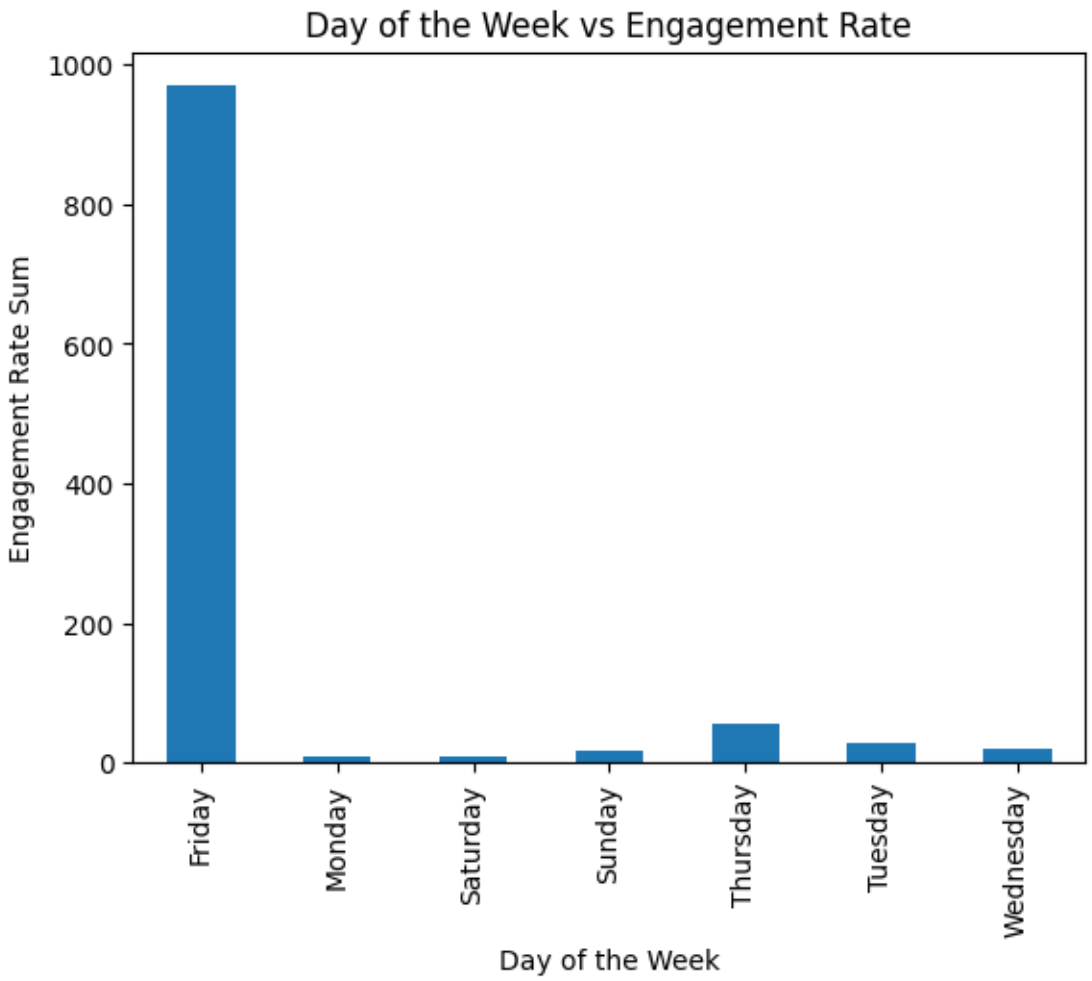
[50]:
```
#Question 2
social_data['Day of the Week']=social_data.index.day_name()
social_data['Time']=social_data.index.time
social_data
```

[50]:
```
                     Account Account Type          Campaign Name  \
Published Date
2023-01-01 14:59:00  General        FBPAGE                    N/A
2023-01-03 10:34:00     CSGO       TWITTER                    N/A
2023-01-03 10:34:00     CSGO       TWITTER                    N/A
2023-01-03 10:34:00     CSGO       TWITTER                    N/A
```

```
2023-01-03 10:35:00      CSGO      TWITTER                   N/A
…                        …         …                         …
2023-03-31 19:43:00      CSGO      TWITTER  Community Engagement
2023-03-31 19:49:00      CSGO      TWITTER                   N/A
2023-03-31 19:49:00      CSGO      TWITTER                   N/A
2023-03-31 19:49:00      CSGO      TWITTER                   N/A
2023-03-31 19:55:00      CSGO      TWITTER                   N/A

                     Total Impressions  Total Engagements Media Type  \
Published Date
2023-01-01 14:59:00                  0                  0      Photo
2023-01-03 10:34:00                  0                  0       Link
2023-01-03 10:34:00               2116                 42       Text
2023-01-03 10:34:00                  0                  0       Link
2023-01-03 10:35:00                  0                  0       Link
…                                  …                  …         …
2023-03-31 19:43:00               9517               1215      Video
2023-03-31 19:49:00                  0                  0       Text
2023-03-31 19:49:00                  0                  0       Text
2023-03-31 19:49:00                  0                  0       Text
2023-03-31 19:55:00                  0                  0       Text

                     Engagement Rate Day of the Week      Time
Published Date
2023-01-01 14:59:00         0.000000          Sunday  14:59:00
2023-01-03 10:34:00         0.000000         Tuesday  10:34:00
2023-01-03 10:34:00         0.019849         Tuesday  10:34:00
2023-01-03 10:34:00         0.000000         Tuesday  10:34:00
2023-01-03 10:35:00         0.000000         Tuesday  10:35:00
…                                 …               …         …
2023-03-31 19:43:00         0.127666          Friday  19:43:00
2023-03-31 19:49:00         0.000000          Friday  19:49:00
2023-03-31 19:49:00         0.000000          Friday  19:49:00
2023-03-31 19:49:00         0.000000          Friday  19:49:00
2023-03-31 19:55:00         0.000000          Friday  19:55:00

[3479 rows x 9 columns]
```

[51]:
```
#Day of the week vs engagement rates
social_data.groupby('Day of the Week')['Engagement Rate'].sum().
 ↪plot(kind='bar',xlabel='Day of the Week',ylabel='Engagement Rate␣
 ↪Sum',title='Day of the Week vs Engagement Rate')
```

[51]:
```
<Axes: title={'center': 'Day of the Week vs Engagement Rate'}, xlabel='Day of
the Week', ylabel='Engagement Rate Sum'>
```



[52]:
```
social_data.groupby('Day of the Week')['Engagement Rate'].sum()
```

[52]:
```
Day of the Week
Friday       969.658948
Monday         8.402261
Saturday       9.788983
Sunday        16.159581
Thursday      55.993295
Tuesday       28.363858
Wednesday     19.106279
Name: Engagement Rate, dtype: float64
```

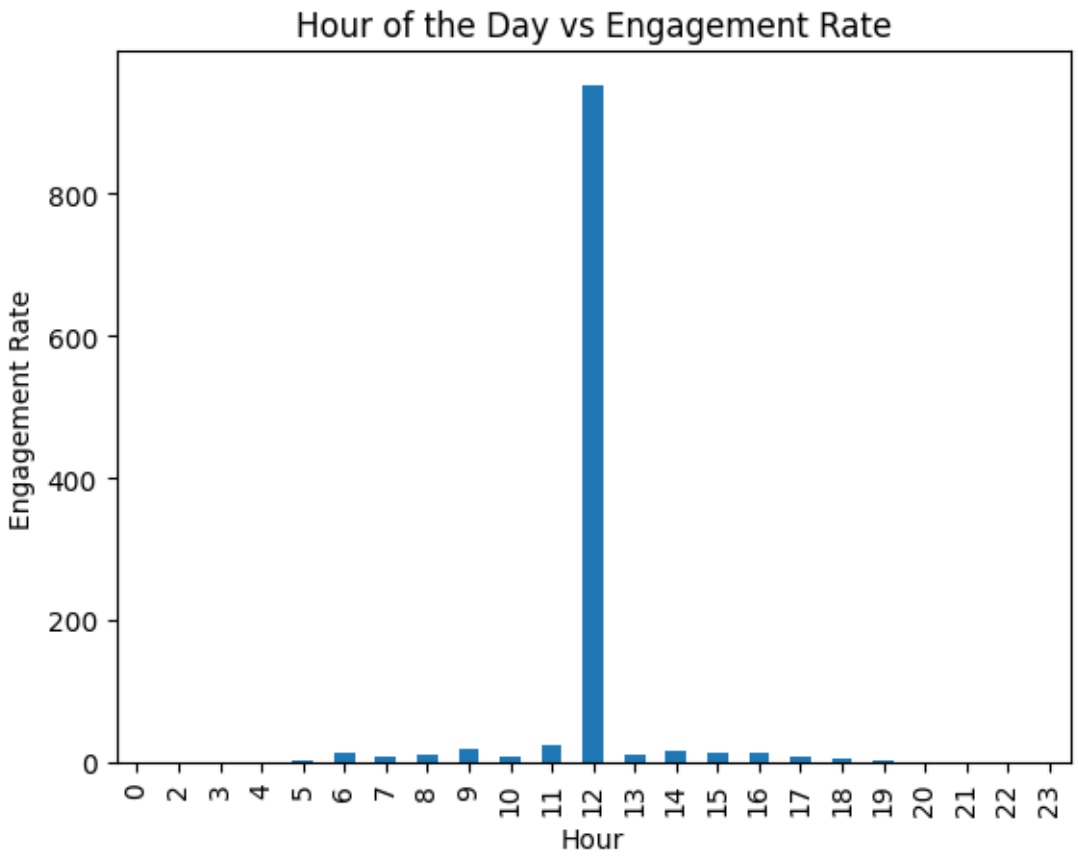
Commentary:
The histogram above shows that day of the week does affect engagement rates because Friday's engagement rate is drastically higher than the other days of the week. This means Evil Geniuses should try to post on their social accounts on Friday to get the most engagement rate.

[58]:
```
social_data['Hour']=social_data.index.hour
social_data.groupby('Hour')['Engagement Rate'].sum()
```

[58]:
```
Hour
0       0.000000
2       0.008402
3       0.339373
4       0.446028
5       2.987140
6      14.134722
7       6.723418
8       9.410305
9      18.747653
10      9.336490
11     24.945571
12    952.048365
13     11.418856
14     14.886849
15     12.340758
16     13.460825
17      8.647487
18      4.238866
19      1.656729
20      0.909702
21      0.487132
22      0.041189
23      0.257345
Name: Engagement Rate, dtype: float64
```

[59]:
```
social_data.groupby('Hour')['Engagement Rate'].sum().
 ↪plot(kind='bar',xlabel='Hour',ylabel='Engagement Rate',title='Hour of the␣
 ↪Day vs Engagement Rate')
```

[59]:
```
<Axes: title={'center': 'Hour of the Day vs Engagement Rate'}, xlabel='Hour',
ylabel='Engagement Rate'>
```



Commentary:
The above histogram shows time does affect engagement rates as well. The 12 o'clock hour has a significantly higher engagement rate than all the other hours of the day. With this data in mind, the best time to post social media activity would be Friday around 12 pm.

[60]:
```
#Question 3
#Game titles
#Use .value_counts() to see the different game titles first
social_data['Account'].value_counts()
```

[60]:
```
Account
General             2271
DOTA2                803
CSGO                 270
Valorant              60
Content Creators      53
General               22
Name: count, dtype: int64
```

Commentary:
I notice there are repeating "General" Account categories with 2 separate counts. After analyzing,

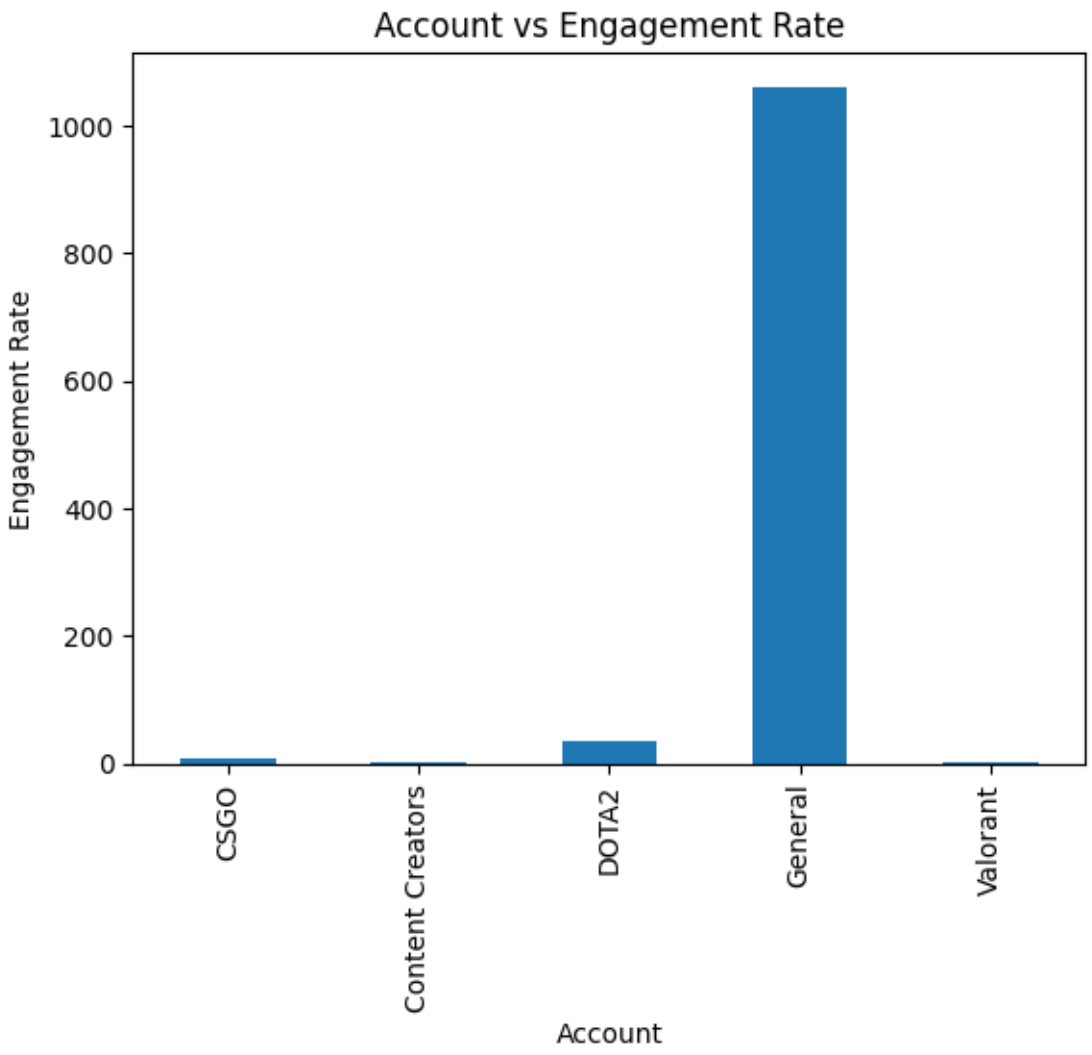
I realize there are different inputs for the “General” account which are “General” and “General” with a space at the end. The function counts these separately so I will account for this.

[61]:
```
social_data['Account']=social_data['Account'].replace('General ','General')
social_data.groupby('Account')['Engagement Rate'].sum()
```

[61]:
```
Account
CSGO                    8.182476
Content Creators        2.160085
DOTA2                  34.515305
General              1060.800423
Valorant                1.814917
Name: Engagement Rate, dtype: float64
```

[64]:
```
social_data.groupby('Account')['Engagement Rate'].sum().
 ↪plot(kind='bar',xlabel='Account',ylabel='Engagement Rate',title='Account vs␣
 ↪Engagement Rate')
```

[64]:
```
<Axes: title={'center': 'Account vs Engagement Rate'}, xlabel='Account',
ylabel='Engagement Rate'>
```



Commentary:
The "General" game title is doing the best in terms of social performance. If Evil Geniuses is solely focused on profits in the short term, they should prioritize posts related to the "General" category. However, if Evil Geniuses wants to grow as an organization in the long term, they should seek to grow engagement in the other accounts like DOTA2, CSGO, Valorant, and Content Creators to diversify engagement and profit. For example, Evil Geniuses could host a giveaway in Valorant and have Evil Geniuses' pro players promote it will which bring more attention to Evil Geniuses' Valorant account and perhaps viewers will stay if the giveaways are consistent or they come to like something about the players or team.

[17]:
```
#Question 4
#Media
social_data['Media Type'].value_counts()
```

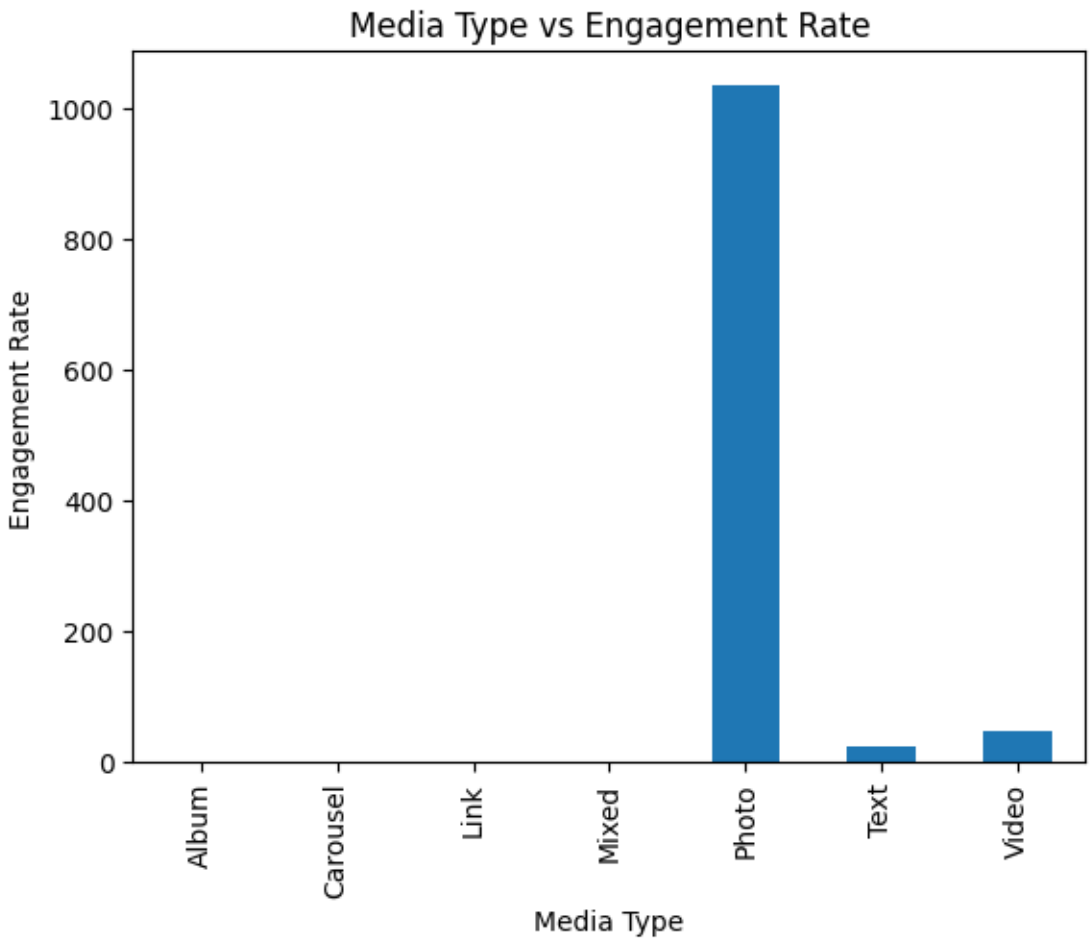
[17]:
```
Photo       1490
Video        967
Text         910
Link          94
Carousel       9
Mixed          5
Album          4
Name: Media Type, dtype: int64
```

[65]:
```
social_data.groupby('Media Type')['Engagement Rate'].sum()
```

[65]:
```
Media Type
Album          0.400000
Carousel       0.340586
Link           1.537493
Mixed          0.538518
Photo       1034.860039
Text          22.379796
Video         47.416773
Name: Engagement Rate, dtype: float64
```

[66]:
```
social_data.groupby('Media Type')['Engagement Rate'].sum().
↪plot(kind='bar',xlabel='Media Type',ylabel='Engagement Rate',title='Media␣
↪Type vs Engagement Rate')
```

[66]:
```
<Axes: title={'center': 'Media Type vs Engagement Rate'}, xlabel='Media Type',
ylabel='Engagement Rate'>
```



Commentary:
The "Photo" media type performs the best.

[26]:
```
#Question 5
#Campaign
social_data['Campaign Name'].value_counts()
```

[26]:
```
N/A                     1485
Community Engagement    1411
Evil Exhibited           420
Evergreen                163
Name: Campaign Name, dtype: int64
```

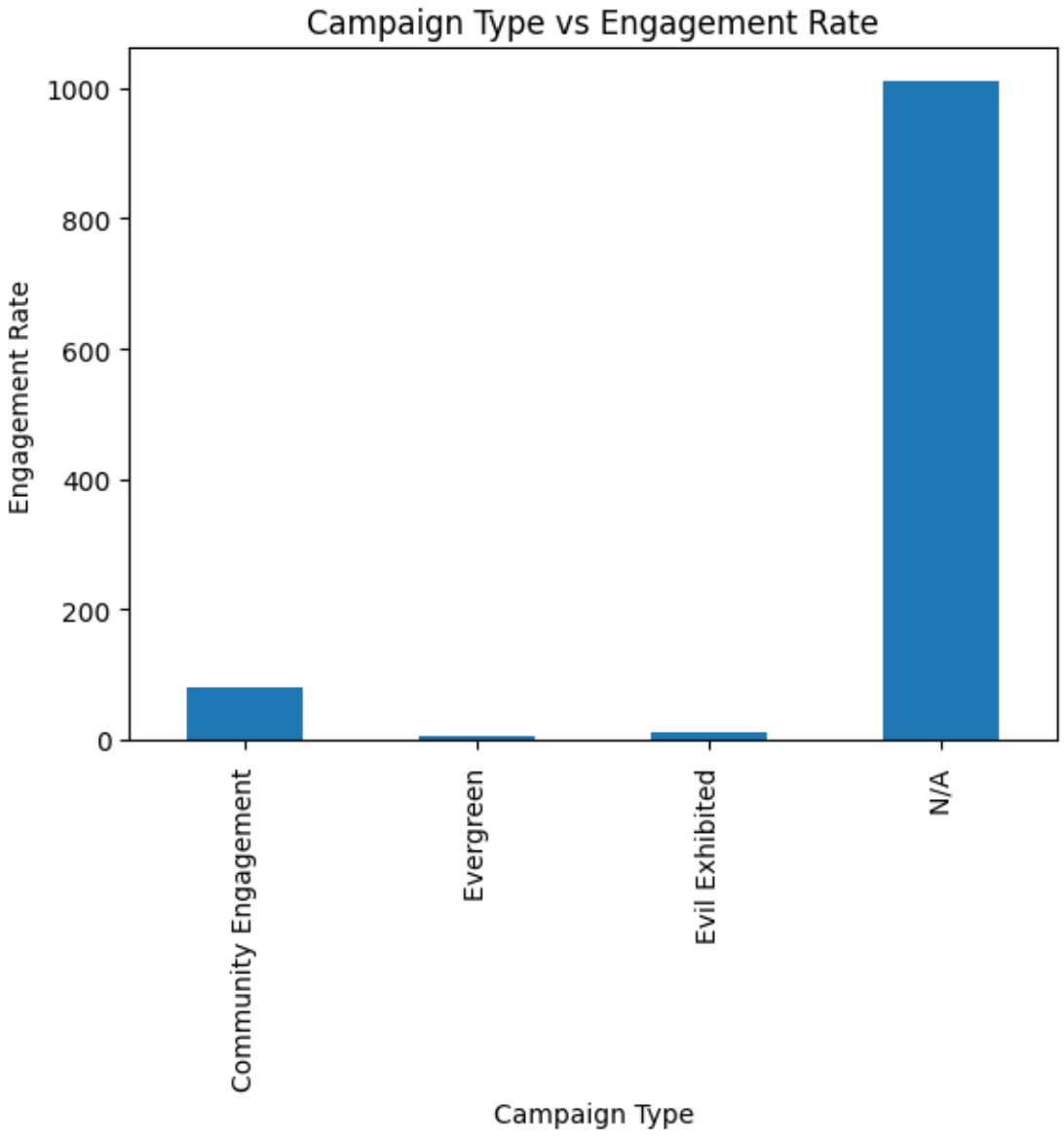
[67]:
```
social_data.groupby('Campaign Name')['Engagement Rate'].sum()
```

[67]:
```
Campaign Name
Community Engagement    79.503456
Evergreen                5.651982
```

```
Evil Exhibited             11.263615
N/A                      1011.054152
Name: Engagement Rate, dtype: float64
```

[68]:
```
social_data.groupby('Campaign Name')['Engagement Rate'].sum().
 ↪plot(kind='bar',xlabel='Campaign Type',ylabel='Engagement␣
 ↪Rate',title='Campaign Type vs Engagement Rate')
```

[68]:
```
<Axes: title={'center': 'Campaign Type vs Engagement Rate'}, xlabel='Campaign
Type', ylabel='Engagement Rate'>
```



Commentary:

The 'N/A' campaign type is the best performing campaign.

[36]:
```
#Question 6
#Account
social_data['Account Type'].value_counts()
```

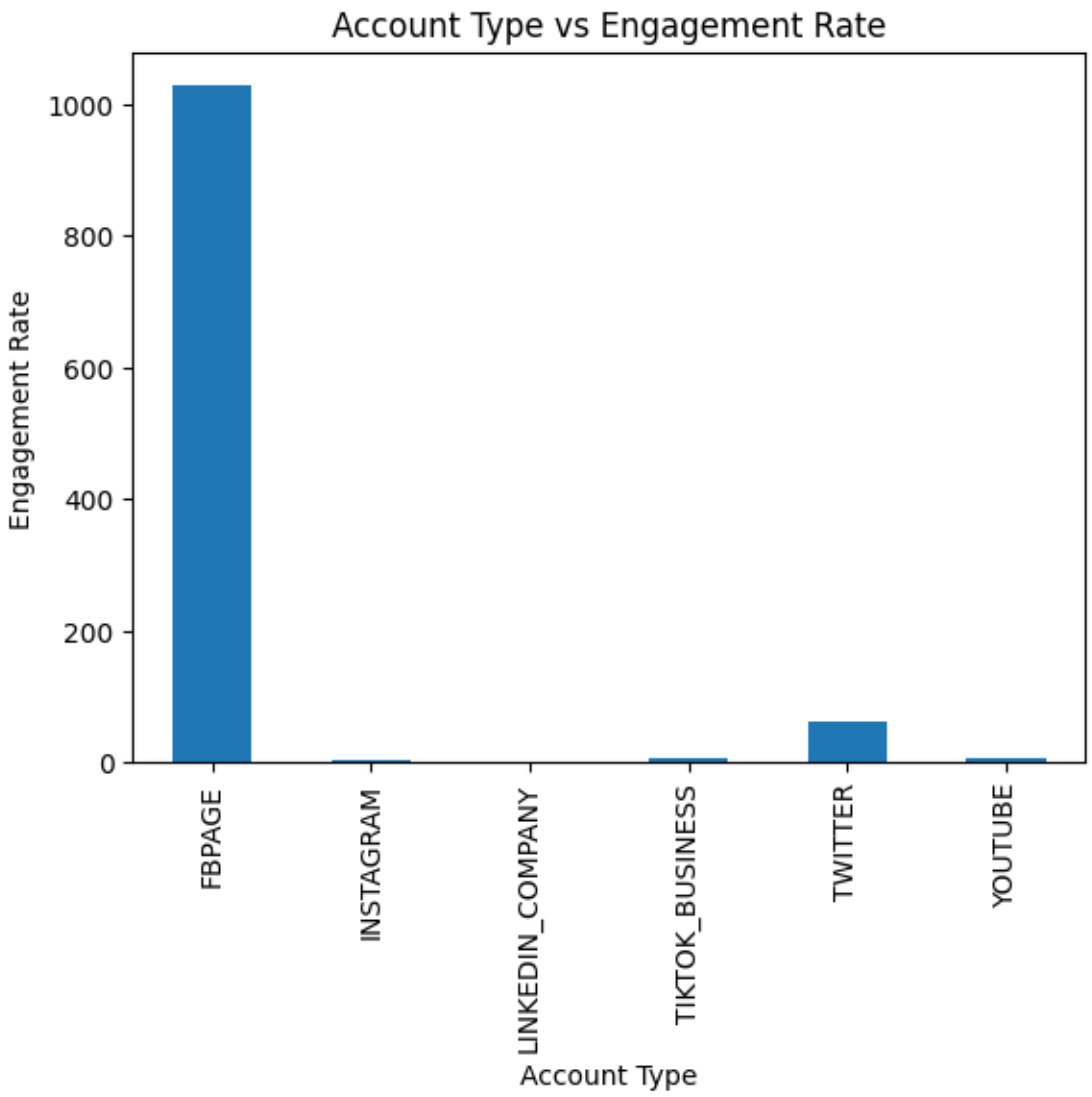
[36]:
```
TWITTER             1951
INSTAGRAM            588
FBPAGE               585
YOUTUBE              220
TIKTOK_BUSINESS      113
LINKEDIN_COMPANY      22
Name: Account Type, dtype: int64
```

[69]:
```
social_data.groupby('Account Type')['Engagement Rate'].sum()
```

[69]:
```
Account Type
FBPAGE              1027.054354
INSTAGRAM              3.920599
LINKEDIN_COMPANY       0.394904
TIKTOK_BUSINESS        6.007931
TWITTER               63.387880
YOUTUBE                6.707538
Name: Engagement Rate, dtype: float64
```

[70]:
```
social_data.groupby('Account Type')['Engagement Rate'].sum().
 ↪plot(kind='bar',xlabel='Account Type',ylabel='Engagement␣
 ↪Rate',title='Account Type vs Engagement Rate')
```

[70]:
```
<Axes: title={'center': 'Account Type vs Engagement Rate'}, xlabel='Account
Type', ylabel='Engagement Rate'>
```



Commentary:
The Facebook page account type has the highest engagement rate.

Commentary:
Based on my discoveries, I would advise the following posting strategy: weigh the more popular variable types more but don't neglect the unpopular variable types.
Continue to be consistent with the most highly engaged variables to maximize profit and keep them at high engagement rates. Specifically, continue to post photos of the "General" game type under the "N/A" campaign on Facebook on Fridays at 12 pm. At the same time, if Evil Geniuses wants to grow its organization name as a whole, it needs to diversify its social media channels' discoveries. So while the most highly engaged variables should be utilized more often to maximize funds, the other social channels, games, and campaigns also need to have activity to try to grow. This is not only for Evil Geniuses to grow in all aspects but what if something bad suddenly happens to Facebook or the "General" game category? Then Evil Geniuses won't have other sources of

popularity or funds to rely on. By maintaining and seeking to grow the less popular categories, Evil Geniuses can hedge against this possible risk.

Question 7
Commentary:
As we see from the data, solely posting won't grow the other variables because they are not getting much engagement to begin with. Thus the social media team needs to have activity outside just posting to bring engagment to the other accounts. For example, host a Valorant giveaway on Instagram or Twitter because these are all less popular variables. Just by word of mouth and reposting, more and more people will see and become engaged with these accounts. In addition, because the "General" game is doing so well but social media accounts, besides Facebook, are not, perhaps the social media team could post about the "General" game category to these other social accounts to attract users who may not use Facebook but use other social media.