wrangle_act

December 14, 2017

1 Wrangle and Analyze Data Project

1.1 1. Gather Data

```
In [1]: # Load packages
        import tweepy
        import numpy as np
        import pandas as pd
        from bs4 import BeautifulSoup
        import os
        import requests
        from PIL import Image
        from io import BytesIO
        import json
```

1.1.1 The WeRateDogs Twitter archive

```
In [2]: twitter_archive_enhanced = pd.read_csv('twitter-archive-enhanced.csv')

In [3]: twitter_archive_enhanced.head()
```

Out[3]:

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

```
2  <a href="http://twitter.com/download/iphone" r...
3  <a href="http://twitter.com/download/iphone" r...
4  <a href="http://twitter.com/download/iphone" r...

                                                text  retweeted_status_id  \
0  This is Phineas. He's a mystical boy. Only eve...                   NaN
1  This is Tilly. She's just checking pup on you...                   NaN
2  This is Archie. He is a rare Norwegian Pouncin...                   NaN
3  This is Darla. She commenced a snooze mid meal...                   NaN
4  This is Franklin. He would like you to stop ca...                   NaN

   retweeted_status_user_id retweeted_status_timestamp  \
0                       NaN                       NaN
1                       NaN                       NaN
2                       NaN                       NaN
3                       NaN                       NaN
4                       NaN                       NaN

                                       expanded_urls  rating_numerator  \
0  https://twitter.com/dog_rates/status/892420643...                13
1  https://twitter.com/dog_rates/status/892177421...                13
2  https://twitter.com/dog_rates/status/891815181...                12
3  https://twitter.com/dog_rates/status/891689557...                13
4  https://twitter.com/dog_rates/status/891327558...                12

   rating_denominator      name doggo floofer pupper puppo
0                  10   Phineas  None    None   None  None
1                  10     Tilly  None    None   None  None
2                  10    Archie  None    None   None  None
3                  10     Darla  None    None   None  None
4                  10  Franklin  None    None   None  None
```

1.1.2 Image Predictions

```
In [4]: tweet_image_prediction_url = 'https://d17h27t6h515a5.cloudfront.net/topher/2017/August/
        response = requests.get(tweet_image_prediction_url)
        with open('image_predictions.tsv', mode = 'wb') as file:
            file.write(response.content)
```

1.1.3 Tweet's Data Stats

```
In [5]: # consumer_key, consumer_secret, access_token and access_secret should be achieved
        # by creating a twitter account and twitter app on https://apps.twitter.com/app

        # consumer_key = 'YOUR CONSUMER KEY'
        # consumer_secret = 'YOUR CONSUMER SECRET'
        # access_token = 'YOUR ACCESS TOKEN'
        # access_secret = 'YOUR 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, wait_on_rate_limit_notify = True)
```

```
In [6]: # Use this for retrive json data
        # with open('tweet_json.txt', 'w') as outfile:
        #     data = []
        #     for id in twitter_archive_enhanced['tweet_id']:
        #         try:
        #             tweet = api.get_status(id, tweet_mode='extended')
        #             data.append(tweet._json)
        #         except:
        #             pass
        #     json.dump(data, outfile)
```

```
In [7]: # Test if data was written successfully
        with open('tweet_json.txt') as json_file:
            data = json.load(json_file)
            for tweet in data[:4]:
                print(tweet)
```

```
{'created_at': 'Tue Aug 01 16:23:56 +0000 2017', 'id': 892420643555336193, 'id_str': '89242064
{'created_at': 'Tue Aug 01 00:17:27 +0000 2017', 'id': 892177421306343426, 'id_str': '89217742
{'created_at': 'Mon Jul 31 00:18:03 +0000 2017', 'id': 891815181378084864, 'id_str': '89181518
{'created_at': 'Sun Jul 30 15:58:51 +0000 2017', 'id': 891689557279858688, 'id_str': '89168955
```

```
In [8]: # read json file
        tweets = pd.read_json('tweet_json.txt')
```

```
In [9]: tweets.tail()
```

```
Out[9]:      contributors  coordinates          created_at display_text_range  \
        2344           NaN          NaN 2015-11-16 00:24:50           [0, 120]
        2345           NaN          NaN 2015-11-16 00:04:52           [0, 137]
        2346           NaN          NaN 2015-11-15 23:21:54           [0, 130]
        2347           NaN          NaN 2015-11-15 23:05:30           [0, 139]
        2348           NaN          NaN 2015-11-15 22:32:08           [0, 131]

                                                    entities  \
        2344  {'hashtags': [], 'symbols': [], 'user_mentions...
        2345  {'hashtags': [], 'symbols': [], 'user_mentions...
        2346  {'hashtags': [], 'symbols': [], 'user_mentions...
        2347  {'hashtags': [], 'symbols': [], 'user_mentions...
        2348  {'hashtags': [], 'symbols': [], 'user_mentions...

                                            extended_entities  favorite_count  \
```

```
2344  {'media': [{'id': 666049244999131136, 'id_str'...             110
2345  {'media': [{'id': 666044217047650304, 'id_str'...             306
2346  {'media': [{'id': 666033409081393153, 'id_str'...             127
2347  {'media': [{'id': 666029276303482880, 'id_str'...             131
2348  {'media': [{'id': 666020881337073664, 'id_str'...            2531

      favorited                                          full_text  geo  \
2344      False  Here we have a 1949 1st generation vulpix. Enj...  NaN
2345      False  This is a purebred Piers Morgan. Loves to Netf...  NaN
2346      False  Here is a very happy pup. Big fan of well-main...  NaN
2347      False  This is a western brown Mitsubishi terrier. Up...  NaN
2348      False  Here we have a Japanese Irish Setter. Lost eye...  NaN

                            ...                            \
2344                        ...
2345                        ...
2346                        ...
2347                        ...
2348                        ...

      possibly_sensitive_appealable  quoted_status quoted_status_id  \
2344                            0.0            NaN              NaN
2345                            0.0            NaN              NaN
2346                            0.0            NaN              NaN
2347                            0.0            NaN              NaN
2348                            0.0            NaN              NaN

      quoted_status_id_str  retweet_count  retweeted  retweeted_status  \
2344                   NaN             40      False               NaN
2345                   NaN            143      False               NaN
2346                   NaN             46      False               NaN
2347                   NaN             47      False               NaN
2348                   NaN            527      False               NaN

                                              source truncated  \
2344  <a href="http://twitter.com/download/iphone" r...     False
2345  <a href="http://twitter.com/download/iphone" r...     False
2346  <a href="http://twitter.com/download/iphone" r...     False
2347  <a href="http://twitter.com/download/iphone" r...     False
2348  <a href="http://twitter.com/download/iphone" r...     False

                                                   user
2344  {'id': 4196983835, 'id_str': '4196983835', 'na...
2345  {'id': 4196983835, 'id_str': '4196983835', 'na...
2346  {'id': 4196983835, 'id_str': '4196983835', 'na...
2347  {'id': 4196983835, 'id_str': '4196983835', 'na...
2348  {'id': 4196983835, 'id_str': '4196983835', 'na...
```

```
        [5 rows x 31 columns]
```

```
In [10]: tweets.describe()
```

Out[10]:

	contributors	coordinates	favorite_count	geo	id	\
count	0.0	0.0	2349.000000	0.0	2.349000e+03	
mean	NaN	NaN	8109.720732	NaN	7.424674e+17	
std	NaN	NaN	12051.729881	NaN	6.840987e+16	
min	NaN	NaN	0.000000	NaN	6.660209e+17	
25%	NaN	NaN	1415.000000	NaN	6.783890e+17	
50%	NaN	NaN	3585.000000	NaN	7.193325e+17	
75%	NaN	NaN	10100.000000	NaN	7.989257e+17	
max	NaN	NaN	131820.000000	NaN	8.924206e+17	

	id_str	in_reply_to_status_id	in_reply_to_status_id_str	\
count	2.349000e+03	7.800000e+01	7.800000e+01	
mean	7.424674e+17	7.455079e+17	7.455079e+17	
std	6.840987e+16	7.582492e+16	7.582492e+16	
min	6.660209e+17	6.658147e+17	6.658147e+17	
25%	6.783890e+17	6.757419e+17	6.757419e+17	
50%	7.193325e+17	7.038708e+17	7.038708e+17	
75%	7.989257e+17	8.257804e+17	8.257804e+17	
max	8.924206e+17	8.862664e+17	8.862664e+17	

	in_reply_to_user_id	in_reply_to_user_id_str	possibly_sensitive	\
count	7.800000e+01	7.800000e+01	2208.0	
mean	2.014171e+16	2.014171e+16	0.0	
std	1.252797e+17	1.252797e+17	0.0	
min	1.185634e+07	1.185634e+07	0.0	
25%	3.086374e+08	3.086374e+08	0.0	
50%	4.196984e+09	4.196984e+09	0.0	
75%	4.196984e+09	4.196984e+09	0.0	
max	8.405479e+17	8.405479e+17	0.0	

	possibly_sensitive_appealable	quoted_status_id	quoted_status_id_str	\
count	2208.0	2.900000e+01	2.900000e+01	
mean	0.0	8.162686e+17	8.162686e+17	
std	0.0	6.164161e+16	6.164161e+16	
min	0.0	6.721083e+17	6.721083e+17	
25%	0.0	7.888183e+17	7.888183e+17	
50%	0.0	8.340867e+17	8.340867e+17	
75%	0.0	8.664587e+17	8.664587e+17	
max	0.0	8.860534e+17	8.860534e+17	

	retweet_count
count	2349.000000
mean	3097.263942
std	5133.834333

```
min         0.000000
25%       615.000000
50%      1445.000000
75%      3606.000000
max     78754.000000
```

```
In [11]: tweets.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2349 entries, 0 to 2348
Data columns (total 31 columns):
contributors                    0 non-null float64
coordinates                     0 non-null float64
created_at                      2349 non-null datetime64[ns]
display_text_range              2349 non-null object
entities                        2349 non-null object
extended_entities               2070 non-null object
favorite_count                  2349 non-null int64
favorited                       2349 non-null bool
full_text                       2349 non-null object
geo                             0 non-null float64
id                              2349 non-null int64
id_str                          2349 non-null int64
in_reply_to_screen_name         78 non-null object
in_reply_to_status_id           78 non-null float64
in_reply_to_status_id_str       78 non-null float64
in_reply_to_user_id             78 non-null float64
in_reply_to_user_id_str         78 non-null float64
is_quote_status                 2349 non-null bool
lang                            2349 non-null object
place                           1 non-null object
possibly_sensitive              2208 non-null float64
possibly_sensitive_appealable   2208 non-null float64
quoted_status                   28 non-null object
quoted_status_id                29 non-null float64
quoted_status_id_str            29 non-null float64
retweet_count                   2349 non-null int64
retweeted                       2349 non-null bool
retweeted_status                174 non-null object
source                          2349 non-null object
truncated                       2349 non-null bool
user                            2349 non-null object
dtypes: bool(4), datetime64[ns](1), float64(11), int64(4), object(11)
memory usage: 523.0+ KB
```

```
In [12]: # Keep only tweet ID, retweet count, and favorite count
         tweets = tweets[['user', 'favorite_count', 'retweet_count']]
```

```
In [13]: tweets.head()
```

```
Out[13]:                                                  user  favorite_count  \
         0  {'id': 4196983835, 'id_str': '4196983835', 'na...           39334
         1  {'id': 4196983835, 'id_str': '4196983835', 'na...           33671
         2  {'id': 4196983835, 'id_str': '4196983835', 'na...           25363
         3  {'id': 4196983835, 'id_str': '4196983835', 'na...           42708
         4  {'id': 4196983835, 'id_str': '4196983835', 'na...           40850

            retweet_count
         0           8786
         1           6439
         2           4270
         3           8877
         4           9654
```

1.2 2. Assessing Data

```
In [14]: twitter_archive_enhanced.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2356 entries, 0 to 2355
Data columns (total 17 columns):
tweet_id                    2356 non-null int64
in_reply_to_status_id       78 non-null float64
in_reply_to_user_id         78 non-null float64
timestamp                   2356 non-null object
source                      2356 non-null object
text                        2356 non-null object
retweeted_status_id         181 non-null float64
retweeted_status_user_id    181 non-null float64
retweeted_status_timestamp  181 non-null object
expanded_urls               2297 non-null object
rating_numerator            2356 non-null int64
rating_denominator          2356 non-null int64
name                        2356 non-null object
doggo                       2356 non-null object
floofer                     2356 non-null object
pupper                      2356 non-null object
puppo                       2356 non-null object
dtypes: float64(4), int64(3), object(10)
memory usage: 313.0+ KB
```

1.2.1 Quality Issues

twitter_archive_enhanced: - We don't need reply tweets - We don't need retweets - Wrong time format - Some expanded urls are missing - Uncorrect rating compared with text - Missing Name - Unclear tag(doggo, floofer, pupper, puppo) - Source should not include link

1.2.2 Tidyness

twitter_archive_enhanced: - Unuseful dog tag
tweets - User id displayed in wrong format

1.3 Cleaning Data

1.3.1 Quality

```
In [15]: # Make a copy of twitter_archive_enhanced
         twitter_archive_enhanced_clean = twitter_archive_enhanced.copy()

In [16]: # 1. Remove the reply tweets and drop in_reply_to_status_id and in_reply_to_user_id c
         twitter_archive_enhanced_clean = twitter_archive_enhanced_clean[twitter_archive_enhanc
         twitter_archive_enhanced_clean = twitter_archive_enhanced_clean.drop(['in_reply_to_sta

In [17]: # 2. Remove the reply retweets and drop retweeted_status_id,
         # retweeted_status_user_id and retweeted_status_timestamp column
         twitter_archive_enhanced_clean = twitter_archive_enhanced_clean[twitter_archive_enhanc
         twitter_archive_enhanced_clean = twitter_archive_enhanced_clean.drop(['retweeted_statu

In [18]: # 3. Correct format of timestamp
         twitter_archive_enhanced_clean['timestamp'] = pd.to_datetime(twitter_archive_enhanced_

In [19]: # 4 & 5. Uncorrect rating and extract short url instead of using the expanded url
         from fractions import Fraction
         def clean_ratings_and_urls(twitter_archive_enhanced_clean):
             text = twitter_archive_enhanced_clean.text
             text = text.replace('\n', ' ')
             text = text.replace('\t', ' ')
             text = text.replace(',', ' ')
             text = text.split(' ')
             numerator, denominator, url = 0, 0, None
             for s in text:
                 if 't.co' in s:
                     url = s
                 else:
                     try:
                         num = Fraction(s)
                         numerator = num.numerator
                         denominator = num.denominator
                         if denominator != 10:
                             numerator *= 10/denominator
                             denominator = 10
                     except:
                         pass
             twitter_archive_enhanced_clean['rating_numerator'] = int(numerator)
             twitter_archive_enhanced_clean['rating_denominator'] = denominator
             twitter_archive_enhanced_clean['url'] = url
```

```
        return twitter_archive_enhanced_clean

    twitter_archive_enhanced_clean = twitter_archive_enhanced_clean.apply(clean_ratings_a
```

In [20]:
```
    # 6. Missing Name
    def clean_dog_name(twitter_archive_enhanced_clean):
        if twitter_archive_enhanced_clean['name'].islower():
            return 'Unknown'
        elif twitter_archive_enhanced_clean['name'] == 'None':
            return 'Unknown'
        else:
            return twitter_archive_enhanced_clean['name']
    twitter_archive_enhanced_clean['name'] = twitter_archive_enhanced_clean.apply(clean_d

    twitter_archive_enhanced_clean.tail(50)
```

Out[20]:

	tweet_id	timestamp	\
2306	668635007768551424	2015-11-18 04:27:09	
2307	668626780179869698	2015-11-18 03:54:28	
2308	668617836334096384	2015-11-18 03:18:55	
2309	668604364988780544	2015-11-18 02:25:23	
2310	668786068205871104	2015-11-18 01:12:41	
2311	668781792255496192	2015-11-18 00:55:42	
2312	668776908487630848	2015-11-18 00:36:17	
2313	668739327293083650	2015-11-17 22:06:57	
2314	668701168228331520	2015-11-17 19:35:19	
2315	668691418707132416	2015-11-17 18:56:35	
2316	668649482315059201	2015-11-17 16:09:56	
2317	668644823164719104	2015-11-17 15:51:26	
2318	668454714377183233	2015-11-17 03:16:00	
2319	668447344410484738	2015-11-17 02:46:43	
2320	668437273139982337	2015-11-17 02:06:42	
2321	668435652385423360	2015-11-17 02:00:15	
2322	668430724426358785	2015-11-17 01:40:41	
2323	668428276349472768	2015-11-17 01:30:57	
2324	668421158376562688	2015-11-17 01:02:40	
2325	668418789513326592	2015-11-17 00:53:15	
2326	668411507551481857	2015-11-17 00:24:19	
2327	668407126856765440	2015-11-17 00:06:54	
2328	668396247373291520	2015-11-16 23:23:41	
2329	668373753744588802	2015-11-16 21:54:18	
2330	668362758909284353	2015-11-16 21:10:36	
2331	668353288456101888	2015-11-16 20:32:58	
2332	668345417576210432	2015-11-16 20:01:42	
2333	668337882303524864	2015-11-16 19:31:45	
2334	668293911632134144	2015-11-16 16:37:02	
2335	668287406224695296	2015-11-16 16:11:11	
2336	668273097616637952	2015-11-16 15:14:19	

```
2337  666268910803644416 2015-11-16 14:57:41
2338  666104133288665088 2015-11-16 04:02:55
2339  666102155909144576 2015-11-16 03:55:04
2340  666099513787052032 2015-11-16 03:44:34
2341  666094000022159362 2015-11-16 03:22:39
2342  666082916733198337 2015-11-16 02:38:37
2343  666073100786774016 2015-11-16 01:59:36
2344  666071193221509120 2015-11-16 01:52:02
2345  666063827256086533 2015-11-16 01:22:45
2346  666058600524156928 2015-11-16 01:01:59
2347  666057090499244032 2015-11-16 00:55:59
2348  666055525042405380 2015-11-16 00:49:46
2349  666051853826850816 2015-11-16 00:35:11
2350  666050758794694657 2015-11-16 00:30:50
2351  666049248165822465 2015-11-16 00:24:50
2352  666044226329800704 2015-11-16 00:04:52
2353  666033412701032449 2015-11-15 23:21:54
2354  666029285002620928 2015-11-15 23:05:30
2355  666020888022790149 2015-11-15 22:32:08

                                                  source  \
2306  <a href="http://twitter.com/download/iphone" r...
2307  <a href="http://twitter.com/download/iphone" r...
2308  <a href="http://twitter.com/download/iphone" r...
2309  <a href="http://twitter.com/download/iphone" r...
2310  <a href="http://twitter.com/download/iphone" r...
2311  <a href="http://twitter.com/download/iphone" r...
2312  <a href="http://twitter.com/download/iphone" r...
2313  <a href="http://twitter.com/download/iphone" r...
2314  <a href="http://twitter.com/download/iphone" r...
2315  <a href="http://twitter.com/download/iphone" r...
2316  <a href="http://twitter.com/download/iphone" r...
2317  <a href="http://twitter.com/download/iphone" r...
2318  <a href="http://twitter.com/download/iphone" r...
2319  <a href="http://twitter.com/download/iphone" r...
2320  <a href="http://twitter.com/download/iphone" r...
2321  <a href="http://twitter.com/download/iphone" r...
2322  <a href="http://twitter.com/download/iphone" r...
2323  <a href="http://twitter.com/download/iphone" r...
2324  <a href="http://twitter.com/download/iphone" r...
2325  <a href="http://twitter.com/download/iphone" r...
2326  <a href="http://twitter.com/download/iphone" r...
2327  <a href="http://twitter.com/download/iphone" r...
2328  <a href="http://twitter.com/download/iphone" r...
2329  <a href="http://twitter.com/download/iphone" r...
2330  <a href="http://twitter.com/download/iphone" r...
2331  <a href="http://twitter.com/download/iphone" r...
2332  <a href="http://twitter.com/download/iphone" r...
```

```
2333  <a href="http://twitter.com/download/iphone" r...
2334  <a href="http://twitter.com/download/iphone" r...
2335  <a href="http://twitter.com/download/iphone" r...
2336  <a href="http://twitter.com/download/iphone" r...
2337  <a href="http://twitter.com/download/iphone" r...
2338  <a href="http://twitter.com/download/iphone" r...
2339  <a href="http://twitter.com/download/iphone" r...
2340  <a href="http://twitter.com/download/iphone" r...
2341  <a href="http://twitter.com/download/iphone" r...
2342  <a href="http://twitter.com/download/iphone" r...
2343  <a href="http://twitter.com/download/iphone" r...
2344  <a href="http://twitter.com/download/iphone" r...
2345  <a href="http://twitter.com/download/iphone" r...
2346  <a href="http://twitter.com/download/iphone" r...
2347  <a href="http://twitter.com/download/iphone" r...
2348  <a href="http://twitter.com/download/iphone" r...
2349  <a href="http://twitter.com/download/iphone" r...
2350  <a href="http://twitter.com/download/iphone" r...
2351  <a href="http://twitter.com/download/iphone" r...
2352  <a href="http://twitter.com/download/iphone" r...
2353  <a href="http://twitter.com/download/iphone" r...
2354  <a href="http://twitter.com/download/iphone" r...
2355  <a href="http://twitter.com/download/iphone" r...

                                                  text  \
2306  These are Peruvian Feldspars. Their names are ...
2307  12/10 simply brilliant pup https://t.co/V6ZzG4...
2308  This is Jeph. He is a German Boston Shuttlecoc...
2309  This is Jockson. He is a Pinnacle Sagittarius...
2310  Unfamiliar with this breed. Ears pointy af. Wo...
2311  This is a purebred Bacardi named Octaviath. Ca...
2312  This is Josep. He is a Rye Manganese mix. Can ...
2313  This is Lugan. He is a Bohemian Rhapsody. Very...
2314  This is a golden Buckminsterfullerene named Jo...
2315  This is Christoper. He is a spotted Penne. Can...
2316  Cool dog. Enjoys couch. Low monotone bark. Ver...
2317  This is Jimothy. He is a Botwanian Gouda. Can ...
2318  I'll name the dogs from now on. This is Kreggo...
2319  This is Scout. She is a black Downton Abbey. I...
2320  Here we see a lone northeastern Cumberbatch. H...
2321  "Can you behave? You're ruining my wedding day...
2322  Oh boy what a pup! Sunglasses take this one to...
2323  Here we have an Austrian Pulitzer. Collectors ...
2324  *internally screaming* 12/10 https://t.co/YMcr...
2325  This is Walter. He is an Alaskan Terrapin. Lov...
2326  This is quite the dog. Gets really excited whe...
2327  This is a southern Vesuvius bumblegruff. Can d...
2328  Oh goodness. A super rare northeast Qdoba kang...
```

2329	Those are sunglasses and a jean jacket. 11/10 ...	
2330	Unique dog here. Very small. Lives in containe...	
2331	Here we have a mixed Asiago from the Galápagos...	
2332	Look at this jokester thinking seat belt laws ...	
2333	This is an extremely rare horned Parthenon. No...	
2334	This is a funny dog. Weird toes. Won't come do...	
2335	This is an Albanian 3 1/2 legged Episcopalian...	
2336	Can take selfies 11/10 https://t.co/ws2AMaNwPW	
2337	Very concerned about fellow dog trapped in com...	
2338	Not familiar with this breed. No tail (weird)...	
2339	Oh my. Here you are seeing an Adobe Setter giv...	
2340	Can stand on stump for what seems like a while...	
2341	This appears to be a Mongolian Presbyterian mi...	
2342	Here we have a well-established sunblockerspan...	
2343	Let's hope this flight isn't Malaysian (lol). ...	
2344	Here we have a northern speckled Rhododendron...	
2345	This is the happiest dog you will ever see. Ve...	
2346	Here is the Rand Paul of retrievers folks! He'...	
2347	My oh my. This is a rare blond Canadian terrie...	
2348	Here is a Siberian heavily armored polar bear ...	
2349	This is an odd dog. Hard on the outside but lo...	
2350	This is a truly beautiful English Wilson Staff...	
2351	Here we have a 1949 1st generation vulpix. Enj...	
2352	This is a purebred Piers Morgan. Loves to Netf...	
2353	Here is a very happy pup. Big fan of well-main...	
2354	This is a western brown Mitsubishi terrier. Up...	
2355	Here we have a Japanese Irish Setter. Lost eye...	

	expanded_urls	rating_numerator	\
2306	https://twitter.com/dog_rates/status/666835007...	10	
2307	https://twitter.com/dog_rates/status/666826780...	12	
2308	https://twitter.com/dog_rates/status/666817836...	9	
2309	https://twitter.com/dog_rates/status/666804364...	8	
2310	https://twitter.com/dog_rates/status/666786068...	2	
2311	https://twitter.com/dog_rates/status/666781792...	10	
2312	https://twitter.com/dog_rates/status/666776908...	5	
2313	https://twitter.com/dog_rates/status/666739327...	10	
2314	https://twitter.com/dog_rates/status/666701168...	8	
2315	https://twitter.com/dog_rates/status/666691418...	8	
2316	https://twitter.com/dog_rates/status/666649482...	4	
2317	https://twitter.com/dog_rates/status/666644823...	9	
2318	https://twitter.com/dog_rates/status/666454714...	10	
2319	https://twitter.com/dog_rates/status/666447344...	9	
2320	https://twitter.com/dog_rates/status/666437273...	7	
2321	https://twitter.com/dog_rates/status/666435652...	10	
2322	https://twitter.com/dog_rates/status/666430724...	6	
2323	https://twitter.com/dog_rates/status/666428276...	7	
2324	https://twitter.com/dog_rates/status/666421158...	12	

```
2325  https://twitter.com/dog_rates/status/666418789...                10
2326  https://twitter.com/dog_rates/status/666411507...                 2
2327  https://twitter.com/dog_rates/status/666407126...                 7
2328  https://twitter.com/dog_rates/status/666396247...                 9
2329  https://twitter.com/dog_rates/status/666373753...                11
2330  https://twitter.com/dog_rates/status/666362758...                 6
2331  https://twitter.com/dog_rates/status/666353288...                 8
2332  https://twitter.com/dog_rates/status/666345417...                10
2333  https://twitter.com/dog_rates/status/666337882...                 9
2334  https://twitter.com/dog_rates/status/666293911...                 3
2335  https://twitter.com/dog_rates/status/666287406...                 9
2336  https://twitter.com/dog_rates/status/666273097...                11
2337  https://twitter.com/dog_rates/status/666268910...                10
2338  https://twitter.com/dog_rates/status/666104133...                 1
2339  https://twitter.com/dog_rates/status/666102155...                11
2340  https://twitter.com/dog_rates/status/666099513...                 8
2341  https://twitter.com/dog_rates/status/666094000...                 9
2342  https://twitter.com/dog_rates/status/666082916...                 6
2343  https://twitter.com/dog_rates/status/666073100...                10
2344  https://twitter.com/dog_rates/status/666071193...                 9
2345  https://twitter.com/dog_rates/status/666063827...                10
2346  https://twitter.com/dog_rates/status/666058600...                 8
2347  https://twitter.com/dog_rates/status/666057090...                 9
2348  https://twitter.com/dog_rates/status/666055525...                10
2349  https://twitter.com/dog_rates/status/666051853...                 2
2350  https://twitter.com/dog_rates/status/666050758...                10
2351  https://twitter.com/dog_rates/status/666049248...                 5
2352  https://twitter.com/dog_rates/status/666044226...                 6
2353  https://twitter.com/dog_rates/status/666033412...                 9
2354  https://twitter.com/dog_rates/status/666029285...                 7
2355  https://twitter.com/dog_rates/status/666020888...                 8

      rating_denominator        name doggo floofer pupper puppo  \
2306                  10     Unknown  None    None   None  None
2307                  10     Unknown  None    None   None  None
2308                  10        Jeph  None    None   None  None
2309                  10     Jockson  None    None   None  None
2310                  10     Unknown  None    None   None  None
2311                  10     Unknown  None    None   None  None
2312                  10       Josep  None    None   None  None
2313                  10       Lugan  None    None   None  None
2314                  10     Unknown  None    None   None  None
2315                  10  Christoper  None    None   None  None
2316                  10     Unknown  None    None   None  None
2317                  10     Jimothy  None    None   None  None
2318                  10    Kreggory  None    None   None  None
2319                  10       Scout  None    None   None  None
2320                  10     Unknown  None    None   None  None
```

2321	10	Unknown	None	None	None	None
2322	10	Unknown	None	None	None	None
2323	10	Unknown	None	None	None	None
2324	10	Unknown	None	None	None	None
2325	10	Walter	None	None	None	None
2326	10	Unknown	None	None	None	None
2327	10	Unknown	None	None	None	None
2328	10	Unknown	None	None	None	None
2329	10	Unknown	None	None	None	None
2330	10	Unknown	None	None	None	None
2331	10	Unknown	None	None	None	None
2332	10	Unknown	None	None	None	None
2333	10	Unknown	None	None	None	None
2334	10	Unknown	None	None	None	None
2335	10	Unknown	None	None	None	None
2336	10	Unknown	None	None	None	None
2337	10	Unknown	None	None	None	None
2338	10	Unknown	None	None	None	None
2339	10	Unknown	None	None	None	None
2340	10	Unknown	None	None	None	None
2341	10	Unknown	None	None	None	None
2342	10	Unknown	None	None	None	None
2343	10	Unknown	None	None	None	None
2344	10	Unknown	None	None	None	None
2345	10	Unknown	None	None	None	None
2346	10	Unknown	None	None	None	None
2347	10	Unknown	None	None	None	None
2348	10	Unknown	None	None	None	None
2349	10	Unknown	None	None	None	None
2350	10	Unknown	None	None	None	None
2351	10	Unknown	None	None	None	None
2352	10	Unknown	None	None	None	None
2353	10	Unknown	None	None	None	None
2354	10	Unknown	None	None	None	None
2355	10	Unknown	None	None	None	None

	url
2306	https://t.co/ZnEMHBsAs1
2307	https://t.co/V6ZzG45zzG
2308	https://t.co/8whlkYw3mO
2309	https://t.co/RdKbAOEpDK
2310	https://t.co/EIn5kElY1S
2311	https://t.co/uEvsGLOFHa
2312	https://t.co/XNGeDwrtYH
2313	https://t.co/tI3uFLDHBI
2314	https://t.co/uQbZJM2DQB
2315	https://t.co/bg4TqvvkuF
2316	https://t.co/vXMKrJC81s

```
2317  https://t.co/LEkZjZxESQ
2318  https://t.co/uPqPeXAcua
2319  https://t.co/kH60oka1HW
2320  https://t.co/7LtjBS0GPK
2321  https://t.co/GlFZPzqcEU
2322  https://t.co/yECbFrSArM
2323  https://t.co/NMQq6HIglK
2324  https://t.co/YMcrXC2Y6R
2325  https://t.co/qXpcwENTvn
2326  https://t.co/aMCTNWO94t
2327  https://t.co/LopTBkKa8h
2328  https://t.co/Dc7b0E8qFE
2329  https://t.co/uHXrPkUEyl
2330  https://t.co/XMD9CwjEnM
2331  https://t.co/tltQ5w9aUO
2332  https://t.co/VFKG1vxGjB
2333  https://t.co/QpRjllzWAL
2334  https://t.co/IIXis0zta0
2335  https://t.co/d9NcXFKwLv
2336  https://t.co/ws2AMaNwPW
2337  https://t.co/0yxApIikpk
2338  https://t.co/Asgdc6kuLX
2339  https://t.co/11LvqN4WLq
2340  https://t.co/Ri4nMTLq5C
2341  https://t.co/mnioXo3IfP
2342  https://t.co/3RU6x0vHB7
2343  https://t.co/Yk6GHE9tOY
2344  https://t.co/ZoL8kq2XFx
2345  https://t.co/RhUEAloehK
2346  https://t.co/pYAJkAe76p
2347  https://t.co/yWBqbrzy8O
2348  https://t.co/rdivxLiqEt
2349  https://t.co/v5A4vzSDdc
2350  https://t.co/fvIbQfHjIe
2351  https://t.co/4B7cOc1EDq
2352  https://t.co/DWnyCjf2mx
2353  https://t.co/y671yMhoiR
2354  https://t.co/r7mOb2m0UI
2355  https://t.co/BLDqew2Ijj
```

In [21]:
```
# 7. Take a look at twitter_archive_enhanced data, we can find all
# data are either none or same as column name, we can change it to
# 0 as none or 1 as indicated by column name
for col in ['doggo', 'floofer', 'pupper', 'puppo']:
    twitter_archive_enhanced_clean[col] = 0
    mask = twitter_archive_enhanced[col] == col
    twitter_archive_enhanced_clean.loc[mask, col] = 1
```

In [22]:
```
# 8. Source should not include link
```

```
def clean_source(twitter_archive_enhanced_clean):
    text = twitter_archive_enhanced_clean.source
    try:
        left = text.find('>')
        return text[left+1:-4]
    except:
        return 'Unknown'

twitter_archive_enhanced_clean['source'] = twitter_archive_enhanced_clean.apply(clean_
```

In [23]:
```
twitter_archive_enhanced_clean.head(50)
```

Out[23]:

	tweet_id	timestamp	source
0	892420643555336193	2017-08-01 16:23:56	Twitter for iPhone
1	892177421306343426	2017-08-01 00:17:27	Twitter for iPhone
2	891815181378084864	2017-07-31 00:18:03	Twitter for iPhone
3	891689557279858688	2017-07-30 15:58:51	Twitter for iPhone
4	891327558926688256	2017-07-29 16:00:24	Twitter for iPhone
5	891087950875897856	2017-07-29 00:08:17	Twitter for iPhone
6	890971913173991426	2017-07-28 16:27:12	Twitter for iPhone
7	890729181411237888	2017-07-28 00:22:40	Twitter for iPhone
8	890609185150312448	2017-07-27 16:25:51	Twitter for iPhone
9	890240255349198849	2017-07-26 15:59:51	Twitter for iPhone
10	890006608113172480	2017-07-26 00:31:25	Twitter for iPhone
11	889880896479866881	2017-07-25 16:11:53	Twitter for iPhone
12	889665388333682689	2017-07-25 01:55:32	Twitter for iPhone
13	889638837579907072	2017-07-25 00:10:02	Twitter for iPhone
14	889531135344209921	2017-07-24 17:02:04	Twitter for iPhone
15	889278841981685760	2017-07-24 00:19:32	Twitter for iPhone
16	888917238123831296	2017-07-23 00:22:39	Twitter for iPhone
17	888804989199671297	2017-07-22 16:56:37	Twitter for iPhone
18	888554962724278272	2017-07-22 00:23:06	Twitter for iPhone
20	888078434458587136	2017-07-20 16:49:33	Twitter for iPhone
21	887705289381826560	2017-07-19 16:06:48	Twitter for iPhone
22	887517139158093824	2017-07-19 03:39:09	Twitter for iPhone
23	887473957103951883	2017-07-19 00:47:34	Twitter for iPhone
24	887343217045368832	2017-07-18 16:08:03	Twitter for iPhone
25	887101392804085760	2017-07-18 00:07:08	Twitter for iPhone
26	886983233522544640	2017-07-17 16:17:36	Twitter for iPhone
27	886736880519319552	2017-07-16 23:58:41	Twitter for iPhone
28	886680336477933568	2017-07-16 20:14:00	Twitter for iPhone
29	886366144734445568	2017-07-15 23:25:31	Twitter for iPhone
31	886258384151887873	2017-07-15 16:17:19	Twitter for iPhone
33	885984800019947520	2017-07-14 22:10:11	Twitter for iPhone
34	885528943205470208	2017-07-13 15:58:47	Twitter for iPhone
35	885518971528720385	2017-07-13 15:19:09	Twitter for iPhone
37	885167619883638784	2017-07-12 16:03:00	Twitter for iPhone
38	884925521741709313	2017-07-12 00:01:00	Twitter for iPhone

```
39  884876753390489601 2017-07-11 20:47:12  Twitter for iPhone
40  884562892145688576 2017-07-11 00:00:02  Twitter for iPhone
41  884441805382717440 2017-07-10 15:58:53  Twitter for iPhone
42  884247878851493888 2017-07-10 03:08:17  Twitter for iPhone
43  884162670584377345 2017-07-09 21:29:42  Twitter for iPhone
44  883838122936631299 2017-07-09 00:00:04  Twitter for iPhone
45  883482846933004288 2017-07-08 00:28:19  Twitter for iPhone
46  883360690899218434 2017-07-07 16:22:55  Twitter for iPhone
47  883117836046086144 2017-07-07 00:17:54  Twitter for iPhone
48  882992080364220416 2017-07-06 15:58:11  Twitter for iPhone
49  882762694511734784 2017-07-06 00:46:41  Twitter for iPhone
50  882627270321602560 2017-07-05 15:48:34  Twitter for iPhone
51  882268110199369728 2017-07-04 16:01:23  Twitter for iPhone
52  882045870035918850 2017-07-04 01:18:17  Twitter for iPhone
53  881906580714921986 2017-07-03 16:04:48  Twitter for iPhone

                                                   text  \
0   This is Phineas. He's a mystical boy. Only eve...
1   This is Tilly. She's just checking pup on you...
2   This is Archie. He is a rare Norwegian Pouncin...
3   This is Darla. She commenced a snooze mid meal...
4   This is Franklin. He would like you to stop ca...
5   Here we have a majestic great white breaching ...
6   Meet Jax. He enjoys ice cream so much he gets ...
7   When you watch your owner call another dog a g...
8   This is Zoey. She doesn't want to be one of th...
9   This is Cassie. She is a college pup. Studying...
10  This is Koda. He is a South Australian decksha...
11  This is Bruno. He is a service shark. Only get...
12  Here's a puppo that seems to be on the fence a...
13  This is Ted. He does his best. Sometimes that'...
14  This is Stuart. He's sporting his favorite fan...
15  This is Oliver. You're witnessing one of his m...
16  This is Jim. He found a fren. Taught him how t...
17  This is Zeke. He has a new stick. Very proud o...
18  This is Ralphus. He's powering up. Attempting ...
20  This is Gerald. He was just told he didn't get...
21  This is Jeffrey. He has a monopoly on the pool...
22  I've yet to rate a Venezuelan Hover Wiener. Th...
23  This is Canela. She attempted some fancy porch...
24  You may not have known you needed to see this ...
25  This... is a Jubilant Antarctic House Bear. We...
26  This is Maya. She's very shy. Rarely leaves he...
27  This is Mingus. He's a wonderful father to his...
28  This is Derek. He's late for a dog meeting. 13...
29  This is Roscoe. Another pupper fallen victim t...
31  This is Waffles. His doggles are pupside down...
33  Viewer discretion advised. This is Jimbo. He w...
```

```
34  This is Maisey. She fell asleep mid-excavation...
35  I have a new hero and his name is Howard. 14/1...
37  Here we have a corgi undercover as a malamute...
38  This is Earl. He found a hat. Nervous about wh...
39  This is Lola. It's her first time outside. Mus...
40  This is Kevin. He's just so happy. 13/10 what ...
41  I present to you, Pup in Hat. Pup in Hat is gr...
42  OMG HE DIDN'T MEAN TO HE WAS JUST TRYING A LIT...
43  Meet Yogi. He doesn't have any important dog m...
44  This is Noah. He can't believe someone made th...
45  This is Bella. She hopes her smile made you sm...
46  Meet Grizzwald. He may be the floofiest floofe...
47  Please only send dogs. We don't rate mechanics...
48  This is Rusty. He wasn't ready for the first p...
49  This is Gus. He's quite the cheeky pupper. Alr...
50  This is Stanley. He has his first swim lesson ...
51  This is Alfy. You're witnessing his first wate...
52  This is Koko. Her owner, inspired by Barney, r...
53  This is Rey. He's a Benebop Cumberfloof. 12/10...

                                        expanded_urls  rating_numerator  \
0   https://twitter.com/dog_rates/status/892420643...                13
1   https://twitter.com/dog_rates/status/892177421...                13
2   https://twitter.com/dog_rates/status/891815181...                12
3   https://twitter.com/dog_rates/status/891689557...                13
4   https://twitter.com/dog_rates/status/891327558...                12
5   https://twitter.com/dog_rates/status/891087950...                13
6   https://gofundme.com/ydvmve-surgery-for-jax,ht...                13
7   https://twitter.com/dog_rates/status/890729181...                13
8   https://twitter.com/dog_rates/status/890609185...                13
9   https://twitter.com/dog_rates/status/890240255...                14
10  https://twitter.com/dog_rates/status/890006608...                13
11  https://twitter.com/dog_rates/status/889880896...                13
12  https://twitter.com/dog_rates/status/889665388...                13
13  https://twitter.com/dog_rates/status/889638837...                12
14  https://twitter.com/dog_rates/status/889531135...                13
15  https://twitter.com/dog_rates/status/889278841...                13
16  https://twitter.com/dog_rates/status/888917238...                12
17  https://twitter.com/dog_rates/status/888804989...                13
18  https://twitter.com/dog_rates/status/888554962...                13
20  https://twitter.com/dog_rates/status/888078434...                12
21  https://twitter.com/dog_rates/status/887705289...                13
22  https://twitter.com/dog_rates/status/887517139...                14
23  https://twitter.com/dog_rates/status/887473957...                13
24  https://twitter.com/dog_rates/status/887343217...                13
25  https://twitter.com/dog_rates/status/887101392...                12
26  https://twitter.com/dog_rates/status/886983233...                13
27  https://www.gofundme.com/mingusneedsus,https:/...                13
```

```
28  https://twitter.com/dog_rates/status/886680336...                13
29  https://twitter.com/dog_rates/status/886366144...                12
31  https://twitter.com/dog_rates/status/886258384...                13
33  https://twitter.com/dog_rates/status/885984800...                12
34  https://twitter.com/dog_rates/status/885528943...                13
35  https://twitter.com/4bonds2carbon/status/88551...                14
37  https://twitter.com/dog_rates/status/885167619...                13
38  https://twitter.com/dog_rates/status/884925521...                12
39  https://twitter.com/dog_rates/status/884876753...                13
40  https://twitter.com/dog_rates/status/884562892...                13
41  https://twitter.com/dog_rates/status/884441805...                14
42  https://twitter.com/kaijohnson_19/status/88396...                13
43  https://twitter.com/dog_rates/status/884162670...                12
44  https://twitter.com/dog_rates/status/883838122...                12
45  https://twitter.com/dog_rates/status/883482846...                 0
46  https://twitter.com/dog_rates/status/883360690...                13
47  https://twitter.com/dog_rates/status/883117836...                13
48  https://twitter.com/dog_rates/status/882992080...                13
49  https://twitter.com/dog_rates/status/882762694...                12
50  https://twitter.com/dog_rates/status/882627270...                13
51  https://twitter.com/dog_rates/status/882268110...                13
52  https://twitter.com/dog_rates/status/882045870...                13
53  https://twitter.com/dog_rates/status/881906580...                12

    rating_denominator       name  doggo  floofer  pupper  puppo  \
0                   10     Phineas      0        0       0      0
1                   10      Tilly      0        0       0      0
2                   10     Archie      0        0       0      0
3                   10      Darla      0        0       0      0
4                   10   Franklin      0        0       0      0
5                   10    Unknown      0        0       0      0
6                   10        Jax      0        0       0      0
7                   10    Unknown      0        0       0      0
8                   10       Zoey      0        0       0      0
9                   10     Cassie      1        0       0      0
10                  10       Koda      0        0       0      0
11                  10      Bruno      0        0       0      0
12                  10    Unknown      0        0       0      1
13                  10        Ted      0        0       0      0
14                  10     Stuart      0        0       0      1
15                  10     Oliver      0        0       0      0
16                  10        Jim      0        0       0      0
17                  10       Zeke      0        0       0      0
18                  10    Ralphus      0        0       0      0
20                  10     Gerald      0        0       0      0
21                  10    Jeffrey      0        0       0      0
22                  10    Unknown      0        0       0      0
23                  10     Canela      0        0       0      0
```

24	10	Unknown	0	0	0	0
25	10	Unknown	0	0	0	0
26	10	Maya	0	0	0	0
27	10	Mingus	0	0	0	0
28	10	Derek	0	0	0	0
29	10	Roscoe	0	0	1	0
31	10	Waffles	0	0	0	0
33	10	Jimbo	0	0	0	0
34	10	Maisey	0	0	0	0
35	10	Unknown	0	0	0	0
37	10	Unknown	0	0	0	0
38	10	Earl	0	0	0	0
39	10	Lola	0	0	0	0
40	10	Kevin	0	0	0	0
41	10	Unknown	0	0	0	0
42	10	Unknown	0	0	0	0
43	10	Yogi	1	0	0	0
44	10	Noah	0	0	0	0
45	0	Bella	0	0	0	0
46	10	Grizzwald	0	1	0	0
47	10	Unknown	0	0	0	0
48	10	Rusty	0	0	0	0
49	10	Gus	0	0	1	0
50	10	Stanley	0	0	0	0
51	10	Alfy	0	0	0	0
52	10	Koko	0	0	0	0
53	10	Rey	0	0	0	0

	url
0	https://t.co/MgUWQ76dJU
1	https://t.co/0Xxu71qeIV
2	https://t.co/wUnZnhtVJB
3	https://t.co/tD36da7qLQ
4	https://t.co/AtUZn91f7f
5	https://t.co/kQ04fDDRmh
6	https://t.co/tVJBRMnhxl
7	https://t.co/v0nONBcwxq
8	https://t.co/9TwLuAGH0b
9	https://t.co/t1bfwz5S2A
10	https://t.co/dVPW0B0Mme
11	https://t.co/u1XPQMl29g
12	https://t.co/BxvuXk0UCm
13	https://t.co/f8dEDcrKSR
14	https://t.co/y70o6h3isq
15	https://t.co/WpHvrQedPb
16	https://t.co/chxruIOUJN
17	https://t.co/HTQ77yNQ5K
18	https://t.co/YnYAFCTTiK

```
20  https://t.co/DK7iDPfuRX
21  https://t.co/PhrUk20Q64
22  https://t.co/20VrLAA8ba
23  https://t.co/cLyzpcUcMX
24  https://t.co/WZqNqygEyV
25  https://t.co/4Ad1jzJSdp
26  https://t.co/I6oNy0CgiT
27  https://t.co/ISvKOSkd5b
28  https://t.co/BCoWue0abA
29  https://t.co/RGE08MIJox
31  https://t.co/xZDA9Qsq1O
33  https://t.co/BuveP0uMF1
34  https://t.co/tp1kQ8i9JF
35  https://t.co/gzLHboL7Sk
37  https://t.co/44ItaMubBf
38  https://t.co/MYJvdlNRVa
39  https://t.co/74TKAUsLkO
40  https://t.co/1r4MFCbCX5
41  https://t.co/vvBOcC2VdC
42  https://t.co/uF3pQ8Wubj
43  https://t.co/YSI00BzTBZ
44  https://t.co/V85xujjDDY
45  https://t.co/qjrljjt948
46  https://t.co/rf661IFEYP
47  https://t.co/Se5fZ9wp5E
48  https://t.co/tyER0KpdXj
49  https://t.co/D43I96SlVu
50  https://t.co/Nx52PGwH94
51  https://t.co/fYP5RlutfA
52  https://t.co/zeDpnsKX7w
53  https://t.co/503CgWbhxQ
```

1.3.2 Tidyness

In [24]:
```
# 1. Unuseful dog tag doggo floofer pupper puppo, remove those columns
twitter_archive_enhanced_clean = twitter_archive_enhanced_clean.drop(["doggo", "floofe
twitter_archive_enhanced_clean.head()
```

Out[24]:

	tweet_id	timestamp	source	text
0	892420643555336193	2017-08-01 16:23:56	Twitter for iPhone	This is Phineas. He's a mystical boy. Only eve...
1	892177421306343426	2017-08-01 00:17:27	Twitter for iPhone	This is Tilly. She's just checking pup on you...
2	891815181378084864	2017-07-31 00:18:03	Twitter for iPhone	
3	891689557279858688	2017-07-30 15:58:51	Twitter for iPhone	
4	891327558926688256	2017-07-29 16:00:24	Twitter for iPhone	

```
2  This is Archie. He is a rare Norwegian Pouncin...
3  This is Darla. She commenced a snooze mid meal...
4  This is Franklin. He would like you to stop ca...

                                        expanded_urls  rating_numerator  \
0  https://twitter.com/dog_rates/status/892420643...                13
1  https://twitter.com/dog_rates/status/892177421...                13
2  https://twitter.com/dog_rates/status/891815181...                12
3  https://twitter.com/dog_rates/status/891689557...                13
4  https://twitter.com/dog_rates/status/891327558...                12

   rating_denominator      name                       url
0                  10   Phineas  https://t.co/MgUWQ76dJU
1                  10     Tilly  https://t.co/0Xxu71qeIV
2                  10    Archie  https://t.co/wUnZnhtVJB
3                  10     Darla  https://t.co/tD36da7qLQ
4                  10  Franklin  https://t.co/AtUZn91f7f
```

In [25]:
```
# 2. Clean user id in tweets data
tweets_clean = tweets.copy()
```

In [26]:
```
from pandas.io.json import json_normalize
user_info = json_normalize(tweets_clean['user'])
user_info.columns
```

Out[26]:
```
Index(['contributors_enabled', 'created_at', 'default_profile',
       'default_profile_image', 'description', 'entities.description.urls',
       'entities.url.urls', 'favourites_count', 'follow_request_sent',
       'followers_count', 'following', 'friends_count', 'geo_enabled',
       'has_extended_profile', 'id', 'id_str', 'is_translation_enabled',
       'is_translator', 'lang', 'listed_count', 'location', 'name',
       'notifications', 'profile_background_color',
       'profile_background_image_url', 'profile_background_image_url_https',
       'profile_background_tile', 'profile_banner_url', 'profile_image_url',
       'profile_image_url_https', 'profile_link_color',
       'profile_sidebar_border_color', 'profile_sidebar_fill_color',
       'profile_text_color', 'profile_use_background_image', 'protected',
       'screen_name', 'statuses_count', 'time_zone', 'translator_type', 'url',
       'utc_offset', 'verified'],
      dtype='object')
```

In [27]:
```
tweets_clean['user'] = user_info['id']
tweets_clean.head()
```

Out[27]:

	user	favorite_count	retweet_count
0	4196983835	39334	8786
1	4196983835	33671	6439
2	4196983835	25363	4270
3	4196983835	42708	8877
4	4196983835	40850	9654

1.4 4. Storing, Analyzing, and Visualizing Data for this Project

Store twitter_archive_enhanced_clean to csv

```
In [28]: twitter_archive_enhanced_clean.to_csv('twitter_archive_master.csv')
         tweets_clean.to_csv('tweets_stats.csv')
```

Insights

```
In [29]: twitter_archive_enhanced_clean.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2097 entries, 0 to 2355
Data columns (total 9 columns):
tweet_id              2097 non-null int64
timestamp             2097 non-null datetime64[ns]
source                2097 non-null object
text                  2097 non-null object
expanded_urls         2094 non-null object
rating_numerator      2097 non-null int64
rating_denominator    2097 non-null int64
name                  2097 non-null object
url                   2094 non-null object
dtypes: datetime64[ns](1), int64(3), object(5)
memory usage: 163.8+ KB
```

Insights 1: There are 2097 original tweets from WeRateDogs after we wrangle the data

```
In [30]: tweets_clean.describe()
```

Out[30]:

	user	favorite_count	retweet_count
count	2.349000e+03	2349.000000	2349.000000
mean	4.196984e+09	8109.720732	3097.263942
std	0.000000e+00	12051.729881	5133.834333
min	4.196984e+09	0.000000	0.000000
25%	4.196984e+09	1415.000000	615.000000
50%	4.196984e+09	3585.000000	1445.000000
75%	4.196984e+09	10100.000000	3606.000000
max	4.196984e+09	131820.000000	78754.000000

Insights 2: The maximum favorite count is 131820 and retweet count is 78754, and minimum for both is 0.

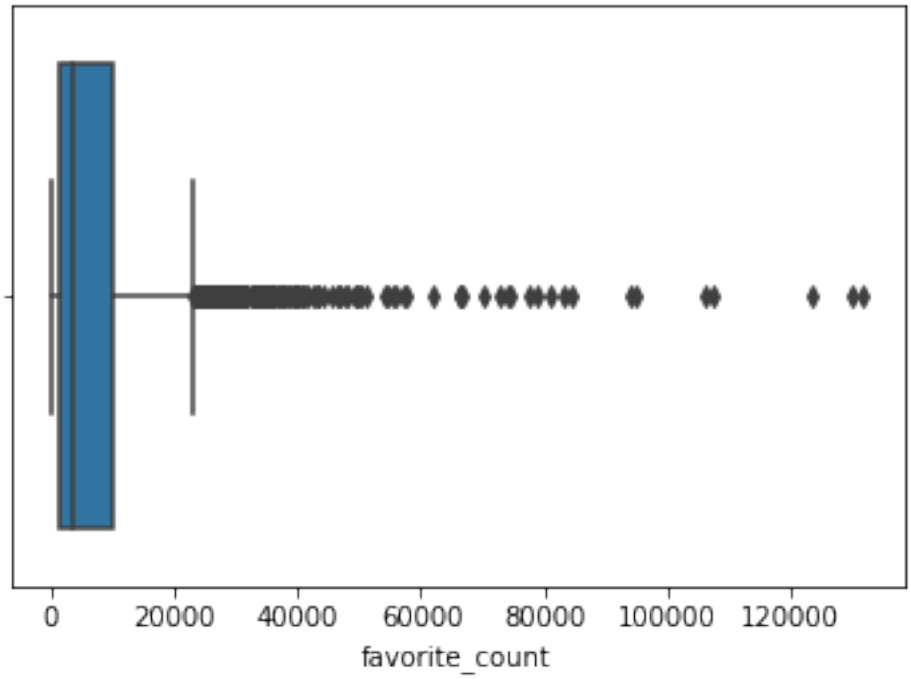
Insights 3: The mean of favorite count is 8110 and mean of retweet count is 3097.

Visualization

```
In [37]: # Use seaborn package to draw boxplot of tweets data to visualize it.
         import seaborn as sns
         import matplotlib
         %matplotlib inline
```

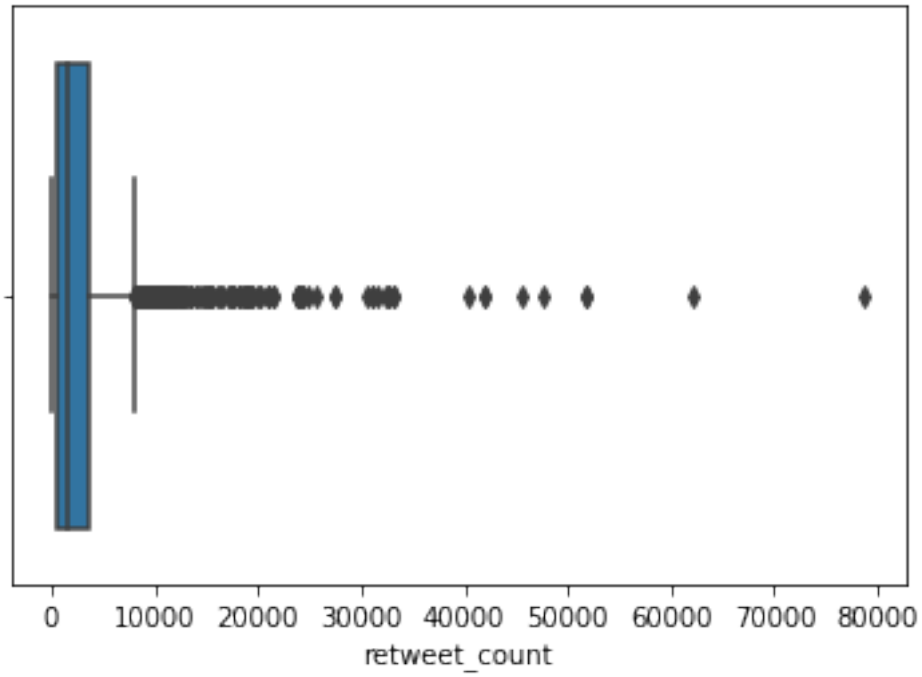
```
In [38]: sns.boxplot(x = tweets_clean['favorite_count'])
```

```
Out[38]: <matplotlib.axes._subplots.AxesSubplot at 0x11c0e8048>
```




```
In [39]: sns.boxplot(x = tweets_clean['retweet_count'])
```

```
Out[39]: <matplotlib.axes._subplots.AxesSubplot at 0x11c0bd668>
```


0
10000
20000
30000
40000
50000
60000
70000
80000
retweet_count