wrangle_act

June 28, 2022

1 Project: Wrangling and Analyze Data

1.1 Data Gathering

In the cell below, gather **all** three pieces of data for this project and load them in the notebook. **Note:** the methods required to gather each data are different. 1. Directly download the WeRate-Dogs Twitter archive data (twitter_archive_enhanced.csv)

```
In [1]: import pandas as pd
        import requests
        import os
        import tweepy
        import json
        import re
        import matplotlib.pyplot as plt
        %matplotlib inline
```

```
In [111]: #Reading the csv file into a dataframe
          archive_df = pd.read_csv("twitter-archive-enhanced.csv")
```

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

```
In [3]: url = "https://d17h27t6h515a5.cloudfront.net/topher/2017/August/599fd2ad_image-predictio
        response = requests.get(url)
        folder_name = 'images'
        # Make directory if it doesn't already exist
        if not os.path.exists(folder_name):
            os.makedirs(folder_name)
        # Make a path to the file and write to it
        with open(os.path.join(folder_name, url.split('/')[-1]), mode = 'wb') as file:
                file.write(response.content)
```

```
In [4]: # Reading the tsv file into a dataframe
        image_df = pd.read_csv("images/image-predictions.tsv", sep='\t')
```

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

```
In [6]: consumer_key = ''
        consumer_secret = ''
        access_token = ''
        access_secret = ''

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

        api = tweepy.API(auth, wait_on_rate_limit=True,wait_on_rate_limit_notify=False, compress
```

```
In [7]: id = archive_df['tweet_id']
        tweet_list = []
        id_errors = []

        for number in id:
            try:
                tweet_text = api.get_status(number, tweet_mode='extended')._json
                tweet_list.append({'tweet_id':tweet_text['id'],
                                  'favorite_count':tweet_text['favorite_count'],
                                  'retweet_count': tweet_text['retweet_count']})
            except Exception as e:
                                id_errors.append(e)
```

```
In [8]: # writing the queried tweets to a text file.
        with open('tweet_json.txt', 'w') as file:
            file.write(json.dumps(tweet_list))
```

```
In [9]: # Creating a dataframe of columms tweet id, favorite count and retweet count.
        tweet_df = pd.DataFrame(tweet_list, columns=['tweet_id','favorite_count','retweet_count'
```

1.2 Assessing Data

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

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

- You only want original ratings (no retweets) that have images. Though there are 5000+ tweets in the dataset, not all are dog ratings and some are retweets.
- Assessing and cleaning the entire dataset completely would require a lot of time, and is not necessary to practice and demonstrate your skills in data wrangling. Therefore, the requirements of this project are only to assess and clean at least 8 quality issues and at least 2 tidiness issues in this dataset.
- The fact that the rating numerators are greater than the denominators does not need to be cleaned. This unique rating system is a big part of the popularity of WeRateDogs.
- You do not need to gather the tweets beyond August 1st, 2017. You can, but note that you won't be able to gather the image predictions for these tweets since you don't have access to the algorithm used.

Visual assessment

```
In [112]: archive_df.head()
```

```
Out[112]:              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

                             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

                                                        source  \
          0  <a href="http://twitter.com/download/iphone" r...
          1  <a href="http://twitter.com/download/iphone" r...
          2  <a href="http://twitter.com/download/iphone" r...
          3  <a href="http://twitter.com/download/iphone" r...
          4  <a href="http://twitter.com/download/iphone" r...

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

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

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

             rating_denominator      name doggo floofer pupper puppo
          0                  10   Phineas  None    None   None  None
          1                  10     Tilly  None    None   None  None
```

```
2                   10    Archie  None    None   None  None
3                   10     Darla  None    None   None  None
4                   10  Franklin  None    None   None  None
```

```
In [55]: image_df.head()
```

```
Out[55]:              tweet_id                                          jpg_url  \
         0  666020888022790149  https://pbs.twimg.com/media/CT4udn0WwAA0aMy.jpg
         1  666029285002620928  https://pbs.twimg.com/media/CT42GRgUYAA5iDo.jpg
         2  666033412701032449  https://pbs.twimg.com/media/CT4521TWwAEvMyu.jpg
         3  666044226329800704  https://pbs.twimg.com/media/CT5Dr8HUEAA-lEu.jpg
         4  666049248165822465  https://pbs.twimg.com/media/CT5IQmsXIAAKY4A.jpg

            img_num                      p1   p1_conf  p1_dog                  p2  \
         0        1  Welsh_springer_spaniel  0.465074    True              collie
         1        1                 redbone  0.506826    True  miniature_pinscher
         2        1         German_shepherd  0.596461    True            malinois
         3        1     Rhodesian_ridgeback  0.408143    True             redbone
         4        1      miniature_pinscher  0.560311    True          Rottweiler

             p2_conf  p2_dog                   p3   p3_conf  p3_dog
         0  0.156665    True     Shetland_sheepdog  0.061428    True
         1  0.074192    True  Rhodesian_ridgeback  0.072010    True
         2  0.138584    True           bloodhound  0.116197    True
         3  0.360687    True   miniature_pinscher  0.222752    True
         4  0.243682    True             Doberman  0.154629    True
```

```
In [11]: tweet_df.head()
```

```
Out[11]:              tweet_id  favorite_count  retweet_count
         0  892420643555336193           33798           7009
         1  892177421306343426           29332           5302
         2  891815181378084864           22056           3481
         3  891689557279858688           36938           7227
         4  891327558926688256           35312           7762
```

Programmatic asessment

```
In [56]: archive_df.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 [57]: archive_df.describe()
```

```
Out[57]:            tweet_id  in_reply_to_status_id  in_reply_to_user_id  \
         count  2.356000e+03           7.800000e+01         7.800000e+01
         mean   7.427716e+17           7.455079e+17         2.014171e+16
         std    6.856705e+16           7.582492e+16         1.252797e+17
         min    6.660209e+17           6.658147e+17         1.185634e+07
         25%    6.783989e+17           6.757419e+17         3.086374e+08
         50%    7.196279e+17           7.038708e+17         4.196984e+09
         75%    7.993373e+17           8.257804e+17         4.196984e+09
         max    8.924206e+17           8.862664e+17         8.405479e+17

                retweeted_status_id  retweeted_status_user_id  rating_numerator  \
         count         1.810000e+02              1.810000e+02       2356.000000
         mean          7.720400e+17              1.241698e+16         13.126486
         std           6.236928e+16              9.599254e+16         45.876648
         min           6.661041e+17              7.832140e+05          0.000000
         25%           7.186315e+17              4.196984e+09         10.000000
         50%           7.804657e+17              4.196984e+09         11.000000
         75%           8.203146e+17              4.196984e+09         12.000000
         max           8.874740e+17              7.874618e+17       1776.000000

                rating_denominator
         count         2356.000000
         mean            10.455433
         std              6.745237
         min              0.000000
         25%             10.000000
         50%             10.000000
         75%             10.000000
         max            170.000000
```

```
In [16]: sum(archive_df.duplicated())
```

```
Out[16]: 0

In [17]: archive_df.isnull().sum()

Out[17]: tweet_id                         0
         in_reply_to_status_id         2278
         in_reply_to_user_id           2278
         timestamp                        0
         source                           0
         text                             0
         retweeted_status_id           2175
         retweeted_status_user_id      2175
         retweeted_status_timestamp    2175
         expanded_urls                   59
         rating_numerator                 0
         rating_denominator               0
         name                             0
         doggo                            0
         floofer                          0
         pupper                           0
         puppo                            0
         dtype: int64

In [58]: archive_df.name.value_counts().head()

Out[58]: None       745
         a           55
         Charlie     12
         Cooper      11
         Oliver      11
         Name: name, dtype: int64

In [19]: image_df.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
```

```
In [20]: image_df.describe()
```

```
Out[20]:            tweet_id      img_num      p1_conf       p2_conf       p3_conf
         count  2.075000e+03  2075.000000  2075.000000  2.075000e+03  2.075000e+03
         mean   7.384514e+17     1.203855     0.594548  1.345886e-01  6.032417e-02
         std    6.785203e+16     0.561875     0.271174  1.006657e-01  5.090593e-02
         min    6.660209e+17     1.000000     0.044333  1.011300e-08  1.740170e-10
         25%    6.764835e+17     1.000000     0.364412  5.388625e-02  1.622240e-02
         50%    7.119988e+17     1.000000     0.588230  1.181810e-01  4.944380e-02
         75%    7.932034e+17     1.000000     0.843855  1.955655e-01  9.180755e-02
         max    8.924206e+17     4.000000     1.000000  4.880140e-01  2.734190e-01
```

```
In [21]: sum(image_df.duplicated())
```

```
Out[21]: 0
```

```
In [26]: tweet_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2327 entries, 0 to 2326
Data columns (total 3 columns):
tweet_id          2327 non-null int64
favorite_count    2327 non-null int64
retweet_count     2327 non-null int64
dtypes: int64(3)
memory usage: 54.6 KB
```

```
In [27]: sum(tweet_df.duplicated())
```

```
Out[27]: 0
```

1.2.1 Quality issues

archive_df

- There are columns with null values; 'in_reply_to_status_id', 'in_reply_to_user_id', 'retweeted_status_id', 'retweeted_status_user_id', 'retweeted_status_timestamp', 'expanded_urls'.
- The timestamp column should be of datetime type.
- There are plenty of dog names categorized as 'None', and others with 'a' and 'an'.
- There should be one column for all the dog stages.
- The tweet_id column should be of object datatype.

image_df

- The text in the p1, p2 and p3 columns are a mix of upper and lower case characters.
- The tweet_id column should be of object datatype.

#### tweet_df

- The tweet_id column should be of object datatype.

1.2.2 Tidiness

- The source column looks messy and should be dropped.
- The links in the text column should be removed.
- The three dataframes have similar properties and should be merged.

1.3 Cleaning Data

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

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

```
In [113]: # Make copies of original pieces of data
          archive = archive_df.copy()
          images = image_df.copy()
          tweets = tweet_df.copy()
```

1.3.1 Issue #1:

Define: Drop columns with null values from the archive dataframe.

Code:

```
In [114]: archive.dropna(axis='columns', inplace=True)
```

```
In [139]: archive.drop(columns='source', inplace=True)
```

Test

```
In [140]: archive.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2356 entries, 0 to 2355
Data columns (total 7 columns):
tweet_id              2356 non-null object
timestamp             2356 non-null datetime64[ns]
text                  2356 non-null object
rating_numerator      2356 non-null int64
```

```
rating_denominator    2356 non-null int64
name                  2356 non-null object
dog-stage             2356 non-null object
dtypes: datetime64[ns](1), int64(2), object(4)
memory usage: 128.9+ KB
```

1.3.2 Issue #2:

Define: Convert the timestamp column to type datetime.

Code

```
In [116]: archive['timestamp'] = pd.to_datetime(archive['timestamp'])
```

Test

```
In [141]: archive.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2356 entries, 0 to 2355
Data columns (total 7 columns):
tweet_id              2356 non-null object
timestamp             2356 non-null datetime64[ns]
text                  2356 non-null object
rating_numerator      2356 non-null int64
rating_denominator    2356 non-null int64
name                  2356 non-null object
dog-stage             2356 non-null object
dtypes: datetime64[ns](1), int64(2), object(4)
memory usage: 128.9+ KB
```

1.3.3 Issue #3

Define: Change the tweet_id in the three dataframes to object datatype.

Code

```
In [118]: archive.tweet_id = archive.tweet_id.astype('str')
          images.tweet_id = images.tweet_id.astype('str')
          tweets.tweet_id = tweets.tweet_id.astype('str')
```

Test

```
In [142]: archive.info()
          images.info()
          tweets.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2356 entries, 0 to 2355
Data columns (total 7 columns):
tweet_id              2356 non-null object
timestamp             2356 non-null datetime64[ns]
text                  2356 non-null object
rating_numerator      2356 non-null int64
rating_denominator    2356 non-null int64
name                  2356 non-null object
dog-stage             2356 non-null object
dtypes: datetime64[ns](1), int64(2), object(4)
memory usage: 128.9+ KB
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2075 entries, 0 to 2074
Data columns (total 12 columns):
tweet_id    2075 non-null object
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(1), object(5)
memory usage: 152.1+ KB
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2327 entries, 0 to 2326
Data columns (total 3 columns):
tweet_id          2327 non-null object
favorite_count    2327 non-null int64
retweet_count     2327 non-null int64
dtypes: int64(2), object(1)
memory usage: 54.6+ KB
```

1.3.4 Issue #4

Define: The dog names categorized as 'a' and 'an' should be added to the 'None' category instead.

Code

```
In [120]: archive['name'][archive.name.str.match('[a-z]+')] = 'None'
```

```
/opt/conda/lib/python3.6/site-packages/ipykernel_launcher.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.html#
  """Entry point for launching an IPython kernel.
```

Test

```
In [121]: archive.name.value_counts()
```

```
Out[121]: None          854
          Charlie        12
          Oliver         11
          Lucy           11
          Cooper         11
          Tucker         10
          Penny          10
          Lola           10
          Bo              9
          Winston         9
          Sadie           8
          Daisy           7
          Toby            7
          Buddy           7
          Bailey          7
          Stanley         6
          Koda            6
          Leo             6
          Jack            6
          Rusty           6
          Milo            6
          Oscar           6
          Jax             6
          Dave            6
          Bella           6
          Scout           6
          Bentley         5
          George          5
          Oakley          5
          Chester         5
                       ...
          Terrenth        1
          Sparky          1
          Spencer         1
          Shadoe          1
          Covach          1
          Crumpet         1
```

```
Strider        1
Kobe           1
Tedders        1
Mitch          1
Alexander      1
Major          1
Lucky          1
Rizzo          1
Jennifur       1
Tobi           1
Mutt           1
Bronte         1
Holly          1
Ralphé         1
Murphy         1
Ozzie          1
Kulet          1
Danny          1
Rumpole        1
Hector         1
Kota           1
Kanu           1
Ricky          1
Pete           1
Name: name, Length: 932, dtype: int64
```

1.3.5 Issue #5

Define: The different dog stages should be made into a single column.

Code

```
In [122]: #adding all the columns into a single column
          archive['stages'] = archive.doggo + archive.floofer + archive.pupper + archive.puppo

In [125]: #checking to see twenty random samples of the new column
          archive.stages.sample(20)

Out[125]: 512       NoneNoneNoneNone
          1944      NoneNoneNoneNone
          1209      NoneNoneNoneNone
          2249      NoneNoneNoneNone
          138       NoneNoneNoneNone
          692       NoneNoneNoneNone
          399       NoneNoneNoneNone
          60        NoneNoneNoneNone
          1690      NoneNoneNoneNone
          1781      NoneNoneNoneNone
```

```
        1149      NoneNoneNoneNone
        1468      NoneNoneNoneNone
        2230      NoneNoneNoneNone
        501      doggoNoneNoneNone
        1235      NoneNoneNoneNone
        1434      NoneNoneNoneNone
        2049      NoneNoneNoneNone
        1248      NoneNoneNoneNone
        1930    NoneNonepupperNone
        207       NoneNoneNoneNone
        Name: stages, dtype: object
```

```
In [126]: #defining a function to extract the different stages
          def extract_stages(archive):
              if archive['stages'].count('None') == 2:
                  return 'Multiple'
              else:
                  if archive['stages'].count('doggo') == 1:
                      return 'Doggo'
                  elif archive['stages'].count('floofer') == 1:
                      return 'Floofer'
                  elif archive['stages'].count('pupper') == 1:
                      return 'Pupper'
                  elif archive['stages'].count('puppo') == 1:
                      return 'Puppo'
                  else:
                      return 'None'
```

```
In [127]: archive['dog-stage'] = archive.apply(extract_stages, axis=1)
```

```
In [143]: archive.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2356 entries, 0 to 2355
Data columns (total 7 columns):
tweet_id              2356 non-null object
timestamp             2356 non-null datetime64[ns]
text                  2356 non-null object
rating_numerator      2356 non-null int64
rating_denominator    2356 non-null int64
name                  2356 non-null object
dog-stage             2356 non-null object
dtypes: datetime64[ns](1), int64(2), object(4)
memory usage: 128.9+ KB
```

```
In [129]: #Dropping the extra columns I no longer need; doggo, floofer, pupper, puppo and stages
          archive.drop(['doggo', 'floofer', 'pupper', 'puppo', 'stages'], axis=1, inplace=True)
```

Test

```
In [144]: archive.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2356 entries, 0 to 2355
Data columns (total 7 columns):
tweet_id              2356 non-null object
timestamp             2356 non-null datetime64[ns]
text                  2356 non-null object
rating_numerator      2356 non-null int64
rating_denominator    2356 non-null int64
name                  2356 non-null object
dog-stage             2356 non-null object
dtypes: datetime64[ns](1), int64(2), object(4)
memory usage: 128.9+ KB
```

```
In [135]: archive['dog-stage'].value_counts()

Out[135]: None        1976
          Pupper       245
          Doggo         83
          Puppo         29
          Multiple      14
          Floofer        9
          Name: dog-stage, dtype: int64
```

1.3.6 Issue #6

Define: The links in the text column should be removed.

Code

```
In [168]: archive['text'] = archive['text'].apply(lambda x: re.split('https:\/\/.*', str(x))[0])
```

Test

```
In [174]: for row in archive.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 available fo
This is Archie. He is a rare Norwegian Pouncing Corgo. Lives in the tall grass. You never know w
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 shark and sh
Here we have a majestic great white breaching off South Africa's coast. Absolutely h*ckin breath
Meet Jax. He enjoys ice cream so much he gets nervous around it. 13/10 help Jax enjoy more thing
```

```
When you watch your owner call another dog a good boy but then they turn back to you and say you
This is Zoey. She doesn't want to be one of the scary sharks. Just wants to be a snuggly pettabl
This is Cassie. She is a college pup. Studying international doggo communication and stick theor
```

1.3.7 Issue #7:

Define: Convert the text in the p1, p2 and p3 columns of the images dataframe to lower case characters.

Code:

```
In [71]: images.p1 = images.p1.str.lower()
         images.p2 = images.p2.str.lower()
         images.p3 = images.p3.str.lower()
```

Test

```
In [72]: images.head()
```

```
Out[72]:             tweet_id                                          jpg_url  \
         0  666020888022790149  https://pbs.twimg.com/media/CT4udn0WwAA0aMy.jpg
         1  666029285002620928  https://pbs.twimg.com/media/CT42GRgUYAA5iDo.jpg
         2  666033412701032449  https://pbs.twimg.com/media/CT4521TWwAEvMyu.jpg
         3  666044226329800704  https://pbs.twimg.com/media/CT5Dr8HUEAA-lEu.jpg
         4  666049248165822465  https://pbs.twimg.com/media/CT5IQmsXIAAKY4A.jpg

            img_num                       p1   p1_conf  p1_dog                  p2  \
         0        1  welsh_springer_spaniel  0.465074    True              collie
         1        1                 redbone  0.506826    True  miniature_pinscher
         2        1         german_shepherd  0.596461    True            malinois
         3        1     rhodesian_ridgeback  0.408143    True             redbone
         4        1      miniature_pinscher  0.560311    True          rottweiler

             p2_conf  p2_dog                   p3   p3_conf  p3_dog
         0  0.156665    True    shetland_sheepdog  0.061428    True
         1  0.074192    True  rhodesian_ridgeback  0.072010    True
         2  0.138584    True           bloodhound  0.116197    True
         3  0.360687    True   miniature_pinscher  0.222752    True
         4  0.243682    True             doberman  0.154629    True
```

1.3.8 Tidiness

Define: Merge the dataframes into one.

Code

```
In [176]: #merge the two tables
          archive = pd.merge(left=archive, right=tweets, how='left', on='tweet_id')
          archive = pd.merge(left=archive, right=images, how='left', on='tweet_id')
```

Test

```
In [177]: archive.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2356 entries, 0 to 2355
Data columns (total 20 columns):
tweet_id              2356 non-null object
timestamp             2356 non-null datetime64[ns]
text                  2356 non-null object
rating_numerator      2356 non-null int64
rating_denominator    2356 non-null int64
name                  2356 non-null object
dog-stage             2356 non-null object
favorite_count        2327 non-null float64
retweet_count         2327 non-null float64
jpg_url               2075 non-null object
img_num               2075 non-null float64
p1                    2075 non-null object
p1_conf               2075 non-null float64
p1_dog                2075 non-null object
p2                    2075 non-null object
p2_conf               2075 non-null float64
p2_dog                2075 non-null object
p3                    2075 non-null object
p3_conf               2075 non-null float64
p3_dog                2075 non-null object
dtypes: datetime64[ns](1), float64(6), int64(2), object(11)
memory usage: 386.5+ KB
```

```
In [179]: #drop rows with missing values from the merged dataframe
          archive.dropna(axis=0, inplace=True)
```

```
In [180]: archive.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2057 entries, 0 to 2355
Data columns (total 20 columns):
tweet_id              2057 non-null object
timestamp             2057 non-null datetime64[ns]
text                  2057 non-null object
rating_numerator      2057 non-null int64
```

```
rating_denominator    2057 non-null int64
name                  2057 non-null object
dog-stage             2057 non-null object
favorite_count        2057 non-null float64
retweet_count         2057 non-null float64
jpg_url               2057 non-null object
img_num               2057 non-null float64
p1                    2057 non-null object
p1_conf               2057 non-null float64
p1_dog                2057 non-null object
p2                    2057 non-null object
p2_conf               2057 non-null float64
p2_dog                2057 non-null object
p3                    2057 non-null object
p3_conf               2057 non-null float64
p3_dog                2057 non-null object
dtypes: datetime64[ns](1), float64(6), int64(2), object(11)
memory usage: 337.5+ KB
```

1.4 Storing Data

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

```
In [ ]: archive.to_csv('twitter_archive_master.csv', index=False)
```

```
In [2]: master = pd.read_csv("twitter_archive_master.csv")
        master.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2057 entries, 0 to 2056
Data columns (total 20 columns):
tweet_id              2057 non-null int64
timestamp             2057 non-null object
text                  2057 non-null object
rating_numerator      2057 non-null int64
rating_denominator    2057 non-null int64
name                  2057 non-null object
dog-stage             2057 non-null object
favorite_count        2057 non-null float64
retweet_count         2057 non-null float64
jpg_url               2057 non-null object
img_num               2057 non-null float64
p1                    2057 non-null object
p1_conf               2057 non-null float64
p1_dog                2057 non-null bool
p2                    2057 non-null object
p2_conf               2057 non-null float64
```

```
p2_dog                 2057 non-null bool
p3                     2057 non-null object
p3_conf                2057 non-null float64
p3_dog                 2057 non-null bool
dtypes: bool(3), float64(6), int64(3), object(8)
memory usage: 279.3+ KB
```

- The favorite and retweet counts are floats upon conversion to csv, so these should be converted to int.
- The tweet_id should also be re-converted to object datatype as well as timestamp to datatype datetime.
- The dog-stages column should be converted to category datatype.

```
In [4]: master['tweet_id'] = master['tweet_id'].astype(str)
        master['dog-stage'] = master['dog-stage'].astype("category")
        master[['rating_numerator', 'rating_denominator']] = master[['rating_numerator', 'rating
        master[['retweet_count', 'favorite_count']] = master[['retweet_count', 'favorite_count']
        master.timestamp = pd.to_datetime(master.timestamp)
```

1.5 Analyzing and Visualizing Data

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

1.5.1 Insights

1. Is there any correlation between the retweet and favorite count?
2. What is the mean of the rating numerator?
3. What dog name is the most common?

1.5.2 Is there any correlation between the retweet and favorite count??

```
In [9]: master['favorite_count'].corr(master['retweet_count'])
```

```
Out[9]: 0.86104253667814268
```

The above shows a positive correlation between the retweet count and the favorite count.

1.5.3 What is the mean of the rating numerator?

```
In [103]: master.rating_numerator.describe()
```

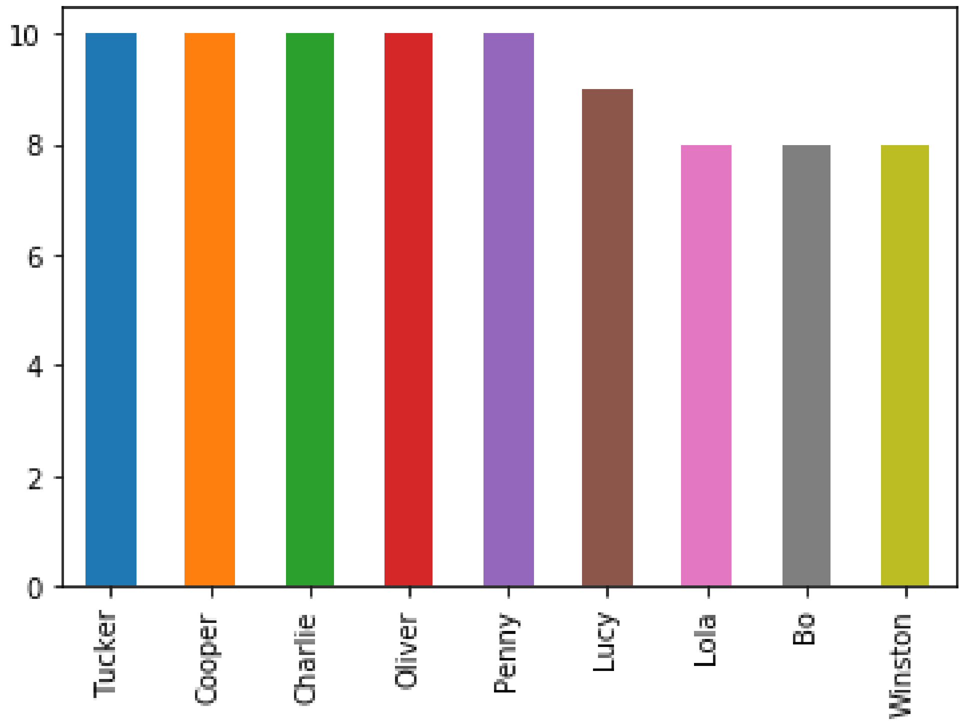
```
Out[103]: count    2057.000000
          mean       12.265921
          std        40.857799
          min         0.000000
```

```
25%        10.000000
50%        11.000000
75%        12.000000
max      1776.000000
Name: rating_numerator, dtype: float64
```

As seen here, the mean for the rating numerator is 12.

1.5.4 What dog name is the most common?

```
In [6]: master.name.value_counts()[1:10].plot(kind='bar');
```

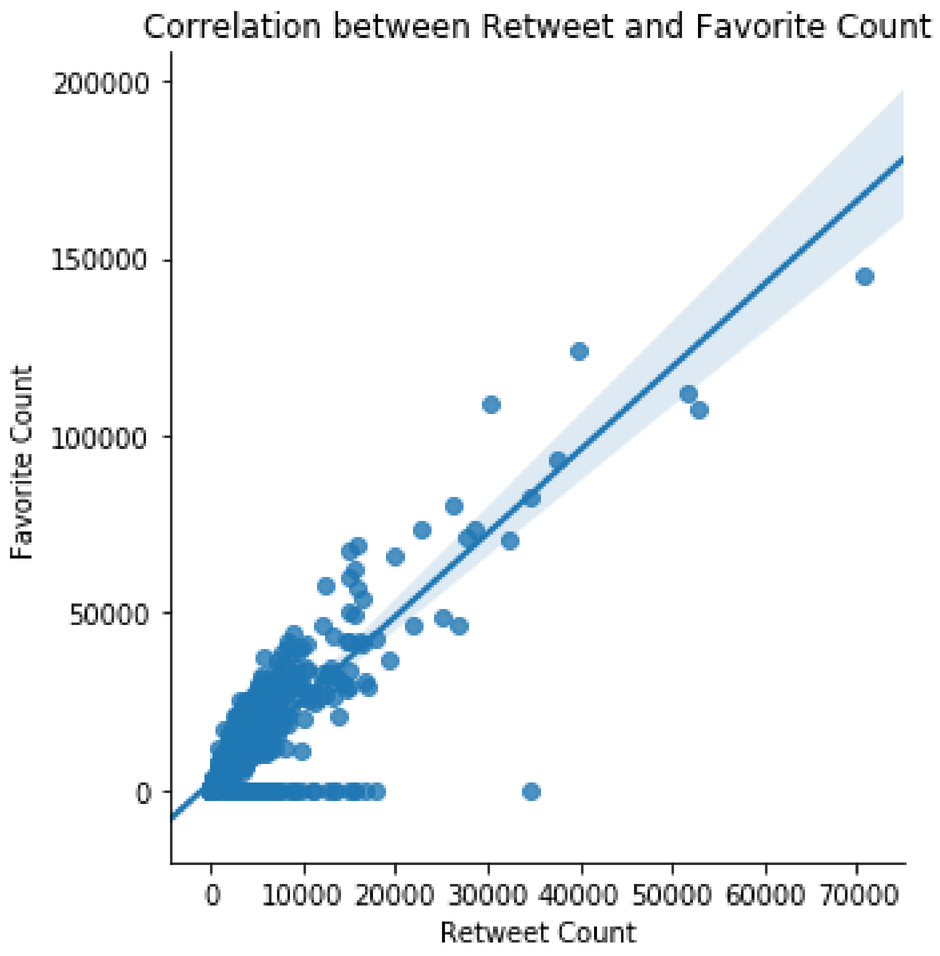


As seen above, for this dataset, the most common dog names are Tucker, Cooper, Oliver, Penny and Charlie.

1.5.5 Visualization

```
In [26]: import seaborn as sns
         plt.figure(figsize=(8,8))
         sns.lmplot(x='retweet_count', y='favorite_count', data=master,fit_reg=True)
         plt.xlabel("Retweet Count")
         plt.ylabel("Favorite Count")
         plt.title("Correlation between Retweet and Favorite Count");
```

```
<matplotlib.figure.Figure at 0x7f6062e05c88>
```


Correlation between Retweet and Favorite Count
Favorite Count
200000
150000
100000
50000
0
Retweet Count
0
10000
20000
30000
40000
50000
60000
70000