wrangle_act

January 18, 2019

1 Project: Wrangle and Analyze Data

1.1 Table of Contents

Introduction

In this project I work on a data set from the tweet archive of Twitter user @dog_rates, also known as **WeRateDogs**. WeRateDogs is a Twitter account that rates people's dogs with a humorous comment about the dog. These ratings almost always have a denominator of 10. The numerators are almost always greater than 10, like 11,12,13, etc. Since retweet count and favorite count are two notable columns missing, I'm going to query Twitter's API to gather this valuable data. We also have a table full of image predictions for each tweet. In particular my task in this project is **Data Wrangling** on These three sources of data I have, and then **Analyzing, and Visualizing** my wrangled data.

```
In [1]: #import required libraries
        import pandas as pd
        import numpy as np
        import requests
        import tweepy
        import json
        import time
        import re
        import matplotlib.pyplot as plt
        %matplotlib inline
```

Gathering Data

We need to gather each of the three pieces of data

__ 1. WeRateDogs Twitter Archive __

```
In [2]: #read csv file for WeRateDogs Twitter archive
        twitter_archive = pd.read_csv('./Data/twitter-archive-enhanced.csv')
```

```
In [3]: twitter_archive.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
```

```
In [4]: twitter_archive.head()
```

Out[4]:

	tweet_id	in_reply_to_status_id	in_reply_to_user_id	timestamp	source	text	retweeted_status_id
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	<a href="http://twitter.com/download/iphone" r...		
3	891689557279858688	NaN	NaN	2017-07-30 15:58:51 +0000	<a href="http://twitter.com/download/iphone" r...		
4	891327558926688256	NaN	NaN	2017-07-29 16:00:24 +0000	<a href="http://twitter.com/download/iphone" r...		

```
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
```

__ 2. Tweet Image Predictions __

```
In [5]: #download programmatically tsv file
        url = 'https://d17h27t6h515a5.cloudfront.net/topher/2017/August/599fd2ad_image-predicti
        response = requests.get(url)
        with open('./Data/image_predictions.tsv', mode = 'wb') as file:
            file.write(response.content)

        #read the downloaded tsv file
        image_predictions = pd.read_csv('./Data/image_predictions.tsv', sep = '\t')

In [6]: image_predictions.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2075 entries, 0 to 2074
Data columns (total 12 columns):
tweet_id    2075 non-null int64
jpg_url     2075 non-null object
img_num     2075 non-null int64
p1          2075 non-null object
p1_conf     2075 non-null float64
p1_dog      2075 non-null bool
```

```
p2          2075 non-null object
p2_conf     2075 non-null float64
p2_dog      2075 non-null bool
p3          2075 non-null object
p3_conf     2075 non-null float64
p3_dog      2075 non-null bool
dtypes: bool(3), float64(3), int64(2), object(4)
memory usage: 152.1+ KB
```

__ 3. Twitter API __

To gather each tweet's retweet count and favorite ('like') count, I'll use the tweet IDs in the WeRateDogs Twitter archive to query the Twitter API for each tweet's JSON data using Python's Tweepy library and store each tweet's entire set of JSON data in a file called tweet_json.txt file. Each tweet's JSON data will be written to its own line. Then I'll read this .txt file line by line into a pandas DataFrame with tweet ID, retweet count, and favorite count.

```
In [7]: #set required authentication values
        consumer_key = ''
        consumer_secret = ''
        access_token = ''
        access_secret = ''

In [8]: #Create api object to gather Twitter data
        auth = tweepy.OAuthHandler(consumer_key, consumer_secret)
        auth.set_access_token(access_token, access_secret)

        api = tweepy.API(auth,
                         parser = tweepy.parsers.JSONParser(), # Parse the result to Json Obje
                         wait_on_rate_limit = True, # Automatically wait for rate limits to re
                         wait_on_rate_limit_notify = True) # Print a notification when Tweepy

In [9]: # List of entire set of JSON data for tweets to write in a text file later
        tweets_list = []
        #List of tweet ids for tweets we can't find
        errors_list = []

        # Save the start time of execution
        start = time.time()

        for tweet_id in twitter_archive['tweet_id']:
            try:
                tweet = api.get_status(tweet_id, tweet_mode='extended')
                # Append to list of tweets
                tweets_list.append(tweet)

            #catch all exceptions
            except Exception as e:
                print(str(tweet_id) + "_"  + str(e))
```

```
                errors_list.append(tweet_id)

        # Calculate the time of execution
        end = time.time()
        print('execution time: ', end - start)
```

```
888202515573088257_[{'code': 144, 'message': 'No status found with that ID.'}]
873697596434513921_[{'code': 144, 'message': 'No status found with that ID.'}]
872668790621863937_[{'code': 144, 'message': 'No status found with that ID.'}]
869988702071779329_[{'code': 144, 'message': 'No status found with that ID.'}]
866816280283807744_[{'code': 144, 'message': 'No status found with that ID.'}]
861769973181624320_[{'code': 144, 'message': 'No status found with that ID.'}]
845459076796616705_[{'code': 144, 'message': 'No status found with that ID.'}]
842892208864923648_[{'code': 144, 'message': 'No status found with that ID.'}]
837012587749474308_[{'code': 144, 'message': 'No status found with that ID.'}]
827228250799742977_[{'code': 144, 'message': 'No status found with that ID.'}]
802247111496568832_[{'code': 144, 'message': 'No status found with that ID.'}]
775096608509886464_[{'code': 144, 'message': 'No status found with that ID.'}]
771004394259247104_[{'code': 179, 'message': 'Sorry, you are not authorized to see this status
770743923962707968_[{'code': 144, 'message': 'No status found with that ID.'}]


Rate limit reached. Sleeping for: 564


754011816964026368_[{'code': 144, 'message': 'No status found with that ID.'}]


Rate limit reached. Sleeping for: 572


execution time:  1883.3629608154297
```

```
In [10]: print(len(tweets_list))
```

```
2341
```

```
In [11]: print(len(errors_list))
```

```
15
```

Fifteen tweets couldn't be found on tweeter, They've probably been deleted.

```
In [12]: # Wrtie JSON data for all tweets in a file
         with open("./Data/tweet_json.txt", "w", encoding='utf-8') as file:
              for tweet in tweets_list:
                 #write each tweet's JSON data on its own line
                 file.write("%s\n" %json.dumps(tweet))
```

```
In [13]: json_tweet_list = []
         #Open the json file to read data line by line
         with open("./Data/tweet_json.txt", "r") as json_file:
             for line in json_file:  # loop through entire file
                 json_tweet = json.loads(line)   #parses json data
                 #save info to list of dicts
                 json_tweet_list.append({'tweet_id':json_tweet['id'],
                                         'retweet_count': json_tweet['retweet_count'],
                                         'favorite_count': json_tweet['favorite_count']})
         #Create a panda data frame from tweets' JSON data
         tweets_info = pd.DataFrame(json_tweet_list, columns = ['tweet_id', 'retweet_count', '
```

Assessing Data

1. Twitter archive dataset

```
In [14]: #With this piece of code the whole context of the columns in the dataframe will be vi
         pd.set_option('display.max_colwidth', -1)

In [15]: twitter_archive.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


In [16]: #view the first 20 rows of Twitter_archive dataframe
         twitter_archive.head(20)

Out[16]:              tweet_id  in_reply_to_status_id  in_reply_to_user_id  \
         0   892420643555336193 NaN                    NaN
```

```
1   892177421306343426 NaN                  NaN
2   891815181378084864 NaN                  NaN
3   891689557279858688 NaN                  NaN
4   891327558926688256 NaN                  NaN
5   891087950875897856 NaN                  NaN
6   890971913173991426 NaN                  NaN
7   890729181411237888 NaN                  NaN
8   890609185150312448 NaN                  NaN
9   890240255349198849 NaN                  NaN
10  890006608113172480 NaN                  NaN
11  889880896479866881 NaN                  NaN
12  889665388333682689 NaN                  NaN
13  889638837579907072 NaN                  NaN
14  889531135344209921 NaN                  NaN
15  889278841981685760 NaN                  NaN
16  888917238123831296 NaN                  NaN
17  888804989199671297 NaN                  NaN
18  888554962724278272 NaN                  NaN
19  888202515573088257 NaN                  NaN

                   timestamp  \
0   2017-08-01 16:23:56 +0000
1   2017-08-01 00:17:27 +0000
2   2017-07-31 00:18:03 +0000
3   2017-07-30 15:58:51 +0000
4   2017-07-29 16:00:24 +0000
5   2017-07-29 00:08:17 +0000
6   2017-07-28 16:27:12 +0000
7   2017-07-28 00:22:40 +0000
8   2017-07-27 16:25:51 +0000
9   2017-07-26 15:59:51 +0000
10  2017-07-26 00:31:25 +0000
11  2017-07-25 16:11:53 +0000
12  2017-07-25 01:55:32 +0000
13  2017-07-25 00:10:02 +0000
14  2017-07-24 17:02:04 +0000
15  2017-07-24 00:19:32 +0000
16  2017-07-23 00:22:39 +0000
17  2017-07-22 16:56:37 +0000
18  2017-07-22 00:23:06 +0000
19  2017-07-21 01:02:36 +0000

                                                                                source
0   <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a
1   <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a
2   <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a
3   <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a
4   <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a
```

```
5   <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>
6   <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>
7   <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>
8   <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>
9   <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>
10  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>
11  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>
12  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>
13  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>
14  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>
15  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>
16  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>
17  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>
18  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>
19  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>


0   This is Phineas. He's a mystical boy. Only ever appears in the hole of a donut. 13
1   This is Tilly. She's just checking pup on you. Hopes you're doing ok. If not, she
2   This is Archie. He is a rare Norwegian Pouncing Corgo. Lives in the tall grass. Yo
3   This is Darla. She commenced a snooze mid meal. 13/10 happens to the best of us ht
4   This is Franklin. He would like you to stop calling him "cute." He is a very fiero
5   Here we have a majestic great white breaching off South Africa's coast. Absolutely
6   Meet Jax. He enjoys ice cream so much he gets nervous around it. 13/10 help Jax en
7   When you watch your owner call another dog a good boy but then they turn back to y
8   This is Zoey. She doesn't want to be one of the scary sharks. Just wants to be a s
9   This is Cassie. She is a college pup. Studying international doggo communication a
10  This is Koda. He is a South Australian deckshark. Deceptively deadly. Frightening
11  This is Bruno. He is a service shark. Only gets out of the water to assist you. 13
12  Here's a puppo that seems to be on the fence about something haha no but seriously
13  This is Ted. He does his best. Sometimes that's not enough. But it's ok. 12/10 wou
14  This is Stuart. He's sporting his favorite fanny pack. Secretly filled with bones
15  This is Oliver. You're witnessing one of his many brutal attacks. Seems to be play
16  This is Jim. He found a fren. Taught him how to sit like the good boys. 12/10 for
17  This is Zeke. He has a new stick. Very proud of it. Would like you to throw it for
18  This is Ralphus. He's powering up. Attempting maximum borkdrive. 13/10 inspiration
19  RT @dog_rates: This is Canela. She attempted some fancy porch pics. They were unsu

    retweeted_status_id  retweeted_status_user_id retweeted_status_timestamp  \
0   NaN                  NaN                     NaN
1   NaN                  NaN                     NaN
2   NaN                  NaN                     NaN
3   NaN                  NaN                     NaN
4   NaN                  NaN                     NaN
5   NaN                  NaN                     NaN
6   NaN                  NaN                     NaN
7   NaN                  NaN                     NaN
8   NaN                  NaN                     NaN
```

```
9  NaN                  NaN                         NaN
10 NaN                  NaN                         NaN
11 NaN                  NaN                         NaN
12 NaN                  NaN                         NaN
13 NaN                  NaN                         NaN
14 NaN                  NaN                         NaN
15 NaN                  NaN                         NaN
16 NaN                  NaN                         NaN
17 NaN                  NaN                         NaN
18 NaN                  NaN                         NaN
19  8.874740e+17         4.196984e+09               2017-07-19 00:47:34 +0000
```

```
0   https://twitter.com/dog_rates/status/892420643555336193/photo/1
1   https://twitter.com/dog_rates/status/892177421306343426/photo/1
2   https://twitter.com/dog_rates/status/891815181378084864/photo/1
3   https://twitter.com/dog_rates/status/891689557279858688/photo/1
4   https://twitter.com/dog_rates/status/891327558926688256/photo/1,https://twitter.co
5   https://twitter.com/dog_rates/status/891087950875897856/photo/1
6   https://gofundme.com/ydvmve-surgery-for-jax,https://twitter.com/dog_rates/status/8
7   https://twitter.com/dog_rates/status/890729181411237888/photo/1,https://twitter.co
8   https://twitter.com/dog_rates/status/890609185150312448/photo/1
9   https://twitter.com/dog_rates/status/890240255349198849/photo/1
10  https://twitter.com/dog_rates/status/890006608113172480/photo/1,https://twitter.co
11  https://twitter.com/dog_rates/status/889880896479866881/photo/1
12  https://twitter.com/dog_rates/status/889665388333682689/photo/1
13  https://twitter.com/dog_rates/status/889638837579907072/photo/1,https://twitter.co
14  https://twitter.com/dog_rates/status/889531135344209921/photo/1
15  https://twitter.com/dog_rates/status/889278841981685760/video/1
16  https://twitter.com/dog_rates/status/888917238123831296/photo/1
17  https://twitter.com/dog_rates/status/888804989199671297/photo/1,https://twitter.co
18  https://twitter.com/dog_rates/status/888554962724278272/photo/1,https://twitter.co
19  https://twitter.com/dog_rates/status/887473957103951883/photo/1,https://twitter.co
```

```
    rating_numerator  rating_denominator      name  doggo floofer pupper  \
0   13                10                    Phineas   None   None    None
1   13                10                    Tilly     None   None    None
2   12                10                    Archie    None   None    None
3   13                10                    Darla     None   None    None
4   12                10                    Franklin  None   None    None
5   13                10                    None      None   None    None
6   13                10                    Jax       None   None    None
7   13                10                    None      None   None    None
8   13                10                    Zoey      None   None    None
9   14                10                    Cassie    doggo  None    None
10  13                10                    Koda      None   None    None
11  13                10                    Bruno     None   None    None
12  13                10                    None      None   None    None
```

```
13  12                10                  Ted       None   None    None
14  13                10                  Stuart    None   None    None
15  13                10                  Oliver    None   None    None
16  12                10                  Jim       None   None    None
17  13                10                  Zeke      None   None    None
18  13                10                  Ralphus   None   None    None
19  13                10                  Canela    None   None    None

    puppo
0   None
1   None
2   None
3   None
4   None
5   None
6   None
7   None
8   None
9   None
10  None
11  None
12  puppo
13  None
14  puppo
15  None
16  None
17  None
18  None
19  None
```

In [17]:
```
#View the last 10 records in twitter archive dataframe
twitter_archive.tail(10)
```

Out[17]:
```
                tweet_id  in_reply_to_status_id  in_reply_to_user_id  \
2346  666058600524156928 NaN                    NaN
2347  666057090499244032 NaN                    NaN
2348  666055525042405380 NaN                    NaN
2349  666051853826850816 NaN                    NaN
2350  666050758794694657 NaN                    NaN
2351  666049248165822465 NaN                    NaN
2352  666044226329800704 NaN                    NaN
2353  666033412701032449 NaN                    NaN
2354  666029285002620928 NaN                    NaN
2355  666020888022790149 NaN                    NaN

                      timestamp  \
2346  2015-11-16 01:01:59 +0000
2347  2015-11-16 00:55:59 +0000
```

```
2348  2015-11-16 00:49:46 +0000
2349  2015-11-16 00:35:11 +0000
2350  2015-11-16 00:30:50 +0000
2351  2015-11-16 00:24:50 +0000
2352  2015-11-16 00:04:52 +0000
2353  2015-11-15 23:21:54 +0000
2354  2015-11-15 23:05:30 +0000
2355  2015-11-15 22:32:08 +0000

                                                                                sou
2346  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone<
2347  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone<
2348  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone<
2349  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone<
2350  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone<
2351  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone<
2352  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone<
2353  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone<
2354  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone<
2355  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone<


2346  Here is the Rand Paul of retrievers folks! He's probably good at poker. Can dri
2347  My oh my. This is a rare blond Canadian terrier on wheels. Only $8.98. Rather d
2348  Here is a Siberian heavily armored polar bear mix. Strong owner. 10/10 I would
2349  This is an odd dog. Hard on the outside but loving on the inside. Petting still
2350  This is a truly beautiful English Wilson Staff retriever. Has a nice phone. Pri
2351  Here we have a 1949 1st generation vulpix. Enjoys sweat tea and Fox News. Canno
2352  This is a purebred Piers Morgan. Loves to Netflix and chill. Always looks like
2353  Here is a very happy pup. Big fan of well-maintained decks. Just look at that t
2354  This is a western brown Mitsubishi terrier. Upset about leaf. Actually 2 dogs h
2355  Here we have a Japanese Irish Setter. Lost eye in Vietnam (?). Big fan of relax

      retweeted_status_id  retweeted_status_user_id  \
2346 NaN                  NaN
2347 NaN                  NaN
2348 NaN                  NaN
2349 NaN                  NaN
2350 NaN                  NaN
2351 NaN                  NaN
2352 NaN                  NaN
2353 NaN                  NaN
2354 NaN                  NaN
2355 NaN                  NaN

     retweeted_status_timestamp  \
2346  NaN
2347  NaN
```

```
2348  NaN
2349  NaN
2350  NaN
2351  NaN
2352  NaN
2353  NaN
2354  NaN
2355  NaN

                                                    expanded_urls  \
2346  https://twitter.com/dog_rates/status/666058600524156928/photo/1
2347  https://twitter.com/dog_rates/status/666057090499244032/photo/1
2348  https://twitter.com/dog_rates/status/666055525042405380/photo/1
2349  https://twitter.com/dog_rates/status/666051853826850816/photo/1
2350  https://twitter.com/dog_rates/status/666050758794694657/photo/1
2351  https://twitter.com/dog_rates/status/666049248165822465/photo/1
2352  https://twitter.com/dog_rates/status/666044226329800704/photo/1
2353  https://twitter.com/dog_rates/status/666033412701032449/photo/1
2354  https://twitter.com/dog_rates/status/666029285002620928/photo/1
2355  https://twitter.com/dog_rates/status/666020888022790149/photo/1

      rating_numerator  rating_denominator  name doggo floofer pupper puppo
2346  8                 10                  the   None  None    None   None
2347  9                 10                  a     None  None    None   None
2348  10                10                  a     None  None    None   None
2349  2                 10                  an    None  None    None   None
2350  10                10                  a     None  None    None   None
2351  5                 10                  None  None  None    None   None
2352  6                 10                  a     None  None    None   None
2353  9                 10                  a     None  None    None   None
2354  7                 10                  a     None  None    None   None
2355  8                 10                  None  None  None    None   None
```

In [18]:
```
#View names for dogs
twitter_archive['name'].value_counts()
```

Out[18]:
```
None          745
a              55
Charlie        12
Lucy           11
Cooper         11
Oliver         11
Tucker         10
Lola           10
Penny          10
Winston         9
Bo              9
Sadie           8
```

```
the           8
Buddy         7
an            7
Bailey        7
Toby          7
Daisy         7
Stanley       6
Koda          6
Scout         6
Dave          6
Bella         6
Jax           6
Milo          6
Rusty         6
Jack          6
Leo           6
Oscar         6
Chester       5
              ..
Lulu          1
Kota          1
Pilot         1
BeBe          1
Kloey         1
Antony        1
Tripp         1
Ralphé        1
Joey          1
Hazel         1
Ulysses       1
Lenox         1
Jeffrie       1
Mary          1
Cannon        1
Hubertson     1
Rhino         1
Julio         1
Pumpkin       1
Andy          1
Aubie         1
Gerbald       1
Stark         1
Hector        1
Harlso        1
Scott         1
Leonidas      1
Christoper    1
DayZ          1
```

```
Thor          1
Name: name, Length: 957, dtype: int64
```

In [19]:
```
#View rating_numerator of doag's rating
twitter_archive['rating_numerator'].value_counts().sort_index()
```

Out[19]:
```
0       2
1       9
2       9
3       19
4       17
5       37
6       32
7       55
8       102
9       158
10      461
11      464
12      558
13      351
14      54
15      2
17      1
20      1
24      1
26      1
27      1
44      1
45      1
50      1
60      1
75      2
80      1
84      1
88      1
99      1
121     1
143     1
144     1
165     1
182     1
204     1
420     2
666     1
960     1
1776    1
Name: rating_numerator, dtype: int64
```

In [20]:
```
#View rating_denominator values for dag's rating
```

```
In [20]: twitter_archive['rating_denominator'].value_counts().sort_index()

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

In [21]: #View different source values for each tweets
         twitter_archive['source'].value_counts().sort_index()

Out[21]: <a href="http://twitter.com" rel="nofollow">Twitter Web Client</a>
         <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for iPhone</a>
         <a href="http://vine.co" rel="nofollow">Vine - Make a Scene</a>
         <a href="https://about.twitter.com/products/tweetdeck" rel="nofollow">TweetDeck</a>
         Name: source, dtype: int64
```

__ 2.Image Predicion Dataset __

```
In [22]: #Show information for image_prediction dataset
         image_predictions.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2075 entries, 0 to 2074
Data columns (total 12 columns):
tweet_id    2075 non-null int64
jpg_url     2075 non-null object
img_num     2075 non-null int64
p1          2075 non-null object
p1_conf     2075 non-null float64
p1_dog      2075 non-null bool
p2          2075 non-null object
p2_conf     2075 non-null float64
p2_dog      2075 non-null bool
p3          2075 non-null object
```

```
p3_conf     2075 non-null float64
p3_dog      2075 non-null bool
dtypes: bool(3), float64(3), int64(2), object(4)
memory usage: 152.1+ KB
```

There are 2356 records in our twitter_archive, but we have just 2075 image for those records.

```
In [23]: #Show first 5 records of image_prediction dataset
         image_predictions.head()
```

Out[23]:

	tweet_id	jpg_url	img_num	p1	p1_conf	p1_dog	p2	p2_conf	p2_dog	p3	p3_conf	p3_dog
0	666020888022790149	https://pbs.twimg.com/media/CT4udn0WwAA0aMy.jpg	1	Welsh_springer_spaniel	0.465074	True	collie	0.156665	True	Shetland_sheepdog	0.061428	True
1	666029285002620928	https://pbs.twimg.com/media/CT42GRgUYAA5iDo.jpg	1	redbone	0.506826	True	miniature_pinscher	0.074192	True	Rhodesian_ridgeback	0.072010	True
2	666033412701032449	https://pbs.twimg.com/media/CT4521TWwAEvMyu.jpg	1	German_shepherd	0.596461	True	malinois	0.138584	True	bloodhound	0.116197	True
3	666044226329800704	https://pbs.twimg.com/media/CT5Dr8HUEAA-lEu.jpg	1	Rhodesian_ridgeback	0.408143	True	redbone	0.360687	True	miniature_pinscher	0.222752	True
4	666049248165822465	https://pbs.twimg.com/media/CT5IQmsXIAAKY4A.jpg	1	miniature_pinscher	0.560311	True	Rottweiler	0.243682	True	Doberman	0.154629	True

```
In [24]: #Show last 5 records of image_prediction dataset
         image_predictions.tail()
```

Out[24]:

	tweet_id	jpg_url	img_num	p1	p1_conf	p1_dog	p2	p2_conf	p2_dog	p3	p3_conf	p3_dog
2070	891327558926688256	https://pbs.twimg.com/media/DF6hr6BUMAAzZgT.jpg	2	basset	0.555712	True	English_springer	0.225770	True	German_short-haired_pointer	0.175219	True
2071	891689557279858688	https://pbs.twimg.com/media/DF_q7IAWsAEuuN8.jpg	1	paper_towel	0.170278	False	Labrador_retriever	0.168086	True	spatula	0.040836	False
2072	891815181378084864	https://pbs.twimg.com/media/DGBdLU1WsAANxJ9.jpg	1	Chihuahua	0.716012	True	malamute	0.078253	True	kelpie	0.031379	True
2073	892177421306343426	https://pbs.twimg.com/media/DGGmoV4XsAAUL6n.jpg	1	Chihuahua	0.323581	True	Pekinese	0.090647	True	papillon	0.068957	True
2074	892420643555336193	https://pbs.twimg.com/media/DGKD1-bXoAAIAUK.jpg	1	orange	0.097049	False	bagel	0.085851	False	banana	0.076110	False

```
      p2_dog                          p3   p3_conf  p3_dog
2070  True    German_short-haired_pointer  0.175219  True
2071  True    spatula                      0.040836  False
2072  True    kelpie                       0.031379  True
2073  True    papillon                     0.068957  True
2074  False   banana                       0.076110  False
```

__ 3. Twitter API __

In [25]:
```
#Show information for tweets_info(data we gatheres through API)
tweets_info.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2341 entries, 0 to 2340
Data columns (total 3 columns):
tweet_id          2341 non-null int64
retweet_count     2341 non-null int64
favorite_count    2341 non-null int64
dtypes: int64(3)
memory usage: 54.9 KB
```

In [26]:
```
#Show the first 20 records in tweets_info
tweets_info.head(20)
```

Out[26]:

	tweet_id	retweet_count	favorite_count
0	892420643555336193	8400	38299
1	892177421306343426	6196	32823
2	891815181378084864	4100	24720
3	891689557279858688	8521	41627
4	891327558926688256	9244	39794
5	891087950875897856	3072	19983
6	890971913173991426	2041	11699
7	890729181411237888	18635	64638
8	890609185150312448	4215	27467
9	890240255349198849	7291	31515
10	890006608113172480	7239	30285
11	889880896479866881	4914	27440
12	889665388333682689	9933	47524
13	889638837579907072	4487	26832
14	889531135344209921	2212	14912
15	889278841981685760	5315	24938
16	888917238123831296	4440	28725
17	888804989199671297	4244	25244
18	888554962724278272	3508	19605
19	888078434458587136	3452	21481

In [27]:
```
#Show the last 5 records in tweets_info
tweets_info.tail()
```

```
Out[27]:                tweet_id  retweet_count  favorite_count
         2336  666049248165822465  40             107
         2337  666044226329800704  139            296
         2338  666033412701032449  44             125
         2339  666029285002620928  47             129
         2340  666020888022790149  508            2548
```

__ Tidiness __

- 'tweets_info' and 'image_predictions' should be part of 'twitter_archive' dataset
- One Variable(dog_stage) in four columns(doggo, floofer, pupper, and puppo) in 'twitter_archive' dataset

__ Quality __

- We only want original tweets(no retweets)
- We only want tweets with image
- We only want tweets with rating
- Errorness datatypes(timestamp, dog_stage)
- '&amp' in tweet's texts
- We want correct values for numerators and denominators
- Source values include URL
- We want to extract correct name from each tweet's text

Cleaning Data

```
In [29]: #Make a copy of each dataseta to have a backup of our data
         twitter_archive_clean = twitter_archive.copy()
         image_predictions_clean = image_predictions.copy()
         tweets_info_clean = tweets_info.copy()
```

__ Define __

Create 'dog_stage' variable and remove individual dog stage columns: 'puppo', 'pupper', 'floofer', 'doggo'

__ Code __

```
In [30]: # Create 'dog_stage' variable by extracting its value from the text column
         twitter_archive_clean['dog_stage'] = twitter_archive_clean['text'].str.extract('(pupp
```

```
In [31]: # Drop columns that are not needed
         columns = ['doggo', 'floofer', 'pupper', 'puppo']
         twitter_archive_clean = twitter_archive_clean.drop(columns, axis=1)
```

__ Test __

```
In [32]: twitter_archive.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
```

```
In [33]: twitter_archive_clean.dog_stage.value_counts()
```

```
Out[33]: pupper     265
         doggo      93
         puppo      37
         floofer    4
         Name: dog_stage, dtype: int64
```

__ Define __
Merge twitter_archive dataset with tweets_info and image_predictions.
__ Code __

```
In [34]: #Merge twitter_archive with tweets_info
         twitter_archive_clean = pd.merge(left = twitter_archive_clean, right = tweets_info_cl
```

```
In [35]: #Merge the result with image_predictions
         twitter_archive_clean = pd.merge(left = twitter_archive_clean, right = image_predictio
```

__ Test __

```
In [36]: twitter_archive_clean.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2067 entries, 0 to 2066
Data columns (total 27 columns):
tweet_id                      2067 non-null int64
in_reply_to_status_id         23 non-null float64
in_reply_to_user_id           23 non-null float64
```

```
timestamp                     2067 non-null object
source                        2067 non-null object
text                          2067 non-null object
retweeted_status_id           74 non-null float64
retweeted_status_user_id      74 non-null float64
retweeted_status_timestamp    74 non-null object
expanded_urls                 2067 non-null object
rating_numerator              2067 non-null int64
rating_denominator            2067 non-null int64
name                          2067 non-null object
dog_stage                     337 non-null object
retweet_count                 2067 non-null int64
favorite_count                2067 non-null int64
jpg_url                       2067 non-null object
img_num                       2067 non-null int64
p1                            2067 non-null object
p1_conf                       2067 non-null float64
p1_dog                        2067 non-null bool
p2                            2067 non-null object
p2_conf                       2067 non-null float64
p2_dog                        2067 non-null bool
p3                            2067 non-null object
p3_conf                       2067 non-null float64
p3_dog                        2067 non-null bool
dtypes: bool(3), float64(7), int64(6), object(11)
memory usage: 409.8+ KB
```

__ Define __
Remove retweets and tweets with no images
__ Code __

```
In [37]: #Drop tweets that are retweets
         twitter_archive_clean = twitter_archive_clean[twitter_archive_clean.retweeted_status_

In [38]: #Drop tweets that don't have any images
         twitter_archive_clean = twitter_archive_clean[twitter_archive_clean.expanded_urls.notn

In [39]: #Drop columns related to retweets
         columns = ['retweeted_status_id', 'retweeted_status_user_id', 'retweeted_status_timest
         twitter_archive_clean = twitter_archive_clean.drop(columns, axis=1)
```

__ Test __

```
In [ ]: twitter_archive_clean.info()
```

__ Define __
Change datatypes of: - 'timestamp' to datetime - 'dog_stage' to categorical
__ Code __

```
In [40]: #Change the datatype for 'dog_stage' and 'timestamp' columns
         twitter_archive_clean['dog_stage'] = twitter_archive_clean['dog_stage'].astype('categ
         twitter_archive_clean['timestamp'] = pd.to_datetime(twitter_archive_clean['timestamp']
```

Test

```
In [41]: twitter_archive_clean.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1993 entries, 0 to 2066
Data columns (total 24 columns):
tweet_id                 1993 non-null int64
in_reply_to_status_id    23 non-null float64
in_reply_to_user_id      23 non-null float64
timestamp                1993 non-null datetime64[ns]
source                   1993 non-null object
text                     1993 non-null object
expanded_urls            1993 non-null object
rating_numerator         1993 non-null int64
rating_denominator       1993 non-null int64
name                     1993 non-null object
dog_stage                326 non-null category
retweet_count            1993 non-null int64
favorite_count           1993 non-null int64
jpg_url                  1993 non-null object
img_num                  1993 non-null int64
p1                       1993 non-null object
p1_conf                  1993 non-null float64
p1_dog                   1993 non-null bool
p2                       1993 non-null object
p2_conf                  1993 non-null float64
p2_dog                   1993 non-null bool
p3                       1993 non-null object
p3_conf                  1993 non-null float64
p3_dog                   1993 non-null bool
dtypes: bool(3), category(1), datetime64[ns](1), float64(5), int64(6), object(8)
memory usage: 334.9+ KB
```

__ Define __
Remove 'amp' after '&' in tweets' text
__ Code __

```
In [43]: #Remove 'amp' after '&' in text column
         twitter_archive_clean['text'] = twitter_archive_clean['text'].str.replace('&amp;', '&
```

Test

```
In [44]: twitter_archive_clean[twitter_archive_clean.text.str.contains('&amp;')]
```

```
Out[44]: Empty DataFrame
         Columns: [tweet_id, in_reply_to_status_id, in_reply_to_user_id, timestamp, source, tex
         Index: []

         [0 rows x 24 columns]
```

__ Define __
Extract rating from the tweet text
__ Code __

```
In [45]: # the pattern we're looking in text for rating value to extract is number/number or n
         twitter_archive_clean['rating'] = twitter_archive_clean['text'].str.extract('(\d*\.*\d
```

```
C:\Users\Simin\Anaconda3\lib\site-packages\ipykernel\__main__.py:2: FutureWarning: currently ex
  from ipykernel import kernelapp as app
```

Test

```
In [46]: twitter_archive_clean.rating.value_counts()
```

```
Out[46]: 12/10       447
         10/10       410
         11/10       392
         13/10       261
         9/10        147
         8/10         94
         7/10         51
         14/10        35
         6/10         32
         5/10         32
         3/10         19
         4/10         15
         2/10          9
         ...10/10      8
         ...11/10      4
         1/10          4
         ...9/10       3
         0/10          2
         ...12/10      2
         ...8/10       1
         165/150       1
         24/7          1
         204/170       1
         7/11          1
         1776/10       1
         9/11          1
         60/50         1
         144/120       1
```

```
84/70       1
420/10      1
11.27/10    1
50/50       1
.10/10      1
121/110     1
44/40       1
99/90       1
13.5/10     1
143/130     1
80/80       1
9.75/10     1
11.26/10    1
88/80       1
4/20        1
45/50       1
1/2         1
Name: rating, dtype: int64
```

__ Define __
Some ratings start with '.' or '...'. Remove the '.'s in the begining of the rating.
__ Code __

```
In [47]: #Remove the '.'s in the begining of the rating.
         twitter_archive_clean['rating'] = twitter_archive_clean['rating'].str.lstrip('.')
```

Test

```
In [48]: twitter_archive_clean.rating.value_counts()
```

```
Out[48]: 12/10       449
         10/10       419
         11/10       396
         13/10       261
         9/10        150
         8/10        95
         7/10        51
         14/10       35
         6/10        32
         5/10        32
         3/10        19
         4/10        15
         2/10        9
         1/10        4
         0/10        2
         144/120     1
         1776/10     1
         9/11        1
         60/50       1
```

```
121/110     1
84/70       1
165/150     1
24/7        1
204/170     1
7/11        1
420/10      1
11.27/10    1
50/50       1
45/50       1
44/40       1
99/90       1
13.5/10     1
143/130     1
80/80       1
9.75/10     1
11.26/10    1
88/80       1
4/20        1
1/2         1
Name: rating, dtype: int64
```

__ Check some odd ratings __

Some ratings look misleading, like '24/7', '9/11', '50/50', '7/11' and '1/2'. I'm wondering if these values refering somethign else in text rather than rating. I check their texts to see if the rating is correct.

```
In [49]: #check the text of tweets with odd ratings.
         twitter_archive_clean[twitter_archive_clean.rating == '24/7'].text

Out[49]: 411    Meet Sam. She smiles 24/7 & secretly aspires to be a reindeer. \nKeep Sam smil
         Name: text, dtype: object

In [50]: twitter_archive_clean[twitter_archive_clean.rating == '9/11'].text

Out[50]: 870    After so many requests, this is Bretagne. She was the last surviving 9/11 searc
         Name: text, dtype: object

In [51]: twitter_archive_clean[twitter_archive_clean.rating == '50/50'].text

Out[51]: 995    This is Bluebert. He just saw that both #FinalFur match ups are split 50/50. An
         Name: text, dtype: object

In [52]: twitter_archive_clean[twitter_archive_clean.rating == '7/11'].text

Out[52]: 1399    This is Darrel. He just robbed a 7/11 and is in a high speed police chase. Was
         Name: text, dtype: object

In [53]: twitter_archive_clean[twitter_archive_clean.rating == '1/2'].text
```

```
Out[53]: 2046    This is an Albanian 3 1/2 legged  Episcopalian. Loves well-polished hardwood f
         Name: text, dtype: object
```

__ Define __

Replace these ratings: - index 411: Drop the row because this tweet doesn't have any rating. - index 870: 14/10 - index 995: 11/10 - index 1399: 10/10 - index 2046: 9/10

__ Code __

```
In [54]: #Replace Correct ratings for the following rows
         twitter_archive_clean.drop(411, inplace = True)
         twitter_archive_clean.loc[870, 'rating'] = '14/10'
         twitter_archive_clean.loc[870, 'rating'] = '14/10'
         twitter_archive_clean.loc[995, 'rating'] = '11/10'
         twitter_archive_clean.loc[1399, 'rating'] = '10/10'
         twitter_archive_clean.loc[2046, 'rating'] = '9/10'
```

Test

```
In [55]: twitter_archive_clean.rating.value_counts()
```

```
Out[55]: 12/10       449
         10/10       420
         11/10       397
         13/10       261
         9/10        151
         8/10         95
         7/10         51
         14/10        36
         5/10         32
         6/10         32
         3/10         19
         4/10         15
         2/10          9
         1/10          4
         0/10          2
         13.5/10       1
         60/50         1
         121/110       1
         204/170       1
         165/150       1
         84/70         1
         1776/10       1
         4/20          1
         144/120       1
         11.27/10      1
         99/90         1
         88/80         1
         11.26/10      1
         45/50         1
```

```
9.75/10      1
44/40        1
80/80        1
143/130      1
420/10       1
Name: rating, dtype: int64
```

__ Define __
Replace the correct values for rating_numerator and rating_denominator
__ Code __

```
In [56]: def find_numerator(tweet):# Extract numerator from rating
             rating = tweet['rating'].split('/')
             numerator = rating[0]
             return numerator

         def find_denominator(tweet):# Extract denominator from rating
             rating = tweet['rating'].split('/')
             denominator = rating[1]
             return denominator

         # set rating_numerator and rating_denominator feilds
         twitter_archive_clean['rating_numerator']  =  twitter_archive_clean.apply(find_numerat
         twitter_archive_clean['rating_denominator']  =  twitter_archive_clean.apply(find_denor
```

Test

```
In [ ]: #for index in twitter_archive_clean.index:
        #   print( twitter_archive_clean.loc[index, 'rating'],
        #          twitter_archive_clean.loc[index, 'rating_numerator'],
        #          twitter_archive_clean.loc[index, 'rating_denominator'])
```

__ Define __
Remove URL from 'source' value
__ Code __

```
In [57]: # Removing url from 'source' value
         twitter_archive_clean['source'] = twitter_archive_clean['source'].str.replace('<a hre
         twitter_archive_clean['source'] = twitter_archive_clean['source'].str.replace('<a hre
         twitter_archive_clean['source'] = twitter_archive_clean['source'].str.replace('<a hre
```

Test

```
In [58]: twitter_archive_clean.source.value_counts()

Out[58]: Twitter for iPhone    1953
         Twitter Web Client    28
         TweetDeck             11
         Name: source, dtype: int64
```

__ Define __
Correct names
__ Code __

```
In [59]: def extract_name(tweet): #function to extract name from tweet's text
             if 'Meet' in tweet.text: # the word after 'Meet' is dog's name
                 match = re.search('Meet (\S+)', tweet.text)
                 name = match.group(1)

             elif 'name is' in tweet.text:# the word after 'name is' is dog's name
                 match = re.search('name is (\S+)', tweet.text)
                 name = match.group(1)

             elif 'named' in tweet.text:# the word after 'name is' is dog's name
                 match = re.search('named (\S+)', tweet.text)
                 name = match.group(1)

             elif 'hello to' in tweet.text:# the word after 'name is' is dog's name
                 match = re.search('hello to (\S+)', tweet.text)
                 name = match.group(1)

             elif 'This is' in tweet.text:# the word after 'name is' is dog's name
                 match = re.search('This is (\S+)', tweet.text)
                 name = match.group(1)
                 if not (name[0].isupper()): # Make sure there is a name after "This is".Names
                     name = None
             else:
                 name = None

             if name != None:
                 while not(name[-1].isalpha()):#Romeve non_alphabet characters like'.' or '...
                     name = name[:-1]

             return(name)

         twitter_archive_clean['name'] = twitter_archive_clean.apply(extract_name, axis=1)
```

Test

```
In [60]: twitter_archive_clean.name.value_counts()
```

```
Out[60]: Cooper        10
         Oliver        10
         Charlie       10
         Lucy          10
         Penny          9
         Tucker         9
         Winston        8
         Sadie          8
```

```
Daisy         7
Lola          7
Toby          7
Koda          6
Bella         6
Bo            6
Jax           6
Stanley       6
Oscar         5
Buddy         5
Leo           5
Chester       5
Milo          5
Zoey          5
Bailey        5
Scout         5
Rusty         5
Louis         5
Winnie        4
Gus           4
Duke          4
Chip          4
              ..
Kathmandu     1
Tickles       1
Cilantro      1
Octaviath     1
Andy          1
Christoper    1
Lillie        1
Leonidas      1
Timber        1
Ole           1
Vince         1
Taco          1
Hazel         1
Ulysses       1
Lenox         1
Jeffrie       1
Thea          1
Mary          1
Cannon        1
Hubertson     1
Rhino         1
Julio         1
Joey          1
Aubie         1
Gerbald       1
```

```
Stark         1
Hector        1
Harlso        1
Scott         1
Thor          1
Name: name, Length: 936, dtype: int64
```

```
In [61]: #Check to see if there are still names 'a'
         twitter_archive_clean[twitter_archive_clean.name == 'a']
```

```
Out[61]: Empty DataFrame
         Columns: [tweet_id, in_reply_to_status_id, in_reply_to_user_id, timestamp, source, tex
         Index: []

         [0 rows x 25 columns]
```

```
In [62]: #Check to see if there are still name 'an'
         twitter_archive_clean[twitter_archive_clean.name == 'an']
```

```
Out[62]: Empty DataFrame
         Columns: [tweet_id, in_reply_to_status_id, in_reply_to_user_id, timestamp, source, tex
         Index: []

         [0 rows x 25 columns]
```

Storing, Analyzing, and Visualizing Data

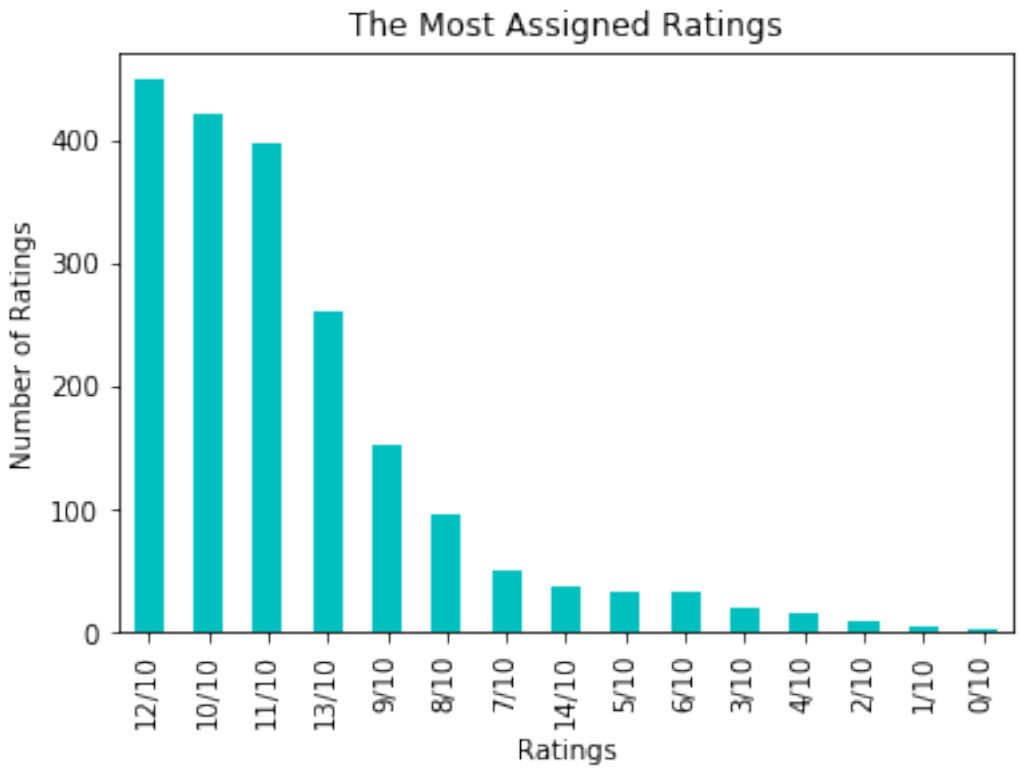
```
In [63]: #Store the clean data in a CSV file
         twitter_archive_clean.to_csv('./Data/twitter_archive_master.csv', index = False, encod
```

```
In [64]: #Make a copy of dataset for analyzing
         df_tweets= twitter_archive_clean
```

1.1.1 The Most Assigned Ratings

```
In [65]: rating_list = df_tweets.rating.value_counts()
```

```
In [77]: #Find the most assigned ratings
         most_assigned_ratings = rating_list[:15]
         most_assigned_ratings.plot(kind = 'bar', color = 'c')
         plt.xlabel('Ratings')
         plt.ylabel('Number of Ratings')
         plt.title('The Most Assigned Ratings');
```




```
In [67]: # Make a list of most assigned ratings
         most_assigned_ratings_list = list(most_assigned_ratings.index)
```

12/10, 10/10 and 11/10 are the most assigned ratings by 'we_rate_dogs' Top fifteeen assigned ratings all have denominator of 10.

1.1.2 The Most Rated Breeds

First we need to find the breed of each dog.

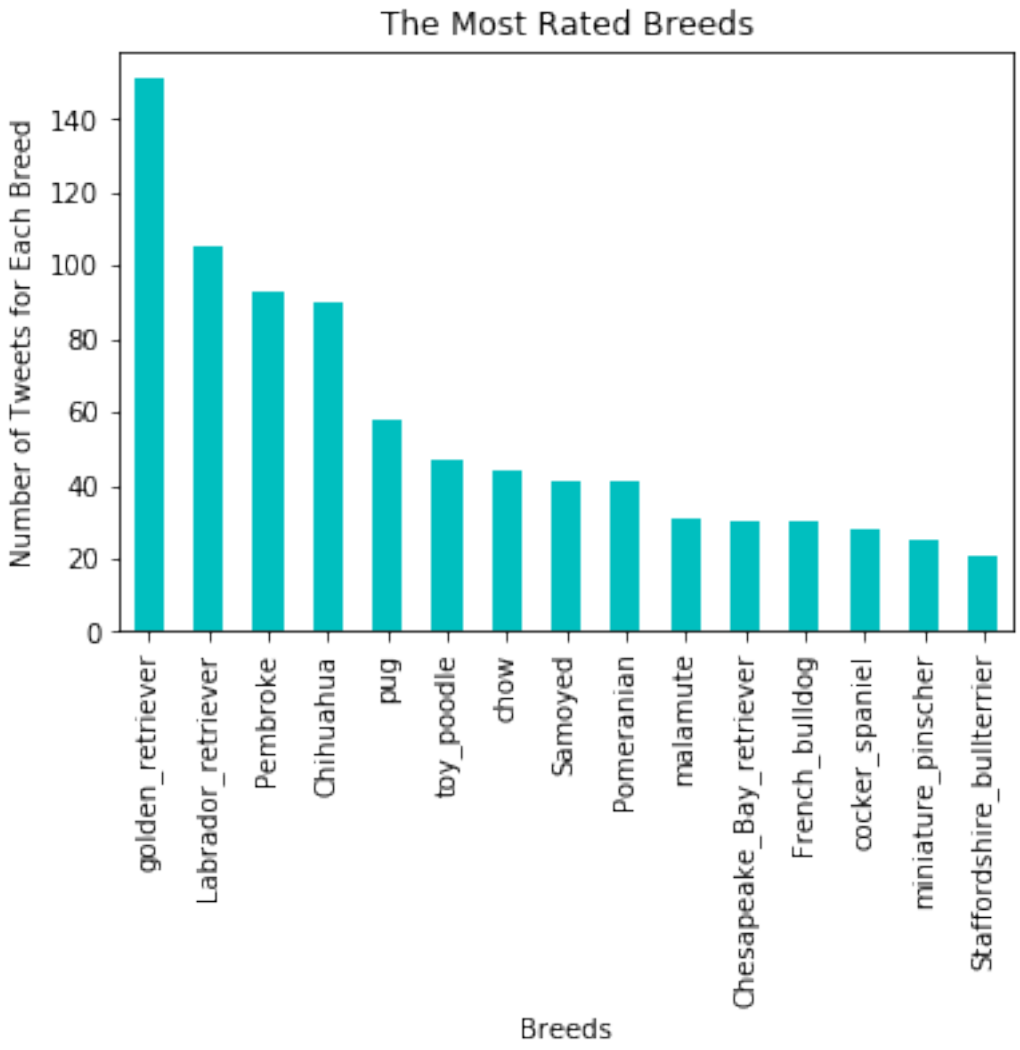
```
In [68]: def find_breed(tweet): # find the breed of dog based on it's confident level of image
             #If prediction algorithem predicts something rather than dog, we won't consider i
             #its conf value zero
             if not tweet.p1_dog:
                 tweet.p1_conf = 0
             if not tweet.p2_dog:
                 tweet.p2_dog = 0
             if not tweet.p3_dog:
                 tweet.p3_dog = 0

             #if none of the predicions is a dog breed, return 'None'
             if tweet.p1_dog == 0 and tweet.p2_dog == 0 and tweet.p3_dog == 0:
                 return(None)
```

```
            #The dog breed is the one with more "conf" value
            breed = tweet.p1
            breed_conf = tweet.p1_conf
            if tweet.p2_conf > breed_conf:
                breed = tweet.p2
                breed_conf = tweet.p2_conf
            if  tweet.p3_conf > breed_conf:
                breed = tweet.p3
            return(breed)
        #Add and set 'breed' column to the dataset
        df_tweets['breed'] = df_tweets.apply(find_breed, axis=1)
```

In [69]:
```
        #Find the top 15 breeds rated
        breeds = df_tweets.breed.value_counts()
        most_rated_breeds = breeds[:15]
```

In [78]:
```
        #Show the bar chart for the most rated breeds
        most_rated_breeds.plot(kind = 'bar', color = 'c')
        plt.xlabel('Breeds')
        plt.ylabel('Number of Tweets for Each Breed')
        plt.title('The Most Rated Breeds');
```




```
In [71]: #make a list for most rated breeds
         most_rated_breeds_list = list(most_rated_breeds.index)
```

The Golden Retriever, and then Labrador Retriever and Pembroke breed has the highest number of dogs rated in our dataset.

1.1.3 Statistics for 'likes', 'retweets' and 'Ratings'

To make a better sence of our result, first I want to filter my dataset for rows with rating in most_assigned_rating_list, because some ratings have unique and strange values like '204/170', '121/110', '143/130', etc.

```
In [72]: #filter dataset with rows have rating in most_assigned_rating_list
         df_selected = df_tweets[df_tweets.rating.isin(most_assigned_ratings_list)]
         #change data type of rating_numerator to integer
```

```
        df_selected['rating_numerator'] = df_selected['rating_numerator'].astype('int64')
        df_selected.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1973 entries, 0 to 2066
Data columns (total 26 columns):
tweet_id                 1973 non-null int64
in_reply_to_status_id    22 non-null float64
in_reply_to_user_id      22 non-null float64
timestamp                1973 non-null datetime64[ns]
source                   1973 non-null object
text                     1973 non-null object
expanded_urls            1973 non-null object
rating_numerator         1973 non-null int64
rating_denominator       1973 non-null object
name                     1370 non-null object
dog_stage                318 non-null category
retweet_count            1973 non-null int64
favorite_count           1973 non-null int64
jpg_url                  1973 non-null object
img_num                  1973 non-null int64
p1                       1973 non-null object
p1_conf                  1973 non-null float64
p1_dog                   1973 non-null bool
p2                       1973 non-null object
p2_conf                  1973 non-null float64
p2_dog                   1973 non-null bool
p3                       1973 non-null object
p3_conf                  1973 non-null float64
p3_dog                   1973 non-null bool
rating                   1973 non-null object
breed                    1668 non-null object
dtypes: bool(3), category(1), datetime64[ns](1), float64(5), int64(5), object(11)
memory usage: 362.4+ KB
```

```
C:\Users\Simin\Anaconda3\lib\site-packages\ipykernel\__main__.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.html
```

```
In [73]: #Show statistics for 'likes' (favorite_count)
         df_selected['favorite_count'].describe()
```

```
Out[73]: count     1973.000000
         mean      8794.694881
         std      12870.922358
```

```
min      80.000000
25%      1881.000000
50%      3980.000000
75%      11002.000000
max      165088.000000
Name: favorite_count, dtype: float64
```

```
In [74]: #Show Statistics for 'retweet_count'
         df_selected['retweet_count'].describe()
```

```
Out[74]: count    1973.000000
         mean     2679.026356
         std      4775.072297
         min      12.000000
         25%      594.000000
         50%      1282.000000
         75%      3072.000000
         max      84372.000000
         Name: retweet_count, dtype: float64
```

```
In [75]: df_selected['rating_numerator'].describe()
```

```
Out[75]: count    1973.000000
         mean     10.551951
         std      2.182115
         min      0.000000
         25%      10.000000
         50%      11.000000
         75%      12.000000
         max      14.000000
         Name: rating_numerator, dtype: float64
```

To understand and interprete easier, since all ratings in most_assigned_rating_list have denominator 10, I research the statistics just for the rating_numerator.

__ Statistics for 'likes', 'retweets' and 'rating_numerator' for the most rated breeds __

```
In [76]: stat= (df_selected.query("breed in @most_rated_breeds_list")
                        .groupby(['breed'], as_index = False)
                        .agg({'favorite_count'  :['count', 'mean', 'max', 'min'],
                              'retweet_count'   :['mean', 'max', 'min'],
                              'rating_numerator':['mean', 'max', 'min']
                              }))
         stat
```

```
Out[76]:                          breed favorite_count                          \
                                               count          mean     max  min
         0   Chesapeake_Bay_retriever   30             10004.000000  78870   165
         1   Chihuahua                  90             8329.222222   121324  124
         2   French_bulldog             30             19760.033333  122699  326
```

3	Labrador_retriever	102	12104.127451	165088	307
4	Pembroke	93	10792.462366	68245	165
5	Pomeranian	40	7255.575000	64638	385
6	Samoyed	41	13689.804878	52800	780
7	Staffordshire_bullterrier	21	8819.333333	36772	421
8	chow	44	9557.704545	75306	433
9	cocker_spaniel	28	11325.392857	55601	284
10	golden_retriever	148	11984.304054	82377	185
11	malamute	31	11047.709677	91185	219
12	miniature_pinscher	25	7847.200000	33676	107
13	pug	58	6046.689655	35541	116
14	toy_poodle	47	6125.489362	48330	247

	retweet_count			rating_numerator		
	mean	max	min	mean	max	min
0	2632.966667	18914	53	10.800000	13	8
1	2760.288889	59975	48	10.566667	14	3
2	5212.233333	35737	118	11.166667	14	8
3	3785.254902	84372	91	11.176471	14	7
4	2968.032258	17958	83	11.387097	14	4
5	2526.550000	18635	96	11.050000	14	6
6	4679.439024	17564	239	11.731707	14	7
7	2181.380952	10167	136	10.761905	13	8
8	2745.022727	23812	204	11.522727	13	7
9	3630.500000	29889	74	11.285714	13	9
10	3573.608108	26413	51	11.641892	14	8
11	3344.612903	31068	71	10.903226	13	8
12	2196.960000	10580	40	10.000000	12	2
13	1805.155172	9820	44	10.275862	13	3
14	2165.553191	20282	84	11.042553	13	7

Rating - **'Golden Retriever'** has the most number of dogs rated by we_rate_dogs. - **'Samoyed'** bread has the highest average rating(11.73/10) and then **Golden Ritriever** with rating 11.64/10. - The lowest rating(10/10) belongs to **Miniature_pinscher** with 25 dogs rated.

Likes - **French Bulldog** has the highest average likes(19773) - __pug__breed has the lowet average likes(6051).

Retweets - All these tweets have been retweeted for at least 40 times. - The lowest retweet count(40) belongs to **Miniature Pinscher**, and the highest(84407) belongs to **Labrador Retriever**. - On average **French Bulldog** has the most number of retweets.

1.1.4 Conclusion

Most of the rated dogs by "We Rate Dogs" are **Golden Retriever**, and they have the second average ratings among all the breeds, but looks like **French Bulldog** was the breed that people liked and retweeted the most.