Introduction

The aim of this project is to put into practice what I have learned in the "wrangling data" section of the Udacity Data Analysis Nanodegree programme. The dataset is the archive of tweets from the Twitter user @dog_rates, also known as WeRateDogs.

In [130…

```
#Importing  all packages to be used in this project
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
import requests
import tweepy
import json
import os
import seaborn as sns
```

In [3]:

```
#Read CSV file
twitter_archive = pd.read_csv('twitter-archive-enhanced-2.csv')
```

In [4]:

```
twitter_archive.sort_values('timestamp')
twitter_archive.head()
```

Out[4]:

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

	tweet_id	in_reply_to_status_id	in_reply_to_user_id	timestamp	
4	891327558926688256	NaN	NaN	2017-07-29 16:00:24 +0000	href="http://twitter.com/down

In [5]:
```
twitter_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 [11]:
```
#Download tweet image predictions TSV using the Requests library and write it to image_
url = 'https://d17h27t6h515a5.cloudfront.net/topher/2017/August/599fd2ad_image-predicti
response = requests.get(url)

#create file
with open('image_predictions.tsv', mode='wb') as file:
    file.write(response.content)

#Import the tweet image predictions TSV file into a DataFrame
image_prediction = pd.read_csv('image_predictions.tsv', sep='\t')
```

Twitter API

In [18]:
```
import tweepy
from tweepy import OAuthHandler
import json
from timeit import default_timer as timer

# Query Twitter API for each tweet in the Twitter archive and save JSON in a text file
# These are hidden to comply with Twitter's API terms and conditions
```

```
consumer_key = 'HIDDEN'
consumer_secret = 'HIDDEN'
access_token = 'HIDDEN'
access_secret = 'HIDDEN'

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

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

# NOTE TO STUDENT WITH MOBILE VERIFICATION ISSUES:
# df_1 is a DataFrame with the twitter_archive_enhanced.csv file. You may have to
# change line 17 to match the name of your DataFrame with twitter_archive_enhanced.csv
# NOTE TO REVIEWER: this student had mobile verification issues so the following
# Twitter API code was sent to this student from a Udacity instructor
# Tweet IDs for which to gather additional data via Twitter's API
tweet_ids = twitter_archive.tweet_id.values
len(tweet_ids)

# 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')
            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)
```

Out[18]:
```
2356
```

In [29]:
```
# For loop which will add each available tweet to a new line of tweet-json.txt
with open('tweet-json.txt', 'a', encoding='utf8') as f:
    for tweet_id in twitter_archive['tweet_id']:
        try:
            tweet = api.get_status(tweet_id, tweet_mode='extended')
            json.dump(tweet._json, f)
            f.write('\n')
        except:
            continue
```

In [32]:
```
twitter_list = []

# Read the .txt file line by line into a list of dictionaries
```

```
for line in open('tweet-json.txt', 'r'):
    twitter_data = json.loads(line)
    twitter_list.append({'tweet_id': twitter_data['id_str'],
                         'retweet_count': twitter_data['retweet_count'],
                         'favorite_count': twitter_data['favorite_count'],
                         'followers_count': twitter_data['user']['followers_count']})
```

In [33]:
```
# Convert the list of dictionaries to a pandas DataFrame
twitter_data = pd.DataFrame(twitter_list, columns = ['tweet_id', 'retweet_count', 'favo
```

Assessing the data

In [34]:
```
twitter_data.head(5)
```

Out[34]:

	tweet_id	retweet_count	favorite_count	followers_count
0	892420643555336193	8853	39467	3200889
1	892177421306343426	6514	33819	3200889
2	891815181378084864	4328	25461	3200889
3	891689557279858688	8964	42908	3200889
4	891327558926688256	9774	41048	3200889

In [35]:
```
twitter_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2354 entries, 0 to 2353
Data columns (total 4 columns):
 #   Column           Non-Null Count  Dtype 
---  ------           --------------  ----- 
 0   tweet_id         2354 non-null   object
 1   retweet_count    2354 non-null   int64 
 2   favorite_count   2354 non-null   int64 
 3   followers_count  2354 non-null   int64 
dtypes: int64(3), object(1)
memory usage: 73.7+ KB
```

In [36]:
```
image_prediction.head()
```

Out[36]:

	tweet_id	jpg_url	img_num	
0	666020888022790149	https://pbs.twimg.com/media/CT4udn0WwAA0aMy.jpg	1	Welsh_springer_span
1	666029285002620928	https://pbs.twimg.com/media/CT42GRgUYAA5iDo.jpg	1	redbo
2	666033412701032449	https://pbs.twimg.com/media/CT4521TWwAEvMyu.jpg	1	German_shephe
3	666044226329800704	https://pbs.twimg.com/media/CT5Dr8HUEAA-lEu.jpg	1	Rhodesian_ridgeba
4	666049248165822465	https://pbs.twimg.com/media/CT5IQmsXIAAKY4A.jpg	1	miniature_pinsch

In [37]:
```
image_prediction.duplicated().sum()
```

Out[37]:
```
0
```

In [38]:
```
twitter_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 [39]:
```
twitter_archive[['rating_numerator', 'rating_denominator']].describe()
```

Out[39]:

	rating_numerator	rating_denominator
count	2356.000000	2356.000000
mean	13.126486	10.455433
std	45.876648	6.745237
min	0.000000	0.000000
25%	10.000000	10.000000
50%	11.000000	10.000000
75%	12.000000	10.000000
max	1776.000000	170.000000

In [40]:
```
twitter_archive.rating_numerator.value_counts()
```

Out[40]:
```
12      558
11      464
10      461
13      351
9       158
```

```
8       102
7        55
14       54
5        37
6        32
3        19
4        17
2         9
1         9
75        2
15        2
420       2
0         2
80        1
144       1
17        1
26        1
20        1
121       1
143       1
44        1
60        1
45        1
50        1
99        1
204       1
1776      1
165       1
666       1
27        1
182       1
24        1
960       1
84        1
88        1
Name: rating_numerator, dtype: int64
```

In [41]:
```
twitter_archive.rating_denominator.value_counts()
```

Out[41]:
```
10     2333
11        3
50        3
20        2
80        2
70        1
7         1
15        1
150       1
170       1
0         1
90        1
40        1
130       1
110       1
16        1
120       1
2         1
Name: rating_denominator, dtype: int64
```

In [42]:
```
twitter_archive.source.value_counts()
```

Out[42]:
```
<a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>     2
221
<a href="http://vine.co" rel="nofollow">Vine - Make a Scene</a>
91
<a href="http://twitter.com" rel="nofollow">Twitter Web Client</a>
33
<a href="https://about.twitter.com/products/tweetdeck" rel="nofollow">TweetDeck</a>
11
Name: source, dtype: int64
```

In [43]:
```
twitter_archive.name.value_counts()
```

Out[43]:
```
None          745
a              55
Charlie        12
Cooper         11
Lucy           11
              ...
Dex             1
Ace             1
Tayzie          1
Grizzie         1
Christoper      1
Name: name, Length: 957, dtype: int64
```

In [44]:
```
twitter_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 [46]:
```
image_prediction.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 [47]:
```
image_prediction.head()
```

Out[47]:

	tweet_id	jpg_url	img_num	
0	666020888022790149	https://pbs.twimg.com/media/CT4udn0WwAA0aMy.jpg	1	Welsh_springer_span
1	666029285002620928	https://pbs.twimg.com/media/CT42GRgUYAA5iDo.jpg	1	redbo
2	666033412701032449	https://pbs.twimg.com/media/CT4521TWwAEvMyu.jpg	1	German_shephe
3	666044226329800704	https://pbs.twimg.com/media/CT5Dr8HUEAA-lEu.jpg	1	Rhodesian_ridgeba
4	666049248165822465	https://pbs.twimg.com/media/CT5IQmsXIAAKY4A.jpg	1	miniature_pinsch

In [48]:
```
twitter_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2354 entries, 0 to 2353
Data columns (total 4 columns):
 #   Column           Non-Null Count  Dtype
---  ------           --------------  -----
 0   tweet_id         2354 non-null   object
 1   retweet_count    2354 non-null   int64
 2   favorite_count   2354 non-null   int64
 3   followers_count  2354 non-null   int64
dtypes: int64(3), object(1)
memory usage: 73.7+ KB
```

Quality issues

Twitter archive table

1. Keep original ratings (no retweets) that have images
2. drop columns not needed for our analysis
3. Erroneous datatypes in these columns (tweet_id, rating_denominator,rating_numerator, in_reply_to_status_id, in_reply_to_user_id, timestamp, retweeted_status_id, retweeted_status_user_id, retweeted_status_timestamp, doggo, floofer, pupper, and puppo)

4. Correct numerators with decimals
5. Missing values in 'name' and dog stages represented as 'None'
6. Some records have more than on dog stage
7. Missing URLs in expanded_urls
8. Source column is in HTML-formatted string, not a normal string
9. Error in dog names (e.g a,an,actually) are not a dog's name.
10. Some values in rating_numerator and rating_denominator seem to be in error or suspicious outliers.
11. text column includes a text and a short link.

Image prediction table

1. Erroneous datatype (tweet_id)
2. Missing images (only 2075 counts out of possible 2356)

Twitter API table

1. Erroneous datatype (tweet_id)
2. Missing tweets

Clean

In [49]:
```
# Making copies to preserve the original datasets
archive_clean = twitter_archive.copy()
image_clean = image_prediction.copy()
twitterapi_clean = twitter_data.copy()
```

In [50]:
```
archive_clean.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
```

define

Keeping original ratings of number of retweets that have images

Code

In [52]:
```
#Delete retweets by filtering the NaN of retweeted_status_user_id
archive_clean = archive_clean[pd.isnull(archive_clean['retweeted_status_user_id'])]
```

Test

In [53]:
```
#confirming the changes
print(sum(archive_clean.retweeted_status_user_id.value_counts()))
```

```
0
```

Define

Erroneous datatype fix

Code

In [76]:
```
# Convert tweet_id to str from twitter_archive, image_prediction, twitter_data tables.
archive_clean.tweet_id = archive_clean.tweet_id.astype(str)
image_clean.tweet_id = image_clean.tweet_id.astype(str)
twitterapi_clean.tweet_id = archive_clean.tweet_id.astype(str)

# convert timestamp to datetime
archive_clean.timestamp = pd.to_datetime(archive_clean.timestamp)

# convert source to category datatype
archive_clean.source = archive_clean.source.astype("category")
```

test

In [77]:
```
#confirming the changes
archive_clean.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2175 entries, 0 to 2355
Data columns (total 11 columns):
 #   Column              Non-Null Count  Dtype              
---  ------              --------------  -----              
 0   tweet_id            2175 non-null   object             
 1   timestamp           2175 non-null   datetime64[ns, UTC]
 2   source              2175 non-null   category           
 3   text                2175 non-null   object             
 4   rating_numerator    2175 non-null   int64              
 5   rating_denominator  2175 non-null   int64              
 6   name                2175 non-null   object             
 7   doggo               2175 non-null   object             
 8   floofer             2175 non-null   object             
 9   pupper              2175 non-null   object             
 10  puppo               2175 non-null   object             
```

```
dtypes: category(1), datetime64[ns, UTC](1), int64(2), object(7)
memory usage: 253.8+ KB
```

define

Correct numerators with decimals

Code

In [78]:

```
# check to see if some columns were not extracted properly to capture decimals
with pd.option_context('max_colwidth', 200):
    display(twitter_archive[twitter_archive['text'].str.contains(r"(\d+\.\d*\/\d+)")]
            [['tweet_id', 'text', 'rating_numerator', 'rating_denominator']])
```

```
C:\Users\JD91F~1.NDA\AppData\Local\Temp/ipykernel_19136/1933527640.py:3: UserWarning: Th
is pattern has match groups. To actually get the groups, use str.extract.
  display(twitter_archive[twitter_archive['text'].str.contains(r"(\d+\.\d*\/\d+)")]
```

	tweet_id	text	rating_numerator	rating_denominator
45	883482846933004288	This is Bella. She hopes her smile made you smile. If not, she is also offering you her favorite monkey. 13.5/10 https://t.co/qjrljjt948	5	10
340	832215909146226688	RT @dog_rates: This is Logan, the Chow who lived. He solemnly swears he's up to lots of good. H*ckin magical af 9.75/10 https://t.co/yBO5wu...	75	10
695	786709082849828864	This is Logan, the Chow who lived. He solemnly swears he's up to lots of good. H*ckin magical af 9.75/10 https://t.co/yBO5wuqaPS	75	10
763	778027034220126208	This is Sophie. She's a Jubilant Bush Pupper. Super h*ckin rare. Appears at random just to smile at the locals. 11.27/10 would smile back https://t.co/QFaUiIHxHq	27	10
1689	681340665377193984	I've been told there's a slight possibility he's checking his mirror. We'll bump to 9.5/10. Still a menace	5	10
1712	680494726643068929	Here we have uncovered an entire battalion of holiday puppers. Average of 11.26/10 https://t.co/eNm2S6p9BD	26	10

Define

Now that we know the affected rows that didnt extract properly, lets fix that.

Code

In [79]:

```
# convert to float datatype
archive_clean[['rating_numerator', 'rating_denominator']] = archive_clean[['rating_nume

#update values
```

```
archive_clean.loc[(archive_clean.tweet_id == 883482846933004288), 'rating_numerator'] =
archive_clean.loc[(archive_clean.tweet_id == 786709082849828864), 'rating_numerator'] =
archive_clean.loc[(archive_clean.tweet_id == 778027034220126208), 'rating_numerator'] =
archive_clean.loc[(archive_clean.tweet_id == 681340665377193984), 'rating_numerator'] =
archive_clean.loc[(archive_clean.tweet_id == 680494726643068929), 'rating_numerator'] =
```

test

In [80]:
```
#confirm changes
with pd.option_context('max_colwidth', 200):
    display(archive_clean[archive_clean['text'].str.contains(r"(\d+\.\d*\/\d+)")]
            [['tweet_id', 'text', 'rating_numerator', 'rating_denominator']])
```

```
C:\Users\JD91F~1.NDA\AppData\Local\Temp/ipykernel_19136/3144054984.py:3: UserWarning: Th
is pattern has match groups. To actually get the groups, use str.extract.
  display(archive_clean[archive_clean['text'].str.contains(r"(\d+\.\d*\/\d+)")]
```

	tweet_id	text	rating_numerator	rating_denominator
45	883482846933004288	This is Bella. She hopes her smile made you smile. If not, she is also offering you her favorite monkey. 13.5/10 https://t.co/qjrljjt948	5.0	10.0
695	786709082849828864	This is Logan, the Chow who lived. He solemnly swears he's up to lots of good. H*ckin magical af 9.75/10 https://t.co/yBO5wuqaPS	75.0	10.0
763	778027034220126208	This is Sophie. She's a Jubilant Bush Pupper. Super h*ckin rare. Appears at random just to smile at the locals. 11.27/10 would smile back https://t.co/QFaUiIHxHq	27.0	10.0
1689	681340665377193984	I've been told there's a slight possibility he's checking his mirror. We'll bump to 9.5/10. Still a menace	5.0	10.0
1712	680494726643068929	Here we have uncovered an entire battalion of holiday puppers. Average of 11.26/10 https://t.co/eNm2S6p9BD	26.0	10.0

Define

Incorrect dog names.

In [83]:
```
archive_clean.name.unique()
```

Out[83]:
```
array(['Phineas', 'Tilly', 'Archie', 'Darla', 'Franklin', 'None', 'Jax',
       'Zoey', 'Cassie', 'Koda', 'Bruno', 'Ted', 'Stuart', 'Oliver',
       'Jim', 'Zeke', 'Ralphus', 'Gerald', 'Jeffrey', 'such', 'Canela',
       'Maya', 'Mingus', 'Derek', 'Roscoe', 'Waffles', 'Jimbo', 'Maisey',
       'Earl', 'Lola', 'Kevin', 'Yogi', 'Noah', 'Bella', 'Grizzwald',
       'Rusty', 'Gus', 'Stanley', 'Alfy', 'Koko', 'Rey', 'Gary', 'a',
       'Elliot', 'Louis', 'Jesse', 'Romeo', 'Bailey', 'Duddles', 'Jack',
       'Steven', 'Beau', 'Snoopy', 'Shadow', 'Emmy', 'Aja', 'Penny',
       'Dante', 'Nelly', 'Ginger', 'Benedict', 'Venti', 'Goose', 'Nugget',
```

'Cash', 'Jed', 'Sebastian', 'Sierra', 'Monkey', 'Harry', 'Kody',
'Lassie', 'Rover', 'Napolean', 'Boomer', 'Cody', 'Rumble',
'Clifford', 'Dewey', 'Scout', 'Gizmo', 'Walter', 'Cooper',
'Harold', 'Shikha', 'Lili', 'Jamesy', 'Coco', 'Sammy', 'Meatball',
'Paisley', 'Albus', 'Neptune', 'Belle', 'Quinn', 'Zooey', 'Dave',
'Jersey', 'Hobbes', 'Burt', 'Lorenzo', 'Carl', 'Jordy', 'Milky',
'Trooper', 'quite', 'Sophie', 'Wyatt', 'Rosie', 'Thor', 'Oscar',
'Callie', 'Cermet', 'Marlee', 'Arya', 'Einstein', 'Alice',
'Rumpole', 'Benny', 'Aspen', 'Jarod', 'Wiggles', 'General',
'Sailor', 'Iggy', 'Snoop', 'Kyle', 'Leo', 'Riley', 'Noosh', 'Odin',
'Jerry', 'Georgie', 'Rontu', 'Cannon', 'Furzey', 'Daisy', 'Tuck',
'Barney', 'Vixen', 'Jarvis', 'Mimosa', 'Pickles', 'Brady', 'Luna',
'Charlie', 'Margo', 'Sadie', 'Hank', 'Tycho', 'Indie', 'Winnie',
'George', 'Bentley', 'Max', 'Dawn', 'Maddie', 'Monty', 'Sojourner',
'Winston', 'Odie', 'Arlo', 'Vincent', 'Lucy', 'Clark', 'Mookie',
'Meera', 'Ava', 'Eli', 'Ash', 'Tucker', 'Tobi', 'Chester',
'Wilson', 'Sunshine', 'Lipton', 'Bronte', 'Poppy', 'Gidget',
'Rhino', 'Willow', 'not', 'Orion', 'Eevee', 'Smiley', 'Miguel',
'Emanuel', 'Kuyu', 'Dutch', 'Pete', 'Scooter', 'Reggie', 'Lilly',
'Samson', 'Mia', 'Astrid', 'Malcolm', 'Dexter', 'Alfie', 'Fiona',
'one', 'Mutt', 'Bear', 'Doobert', 'Beebop', 'Alexander', 'Sailer',
'Brutus', 'Kona', 'Boots', 'Ralphie', 'Loki', 'Cupid', 'Pawnd',
'Pilot', 'Ike', 'Mo', 'Toby', 'Sweet', 'Pablo', 'Nala', 'Crawford',
'Gabe', 'Jimison', 'Duchess', 'Harlso', 'Sundance', 'Luca',
'Flash', 'Sunny', 'Howie', 'Jazzy', 'Anna', 'Finn', 'Bo', 'Wafer',
'Tom', 'Florence', 'Autumn', 'Buddy', 'Dido', 'Eugene', 'Ken',
'Strudel', 'Tebow', 'Chloe', 'Timber', 'Binky', 'Moose', 'Dudley',
'Comet', 'Akumi', 'Titan', 'Olivia', 'Alf', 'Oshie', 'Chubbs',
'Sky', 'Atlas', 'Eleanor', 'Layla', 'Rocky', 'Baron', 'Tyr',
'Bauer', 'Swagger', 'Brandi', 'Mary', 'Moe', 'Halo', 'Augie',
'Craig', 'Sam', 'Hunter', 'Pavlov', 'Phil', 'Kyro', 'Wallace',
'Ito', 'Seamus', 'Ollie', 'Stephan', 'Lennon', 'incredibly',
'Major', 'Duke', 'Sansa', 'Shooter', 'Django', 'Diogi', 'Sonny',
'Marley', 'Severus', 'Ronnie', 'Milo', 'Bones', 'Mauve', 'Chef',
'Doc', 'Peaches', 'Sobe', 'Longfellow', 'Mister', 'Iroh',
'Pancake', 'Snicku', 'Ruby', 'Brody', 'Mack', 'Nimbus', 'Laika',
'Maximus', 'Dobby', 'Moreton', 'Juno', 'Maude', 'Lily', 'Newt',
'Benji', 'Nida', 'Robin', 'Monster', 'BeBe', 'Remus', 'Levi',
'Mabel', 'Misty', 'Betty', 'Mosby', 'Maggie', 'Bruce', 'Happy',
'Ralphy', 'Brownie', 'Rizzy', 'Stella', 'Butter', 'Frank', 'Tonks',
'Lincoln', 'Rory', 'Logan', 'Dale', 'Rizzo', 'Arnie', 'Mattie',
'Pinot', 'Dallas', 'Hero', 'Frankie', 'Stormy', 'Reginald',
'Balto', 'Mairi', 'Loomis', 'Godi', 'Cali', 'Deacon', 'Timmy',
'Sampson', 'Chipson', 'Combo', 'Oakley', 'Dash', 'Hercules', 'Jay',
'Mya', 'Strider', 'Wesley', 'Solomon', 'Huck', 'O', 'Blue',
'Anakin', 'Finley', 'Sprinkles', 'Heinrich', 'Shakespeare',
'Chelsea', 'Bungalo', 'Chip', 'Grey', 'Roosevelt', 'Willem',
'Davey', 'Dakota', 'Fizz', 'Dixie', 'very', 'Al', 'Jackson',
'Carbon', 'Klein', 'DonDon', 'Kirby', 'Lou', 'Chevy', 'Tito',
'Philbert', 'Louie', 'Rupert', 'Rufus', 'Brudge', 'Shadoe',
'Angel', 'Brat', 'Tove', 'my', 'Gromit', 'Aubie', 'Kota', 'Leela',
'Glenn', 'Shelby', 'Sephie', 'Bonaparte', 'Albert', 'Wishes',
'Rose', 'Theo', 'Rocco', 'Fido', 'Emma', 'Spencer', 'Lilli',
'Boston', 'Brandonald', 'Corey', 'Leonard', 'Beckham', 'Devón',
'Gert', 'Watson', 'Keith', 'Dex', 'Ace', 'Tayzie', 'Grizzie',
'Fred', 'Gilbert', 'Meyer', 'Zoe', 'Stewie', 'Calvin', 'Lilah',
'Spanky', 'Jameson', 'Piper', 'Atticus', 'Blu', 'Dietrich',
'Divine', 'Tripp', 'his', 'Cora', 'Huxley', 'Keurig', 'Bookstore',
'Linus', 'Abby', 'Shiloh', 'an', 'Gustav', 'Arlen', 'Percy',
'Lenox', 'Sugar', 'Harvey', 'Blanket', 'actually', 'Geno', 'Stark',

```
'Beya', 'Kilo', 'Kayla', 'Maxaroni', 'Bell', 'Doug', 'Edmund',
'Aqua', 'Theodore', 'just', 'Baloo', 'Chase', 'getting', 'Nollie',
'Rorie', 'Simba', 'Charles', 'Bayley', 'Axel', 'Storkson', 'Remy',
'Chadrick', 'mad', 'Kellogg', 'Buckley', 'Livvie', 'Terry',
'Hermione', 'Ralpher', 'Aldrick', 'Larry', 'this', 'unacceptable',
'Rooney', 'Crystal', 'Ziva', 'Stefan', 'Pupcasso', 'Puff',
'Flurpson', 'Coleman', 'Enchilada', 'Raymond', 'all', 'Rueben',
'Cilantro', 'Karll', 'Sprout', 'Blitz', 'Bloop', 'Colby', 'Lillie',
'Ashleigh', 'Kreggory', 'Sarge', 'Luther', 'Ivar', 'Jangle',
'Schnitzel', 'Panda', 'Berkeley', 'Ralphé', 'Charleson', 'Clyde',
'Harnold', 'Sid', 'Pippa', 'Otis', 'Carper', 'Bowie',
'Alexanderson', 'Suki', 'Barclay', 'Skittle', 'Ebby', 'Flávio',
'Smokey', 'Link', 'Jennifur', 'Ozzy', 'Bluebert', 'Stephanus',
'Bubbles', 'old', 'Zeus', 'Bertson', 'Nico', 'Michelangelope',
'Siba', 'Calbert', 'Curtis', 'Travis', 'Thumas', 'Kanu', 'Lance',
'Opie', 'Stubert', 'Kane', 'Olive', 'Chuckles', 'Staniel', 'Sora',
'Beemo', 'Gunner', 'infuriating', 'Lacy', 'Tater', 'Olaf', 'Cecil',
'Vince', 'Karma', 'Billy', 'Walker', 'Rodney', 'Klevin', 'Malikai',
'Bobble', 'River', 'Jebberson', 'Remington', 'Farfle', 'Jiminus',
'Harper', 'Clarkus', 'Finnegus', 'Cupcake', 'Kathmandu', 'Ellie',
'Katie', 'Kara', 'Adele', 'Zara', 'Ambrose', 'Jimothy', 'Bode',
'Terrenth', 'Reese', 'Chesterson', 'Lucia', 'Bisquick', 'Ralphson',
'Socks', 'Rambo', 'Rudy', 'Fiji', 'Rilo', 'Bilbo', 'Coopson',
'Yoda', 'Millie', 'Chet', 'Crouton', 'Daniel', 'Kaia', 'Murphy',
'Dotsy', 'Eazy', 'Coops', 'Fillup', 'Miley', 'Charl', 'Reagan',
'Yukon', 'CeCe', 'Cuddles', 'Claude', 'Jessiga', 'Carter', 'Ole',
'Pherb', 'Blipson', 'Reptar', 'Trevith', 'Berb', 'Bob', 'Colin',
'Brian', 'Oliviér', 'Grady', 'Kobe', 'Freddery', 'Bodie', 'Dunkin',
'Wally', 'Tupawc', 'Amber', 'Herschel', 'Edgar', 'Teddy',
'Kingsley', 'Brockly', 'Richie', 'Molly', 'Vinscent', 'Cedrick',
'Hazel', 'Lolo', 'Eriq', 'Phred', 'the', 'Oddie', 'Maxwell',
'Geoff', 'Covach', 'Durg', 'Fynn', 'Ricky', 'Herald', 'Lucky',
'Ferg', 'Trip', 'Clarence', 'Hamrick', 'Brad', 'Pubert', 'Frönq',
'Derby', 'Lizzie', 'Ember', 'Blakely', 'Opal', 'Marq', 'Kramer',
'Barry', 'Tyrone', 'Gordon', 'Baxter', 'Mona', 'Horace', 'Crimson',
'Birf', 'Hammond', 'Lorelei', 'Marty', 'Brooks', 'Petrick',
'Hubertson', 'Gerbald', 'Oreo', 'Bruiser', 'Perry', 'Bobby',
'Jeph', 'Obi', 'Tino', 'Kulet', 'Sweets', 'Lupe', 'Tiger',
'Jiminy', 'Griffin', 'Banjo', 'Brandy', 'Lulu', 'Darrel', 'Taco',
'Joey', 'Patrick', 'Kreg', 'Todo', 'Tess', 'Ulysses', 'Toffee',
'Apollo', 'Carly', 'Asher', 'Glacier', 'Chuck', 'Champ', 'Ozzie',
'Griswold', 'Cheesy', 'Moofasa', 'Hector', 'Goliath', 'Kawhi',
'by', 'Emmie', 'Penelope', 'Willie', 'Rinna', 'Mike', 'William',
'Dwight', 'Evy', 'Hurley', 'Rubio', 'officially', 'Chompsky',
'Rascal', 'Linda', 'Tug', 'Tango', 'Grizz', 'Jerome', 'Crumpet',
'Jessifer', 'Izzy', 'Ralph', 'Sandy', 'Humphrey', 'Tassy',
'Juckson', 'Chuq', 'Tyrus', 'Karl', 'Godzilla', 'Vinnie',
'Kenneth', 'Herm', 'Bert', 'Striker', 'Donny', 'Pepper', 'Bernie',
'Buddah', 'Lenny', 'Arnold', 'Zuzu', 'Mollie', 'Laela', 'Tedders',
'Superpup', 'Rufio', 'Jeb', 'Rodman', 'Jonah', 'Chesney', 'life',
'Kenny', 'Henry', 'Bobbay', 'Mitch', 'Kaiya', 'Acro', 'Aiden',
'Obie', 'Dot', 'Shnuggles', 'Kendall', 'Jeffri', 'Steve', 'Eve',
'Mac', 'Fletcher', 'Kenzie', 'Pumpkin', 'Schnozz', 'Gustaf',
'Cheryl', 'Ed', 'Leonidas', 'Norman', 'Caryl', 'Scott', 'Taz',
'Darby', 'Jackie', 'light', 'Jazz', 'Franq', 'Pippin', 'Rolf',
'Snickers', 'Ridley', 'Cal', 'Bradley', 'Bubba', 'Tuco', 'Patch',
'Mojo', 'Batdog', 'Dylan', 'space', 'Mark', 'JD', 'Alejandro',
'Scruffers', 'Pip', 'Julius', 'Tanner', 'Sparky', 'Anthony',
'Holly', 'Jett', 'Amy', 'Sage', 'Andy', 'Mason', 'Trigger',
'Antony', 'Creg', 'Traviss', 'Gin', 'Jeffrie', 'Danny', 'Ester',
```

```
'Pluto', 'Bloo', 'Edd', 'Paull', 'Willy', 'Herb', 'Damon',
'Peanut', 'Nigel', 'Butters', 'Sandra', 'Fabio', 'Randall', 'Liam',
'Tommy', 'Ben', 'Raphael', 'Julio', 'Andru', 'Kloey', 'Shawwn',
'Skye', 'Kollin', 'Ronduh', 'Billl', 'Saydee', 'Dug', 'Tessa',
'Sully', 'Kirk', 'Ralf', 'Clarq', 'Jaspers', 'Samsom', 'Terrance',
'Harrison', 'Chaz', 'Jeremy', 'Jaycob', 'Lambeau', 'Ruffles',
'Amélie', 'Bobb', 'Banditt', 'Kevon', 'Winifred', 'Hanz',
'Churlie', 'Zeek', 'Timofy', 'Maks', 'Jomathan', 'Kallie',
'Marvin', 'Spark', 'Gòrdón', 'Jo', 'DayZ', 'Jareld', 'Torque',
'Ron', 'Skittles', 'Cleopatricia', 'Erik', 'Stu', 'Tedrick',
'Shaggy', 'Filup', 'Kial', 'Naphaniel', 'Dook', 'Hall', 'Philippe',
'Biden', 'Fwed', 'Genevieve', 'Joshwa', 'Timison', 'Bradlay',
'Pipsy', 'Clybe', 'Keet', 'Carll', 'Jockson', 'Josep', 'Lugan',
'Christoper'], dtype=object)
```

Code

In [84]:
```
archive_clean['name'][archive_clean['name'].str.match('[a-z]+')] = 'None'
```

```
C:\Users\JD91F~1.NDA\AppData\Local\Temp/ipykernel_19136/648764250.py:1: SettingWithCopyW
arning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_
guide/indexing.html#returning-a-view-versus-a-copy
  archive_clean['name'][archive_clean['name'].str.match('[a-z]+')] = 'None'
```

Test

In [85]:
```
 # confirming changes
archive_clean.name.value_counts()
```

Out[85]:
```
None          784
Lucy           11
Charlie        11
Cooper         10
Oliver         10
              ...
Shelby          1
Sephie          1
Bonaparte       1
Wishes          1
Christoper      1
Name: name, Length: 931, dtype: int64
```

define

Some of the records have more than one dog stage

Code

In [86]:
```
archive_clean['add_all'] = archive_clean.doggo + archive_clean.floofer + archive_clean.
```

In [87]:
```
archive_clean.add_all.value_counts()
```

Out[87]:
```
NoneNoneNoneNone        1831
NoneNonepupperNone       224
```

```
doggoNoneNoneNone          75
NoneNoneNonepuppo          24
doggoNonepupperNone        10
NoneflooferNoneNone         9
doggoNoneNonepuppo          1
doggoflooferNoneNone        1
Name: add_all, dtype: int64
```

In [88]:
```
# creating a function to check dog stages
def check_stages(archive):
    if archive['add_all'].count('None') == 2:
        return 'Multiple' #this means it has more than one dog stage
    else:
        if archive['add_all'].count('doggo') == 1:
            return 'Doggo'
        elif archive['add_all'].count('floofer') == 1:
            return 'Floofer'
        elif archive['add_all'].count('pupper') == 1:
            return 'Pupper'
        elif archive['add_all'].count('puppo') == 1:
            return 'Puppo'
        else:
            return 'None'

archive_clean['dog_stage'] = archive_clean.apply(check_stages, axis=1)
```

Test

In [89]:
```
archive_clean.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2175 entries, 0 to 2355
Data columns (total 13 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   tweet_id            2175 non-null   object
 1   timestamp           2175 non-null   datetime64[ns, UTC]
 2   source              2175 non-null   category
 3   text                2175 non-null   object
 4   rating_numerator    2175 non-null   float64
 5   rating_denominator  2175 non-null   float64
 6   name                2175 non-null   object
 7   doggo               2175 non-null   object
 8   floofer             2175 non-null   object
 9   pupper              2175 non-null   object
 10  puppo               2175 non-null   object
 11  add_all             2175 non-null   object
 12  dog_stage           2175 non-null   object
dtypes: category(1), datetime64[ns, UTC](1), float64(2), object(9)
memory usage: 287.8+ KB
```

Define

Dropping unused columns

Code

In [90]:
```
 # drop columns
```

```
archive_clean.drop(['doggo', 'floofer', 'pupper', 'puppo', 'add_all'], axis=1, inplace=
```

In [93]:
```
# convert to category datatype
archive_clean.dog_stage = archive_clean.dog_stage.astype('category')
```

test

In [94]:
```
#confirm changes
archive_clean.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2175 entries, 0 to 2355
Data columns (total 8 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   tweet_id            2175 non-null   object
 1   timestamp           2175 non-null   datetime64[ns, UTC]
 2   source              2175 non-null   category
 3   text                2175 non-null   object
 4   rating_numerator    2175 non-null   float64
 5   rating_denominator  2175 non-null   float64
 6   name                2175 non-null   object
 7   dog_stage           2175 non-null   category
dtypes: category(2), datetime64[ns, UTC](1), float64(2), object(3)
memory usage: 188.1+ KB
```

In [95]:
```
# matched deleted columns
archive_clean.dog_stage.value_counts()
```

Out[95]:
```
None        1831
Pupper       224
Doggo         75
Puppo         24
Multiple      12
Floofer        9
Name: dog_stage, dtype: int64
```

In [96]:
```
archive_clean.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2175 entries, 0 to 2355
Data columns (total 8 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   tweet_id            2175 non-null   object
 1   timestamp           2175 non-null   datetime64[ns, UTC]
 2   source              2175 non-null   category
 3   text                2175 non-null   object
 4   rating_numerator    2175 non-null   float64
 5   rating_denominator  2175 non-null   float64
 6   name                2175 non-null   object
 7   dog_stage           2175 non-null   category
dtypes: category(2), datetime64[ns, UTC](1), float64(2), object(3)
memory usage: 188.1+ KB
```

Define

Source column is in HTML-formatted string, not a normal string

Code

In [97]:
```
#extract values
archive_clean.source = archive_clean.source.str.extract('>([\w\W\s]*)<', expand=True)
```

Test

In [98]:
```
#confirm changes
archive_clean.source.value_counts()
```

Out[98]:
```
Twitter for iPhone     2042
Vine - Make a Scene      91
Twitter Web Client       31
TweetDeck                11
Name: source, dtype: int64
```

Define

Removing hyperlinks in tweets.

Code

In [100…
```
#define function and apply to archive_clean table
def htmllink(x):
        http_pos = x.find("http")
        # If no link, retain row
        if http_pos == -1:
            x = x
        else:
            # Remove space before link to end
            x = x[:http_pos - 1]
        return x

archive_clean.text = archive_clean.text.apply(htmlink)
```

Test

In [101…
```
#confirm changes to show no hyperlink in column again
for row in archive_clean.text[:10]:
    print(row)
```

```
This is Phineas. He's a mystical boy. Only ever appears in the hole of a donut. 13/10
This is Tilly. She's just checking pup on you. Hopes you're doing ok. If not, she's avai
lable for pats, snugs, boops, the whole bit. 13/10
This is Archie. He is a rare Norwegian Pouncing Corgo. Lives in the tall grass. You neve
r know when one may strike. 12/10
This is Darla. She commenced a snooze mid meal. 13/10 happens to the best of us
This is Franklin. He would like you to stop calling him "cute." He is a very fierce shar
k and should be respected as such. 12/10 #BarkWeek
Here we have a majestic great white breaching off South Africa's coast. Absolutely h*cki
n breathtaking. 13/10 (IG: tucker_marlo) #BarkWeek
Meet Jax. He enjoys ice cream so much he gets nervous around it. 13/10 help Jax enjoy mo
re things by clicking below

When you watch your owner call another dog a good boy but then they turn back to you and
```

```
say you're a great boy. 13/10
This is Zoey. She doesn't want to be one of the scary sharks. Just wants to be a snuggly
pettable boatpet. 13/10 #BarkWeek
This is Cassie. She is a college pup. Studying international doggo communication and sti
ck theory. 14/10 so elegant much sophisticate
```

Tidiness

Define

Moving twitter api table and image prediction table to twitter archive table.

Code

In [102…

```
#merge the two tables
archive_clean = pd.merge(left=archive_clean, right=twitterapi_clean, how='left', on='tw
archive_clean = pd.merge(left=archive_clean, right=image_clean, how='left', on='tweet_i
```

Test

In [103…

```
 # confirming changes
archive_clean.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2175 entries, 0 to 2174
Data columns (total 22 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   tweet_id            2175 non-null   object
 1   timestamp           2175 non-null   datetime64[ns, UTC]
 2   source              2175 non-null   object
 3   text                2175 non-null   object
 4   rating_numerator    2175 non-null   float64
 5   rating_denominator  2175 non-null   float64
 6   name                2175 non-null   object
 7   dog_stage           2175 non-null   category
 8   retweet_count       2173 non-null   float64
 9   favorite_count      2173 non-null   float64
 10  followers_count     2173 non-null   float64
 11  jpg_url             1994 non-null   object
 12  img_num             1994 non-null   float64
 13  p1                  1994 non-null   object
 14  p1_conf             1994 non-null   float64
 15  p1_dog              1994 non-null   object
 16  p2                  1994 non-null   object
 17  p2_conf             1994 non-null   float64
 18  p2_dog              1994 non-null   object
 19  p3                  1994 non-null   object
 20  p3_conf             1994 non-null   float64
 21  p3_dog              1994 non-null   object
dtypes: category(1), datetime64[ns, UTC](1), float64(9), object(11)
memory usage: 376.2+ KB
```

Define

Lets drop tweets with no images

Code

In [105…
```
# drop rows with no image
archive_clean.dropna(axis = 0, inplace=True)
```

Test

In [106…
```
archive_clean.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1992 entries, 0 to 2172
Data columns (total 22 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   tweet_id            1992 non-null   object
 1   timestamp           1992 non-null   datetime64[ns, UTC]
 2   source              1992 non-null   object
 3   text                1992 non-null   object
 4   rating_numerator    1992 non-null   float64
 5   rating_denominator  1992 non-null   float64
 6   name                1992 non-null   object
 7   dog_stage           1992 non-null   category
 8   retweet_count       1992 non-null   float64
 9   favorite_count      1992 non-null   float64
 10  followers_count     1992 non-null   float64
 11  jpg_url             1992 non-null   object
 12  img_num             1992 non-null   float64
 13  p1                  1992 non-null   object
 14  p1_conf             1992 non-null   float64
 15  p1_dog              1992 non-null   object
 16  p2                  1992 non-null   object
 17  p2_conf             1992 non-null   float64
 18  p2_dog              1992 non-null   object
 19  p3                  1992 non-null   object
 20  p3_conf             1992 non-null   float64
 21  p3_dog              1992 non-null   object
dtypes: category(1), datetime64[ns, UTC](1), float64(9), object(11)
memory usage: 344.5+ KB
```

Saving cleaned data

In [107…
```
archive_clean.to_csv('twitter_archive_master.csv', index=False)
```

Analysis and visualization

In [108…
```
twitter_archive_master = pd.read_csv('twitter_archive_master.csv')
```

In [109…
```
twitter_archive_master.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1992 entries, 0 to 1991
Data columns (total 22 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   tweet_id            1992 non-null   int64
 1   timestamp           1992 non-null   object
```

```
 2   source              1992 non-null   object
 3   text                1992 non-null   object
 4   rating_numerator    1992 non-null   float64
 5   rating_denominator  1992 non-null   float64
 6   name                1992 non-null   object
 7   dog_stage           1992 non-null   object
 8   retweet_count       1992 non-null   float64
 9   favorite_count      1992 non-null   float64
 10  followers_count     1992 non-null   float64
 11  jpg_url             1992 non-null   object
 12  img_num             1992 non-null   float64
 13  p1                  1992 non-null   object
 14  p1_conf             1992 non-null   float64
 15  p1_dog              1992 non-null   bool
 16  p2                  1992 non-null   object
 17  p2_conf             1992 non-null   float64
 18  p2_dog              1992 non-null   bool
 19  p3                  1992 non-null   object
 20  p3_conf             1992 non-null   float64
 21  p3_dog              1992 non-null   bool
dtypes: bool(3), float64(9), int64(1), object(9)
memory usage: 301.6+ KB
```

We have to change our types back because they have lost them after saving in csv.

In [110…

```
# Change types
twitter_archive_master.tweet_id = twitter_archive_master.tweet_id.astype(str)
twitter_archive_master.dog_stage = twitter_archive_master.dog_stage.astype("category")
twitter_archive_master[['rating_numerator', 'rating_denominator']] = twitter_archive_ma
twitter_archive_master[['retweet_count', 'favorite_count', 'followers_count']] = twitte
twitter_archive_master.source = twitter_archive_master.source.astype("category")
twitter_archive_master.timestamp = pd.to_datetime(twitter_archive_master.timestamp)
```

In [111…

```
twitter_archive_master.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1992 entries, 0 to 1991
Data columns (total 22 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   tweet_id            1992 non-null   object
 1   timestamp           1992 non-null   datetime64[ns, UTC]
 2   source              1992 non-null   category
 3   text                1992 non-null   object
 4   rating_numerator    1992 non-null   float64
 5   rating_denominator  1992 non-null   float64
 6   name                1992 non-null   object
 7   dog_stage           1992 non-null   category
 8   retweet_count       1992 non-null   int32
 9   favorite_count      1992 non-null   int32
 10  followers_count     1992 non-null   int32
 11  jpg_url             1992 non-null   object
 12  img_num             1992 non-null   float64
 13  p1                  1992 non-null   object
 14  p1_conf             1992 non-null   float64
 15  p1_dog              1992 non-null   bool
 16  p2                  1992 non-null   object
 17  p2_conf             1992 non-null   float64
```

```
 18  p2_dog              1992 non-null   bool
 19  p3                  1992 non-null   object
 20  p3_conf             1992 non-null   float64
 21  p3_dog              1992 non-null   bool
dtypes: bool(3), category(2), datetime64[ns, UTC](1), float64(6), int32(3), object(7)
memory usage: 251.4+ KB
```

Most frequently used Twitter source

In [112…

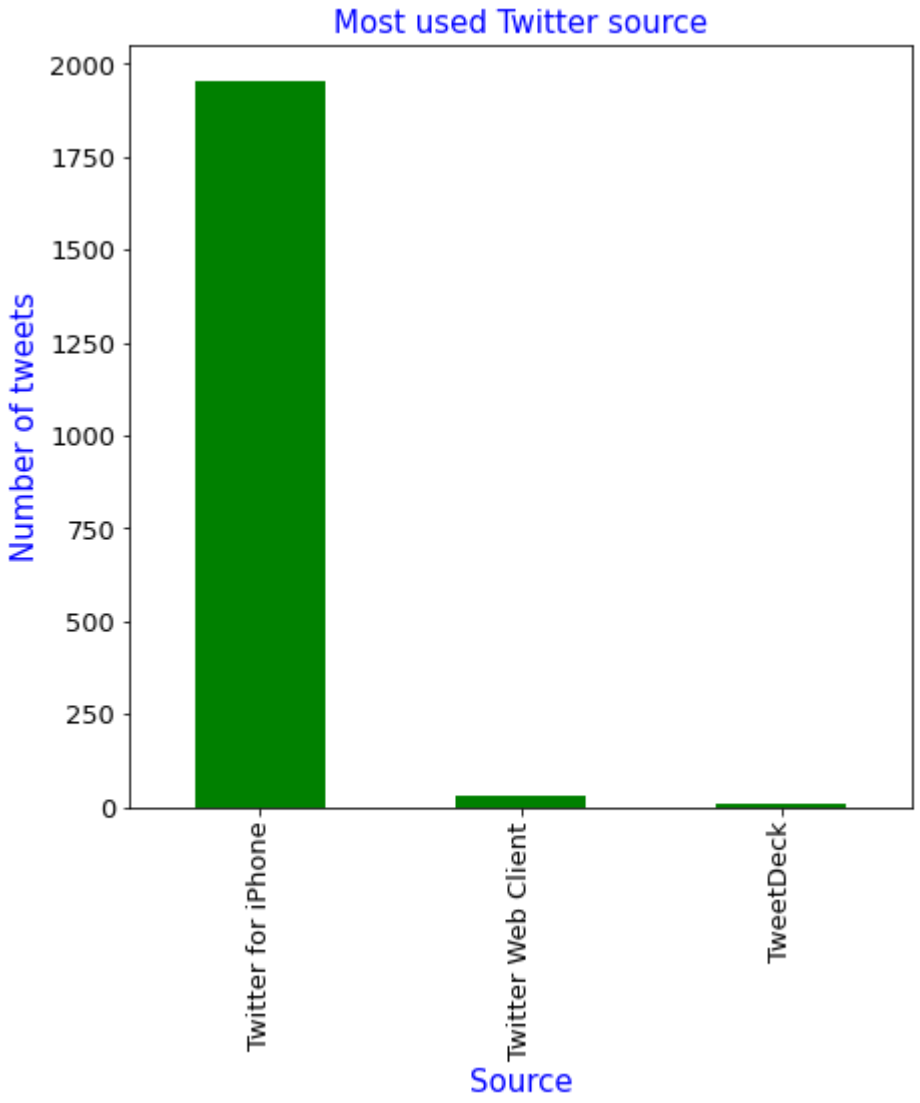
```
source = twitter_archive_master['source'].value_counts()
source
```

Out[112…

```
Twitter for iPhone    1953
Twitter Web Client      28
TweetDeck               11
Name: source, dtype: int64
```

In [116…

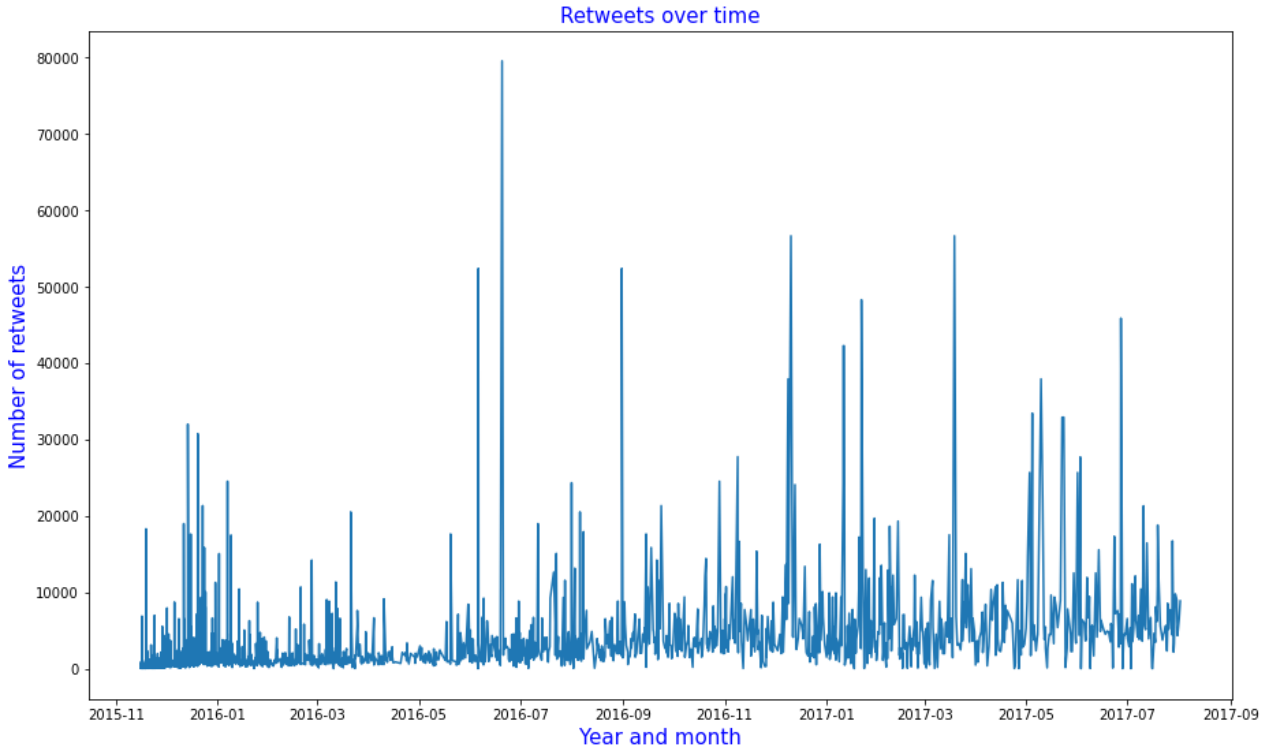
```
 #plot
p_bar = source.plot.bar(color = 'green', fontsize = 13)

#figure size(width, height)
p_bar.figure.set_size_inches(7, 7);

#Add labels
plt.title('Most used Twitter source', color = 'blue', fontsize = '15')
plt.xlabel('Source', color = 'blue', fontsize = '15')
plt.ylabel('Number of tweets', color = 'blue', fontsize = '15');
```



WeRateDogs Retweet over time?

In [120…

```
#plot
sns.set_context()
plt.subplots(figsize=(15, 9))
plt.plot(twitter_archive_master.timestamp, twitter_archive_master.retweet_count)
plt.title('Retweets over time', color = 'blue', fontsize = '15')
plt.xlabel('Year and month', color = 'blue', fontsize = '15')
plt.ylabel('Number of retweets', color = 'blue', fontsize = '15');
```



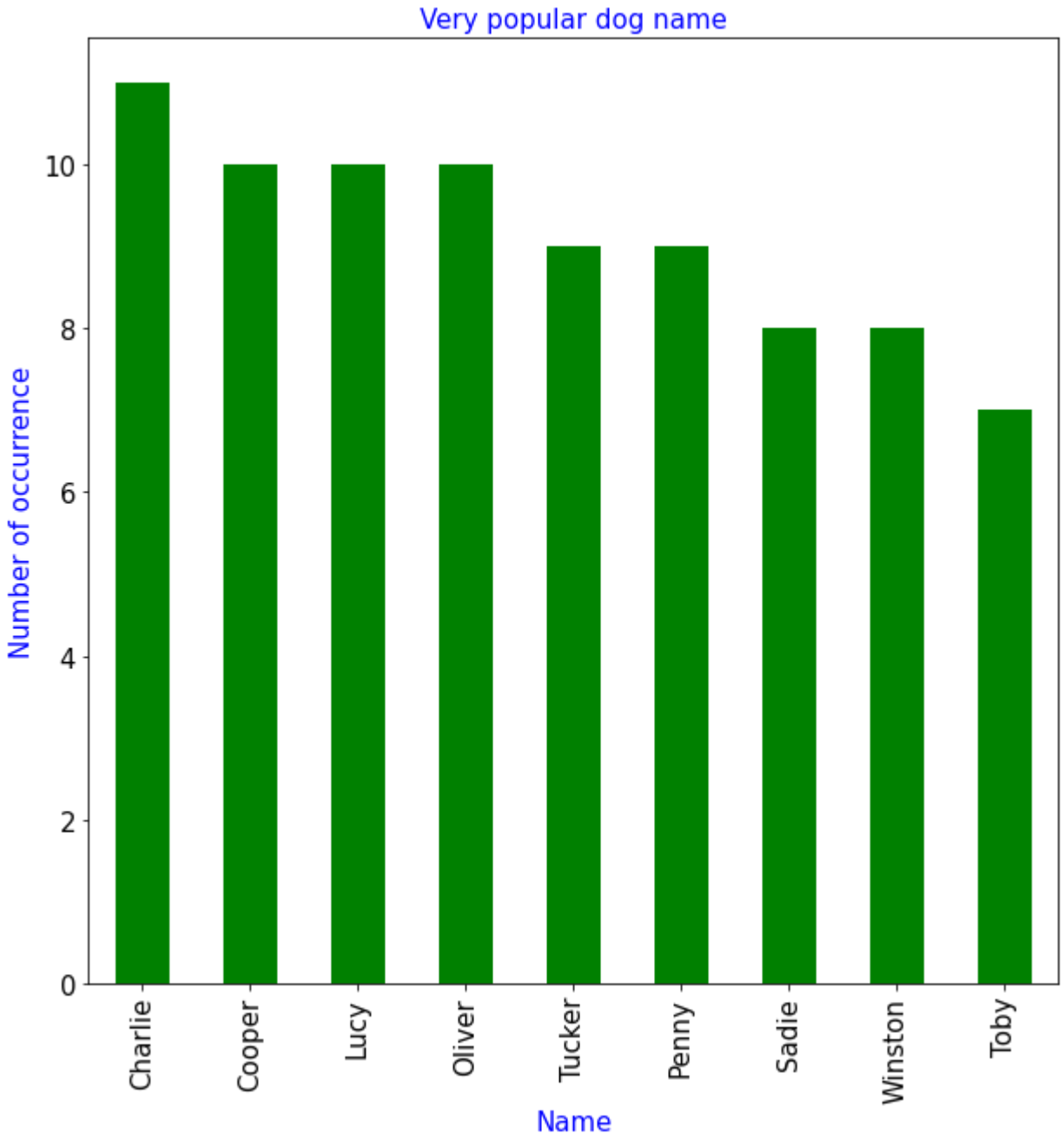
Very popular dog name

In [121…

```
pname = twitter_archive_master.name.value_counts()[1:10]
```

In [127…

```
#plot
g_bar = pname.plot.bar(color = 'green', fontsize = 15)

#figure size(width, height)
g_bar.figure.set_size_inches(10,10);

#Add labels
plt.title('Very popular dog name', color = 'blue', fontsize = '15')
plt.xlabel('Name', color = 'blue', fontsize = '15')
plt.ylabel('Number of occurrence', color = 'blue', fontsize = '15');
```

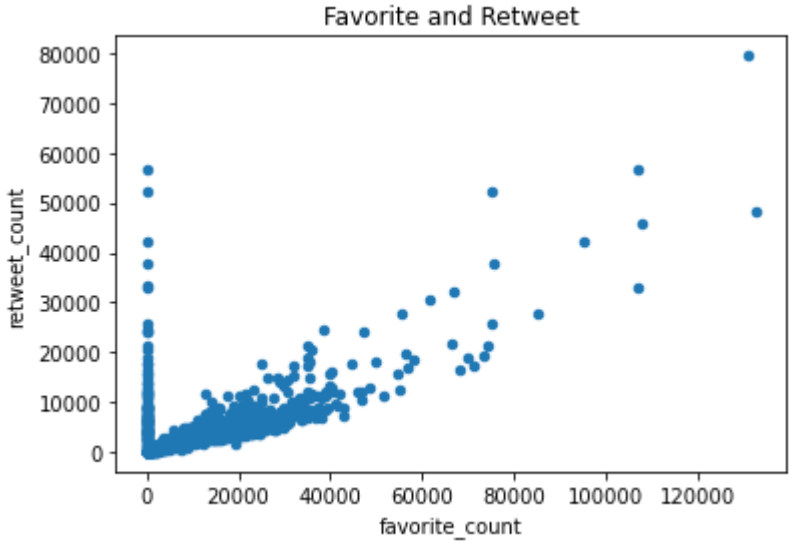


'Charlie' the very popular dog name.

Is there any relationship between Favorites and Retweets?

In [128…

```
# relationship between Favorites and Retweets
twitter_archive_master.plot(x='favorite_count', y='retweet_count', kind='scatter', titl
```



In [129…
```
twitter_archive_master['favorite_count'].corr(twitter_archive_master['retweet_count'])
```

Out[129…
```
0.7120771236949002
```

The scatter plot above shows that there is a strong positive relationship between favourites and Retweets.

In [ ]: