Project: Wrangling and Analyze Data

Data Gathering

In the cell below, gather **all** three pieces of data for this project and load them in the notebook. **Note:** the methods required to gather each data are different.

In [832…

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
import requests
import tweepy
from tweepy import OAuthHandler
import json
from timeit import default_timer as timer
import seaborn as sns
```

1. Directly download the WeRateDogs Twitter archive data (twitter_archive_enhanced.csv)

In [833…

```
df_archive=pd.read_csv('twitter-archive-enhanced.csv')
df_archive.head(10)
```

Out[833]:

	tweet_id	in_reply_to_status_id	in_reply_to_user_id	timestamp	sour
0	892420643555336193	NaN	NaN	2017-08-01 16:23:56 +0000	href="http://twitter.com/download/iphon
1	892177421306343426	NaN	NaN	2017-08-01 00:17:27 +0000	href="http://twitter.com/download/iphon
2	891815181378084864	NaN	NaN	2017-07-31 00:18:03 +0000	href="http://twitter.com/download/iphon
3	891689557279858688	NaN	NaN	2017-07-30 15:58:51 +0000	href="http://twitter.com/download/iphon
4	891327558926688256	NaN	NaN	2017-07-29 16:00:24 +0000	href="http://twitter.com/download/iphon
5	891087950875897856	NaN	NaN	2017-07-29 00:08:17 +0000	href="http://twitter.com/download/iphon

6	890971913173991426	NaN	NaN	2017-07-28 16:27:12 +0000	href="http://twitter.com/download/iphon
7	890729181411237888	NaN	NaN	2017-07-28 00:22:40 +0000	href="http://twitter.com/download/iphon
8	890609185150312448	NaN	NaN	2017-07-27 16:25:51 +0000	href="http://twitter.com/download/iphon
9	890240255349198849	NaN	NaN	2017-07-26 15:59:51 +0000	href="http://twitter.com/download/iphon

1. Use the Requests library to download the tweet image prediction (image_predictions.tsv)

In [834…
```python
#url link
url='https://d17h27t6h515a5.cloudfront.net/topher/2017/August/599fd2ad_image-predictions
response=requests.get(url)


file_name = "image-predictions.tsv"
with open(file_name, 'wb') as file:
     file.write(response.content)

#test file
df_image=pd.read_csv('image-predictions.tsv',sep='\t')
df_image.head(10)
len(df_image)
```

Out[834]:
```
2075
```

1. Use the Tweepy library to query additional data via the Twitter API (tweet_json.txt)

In [835…
```python
#pip install tweepy

consumer_key = ''
consumer_secret = ''
access_token = ''
access_secret = ''

auth = tweepy.OAuthHandler(consumer_key, consumer_secret)
auth.set_access_token(access_token, access_secret)

api = tweepy.API(auth, wait_on_rate_limit=True)
```

In [836…
```python
# Query Twitter's API for JSON data for each tweet ID in the Twitter archive
#count = 0
#fails_dict = {}
#start = timer()
```

```
# Save each tweet's returned JSON as a new line in a .txt file
#with open('tweet_json.txt', 'w') as outfile:
    # This loop will likely take 20-30 minutes to run because of Twitter's rate limit
#     for tweet_id in tweet_ids:
#         count += 1
#         print(str(count) + ": " + str(tweet_id))
#         try:
#             tweet = api.get_status(tweet_id, tweet_mode='extended',wait_on_rate_limit=T
#             print("Success")
#             json.dump(tweet._json, outfile)
#             outfile.write('\n')
#         except tweepy.TweepError as e:
#             print("Fail")
#             fails_dict[tweet_id] = e
#             pass
#end = timer()
#print(end - start)
#print(fails_dict)
#
```

In [ ]:

In [837…

```
df_count = []

with open('tweet-json.txt', 'r') as file:
    for row in file:
        tweet = json.loads(row)
        tweet_id = tweet['id']
        retweet_count = tweet['retweet_count']
        fav_count = tweet['favorite_count']
        df_count.append({
            'tweet_id':tweet_id,
            'retweet_count': retweet_count,
            'favorite_count': fav_count,})

df_count= pd.DataFrame(df_count)
df_count.head()
```

Out[837]:

	tweet_id	retweet_count	favorite_count
0	892420643555336193	8853	39467
1	892177421306343426	6514	33819
2	891815181378084864	4328	25461
3	891689557279858688	8964	42908
4	891327558926688256	9774	41048

Assessing Data

In this section, detect and document at least **eight (8) quality issues and two (2) tidiness issue**. You must use **both** visual assessment programmatic assessement to assess the data.

Note: pay attention to the following key points when you access the data.

- You only want original ratings (no retweets) that have images. Though there are 5000+ tweets in the dataset, not all are dog ratings and some are retweets.
- Assessing and cleaning the entire dataset completely would require a lot of time, and is not necessary to practice and demonstrate your skills in data wrangling. Therefore, the requirements of this project

are only to assess and clean at least 8 quality issues and at least 2 tidiness issues in this dataset.

- The fact that the rating numerators are greater than the denominators does not need to be cleaned. This unique rating system is a big part of the popularity of WeRateDogs.
- You do not need to gather the tweets beyond August 1st, 2017. You can, but note that you won't be able to gather the image predictions for these tweets since you don't have access to the algorithm used.

In [838…

```
#Check tweets table data
df_archive.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2356 entries, 0 to 2355
Data columns (total 17 columns):
 #   Column                      Non-Null Count  Dtype  
---  ------                      --------------  -----  
 0   tweet_id                    2356 non-null   int64  
 1   in_reply_to_status_id       78 non-null     float64
 2   in_reply_to_user_id         78 non-null     float64
 3   timestamp                   2356 non-null   object 
 4   source                      2356 non-null   object 
 5   text                        2356 non-null   object 
 6   retweeted_status_id         181 non-null    float64
 7   retweeted_status_user_id    181 non-null    float64
 8   retweeted_status_timestamp  181 non-null    object 
 9   expanded_urls               2297 non-null   object 
 10  rating_numerator            2356 non-null   int64  
 11  rating_denominator          2356 non-null   int64  
 12  name                        2356 non-null   object 
 13  doggo                       2356 non-null   object 
 14  floofer                     2356 non-null   object 
 15  pupper                      2356 non-null   object 
 16  puppo                       2356 non-null   object 
dtypes: float64(4), int64(3), object(10)
memory usage: 313.0+ KB
```

In [839…

```
#scope of work
#You only want original ratings (no retweets) that have images
df_archive_no_retweets = df_archive[(df_archive['retweeted_status_id'].isnull() & df_arc
df_archive_no_retweets.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2117 entries, 0 to 2355
Data columns (total 17 columns):
 #   Column                      Non-Null Count  Dtype  
---  ------                      --------------  -----  
 0   tweet_id                    2117 non-null   int64  
 1   in_reply_to_status_id       23 non-null     float64
 2   in_reply_to_user_id         23 non-null     float64
 3   timestamp                   2117 non-null   object 
 4   source                      2117 non-null   object 
 5   text                        2117 non-null   object 
 6   retweeted_status_id         0 non-null      float64
 7   retweeted_status_user_id    0 non-null      float64
 8   retweeted_status_timestamp  0 non-null      object 
 9   expanded_urls               2117 non-null   object 
 10  rating_numerator            2117 non-null   int64  
 11  rating_denominator          2117 non-null   int64  
 12  name                        2117 non-null   object 
 13  doggo                       2117 non-null   object 
 14  floofer                     2117 non-null   object 
 15  pupper                      2117 non-null   object 
 16  puppo                       2117 non-null   object 
```

```
dtypes: float64(4), int64(3), object(10)
memory usage: 297.7+ KB
```

In [840…

```
#A visual assessment of the table
df_archive_no_retweets.sample(5)
```

Out[840]:

	tweet_id	in_reply_to_status_id	in_reply_to_user_id	timestamp	s
729	781955203444699136	NaN	NaN	2016-09-30 20:33:43 +0000	href="http://twitter.com/download/ip
1327	705975130514706432	NaN	NaN	2016-03-05 04:36:02 +0000	href="http://twitter.com/download/ip
631	794205286408003585	NaN	NaN	2016-11-03 15:51:10 +0000	href="http://twitter.com/download/ip
2250	667832474953625600	NaN	NaN	2015-11-20 22:30:44 +0000	href="http://twitter.com/download/ip
1290	708130923141795840	NaN	NaN	2016-03-11 03:22:23 +0000	href="http://twitter.com/download/ip

In [841…

```
#Check duplicated for the Tweet id column
df_archive_no_retweets.tweet_id.duplicated()
```

Out[841]:

```
0       False
1       False
2       False
3       False
4       False
        ...
2351    False
2352    False
2353    False
2354    False
2355    False
Name: tweet_id, Length: 2117, dtype: bool
```

In [842…

```
#Have a look at Unique Values. And the extent of repetition and if there are illogical v
df_archive_no_retweets.name.value_counts()
```

Out[842]:

```
None          622
a              55
Lucy           11
Charlie        11
Cooper         10
             ...
Wishes          1
Rose            1
Theo            1
Fido            1
```

```
Christoper       1
Name: name, Length: 956, dtype: int64
```

In [843…

```
#Have a look at the image table structure
df_image.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2075 entries, 0 to 2074
Data columns (total 12 columns):
 #   Column    Non-Null Count  Dtype  
---  ------    --------------  -----  
 0   tweet_id  2075 non-null   int64  
 1   jpg_url   2075 non-null   object 
 2   img_num   2075 non-null   int64  
 3   p1        2075 non-null   object 
 4   p1_conf   2075 non-null   float64
 5   p1_dog    2075 non-null   bool   
 6   p2        2075 non-null   object 
 7   p2_conf   2075 non-null   float64
 8   p2_dog    2075 non-null   bool   
 9   p3        2075 non-null   object 
 10  p3_conf   2075 non-null   float64
 11  p3_dog    2075 non-null   bool   
dtypes: bool(3), float64(3), int64(2), object(4)
memory usage: 152.1+ KB
```

In [844…

```
#Visual evaluation of the table of pictures
df_image.sample(10)
```

Out[844]:

	tweet_id	jpg_url	img_num	p1	p1_con
897	699775878809702401	https://pbs.twimg.com/media/CbYac83W4AAUH1O.jpg	1	Dandie_Dinmont	0.27168
131	668297328638447616	https://pbs.twimg.com/media/CUZE4IWW4AAZmDf.jpg	1	king_penguin	0.60674
1931	859074603037188101	https://pbs.twimg.com/media/C-wLyufW0AA546I.jpg	1	revolver	0.19029
1034	711732680602345472	https://pbs.twimg.com/media/CeCVGEbUYAASeY4.jpg	3	dingo	0.36687
768	689280876073582592	https://pbs.twimg.com/media/CZDRTAPUoAEaqxF.jpg	3	Chihuahua	0.63754
1039	712085617388212225	https://pbs.twimg.com/media/CeHWFksXIAAyypp.jpg	2	Shih-Tzu	0.62512
922	702217446468493312	https://pbs.twimg.com/media/Cb7HCMkWEAAV9zY.jpg	1	golden_retriever	0.24241
1333	757729163776290825	https://pbs.twimg.com/media/CWyD2HGUYAQ1Xa7.jpg	2	cash_machine	0.80233
438	674422304705744896	https://pbs.twimg.com/media/CVwHgblWcAACWOD.jpg	1	golden_retriever	0.96449
1252	747963614829678593	https://pbs.twimg.com/media/CmFM7ngXEAEitfh.jpg	1	kelpie	0.30767

In [845…

```
#chack that there are no duplicates
df_image.tweet_id.duplicated()
```

Out[845]:

```
0       False
1       False
2       False
3       False
4       False
        ...  
2070    False
2071    False
2072    False
2073    False
2074    False
Name: tweet_id, Length: 2075, dtype: bool
```

```
In [846…  # Check the stats count table
          df_count.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2354 entries, 0 to 2353
Data columns (total 3 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   tweet_id        2354 non-null   int64
 1   retweet_count   2354 non-null   int64
 2   favorite_count  2354 non-null   int64
dtypes: int64(3)
memory usage: 55.3 KB
```

```
In [847…  #visual assessment of the sample
          df_count.sample(5)
```

Out[847]:

	tweet_id	retweet_count	favorite_count
110	871032628920680449	3999	23255
975	750011400160841729	1035	3568
820	770093767776997377	3520	0
1254	710588934686908417	2107	4968
649	792883833364439040	4964	12666

```
In [848…  #Verify.. that there is no duplicated
          df_count.tweet_id.duplicated()
```

```
Out[848]:
0       False
1       False
2       False
3       False
4       False
        ...
2349    False
2350    False
2351    False
2352    False
2353    False
Name: tweet_id, Length: 2354, dtype: bool
```

```
In [849…  #For further verification, the two tables have been merged to find out the missing value
          df_join = pd.merge(df_archive_no_retweets, df_image, on="tweet_id" ,how="left")
```

```
In [850…  #Look at the table after the merge
          df_join.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2117 entries, 0 to 2116
Data columns (total 28 columns):
 #   Column                      Non-Null Count  Dtype
---  ------                      --------------  -----
 0   tweet_id                    2117 non-null   int64
 1   in_reply_to_status_id       23 non-null     float64
 2   in_reply_to_user_id         23 non-null     float64
 3   timestamp                   2117 non-null   object
 4   source                      2117 non-null   object
 5   text                        2117 non-null   object
 6   retweeted_status_id         0 non-null      float64
 7   retweeted_status_user_id    0 non-null      float64
 8   retweeted_status_timestamp  0 non-null      object
 9   expanded_urls               2117 non-null   object
 10  rating_numerator            2117 non-null   int64  
 11  rating_denominator          2117 non-null   int64  
 12  name                        2117 non-null   object 
 13  doggo                       2117 non-null   object 
 14  floofer                     2117 non-null   object 
 15  pupper                      2117 non-null   object 
 16  puppo                       2117 non-null   object 
 17  jpg_url                     1994 non-null   object 
 18  img_num                     1994 non-null   float64
 19  p1                          1994 non-null   object 
 20  p1_conf                     1994 non-null   float64
 21  p1_dog                      1994 non-null   object 
 22  p2                          1994 non-null   object 
 23  p2_conf                     1994 non-null   float64
 24  p2_dog                      1994 non-null   object 
 25  p3                          1994 non-null   object 
 26  p3_conf                     1994 non-null   float64
 27  p3_dog                      1994 non-null   object 
dtypes: float64(8), int64(3), object(17)
memory usage: 479.6+ KB
```

In [851…

```python
# Take a look at the table after excluding tweets that do not have an image
df_join[((
    df_join['jpg_url'].notnull()
    )
)].info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1994 entries, 0 to 2116
Data columns (total 28 columns):
 #   Column                      Non-Null Count  Dtype  
---  ------                      --------------  -----  
 0   tweet_id                    1994 non-null   int64  
 1   in_reply_to_status_id       23 non-null     float64
 2   in_reply_to_user_id         23 non-null     float64
 3   timestamp                   1994 non-null   object 
 4   source                      1994 non-null   object 
 5   text                        1994 non-null   object 
 6   retweeted_status_id         0 non-null      float64
 7   retweeted_status_user_id    0 non-null      float64
 8   retweeted_status_timestamp  0 non-null      object 
 9   expanded_urls               1994 non-null   object 
 10  rating_numerator            1994 non-null   int64  
 11  rating_denominator          1994 non-null   int64  
 12  name                        1994 non-null   object 
 13  doggo                       1994 non-null   object 
 14  floofer                     1994 non-null   object 
 15  pupper                      1994 non-null   object 
 16  puppo                       1994 non-null   object 
 17  jpg_url                     1994 non-null   object 
 18  img_num                     1994 non-null   float64
 19  p1                          1994 non-null   object 
 20  p1_conf                     1994 non-null   float64
 21  p1_dog                      1994 non-null   object 
 22  p2                          1994 non-null   object 
 23  p2_conf                     1994 non-null   float64
 24  p2_dog                      1994 non-null   object 
 25  p3                          1994 non-null   object 
 26  p3_conf                     1994 non-null   float64
 27  p3_dog                      1994 non-null   object 
dtypes: float64(8), int64(3), object(17)
memory usage: 451.8+ KB
```

In [852…

```python
#Random sample
df_join.sample(5)
```

Out[852]:

	tweet_id	in_reply_to_status_id	in_reply_to_user_id	timestamp	s
1600	676263575653122048	NaN	NaN	2015-12-14 04:52:55 +0000	href="http://twitter.com/download/ip
202	845306882940190720	NaN	NaN	2017-03-24 16:10:40 +0000	href="http://twitter.com/download/ip
1143	703382836347330562	NaN	NaN	2016-02-27 00:55:11 +0000	href="http://twitter.com/download/ip
1841	670840546554966016	NaN	NaN	2015-11-29 05:43:44 +0000	href="http://twitter.com/download/ip
1687	674269164442398721	NaN	NaN	2015-12-08 16:47:50 +0000	href="http://twitter.com/download/ip

5 rows × 28 columns

In [853…

```
#Check unique values
df_join['rating_denominator'].value_counts()
```

Out[853]:

```
10     2099
50        3
11        2
80        2
70        1
7         1
150       1
170       1
20        1
90        1
40        1
130       1
110       1
120       1
2         1
Name: rating_denominator, dtype: int64
```

In [854…

```
#Visually check the column for the number of images, as well as the link for the images
df_join[["img_num","jpg_url"]].sort_values(by=['img_num'], ascending=False).head(10)
```

Out[854]:

	img_num	jpg_url
304	4.0	https://pbs.twimg.com/media/C3rN-lcWEAA9CmR.jpg
504	4.0	https://pbs.twimg.com/media/CvukbEkWAAAV-69.jpg
608	4.0	https://pbs.twimg.com/media/Cr2_6R8WAAAUMtc.jpg
283	4.0	https://pbs.twimg.com/media/C4UZLZLWYAA0dcs.jpg

278	4.0	https://pbs.twimg.com/media/C4lst0bXAAE6MP8.jpg
33	4.0	https://pbs.twimg.com/media/DEi_N9qXYAAgEEw.jpg
1315	4.0	https://pbs.twimg.com/media/CZMJYCRVAAE35Wk.jpg
273	4.0	https://pbs.twimg.com/media/C4uLLGuUoAAkIHm.jpg
181	4.0	https://pbs.twimg.com/media/C8m3-iQVoAAETnF.jpg
162	4.0	https://pbs.twimg.com/media/C9px7jyVwAAnmwN.jpg

Quality issues

df_archive

1. We actually have 2117 tweets but the number of tweets that have df_image is 1994 - we have missing values
2. timestamp column Object type has to be modified and tweet_id column int64 to Object
3. In the Columns of the (name , doggo , flooter, pupper ,puppo), there are values with the name None, which means that they are empty values. The value must be modified and made empty
4. (retweeted_status_id , retweeted_status_user_id , retweeted_status_timestamp) These columns contain null values. They show retweeted answers being dropped
5. (in_reply_to_status_id ,in_reply_to_user_id) Columns contain missing values and do not have and cannot be used. They must be dropped
6. (rating_denominator) column contains a number of 2099 as a result of a value of 10, which is illogical and makes this information useless.
7. (source) column contains redundant and useless data that should be dropped

df_image

1. jpg_url column contains only one picture. We show in a column img_num that contains more than one picture

Tidiness issues

1. The table (df_archive , df_image , df_join) must be merged into one table
2. Merge the data from (doggo, puppo, pupper, floofer) into a single column. NEW

Cleaning Data

In this section, clean **all** of the issues you documented while assessing.

Note: Make a copy of the original data before cleaning. Cleaning includes merging individual pieces of data according to the rules of tidy data. The result should be a high-quality and tidy master pandas DataFrame (or DataFrames, if appropriate).

In [855…
```
# Make copies of original pieces of data
```

```
#scope of work
#You only want original ratings (no retweets) that have images
#df_archive_new = df_archive[(df_archive['retweeted_status_id'].isnull() & df_archive['e

#copy data
df_archive_new = df_archive.copy()

# drop retweeted row
drop_row = df_archive_new[(df_archive_new['retweeted_status_id'].notnull())].index
df_archive_new.drop(drop_row,  inplace=True)

# drop rows without images
drop_row = df_archive_new[(df_archive_new['expanded_urls'].isnull())].index
df_archive_new.drop(drop_row ,  inplace=True)

#copy image
df_image_new = df_image.copy()

#copy Likes and retweets counts
df_count_new = df_count.copy()
```

In [856…

```
#chack row  retweeted_
df_archive_new['tweet_id'][(df_archive_new['retweeted_status_id'].notnull())].count()
```

Out[856]:

```
0
```

In [857…

```
#chack row without images
df_archive_new['tweet_id'][(df_archive_new['expanded_urls'].isnull())].count()
```

Out[857]:

```
0
```

In [858…

```
#info data
df_archive_new.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2117 entries, 0 to 2355
Data columns (total 17 columns):
 #   Column                      Non-Null Count  Dtype  
---  ------                      --------------  -----  
 0   tweet_id                    2117 non-null   int64  
 1   in_reply_to_status_id       23 non-null     float64
 2   in_reply_to_user_id         23 non-null     float64
 3   timestamp                   2117 non-null   object 
 4   source                      2117 non-null   object 
 5   text                        2117 non-null   object 
 6   retweeted_status_id         0 non-null      float64
 7   retweeted_status_user_id    0 non-null      float64
 8   retweeted_status_timestamp  0 non-null      object 
 9   expanded_urls               2117 non-null   object 
 10  rating_numerator            2117 non-null   int64  
 11  rating_denominator          2117 non-null   int64  
 12  name                        2117 non-null   object 
 13  doggo                       2117 non-null   object 
 14  floofer                     2117 non-null   object 
 15  pupper                      2117 non-null   object 
 16  puppo                       2117 non-null   object 
dtypes: float64(4), int64(3), object(10)
memory usage: 297.7+ KB
```

Issue #1:

Define

The table (df_archive , df_image , df_join) must be merged into one table

Code

In [859…

```
#Merging tables into one table and linking them by Tweet ID
df_Tweet_stats2 =[]
df_Tweet_stats2 = df_archive_new.merge(df_image_new , on="tweet_id" ,how="left")
df_Tweet_stats3 = df_Tweet_stats2.merge( df_count_new , on="tweet_id" ,how="left")
```

Test

In [860…

```
#
df_Tweet_stats3.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2117 entries, 0 to 2116
Data columns (total 30 columns):
 #   Column                      Non-Null Count  Dtype  
---  ------                      --------------  -----  
 0   tweet_id                    2117 non-null   int64  
 1   in_reply_to_status_id       23 non-null     float64
 2   in_reply_to_user_id         23 non-null     float64
 3   timestamp                   2117 non-null   object 
 4   source                      2117 non-null   object 
 5   text                        2117 non-null   object 
 6   retweeted_status_id         0 non-null      float64
 7   retweeted_status_user_id    0 non-null      float64
 8   retweeted_status_timestamp  0 non-null      object 
 9   expanded_urls               2117 non-null   object 
 10  rating_numerator            2117 non-null   int64  
 11  rating_denominator          2117 non-null   int64  
 12  name                        2117 non-null   object 
 13  doggo                       2117 non-null   object 
 14  floofer                     2117 non-null   object 
 15  pupper                      2117 non-null   object 
 16  puppo                       2117 non-null   object 
 17  jpg_url                     1994 non-null   object 
 18  img_num                     1994 non-null   float64
 19  p1                          1994 non-null   object 
 20  p1_conf                     1994 non-null   float64
 21  p1_dog                      1994 non-null   object 
 22  p2                          1994 non-null   object 
 23  p2_conf                     1994 non-null   float64
 24  p2_dog                      1994 non-null   object 
 25  p3                          1994 non-null   object 
 26  p3_conf                     1994 non-null   float64
 27  p3_dog                      1994 non-null   object 
 28  retweet_count               2117 non-null   int64  
 29  favorite_count              2117 non-null   int64  
dtypes: float64(8), int64(5), object(17)
memory usage: 512.7+ KB
```

Issue #2:

Define

In the Columns of the (name , doggo , flooter, pupper ,puppo), there are values with the name None, which means that they are empty values. The value must be modified and made empty

In [861…

```
#
Column_None = ["name" , "doggo" , "floofer", "pupper" ,"puppo"]
```

```
df_Tweet_stats3[Column_None] = df_Tweet_stats3[Column_None].replace({ "None": np.nan })
```

Code

In [862...

```
#
Column_None = ["name" , "doggo" , "floofer", "pupper" ,"puppo"]
df_Tweet_stats3[Column_None] = df_Tweet_stats3[Column_None].replace({ "None": np.nan })
```

Test

In [863...

```
if ("None" in set(df_Tweet_stats3[Column_None])) :
    print("recodeing")
else :
    print('done')
```

```
done
```

Issue #3 :

Define

Merge the data from (doggo, puppo, pupper, floofer) into a single column (category_dog)

In [864...

```
# columns
columns = ['doggo', 'floofer', 'pupper', 'puppo']

# Merge the data from (doggo, puppo, pupper, floofer) into a single column (category_dog
df_Tweet_stats3['category_dog'] = df_Tweet_stats3[columns].apply(lambda x: ','.join(x.dr

#fix null value
df_Tweet_stats3['category_dog'] = df_Tweet_stats3['category_dog'].replace({ "": np.nan }
```

Test

In [865...

```
if(df_Tweet_stats3['category_dog'].count()== (df_Tweet_stats3['doggo'].count()+df_Tweet_
    print("done ")
else :
      print(df_Tweet_stats3['category_dog'].value_counts())
```

```
pupper           222
doggo             72
puppo             23
doggo,pupper      10
floofer            9
doggo,puppo        1
doggo,floofer      1
Name: category_dog, dtype: int64
```

> This is a quality problem, which is the presence of more than one value for the same line. We will solve it next (doggo,pupper ,doggo,puppo, doggo,floofer)

Issue #4:

Define

category_dog columns: This is a quality problem, which is the presence of more than one value for the same line(doggo,pupper doggo,puppo, doggo,floofer) we will drop row

Code

```
In [866…
#value drop
category_drop =['doggo,pupper' , 'doggo,puppo' ,'doggo,floofer']

#
category_drop = df_Tweet_stats3[df_Tweet_stats3['category_dog'].isin(category_drop) == T

#
df_Tweet_stats3.drop(category_drop ,  inplace=True)
```

Test

```
In [867…
#value drop
category_drop =['doggo,pupper' , 'doggo,puppo' ,'doggo,floofer']

if df_Tweet_stats3['category_dog'][df_Tweet_stats3['category_dog'].isin(category_drop)].
    #Drop columns 'doggo', 'floofer', 'pupper', 'puppo'
    df_Tweet_stats3 = df_Tweet_stats3.drop(columns, axis=1)
    print('done and  Drop columns')

else :
    print("recodeing")
```

```
done and  Drop columns
```

Issue #5:

Define

Drop the following columns: retweeted_status_id , retweeted_status_user_id , retweeted_status_timestamp , jpg_url , in_reply_to_status_id, in_reply_to_user_id ,source

Code

```
In [868…
#Drop columns
drop_list = [ 'retweeted_status_id' , 'retweeted_status_user_id' , 'retweeted_status_tim

df_Tweet_stats3 = df_Tweet_stats3.drop(drop_list, axis=1)
```

Test

```
In [869…
#
if set(drop_list).issubset(df_Tweet_stats3.columns):
    print('not working re codeing')
else :
    df_Tweet_stats3.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2105 entries, 0 to 2116
Data columns (total 20 columns):
 #   Column               Non-Null Count  Dtype
---  ------               --------------  -----
 0   tweet_id             2105 non-null   int64
 1   timestamp            2105 non-null   object
 2   text                 2105 non-null   object
 3   expanded_urls        2105 non-null   object
 4   rating_numerator    2105 non-null   int64
 5   rating_denominator  2105 non-null   int64
 6   name                1490 non-null   object
 7   img_num             1983 non-null   float64
 8   p1                  1983 non-null   object
 9   p1_conf             1983 non-null   float64
 10  p1_dog              1983 non-null   object
 11  p2                  1983 non-null   object
 12  p2_conf             1983 non-null   float64
 13  p2_dog              1983 non-null   object
 14  p3                  1983 non-null   object
 15  p3_conf             1983 non-null   float64
 16  p3_dog              1983 non-null   object
 17  retweet_count       2105 non-null   int64
 18  favorite_count      2105 non-null   int64
 19  category_dog        326 non-null    object
dtypes: float64(4), int64(5), object(11)
memory usage: 345.4+ KB
```

Issue #6:

Define

Column type timestamp to datetime and p1_dog,p2_dog,p3_dog to bool and tweet_id to object

Code

In [870…

```
#
to_bool =  [ 'p1_dog','p2_dog','p3_dog' ]
to_timestamp = 'timestamp'

df_Tweet_stats3[to_bool] = df_Tweet_stats3[to_bool].astype('bool')
df_Tweet_stats3[to_timestamp] = pd.to_datetime(df_Tweet_stats3[to_timestamp])
df_Tweet_stats3['tweet_id'] = df_Tweet_stats3['tweet_id'].astype('object')
```

Test

In [871…

```
if df_Tweet_stats3[to_bool[0]].dtypes == 'bool' :
    print('done')
if df_Tweet_stats3[to_bool[1]].dtypes == 'bool' :
    print('done')
if df_Tweet_stats3[to_bool[2]].dtypes == 'bool' :
    print('done')
if df_Tweet_stats3[to_timestamp].dtypes == 'datetime64[ns, UTC]' :
    print('done')
if df_Tweet_stats3['tweet_id'].dtypes == 'object' :
    print('done')
```

```
done
done
done
done
done
```

Storing Data

Save gathered, assessed, and cleaned master dataset to a CSV file named "twitter_archive_master.csv".

In [872…
```
df_Tweet_stats3.to_csv('Twitter_archive_master.csv')
Twitter_archive_master=pd.read_csv('Twitter_archive_master.csv')
```

Analyzing and Visualizing Data

In this section, analyze and visualize your wrangled data. You must produce at least **three (3) insights and one (1) visualization.**

In [873…
```
##
Twitter_archive_master.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2105 entries, 0 to 2104
Data columns (total 21 columns):
 #   Column               Non-Null Count  Dtype
---  ------               --------------  -----
 0   Unnamed: 0           2105 non-null   int64
 1   tweet_id             2105 non-null   int64
 2   timestamp            2105 non-null   object
 3   text                 2105 non-null   object
 4   expanded_urls        2105 non-null   object
 5   rating_numerator     2105 non-null   int64
 6   rating_denominator   2105 non-null   int64
 7   name                 1490 non-null   object
 8   img_num              1983 non-null   float64
 9   p1                   1983 non-null   object
 10  p1_conf              1983 non-null   float64
 11  p1_dog               2105 non-null   bool
 12  p2                   1983 non-null   object
 13  p2_conf              1983 non-null   float64
 14  p2_dog               2105 non-null   bool
 15  p3                   1983 non-null   object
 16  p3_conf              1983 non-null   float64
 17  p3_dog               2105 non-null   bool
 18  retweet_count        2105 non-null   int64
 19  favorite_count       2105 non-null   int64
 20  category_dog         326 non-null    object
dtypes: bool(3), float64(4), int64(6), object(8)
memory usage: 302.3+ KB
```

In [874…
```
#After converting the dataframe into a file, you must re-assign the columns  types again
to_bool =  [ 'p1_dog','p2_dog','p3_dog' ]
to_timestamp = 'timestamp'

Twitter_archive_master[to_bool] = Twitter_archive_master[to_bool].astype('bool')
Twitter_archive_master[to_timestamp] = pd.to_datetime(Twitter_archive_master[to_timestam
Twitter_archive_master['tweet_id'] = Twitter_archive_master['tweet_id'].astype('object')
```

In [875…
```
#
Twitter_archive_master.describe()
```

Out[875]:

	Unnamed: 0	rating_numerator	rating_denominator	img_num	p1_conf	p2_conf	p3_conf
count	2105.000000	2105.000000	2105.000000	1983.000000	1983.000000	1.983000e+03	1.983000e+03
mean	1061.045131	12.251781	10.504038	1.203732	0.593112	1.346413e-01	6.034123e-02
std	611.422625	40.389622	7.125979	0.561861	0.271886	1.007247e-01	5.089379e-02
min	0.000000	0.000000	2.000000	1.000000	0.044333	1.011300e-08	1.740170e-10
25%	532.000000	10.000000	10.000000	1.000000	0.362715	5.417505e-02	1.624950e-02

50%	1064.000000	11.000000	10.000000	1.000000	0.587342	1.176080e-01	4.965610e-02
75%	1590.000000	12.000000	10.000000	1.000000	0.843635	1.953115e-01	9.158675e-02
max	2116.000000	1776.000000	170.000000	4.000000	1.000000	4.880140e-01	2.734190e-01

Insights:

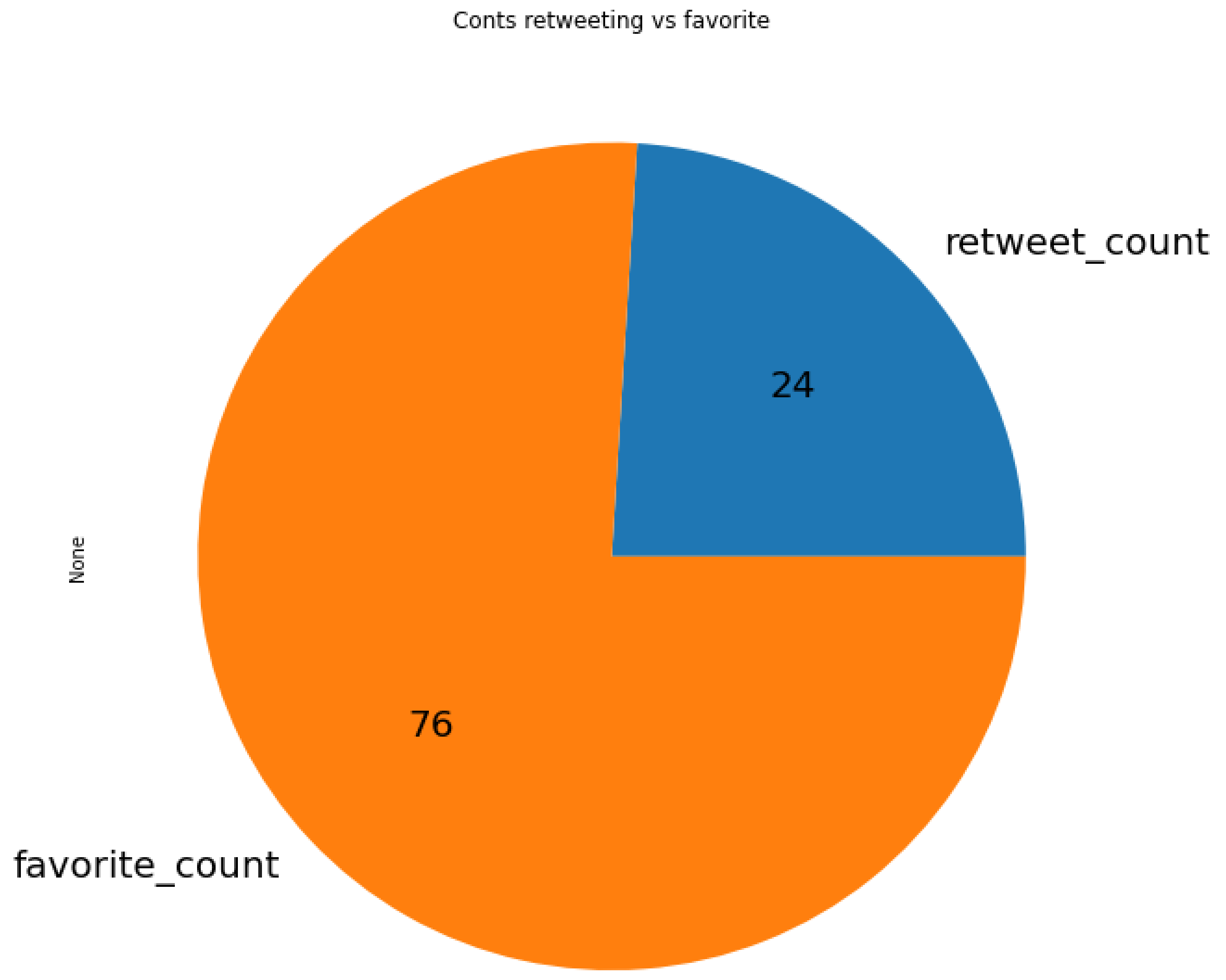
nsights 1:

Do you interact with tweets more by retweeting or favorite?

In [876…
```
#sum of your favorites and retweets
Twitter_sum =Twitter_archive_master[['retweet_count','favorite_count']].sum()
Twitter_sum
```

Out[876]:
```
retweet_count       5921833
favorite_count     18733074
dtype: int64
```

In [877…
```
pie = Twitter_sum.plot(kind='pie',fontsize=20, legend=False, autopct='%.f', subplots=Fal
```



> It shows us that favorites is more than retweeting by a large margin

nsights 2:

What are the most 10 common dog breeds in machine learning?

In [878…

```
dogs_type_best_p = []
dogs_type = Twitter_archive_master
dogs_type = dogs_type.reset_index()
for index, row in dogs_type.iterrows():
    if row['p1_dog'] == True :
     dogs_type_best_p.append({
            'tweet_id':row['tweet_id'],
            'dog_type': row['p1']})
    elif row['p2_dog'] == True :
     dogs_type_best_p.append({
            'tweet_id':row['tweet_id'],
            'dog_type': row['p2']})
    elif row['p3_dog'] == True :
     dogs_type_best_p.append({
            'tweet_id':row['tweet_id'],
            'dog_type': row['p3']})

dogs_type_best_p= pd.DataFrame(dogs_type_best_p)
```

In [879…

```
dogs_type = dogs_type.merge( dogs_type_best_p , on="tweet_id" ,how="left")
```

In [880…

```
hist_dog_hist = dogs_type.dog_type.value_counts()
```

In [881…

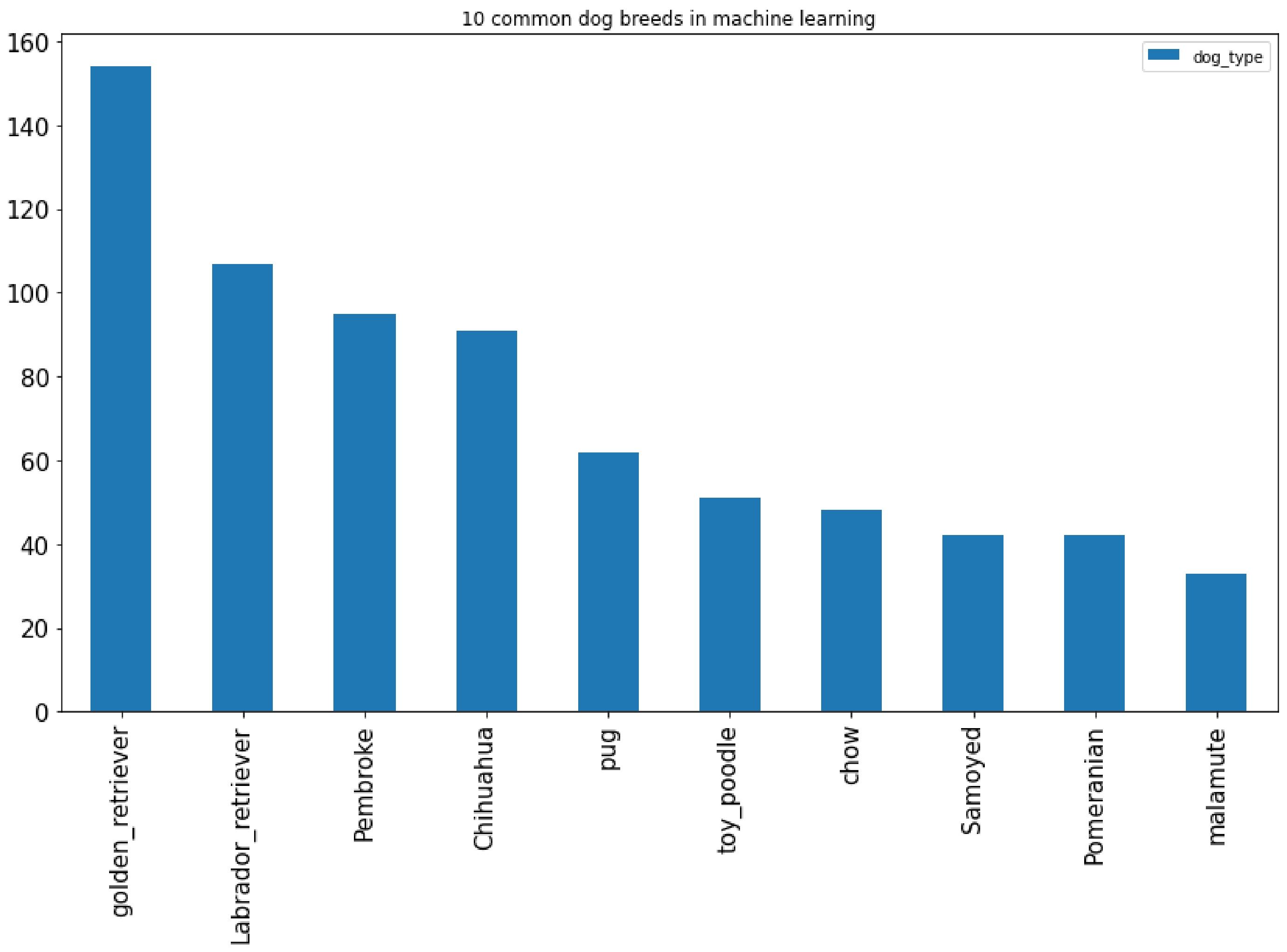
```
hist_dog_hist= pd.DataFrame(hist_dog_hist)
```

In [882…

```
hist_dog_hist.iloc[:10 ].plot(kind='bar', fontsize=15,figsize=(14,8),title='10 common do
```

Out[882]:

```
<AxesSubplot:title={'center':'10 common dog breeds in machine learning'}>
```



nsights 3:

Are the tweets with videos more interactive than other tweets?

In [883…
```
#Photo Tweets
twitter_photo = Twitter_archive_master[Twitter_archive_master['expanded_urls'].str.conta
#Video Tweets
twitter_video = Twitter_archive_master[Twitter_archive_master['expanded_urls'].str.conta
```

In [884…
```
twitter_photo[['expanded_urls','name','retweet_count','favorite_count']].describe()
```

Out[884]:

	retweet_count	favorite_count
count	2032.000000	2032.000000
mean	2581.029528	8483.309055
std	3678.925470	11032.480126
min	16.000000	81.000000
25%	620.750000	1978.500000
50%	1359.500000	4053.500000
75%	3154.000000	11075.500000
max	48265.000000	132810.000000

In [885…
```
twitter_video[['expanded_urls','name','retweet_count','favorite_count']].describe()
```

Out[885]:

	retweet_count	favorite_count

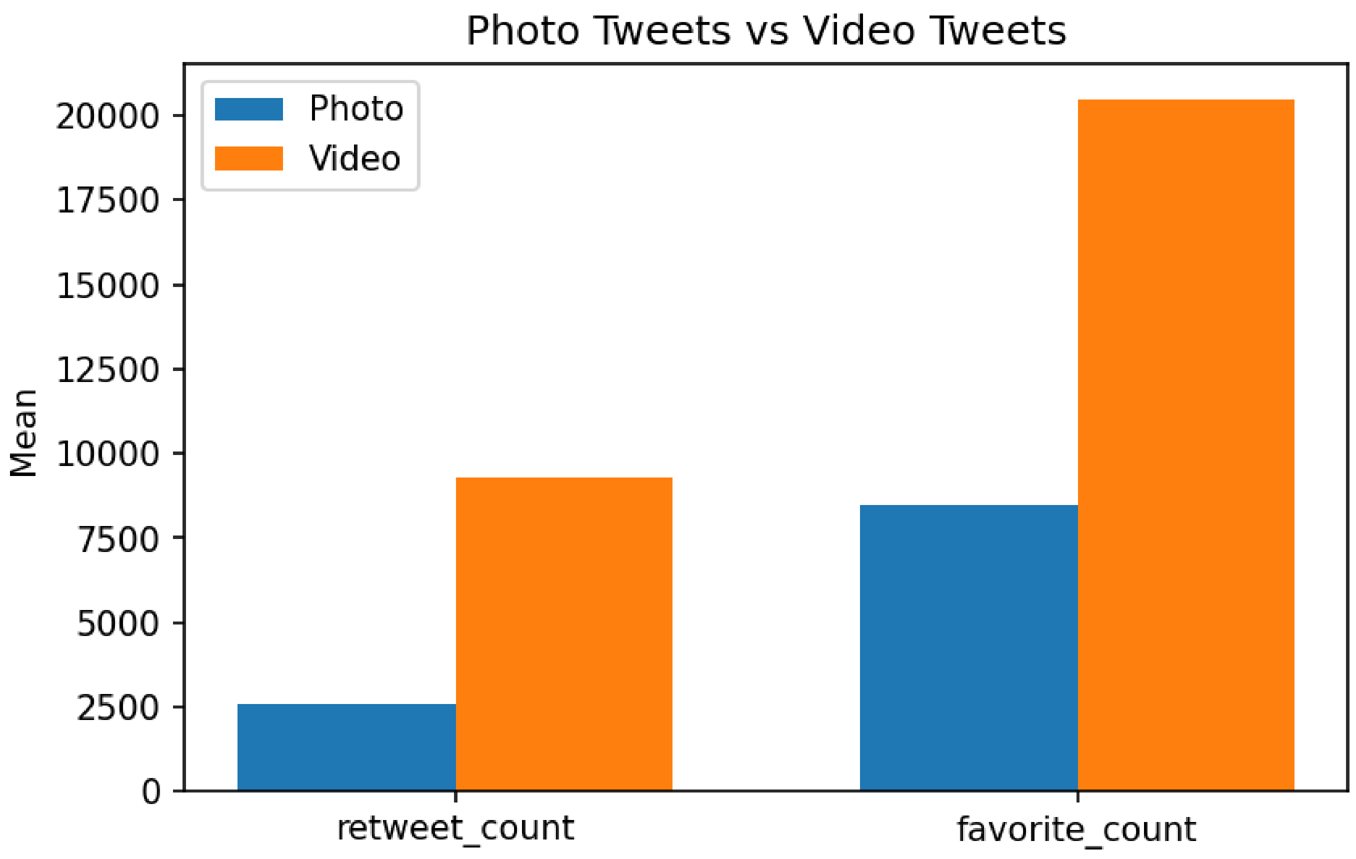
count	73.000000	73.000000
mean	9276.452055	20479.315068
std	14632.284991	26988.841923
min	388.000000	934.000000
25%	1224.000000	3047.000000
50%	3285.000000	9555.000000
75%	9907.000000	25057.000000
max	79515.000000	131075.000000

> Through the previous results, it is clear that interaction with tweets that contain video is more than that of images

Visualization

In [886…

```
# mean photo retweet_count favorite_count
photo_mean = twitter_photo[['retweet_count','favorite_count']].mean()

# mean video retweet_count favorite_count
video_mean = twitter_video[['retweet_count','favorite_count']].mean()
names = ['retweet_count','favorite_count']

fig = plt.figure(figsize=(6,5), dpi=150)
left, bottom, width, height = 0.1, 0.3, 0.8, 0.6
ax = fig.add_axes([left, bottom, width, height])

width = 0.35
ticks = np.arange(len(names))
ax.bar(ticks, photo_mean, width, label='Photo')
ax.bar(ticks + width, video_mean, width, align="center",label='Video')

ax.set_ylabel('Mean')
ax.set_title('Photo Tweets vs Video Tweets')
ax.set_xticks(ticks + width/2)
ax.set_xticklabels(names)

ax.legend(loc='best')
plt.show()
```



In [887…

```
# mean photo Rating Numerator Rating Denominator
photo_mean = twitter_photo[['rating_numerator','rating_denominator']].mean()

# mean video Rating Numerator Rating Denominator
video_mean = twitter_video[['rating_numerator','rating_denominator']].mean()
names = ['Rating Numerator','Rating Denominator']

fig = plt.figure(figsize=(6,5), dpi=150)
left, bottom, width, height = 0.1, 0.3, 0.8, 0.6
ax = fig.add_axes([left, bottom, width, height])

width = 0.35
ticks = np.arange(len(names))
ax.bar(ticks, photo_mean, width, label='Photo')
ax.bar(ticks + width, video_mean, width, align="center",label='Video')

ax.set_ylabel('Mean')
ax.set_title('Photo Tweets vs Video Tweets')
ax.set_xticks(ticks + width/2)
ax.set_xticklabels(names)

ax.legend(loc='best')
plt.show()
```

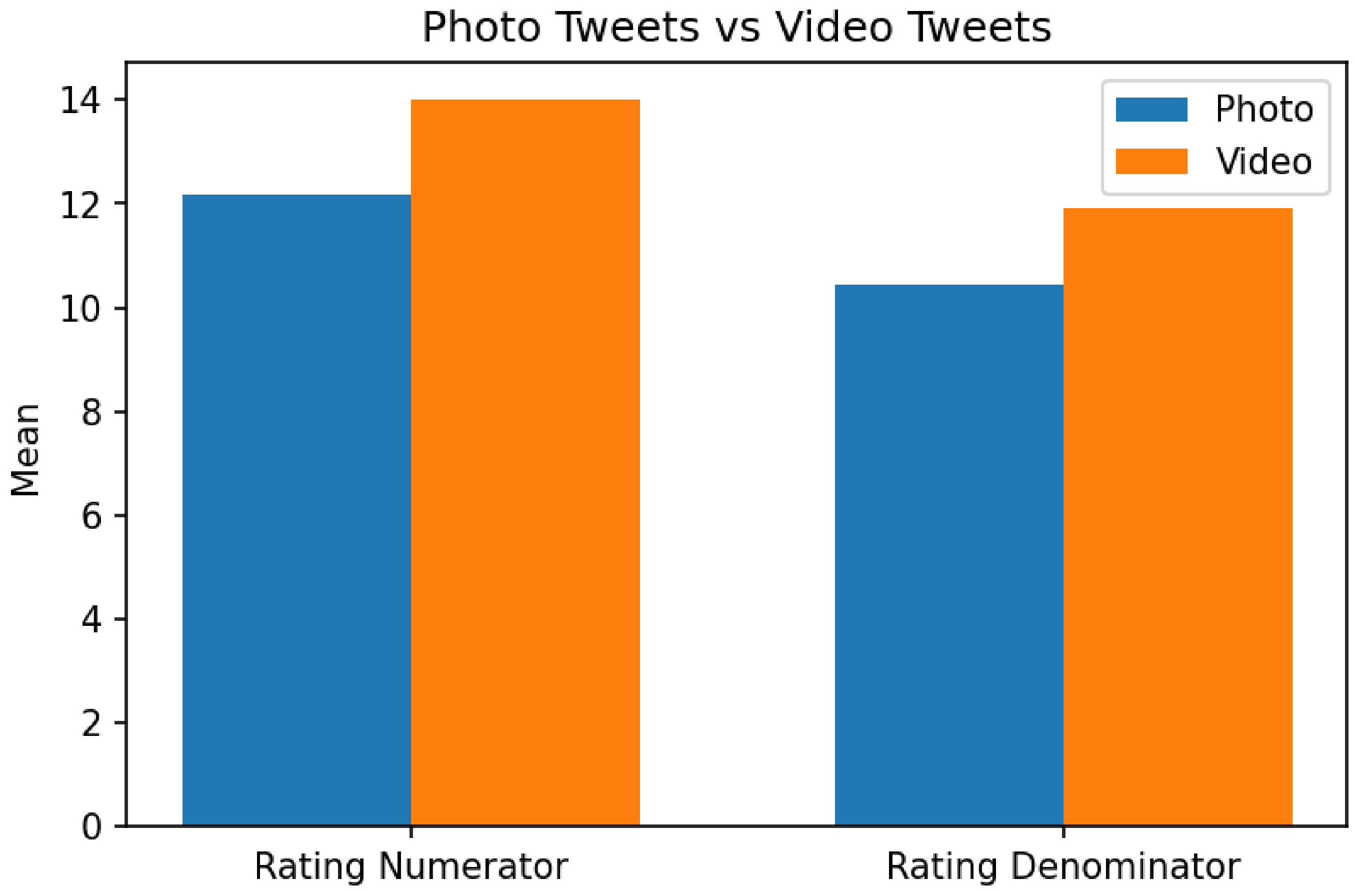


Photo Tweets vs Video Tweets
Mean
14
12
10
8
6
4
2
0
Photo
Video
Rating Numerator
Rating Denominator