wrangle_act

October 9, 2020

1 Wrangle Up Them Puppo's

1.1 Table of Contents

```
In [1]: #Import libraries
        import pandas as pd
        import re
        import tweepy
```

```
In [2]: #Connect to Twitter API
        consumer_key = ''
        consumer_secret = ''
        access_token = ''
        access_token_secret = ''

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

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

```
In [3]: #Test API connection and understand the JSON layout of each twitter post
        #Inserted random tweet_id from archive
        tweet_id = 892420643555336193
        tweet = api.get_status(tweet_id, tweet_mode='extended')
        print(tweet)
```

isplay_url': SbaauskiuspisnattweepycapidAPI'pbjendiats0x7fa83297dc50>',dejsonpfioneatéduats':'Thb}Augr6ttet6e23F5E

Gathering
Steps I've taken to compile all data into a single df for analysis and further wrangling:

1. Read in 'twitter-archive-enhanced.csv' as archive_df: This will allow me to pull the specific tweet_id needed
2. Create list of tweet id's
3. Implement an iteration that will loop thought the id list and extract the JSON file from Tweepy all while converting and storing each JSON file on a separate line in 'tweet_json.txt'
4. Iterate through the .txt file to pull tweet_id, retweet_count and favorite_count. Regex will be very useful here
5. While iterating through .txt store varibles in df_list dictionary.
6. Create a pandas DataFrame 'df' from df_list just created
7. Join archive_df and df on tweet_id as df_join
8. Read in 'image-predictions.tsv' as predictions_df
9. Iterate thru predictions_df comparing the tweet_id from df_join while pulling dog type with highest probability only if value is a dog breed (TRUE).
10. Create df_list of dicitonary items from iteration we can then merge with df_join to create master_df.

We are then going to use a copy of master_df to perform all the assessing and cleaning to create our final df.

```
In [4]: #Read in 'twitter-archive-enhanced.csv'
        archive_df = pd.read_csv('twitter-archive-enhanced.csv')

        #Understand data structure
        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 [9]: #Import timer
        from timeit import default_timer as timer

        #Iterate through tweet_id's and append JSON informatin to 'tweet_json.txt'
        #Implement count number to track code running visually
        count = 0
        tweet_id = archive_df.tweet_id.tolist()
        start = timer()

        for tweet_id in tweet_id:
            count += 1

            #Write in try/except function just in case id no longer exists
            try:
                tweet = api.get_status(tweet_id, tweet_mode='extended')
                with open('tweet_json.txt', 'a') as file:
                    if file is None:
                        file.write(str(tweet))
                    else:
                        file.write('\n{}'.format(tweet))

                print('{} completed, ID: {}'.format(count, tweet_id))

            except Exception:
                print('Tweet id: {} no longer exists'.format(tweet_id))

        end = timer()
        print(end - start)

1 completed, ID: 892420643555336193
2 completed, ID: 892177421306343426
3 completed, ID: 891815181378084864
4 completed, ID: 891689557279858688
5 completed, ID: 891327558926688256
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19 completed, ID: 888554962724278272
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1912.991207177
```

```python
In [122]: #Create list for dict and appending after loop
          df_list = []

          #Read in .txt file 'tweet_json.txt' with proper enconding 'utf-8'
          file = open('tweet_json.txt', 'r', encoding='utf-8')

          #Create iteration line by line to find retweet_count, favorite_count & id
          for _ in file:

              ##Implemented try/except function because 1 id was empty so indexing was out of ra
```

```python
        try:
            string = file.readline()

            #Regex out tweet_id so we can join df's properly
            tweet = re.findall((r"'id':\s\d+"), string)[0]
            tweet_id = re.findall(r'\d+', tweet)[0]

            #Regex out retweet_count
            retweets = re.findall(r"'retweet_count':\s\d+", string)[0]
            retweet_count = re.findall(r'\d+', retweets)[0]

            #Regex out favorite_count
            favorites = re.findall(r"'favorite_count':\s\d+", string)[0]
            favorite_count = re.findall(r'\d+', favorites)[0]


            # Append to list of dictionaries
            df_list.append({'tweet_id': int(tweet_id),
                            'retweet_count': int(retweet_count),
                            'favorite_count': int(favorite_count)})

        except Exception:
            print('Error: Index out of range')

    #Create df so we can join with other dog twitter data
    df = pd.DataFrame(df_list, columns = ['tweet_id', 'retweet_count', 'favorite_count'])

In [123]: #Double check to make sure all columns and rows created properly.
          df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1918 entries, 0 to 1917
Data columns (total 3 columns):
tweet_id          1918 non-null int64
retweet_count     1918 non-null int64
favorite_count    1918 non-null int64
dtypes: int64(3)
memory usage: 45.0 KB
```

Explanation on merge vs. join used below: I used merge because it automatically uses an inner join technique we need. I only want to keep tweet_ids that match becasue since other tweet_id no longer exist I wasn't able to pull data using Tweepy.

```python
In [124]: #Merge archive_df and df DataFrames
          df_join = pd.merge(archive_df, df, on='tweet_id')

          #Test Successfullness - should be 752 max rows
          df_join.info()
```

53

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1918 entries, 0 to 1917
Data columns (total 19 columns):
tweet_id                    1918 non-null int64
in_reply_to_status_id       70 non-null float64
in_reply_to_user_id         70 non-null float64
timestamp                   1918 non-null object
source                      1918 non-null object
text                        1918 non-null object
retweeted_status_id         108 non-null float64
retweeted_status_user_id    108 non-null float64
retweeted_status_timestamp  108 non-null object
expanded_urls               1866 non-null object
rating_numerator            1918 non-null int64
rating_denominator          1918 non-null int64
name                        1918 non-null object
doggo                       1918 non-null object
floofer                     1918 non-null object
pupper                      1918 non-null object
puppo                       1918 non-null object
retweet_count               1918 non-null int64
favorite_count              1918 non-null int64
dtypes: float64(4), int64(5), object(10)
memory usage: 299.7+ KB
```

In [125]: *#Read in 'image-predictions.tsv' as predictions_df*
          predictions_df = pd.read_csv('image-predictions.tsv', sep='\t')

          #Check - Understand df
          predictions_df.head()

Out[125]:   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

                                    54
```

```
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
```

Next,

I need to create a df with tweet_id, highest probability dog breed given dog breed is true and neural network probability. This will make it very easy to merge information into our current data set.

I believe this would also be considered a **tidiness issue** (1) as we would need to combine these observational forms into a single row.

```
In [126]: #Create new columns prior to iteration
          predictions_df['breed'] = 'NaN'
          predictions_df['high_conf'] = 'NaN'
          predictions_df['is_dog'] = 'NaN'
          predictions_df.head()
```

```
Out[126]:               tweet_id                                          jpg_url  \
          0  666020888022790149  https://pbs.twimg.com/media/CT4udnOWwAAOaMy.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 breed high_conf  \
          0  0.156665    True     Shetland_sheepdog  0.061428    True   NaN       NaN
          1  0.074192    True   Rhodesian_ridgeback  0.072010    True   NaN       NaN
          2  0.138584    True            bloodhound  0.116197    True   NaN       NaN
          3  0.360687    True    miniature_pinscher  0.222752    True   NaN       NaN
          4  0.243682    True              Doberman  0.154629    True   NaN       NaN

            is_dog
          0    NaN
          1    NaN
          2    NaN
          3    NaN
          4    NaN
```

```
In [127]: #Compare all confidence values through iteration
          #Create top confidence given is_dog == True
```

```python
p = predictions_df.loc
for index, row in predictions_df.iterrows():
    if p[index, 'p1_dog'] == True:
        if p[index, 'p1_conf'] > int(p[index, 'p2_conf']) & int(p[index, 'p3_conf']):
            p[index, 'breed'] = p[index, 'p1']
            p[index, 'high_conf'] = p[index, 'p1_conf']
            p[index, 'is_dog'] = True

    elif p[index, 'p2_dog'] == True:
        if p[index, 'p2_conf'] > int(p[index, 'p1_conf']) & int(p[index, 'p3_conf']):
            p[index, 'breed'] = p[index, 'p2']
            p[index, 'high_conf'] = p[index, 'p2_conf']
            p[index, 'is_dog'] = True

    elif p[index, 'p3_dog'] == True:
        if p[index, 'p3_conf'] > int(p[index, 'p1_conf']) & int(p[index, 'p2_conf']):
            p[index, 'breed'] = p[index, 'p3']
            p[index, 'high_conf'] = p[index, 'p3_conf']
            p[index, 'is_dog'] = True

#Check outcomes cross-referenced with prior data visually
predictions_df.head(10)
```

```
Out[127]:          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
         5  666050758794694657  https://pbs.twimg.com/media/CT5Jof1WUAEuVxN.jpg
         6  666051853826850816  https://pbs.twimg.com/media/CT5KoJ1WoAAJash.jpg
         7  666055525042405380  https://pbs.twimg.com/media/CT5N9tpXIAAifs1.jpg
         8  666057090499244032  https://pbs.twimg.com/media/CT5PY90WoAAQGLo.jpg
         9  666058600524156928  https://pbs.twimg.com/media/CT5Qw94XAAA_2dP.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
         5        1     Bernese_mountain_dog  0.651137    True    English_springer
         6        1              box_turtle  0.933012   False          mud_turtle
         7        1                    chow  0.692517    True    Tibetan_mastiff
         8        1           shopping_cart  0.962465   False    shopping_basket
         9        1         miniature_poodle  0.201493    True           komondor


            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
5  0.263788    True    Greater_Swiss_Mountain_dog  0.016199    True
6  0.045885   False                       terrapin  0.017885   False
7  0.058279    True                      fur_coat  0.054449   False
8  0.014594   False              golden_retriever  0.007959    True
9  0.192305    True    soft-coated_wheaten_terrier  0.082086    True


                         breed   high_conf is_dog
0  Welsh_springer_spaniel       0.465074    True
1                  redbone       0.506826    True
2          German_shepherd       0.596461    True
3      Rhodesian_ridgeback       0.408143    True
4       miniature_pinscher       0.560311    True
5      Bernese_mountain_dog     0.651137    True
6                      NaN           NaN     NaN
7                     chow       0.692517    True
8         golden_retriever    0.00795896    True
9         miniature_poodle      0.201493    True
```

Why visual comparison/cross-reference?

Given the top 10 rows in *predictions_df*, it covers many possibilities of bugs. **Ex:** All False values for for *_dog* or highest confidence representing something other than a dog.

Time to drop unimportant columns and merge with *df_join* to form a master data set

```
In [128]: #Drop unimportant information
          predictions_df.drop(['p1', 'p1_conf', 'p1_dog', 'p2', 'p2_conf', 'p2_dog', 'p3', 'p3_c

          #Check for success
          predictions_df.head()

Out[128]:              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                   breed high_conf
          0        1  Welsh_springer_spaniel  0.465074
          1        1                 redbone  0.506826
          2        1         German_shepherd  0.596461
          3        1     Rhodesian_ridgeback  0.408143
          4        1      miniature_pinscher  0.560311
```

```
In [129]: #Merge into master dataset
          master_df = pd.merge(predictions_df, df_join, on='tweet_id')
          master_df.head()

Out[129]:              tweet_id                                         jpg_url  \
          0  666020888022790149  https://pbs.twimg.com/media/CT4udn0WwAA0aMy.jpg
          1  666033412701032449  https://pbs.twimg.com/media/CT4521TWwAEvMyu.jpg
          2  666049248165822465  https://pbs.twimg.com/media/CT5IQmsXIAAKY4A.jpg
          3  666051853826850816  https://pbs.twimg.com/media/CT5KoJ1WoAAJash.jpg
          4  666057090499244032  https://pbs.twimg.com/media/CT5PY90WoAAQGLo.jpg


             img_num                  breed   high_conf  in_reply_to_status_id  \
          0        1  Welsh_springer_spaniel    0.465074                    NaN
          1        1         German_shepherd    0.596461                    NaN
          2        1       miniature_pinscher    0.560311                    NaN
          3        1                     NaN         NaN                    NaN
          4        1         golden_retriever  0.00795896                    NaN


             in_reply_to_user_id                   timestamp  \
          0                  NaN  2015-11-15 22:32:08 +0000
          1                  NaN  2015-11-15 23:21:54 +0000
          2                  NaN  2015-11-16 00:24:50 +0000
          3                  NaN  2015-11-16 00:35:11 +0000
          4                  NaN  2015-11-16 00:55:59 +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        ...          \
          0  Here we have a Japanese Irish Setter. Lost eye...        ...
          1  Here is a very happy pup. Big fan of well-main...        ...
          2  Here we have a 1949 1st generation vulpix. Enj...        ...
          3  This is an odd dog. Hard on the outside but lo...        ...
          4  My oh my. This is a rare blond Canadian terrie...        ...


                                          expanded_urls  rating_numerator  \
          0  https://twitter.com/dog_rates/status/666020888...                 8
          1  https://twitter.com/dog_rates/status/666033412...                 9
          2  https://twitter.com/dog_rates/status/666049248...                 5
          3  https://twitter.com/dog_rates/status/666051853...                 2
          4  https://twitter.com/dog_rates/status/666057090...                 9


             rating_denominator  name  doggo  floofer pupper puppo retweet_count  \
          0                  10  None   None     None   None  None           454
```

```
1             10     a   None    None   None  None              39
2             10  None   None    None   None  None              40
3             10    an   None    None   None  None             759
4             10     a   None    None   None  None             121


   favorite_count
0            2367
1             110
2              95
3            1105
4             261


[5 rows x 23 columns]
```

Assesing

Quality Issues: 1. Section **??** 2. Section **??** 3. Section **??** 4. Section **??** 5. Section **??** 6. Section **??** 7. Section **??** 8. Section **??**

Tidiness Issues: 1. Section **??** 2. Section **??**

Note: Some of the other quality issues were taken care of when I combined all the data so hopefully the above 7 will be enough to express my skills for cleaning.

```
In [130]: master_clean.describe()

Out[130]:            img_num  rating_numerator  rating_denominator  retweet_count  \
       count  1658.000000       1658.000000         1658.000000    1658.000000
       mean      1.221954         11.477684           10.515078    2312.925814
       std       0.591797         13.099675            7.104111    3341.986716
       min       1.000000          0.000000            2.000000      11.000000
       25%       1.000000         10.000000           10.000000     545.250000
       50%       1.000000         11.000000           10.000000    1138.500000
       75%       1.000000         12.000000           10.000000    2886.000000
       max       4.000000        420.000000          170.000000   34697.000000


              favorite_count
       count     1658.000000
       mean      8397.286490
       std      10990.432601
       min         69.000000
       25%       1772.750000
       50%       3485.000000
       75%      11589.250000
       max      85091.000000

In [131]: master_clean.info()

<class 'pandas.core.frame.DataFrame'>
Int64Index: 1658 entries, 0 to 1700
Data columns (total 15 columns):
tweet_id              1658 non-null object
```

```
jpg_url                    1658 non-null object
img_num                    1658 non-null int64
breed                      1658 non-null object
high_conf                  1658 non-null object
timestamp                  1658 non-null object
source                     1658 non-null object
text                       1658 non-null object
expanded_urls              1658 non-null object
rating_numerator           1658 non-null int64
rating_denominator         1658 non-null int64
name                       1658 non-null object
retweet_count              1658 non-null int64
favorite_count             1658 non-null int64
stage                      1658 non-null object
dtypes: int64(5), object(10)
memory usage: 287.2+ KB
```

In [132]: master_clean.head()

Out[132]:   tweet_id   jpg_url \
         0 666020888022790149 https://pbs.twimg.com/media/CT4udnOWwAAOaMy.jpg
         1 666033412701032449 https://pbs.twimg.com/media/CT4521TWwAEvMyu.jpg
         2 666049248165822465 https://pbs.twimg.com/media/CT5IQmsXIAAKY4A.jpg
         3 666051853826850816 https://pbs.twimg.com/media/CT5KoJ1WoAAJash.jpg
         4 666057090499244032 https://pbs.twimg.com/media/CT5PY90WoAAQGLo.jpg

            img_num   breed   high_conf   timestamp \
         0   1 Welsh Springer Spaniel   0.465074 2015-11-15 22:32:08
         1   1   German Shepherd   0.596461 2015-11-15 23:21:54
         2   1   Miniature Pinscher   0.560311 2015-11-16 00:24:50
         3   1   Nan   NaN   2015-11-16 00:35:11
         4   1   Golden Retriever   0.00795896 2015-11-16 00:55:59

                     source   text \
         0 Twitter for iPhone Here we have a Japanese Irish Setter. Lost eye...
         1 Twitter for iPhone Here is a very happy pup. Big fan of well-main...
         2 Twitter for iPhone Here we have a 1949 1st generation vulpix. Enj...
         3 Twitter for iPhone This is an odd dog. Hard on the outside but lo...
         4 Twitter for iPhone My oh my. This is a rare blond Canadian terrie...

                                     expanded_urls rating_numerator \
         0 https://twitter.com/dog_rates/status/666020888...   8
         1 https://twitter.com/dog_rates/status/666033412...   9
         2 https://twitter.com/dog_rates/status/666049248...   5
         3 https://twitter.com/dog_rates/status/666051853...   2
         4 https://twitter.com/dog_rates/status/666057090...   9
```

```
     rating_denominator  name  retweet_count  favorite_count stage
0                    10  None            454            2367
1                    10     a             39             110
2                    10  None             40              95
3                    10    an            759            1105
4                    10     a            121             261
```

Further and more programmatic representations of my assessments are threaded in with the cleaning process. I found it extremely cluttered to inclued it all in this section
Cleaning

```
In [133]: #Make copy before cleaning
          master_clean = master_df.copy()
```

Define Drop all retweets - rows with values in retweeted_status_id, retweeted_status_user_id, and retweeted_status_timestamp columns.

```
In [134]: master_clean.query('retweeted_status_id != "NaN"')[['retweeted_status_id', 'retweeted_
```

```
Out[134]:       retweeted_status_id  retweeted_status_user_id retweeted_status_timestamp
          48           6.675487e+17              4.296832e+09   2015-11-20 03:43:06 +0000
          933          7.119983e+17              7.832140e+05   2016-03-21 19:29:52 +0000
          1081         7.575971e+17              2.804798e+08   2016-07-25 15:23:28 +0000
          1088         6.703191e+17              4.196984e+09   2015-11-27 19:11:49 +0000
          1097         7.116948e+17              4.196984e+09   2016-03-20 23:23:54 +0000
```

1.1.1 Code

```
In [135]: master_clean = master_clean[master_clean.retweeted_status_id.isnull()]
```

1.1.2 Test

```
In [136]: (master_clean.query('retweeted_status_id != "NaN"')['retweeted_status_id'] == None).su
```

```
Out[136]: 0
```

Define
Drop columns retweeted_status_id, retweeted_status_user_id, and retweeted_status_timestamp because all values are Null.

```
In [137]: #All values in columns are nan
          master_clean.retweeted_status_id.unique(), master_clean.retweeted_status_user_id.uniqu
```

```
Out[137]: (array([ nan]), array([ nan]), array([nan], dtype=object))
```

1.1.3 Code

```
In [138]: master_clean.drop(['retweeted_status_id', 'retweeted_status_user_id', 'retweeted_statu
```

1.1.4 Test

```
In [139]: master_clean.columns
```

```
Out[139]: Index(['tweet_id', 'jpg_url', 'img_num', 'breed', 'high_conf',
                  'in_reply_to_status_id', 'in_reply_to_user_id', 'timestamp', 'source',
                  'text', 'expanded_urls', 'rating_numerator', 'rating_denominator',
                  'name', 'doggo', 'floofer', 'pupper', 'puppo', 'retweet_count',
                  'favorite_count'],
                dtype='object')
```

Define Change tweet_id dtype from int64 to object as we won't be apply any operations to tweet_id.

```
In [140]: master_clean.tweet_id.dtype
```

```
Out[140]: dtype('int64')
```

1.1.5 Code

```
In [141]: master_clean.tweet_id = master_clean.tweet_id.astype(str)
```

1.1.6 Test

```
In [142]: master_clean.tweet_id.dtype
```

```
Out[142]: dtype('O')
```

Define After visually looking at columns in Excel I saw that the entire tag was present and we just want the contents.

Remove opening and closing hyperlink tag from source column by iterating through column and using Regex to pull relative information.

```
In [143]: master_clean.source.head()
```

```
Out[143]: 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...
          Name: source, dtype: object
```

1.1.7 Code

```
In [144]: #Iteration with iterrows()
          for index, row in master_clean.iterrows():
              string = master_clean.loc[index, 'source']
              master_clean.loc[index, 'source'] = re.findall((r'>[\w\s]+<'), string)[0][1:-1]
```

1.1.8 Test

```
In [145]: master_clean.source.unique()

Out[145]: array(['Twitter for iPhone', 'Twitter Web Client', 'TweetDeck'], dtype=object)
```

Define .strip() various spacing in the jpg_url column by itering through rows.
Note: I've realized now that below isn't actually a problem and that the text in the column is just aligned to the right. Thought I would keep this in here so you could laugh at me haha :)

1.1.9 Code

```
In [146]: for index, row in master_clean.iterrows():
              master_clean.loc[index, 'jpg_url'] = master_clean.loc[index, 'jpg_url'].strip()
```

1.1.10 Test

```
In [147]: master_clean.head()

Out[147]:              tweet_id                                         jpg_url  \
          0   666020888022790149  https://pbs.twimg.com/media/CT4udn0WwAA0aMy.jpg
          1   666033412701032449  https://pbs.twimg.com/media/CT4521TWwAEvMyu.jpg
          2   666049248165822465  https://pbs.twimg.com/media/CT5IQmsXIAAKY4A.jpg
          3   666051853826850816  https://pbs.twimg.com/media/CT5KoJ1WoAAJash.jpg
          4   666057090499244032  https://pbs.twimg.com/media/CT5PY90WoAAQGLo.jpg

             img_num                 breed   high_conf  in_reply_to_status_id  \
          0        1  Welsh_springer_spaniel    0.465074                    NaN
          1        1         German_shepherd    0.596461                    NaN
          2        1       miniature_pinscher    0.560311                    NaN
          3        1                     NaN         NaN                    NaN
          4        1         golden_retriever  0.00795896                    NaN

             in_reply_to_user_id                    timestamp               source  \
          0                   NaN  2015-11-15 22:32:08 +0000  Twitter for iPhone
          1                   NaN  2015-11-15 23:21:54 +0000  Twitter for iPhone
          2                   NaN  2015-11-16 00:24:50 +0000  Twitter for iPhone
          3                   NaN  2015-11-16 00:35:11 +0000  Twitter for iPhone
          4                   NaN  2015-11-16 00:55:59 +0000  Twitter for iPhone

                                                          text  \
          0  Here we have a Japanese Irish Setter. Lost eye...
          1  Here is a very happy pup. Big fan of well-main...
          2  Here we have a 1949 1st generation vulpix. Enj...
          3  This is an odd dog. Hard on the outside but lo...
          4  My oh my. This is a rare blond Canadian terrie...

                                            expanded_urls  rating_numerator  \
          0  https://twitter.com/dog_rates/status/666020888...                 8
```

63

```
1  https://twitter.com/dog_rates/status/666033412...                    9
2  https://twitter.com/dog_rates/status/666049248...                    5
3  https://twitter.com/dog_rates/status/666051853...                    2
4  https://twitter.com/dog_rates/status/666057090...                    9

   rating_denominator  name doggo floofer pupper puppo  retweet_count  \
0                  10  None  None    None   None  None            454
1                  10     a  None    None   None  None             39
2                  10  None  None    None   None  None             40
3                  10    an  None    None   None  None            759
4                  10     a  None    None   None  None            121

   favorite_count
0            2367
1             110
2              95
3            1105
4             261
```

Define Consolidate doggo, floofer, pupper, and puppo columns into a single column to adhere with tidiness structure standards - one type of observation forms one row. Currently dog stages are in 4 different rows.

```
In [149]: master_clean.columns.tolist()

Out[149]: ['tweet_id',
           'jpg_url',
           'img_num',
           'breed',
           'high_conf',
           'in_reply_to_status_id',
           'in_reply_to_user_id',
           'timestamp',
           'source',
           'text',
           'expanded_urls',
           'rating_numerator',
           'rating_denominator',
           'name',
           'doggo',
           'floofer',
           'pupper',
           'puppo',
           'retweet_count',
           'favorite_count']
```

1.1.11 Code

```
In [151]: #Let's start by replacing None values with ''
          master_clean.doggo.replace('None', '', inplace=True)
          master_clean.floofer.replace('None', '', inplace=True)
          master_clean.pupper.replace('None', '', inplace=True)
          master_clean.puppo.replace('None', '', inplace=True)

In [152]: #Now I should be able to easily combine stages and drop columns
          master_clean['stage'] = master_clean.doggo + master_clean.floofer + master_clean.puppe
          master_clean.drop(['doggo', 'floofer', 'puppo', 'pupper'], axis=1, inplace=True)

In [153]: #Shows unique value we must change.
          master_clean.stage.unique().tolist()

Out[153]: ['', 'pupper', 'floofer', 'doggo', 'puppo', 'doggopupper', 'doggofloofer']

In [154]: #Now we must seperate the combines stages with a comma
          master_clean.loc[master_clean.stage == 'doggopupper', 'stage'] = 'doggo,pupper'
          master_clean.loc[master_clean.stage == 'doggofloofer', 'stage'] = 'doggo,floofer'
```

1.1.12 Test

```
In [155]: master_clean.stage.unique()

Out[155]: array(['', 'pupper', 'floofer', 'doggo', 'puppo', 'doggo,pupper',
                 'doggo,floofer'], dtype=object)

In [156]: #Further test just in case to check column layout
          master_clean.head()

Out[156]:         tweet_id                                        jpg_url  \
          0  666020888022790149  https://pbs.twimg.com/media/CT4udn0WwAA0aMy.jpg
          1  666033412701032449  https://pbs.twimg.com/media/CT4521TWwAEvMyu.jpg
          2  666049248165822465  https://pbs.twimg.com/media/CT5IQmsXIAAKY4A.jpg
          3  666051853826850816  https://pbs.twimg.com/media/CT5KoJ1WoAAJash.jpg
          4  666057090499244032  https://pbs.twimg.com/media/CT5PY90WoAAQGLo.jpg


             img_num                breed   high_conf  in_reply_to_status_id  \
          0        1  Welsh_springer_spaniel   0.465074                    NaN
          1        1       German_shepherd    0.596461                    NaN
          2        1     miniature_pinscher   0.560311                    NaN
          3        1                   NaN        NaN                    NaN
          4        1      golden_retriever  0.00795896                    NaN


             in_reply_to_user_id                    timestamp              source  \
          0                 NaN  2015-11-15 22:32:08 +0000  Twitter for iPhone
          1                 NaN  2015-11-15 23:21:54 +0000  Twitter for iPhone
          2                 NaN  2015-11-16 00:24:50 +0000  Twitter for iPhone
          3                 NaN  2015-11-16 00:35:11 +0000  Twitter for iPhone
```

```
4                          NaN  2015-11-16 00:55:59 +0000  Twitter for iPhone

                                                   text  \
0  Here we have a Japanese Irish Setter. Lost eye...
1  Here is a very happy pup. Big fan of well-main...
2  Here we have a 1949 1st generation vulpix. Enj...
3  This is an odd dog. Hard on the outside but lo...
4  My oh my. This is a rare blond Canadian terrie...


                                       expanded_urls  rating_numerator  \
0  https://twitter.com/dog_rates/status/666020888...                 8
1  https://twitter.com/dog_rates/status/666033412...                 9
2  https://twitter.com/dog_rates/status/666049248...                 5
3  https://twitter.com/dog_rates/status/666051853...                 2
4  https://twitter.com/dog_rates/status/666057090...                 9

   rating_denominator  name  retweet_count  favorite_count stage
0                  10  None            454            2367
1                  10     a             39             110
2                  10  None             40              95
3                  10    an            759            1105
4                  10     a            121             261
```

Define Make uniform format of breed column. I believe capitalization and proper spacing will do great here.

```
In [157]: master_clean.breed.head()

Out[157]: 0     Welsh_springer_spaniel
          1            German_shepherd
          2          miniature_pinscher
          3                        NaN
          4            golden_retriever
          Name: breed, dtype: object
```

1.1.13 Code

```
In [158]: #code help from thispointer.com
          def capitalize_each_word(original_str):
              result = ""

              # Split the string and get all words in a list
              list_of_words = original_str.split()

              # Iterate over all elements in list
              for elem in list_of_words:

                  # capitalize first letter of each word and add to a string
                  if len(result) > 0:
```

```
                result = result + " " + elem.strip().capitalize()
            else:
                result = elem.capitalize()

        # If result is still empty then return original string else returned capitalized.
        if not result:
            return original_str
        else:
            return result

    for index, row in master_clean.iterrows():

        #Set input for cap function and replace '_' with ' '(spaces).
        text = master_clean.loc[index, 'breed'].replace('_', ' ')
        master_clean.loc[index, 'breed'] = capitalize_each_word(text)
```

1.1.14 Test

```
In [159]: master_clean.breed.head()

Out[159]: 0      Welsh Springer Spaniel
          1              German Shepherd
          2            Miniature Pinscher
          3                           Nan
          4              Golden Retriever
          Name: breed, dtype: object
```

Define Drop useless +0000 on the entire timestamp column. Splicing off the end 5 characters would be easiest here.

```
In [160]: master_clean.timestamp.head()

Out[160]: 0     2015-11-15 22:32:08 +0000
          1     2015-11-15 23:21:54 +0000
          2     2015-11-16 00:24:50 +0000
          3     2015-11-16 00:35:11 +0000
          4     2015-11-16 00:55:59 +0000
          Name: timestamp, dtype: object
```

1.1.15 Code

```
In [161]: for index, row in master_clean.iterrows():
              master_clean.loc[index, 'timestamp'] = master_clean.loc[index, 'timestamp'][:-6]
```

1.1.16 Test

```
In [162]: master_clean.timestamp.head()
```

```
Out[162]: 0     2015-11-15 22:32:08
          1     2015-11-15 23:21:54
          2     2015-11-16 00:24:50
          3     2015-11-16 00:35:11
          4     2015-11-16 00:55:59
          Name: timestamp, dtype: object
```

Define Drop in_reply_to_status_id and in_reply_to_user_id columns as I don't find them useful or relative to the motivation.

1.1.17 Code

```
In [163]: master_clean.drop(['in_reply_to_user_id', 'in_reply_to_status_id'], axis=1, inplace=Tr
```

1.1.18 Test

```
In [164]: master_clean.columns.tolist()
```

```
Out[164]: ['tweet_id',
           'jpg_url',
           'img_num',
           'breed',
           'high_conf',
           'timestamp',
           'source',
           'text',
           'expanded_urls',
           'rating_numerator',
           'rating_denominator',
           'name',
           'retweet_count',
           'favorite_count',
           'stage']
```

Conclusion

I don't believe that all the assessing and cleaning of this dataset is complete but for the purpose of this assignment, as you mention, my above work should demostrate my ability to Gather, Assess and Clean data. I can finally call myself a Data Wrangler.

```
In [165]: #Export master_clean to a csv file
          master_clean.to_csv(r'twitter_archive_master.csv', index = False)
```

Visualizations Code

Some of the below code is all over the place as I was experimenting a lot with how I could analysis the data. Some of the visualizations weren't really applicable or relevent.

```
In [166]: #Import libraries
          import matplotlib.pyplot as plt
          import numpy as np
          %matplotlib inline
```

Which dog vocab is used the most?

I was initally curious about how much and which dog voab word was used the most through the tweets.

```
In [167]: #Set axis values and simple plot
          master_clean.groupby('stage')['stage'].count()[1:]
          # labels = ['doggo', 'doggo-floofer', 'doggo-pupper', 'floofer', 'pupper', 'puppo']
          # plt.pie(y, labels=labels)

Out[167]: stage
          doggo                 42
          doggo,floofer          2
          doggo,pupper           4
          floofer                4
          pupper               182
          puppo                 12
          Name: stage, dtype: int64

In [168]: #Code help from matplotlib.org
          fig, ax = plt.subplots(figsize=(6, 3), subplot_kw=dict(aspect="equal"))

          #Set labels
          labels = ['doggo', 'pupper', 'puppo', 'other']

          #Pull values from master_clean
          data = [42, 182, 12, 10]

          wedges, texts = ax.pie(data, wedgeprops=dict(width=0.5), startangle=-40)

          bbox_props = dict(boxstyle="square,pad=0.3", fc="w", ec="k", lw=0.72)
          kw = dict(arrowprops=dict(arrowstyle="-"),
                    bbox=bbox_props, zorder=0, va="center")

          def func(pct, allvals):
              absolute = int(pct/100.*np.sum(allvals))
              return "{:.1f}%".format(absolute)


          wedges, texts, autotexts = ax.pie(data, autopct=lambda pct: func(pct, data),
                                            textprops=dict(color="w"))

          for i, p in enumerate(wedges):
              ang = (p.theta2 - p.theta1)/2. + p.theta1
              y = np.sin(np.deg2rad(ang))
              x = np.cos(np.deg2rad(ang))
              horizontalalignment = {-1: "right", 1: "left"}[int(np.sign(x))]
              connectionstyle = "angle,angleA=0,angleB={}".format(ang)
              kw["arrowprops"].update({"connectionstyle": connectionstyle})
```
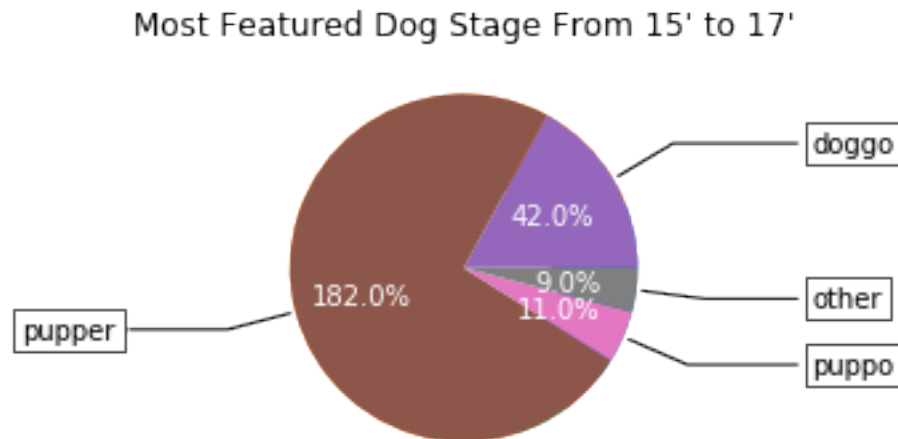
```
        ax.annotate(labels[i], xy=(x, y), xytext=(2*np.sign(x), 1.4*y),
                    horizontalalignment=horizontalalignment, **kw)

    ax.set_title("Most Featured Dog Stage From 15' to 17'")

    #Save as .png
    plt.savefig('vocab.png', dpi=300)
    plt.show()
```

Most Featured Dog Stage From 15' to 17'

```
In [169]: source = master_clean.groupby('source')['source'].count()
          source

          deck = source.TweetDeck
          web = source['Twitter Web Client']
          iphone = source['Twitter for iPhone']
          web

Out[169]: 21
```
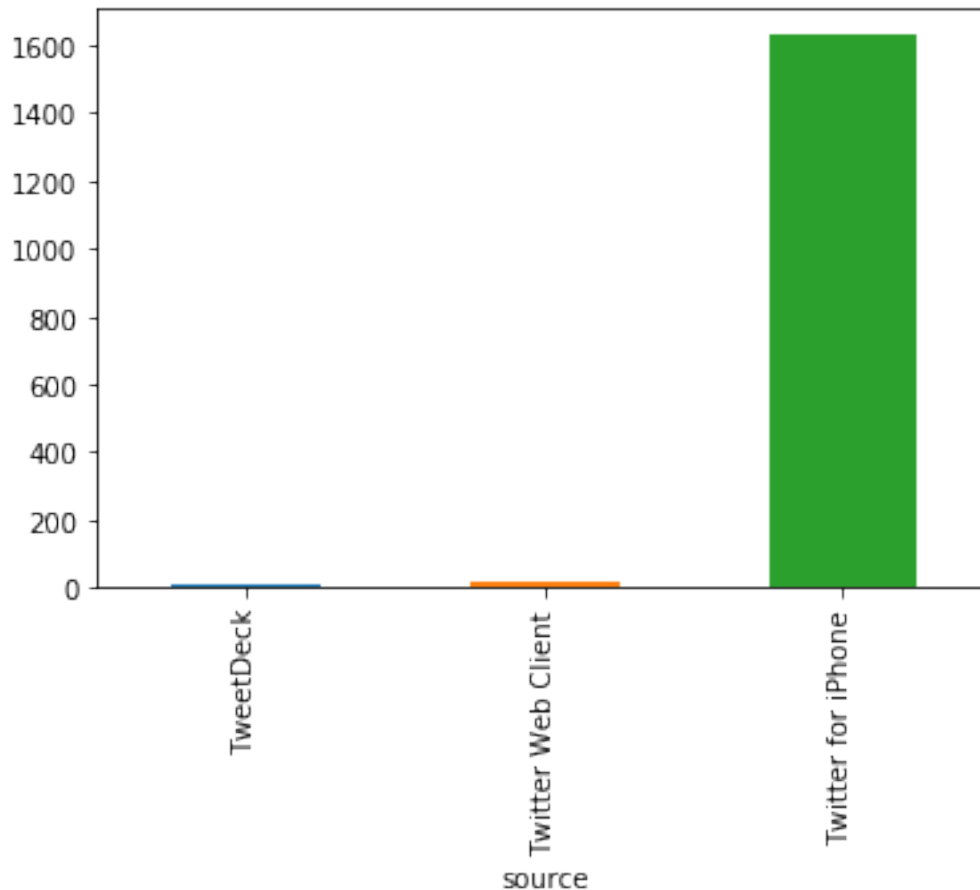
Below graph is pretty much pointless. Obviously, the vast majority of people are using twitter from their mobile device. 653 out of 659 posts!!

```
In [170]: source.plot(kind='bar')

Out[170]: <matplotlib.axes._subplots.AxesSubplot at 0x7fa82c702cf8>
```

```
In [171]: master_clean.head()

Out[171]:                 tweet_id                                      jpg_url  \
          0  666020888022790149  https://pbs.twimg.com/media/CT4udn0WwAA0aMy.jpg
          1  666033412701032449  https://pbs.twimg.com/media/CT4521TWwAEvMyu.jpg
          2  666049248165822465  https://pbs.twimg.com/media/CT5IQmsXIAAKY4A.jpg
          3  666051853826850816  https://pbs.twimg.com/media/CT5KoJ1WoAAJash.jpg
          4  666057090499244032  https://pbs.twimg.com/media/CT5PY90WoAAQGLo.jpg


             img_num                 breed  high_conf            timestamp  \
          0        1  Welsh Springer Spaniel   0.465074  2015-11-15 22:32:08
          1        1        German Shepherd   0.596461  2015-11-15 23:21:54
          2        1      Miniature Pinscher   0.560311  2015-11-16 00:24:50
          3        1                   Nan        NaN   2015-11-16 00:35:11
          4        1        Golden Retriever  0.00795896  2015-11-16 00:55:59


                      source                                           text  \
          0  Twitter for iPhone  Here we have a Japanese Irish Setter. Lost eye...
          1  Twitter for iPhone  Here is a very happy pup. Big fan of well-main...
```

```
2  Twitter for iPhone   Here we have a 1949 1st generation vulpix. Enj...
3  Twitter for iPhone   This is an odd dog. Hard on the outside but lo...
4  Twitter for iPhone   My oh my. This is a rare blond Canadian terrie...


                                       expanded_urls  rating_numerator  \
0  https://twitter.com/dog_rates/status/666020888...                 8
1  https://twitter.com/dog_rates/status/666033412...                 9
2  https://twitter.com/dog_rates/status/666049248...                 5
3  https://twitter.com/dog_rates/status/666051853...                 2
4  https://twitter.com/dog_rates/status/666057090...                 9


   rating_denominator  name  retweet_count  favorite_count stage
0                  10  None            454            2367
1                  10     a             39             110
2                  10  None             40              95
3                  10    an            759            1105
4                  10     a            121             261
```

Next, I wondered **How strong is the correlation between retweet count and favorite count?**

```
In [172]: retweets = master_clean.retweet_count
          favorites = master_clean.favorite_count
          plt.scatter(retweets, favorites)
```
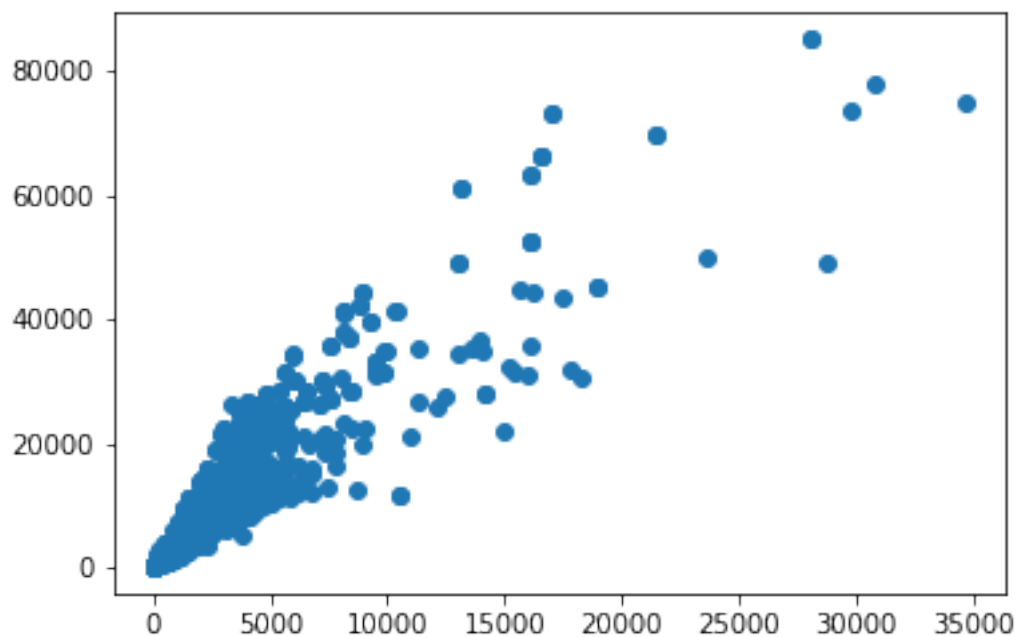
```
Out[172]: <matplotlib.collections.PathCollection at 0x7fa82c63b3c8>
```

```
In [173]: #Correlation is tweets between retweet_count and favorite_count
          from scipy.stats.stats import pearsonr

          #Pearson Correlation Coefficient
          correlation = pearsonr(retweets, favorites)[0]
          correlation

Out[173]: 0.91506409115233778
```
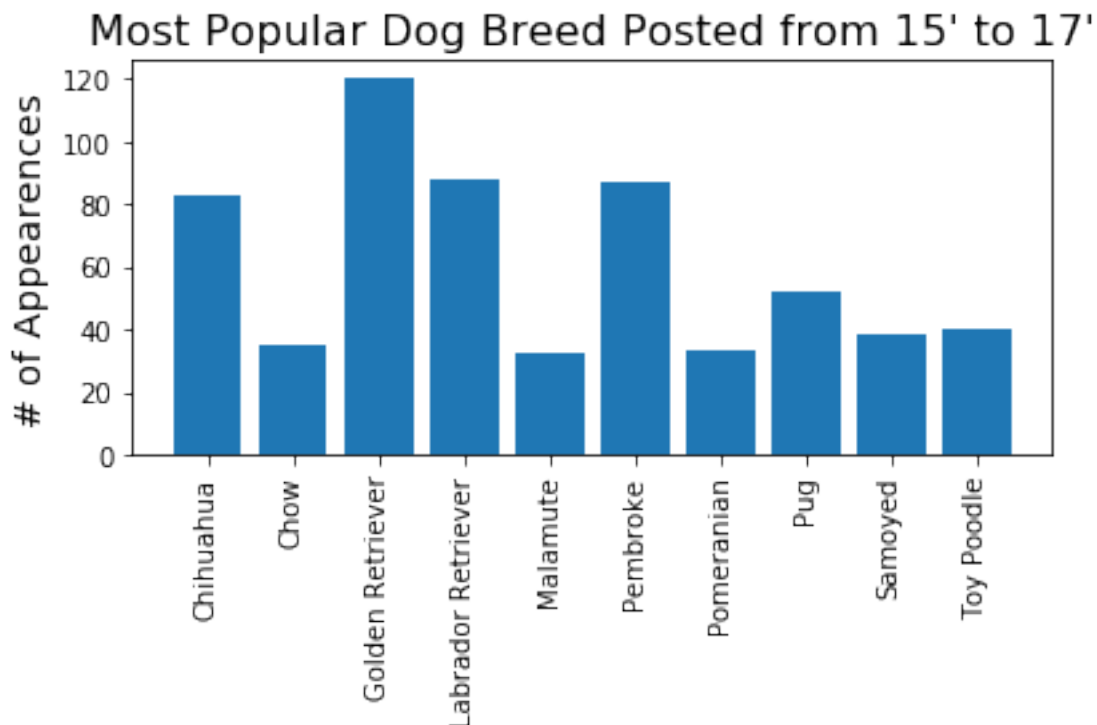
What is the most popular breed that is posted

```
In [174]: #Groupby breed, count and sort values
          top_breeds = master_clean.groupby('breed')['breed'].count().sort_values(ascending=Fals

          #Plot
          top10 = top_breeds[1:]
          labels = ['Golden Retriever', 'Labrador Retriever', 'Pembroke', 'Chihuahua', 'Pug',
                    'Toy Poodle', 'Samoyed', 'Chow', 'Pomeranian', 'Malamute']

          plt.bar(labels, top10)
          plt.xticks(rotation=90)
          plt.ylabel('# of Appearences', size=14)
          plt.title("Most Popular Dog Breed Posted from 15' to 17'", size=16)
          plt.tight_layout()
          plt.savefig('popular.png', dpi=300)
```

```
In [175]: top10

Out[175]: breed
          Golden Retriever      120
          Labrador Retriever     88
          Pembroke               87
          Chihuahua              83
          Pug                    52
          Toy Poodle             40
          Samoyed                38
          Chow                   35
          Pomeranian             33
          Malamute               32
          Name: breed, dtype: int64
```
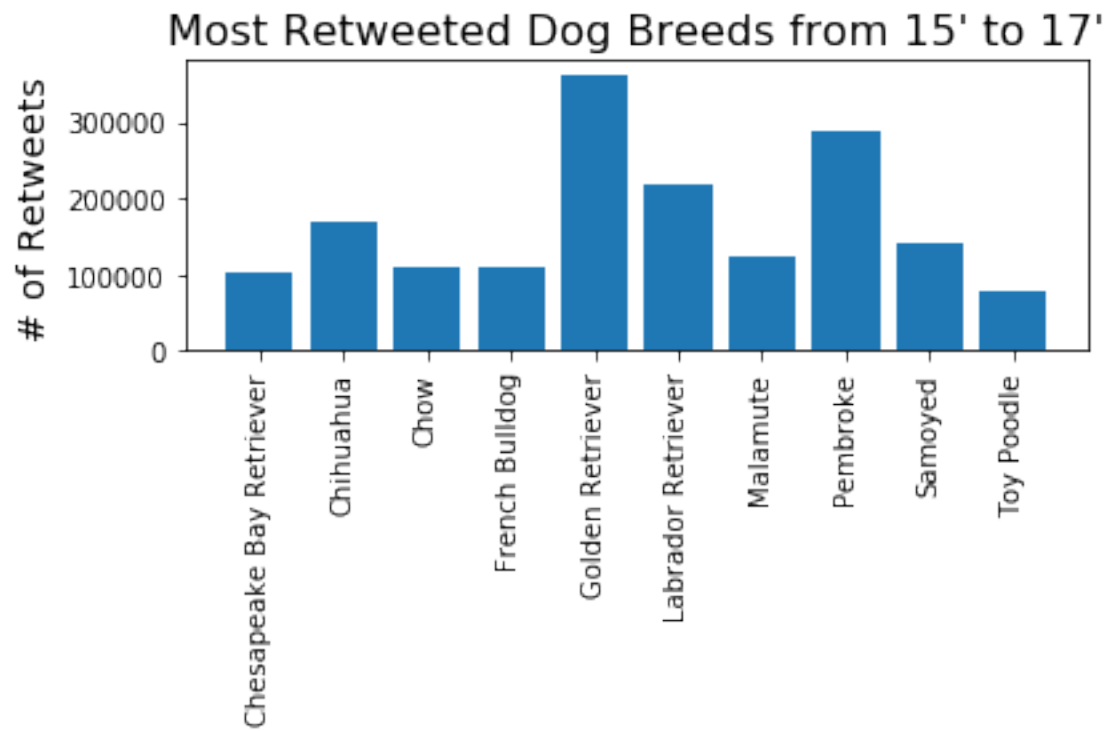
What breeds create the most retweets?

This could help use boost our page numbers in the future as we know what our audience likes the most.

```
In [176]: #Groupby breed, count retweets per breed and sort values
          top_breeds = master_clean.groupby('breed')['retweet_count'].sum().sort_values(ascendin
          top10 = top_breeds[1:]


          #Plot in bar
          top10 = top_breeds[1:]
          labels = ['Golden Retriever', 'Pembroke', 'Labrador Retriever', 'Chihuahua', 'Samoyed'
                    'Malamute', 'French Bulldog', 'Chow', 'Chesapeake Bay Retriever', 'Toy Poodl

          plt.bar(labels, top10)
          plt.xticks(rotation=90)
          plt.ylabel('# of Retweets', size=14)
          plt.title("Most Retweeted Dog Breeds from 15' to 17'", size=16)
          plt.tight_layout()
          plt.savefig('popular.png', dpi=300)
```

Most Retweeted Dog Breeds from 15' to 17'

In [ ]: