

wrangle_act

October 17, 2020

Wrangle and Analyze Data Twitter API

Analyzing And Visualizing The Tweet Archive Of Twitter User @Dog_Rates

```
[1]: import os                #this module routines for NT or Posix depending on what
      ↪system we're on.
import tweepy
import matplotlib.pyplot as plt
import urllib.parse         #this module Parse (absolute and relative) URLs.
import requests             #this module Requests is an HTTP library, written in
      ↪Python, for human beings. Basic GET usage:
import pandas as pd #this module
import numpy as np
import json                 #this module:json exposes an API familiar to users of the
      ↪standard library module
import time                 #This module provides various functions to manipulate
      ↪time values.
import nbconvert
import pypeteer
import pandocfilters
import pip
print ("library-Imported")
```

library-Imported

```
[2]: from tweepy.streaming import StreamListener
from tweepy import OAuthHandler
from tweepy import API
from tweepy import Stream
from tweepy import Cursor
from tweepy.streaming import StreamListener
from timeit import default_timer as timer
from requests.auth import AuthBase
from pandas.core.tools.datetimes import to_datetime
from pandas.core.tools.timedeltas import to_timedelta
from nbconvert import LatexExporter
from nbconvert import PDFExporter
from nbconvert import webpdf
from nbconvert import nbconvertapp
```

```
from nbconvert import templates
print ("functions-Imported")
```

functions-Imported

```
[3]: import os
os.getcwd()
```

```
[3]: 'C:\\Users\\abdel\\FWD-Udacity-Wrangle-and-Analyze-Data-Twitter-API'
```

```
[4]: ls
```

Volume in drive C has no label.
Volume Serial Number is 4EC7-F09B

Directory of C:\Users\abdel\FWD-Udacity-Wrangle-and-Analyze-Data-Twitter-API

10/16/2020	03:35 PM	<DIR>	.
10/16/2020	03:35 PM	<DIR>	..
10/12/2020	01:54 PM		66 .gitattributes
10/16/2020	03:02 PM	<DIR>	.ipynb_checkpoints
10/16/2020	02:58 PM	<DIR>	.vscode
10/13/2020	01:16 AM		38,329 egypt fwd initiative.jpg
10/14/2020	12:56 PM		195,293 FWD.jpg
10/16/2020	03:35 PM		335,079 image_predictions.tsv
10/12/2020	01:45 PM		335,079 image-predictions-3.tsv
10/16/2020	03:45 AM		923,437 main_df.csv
10/14/2020	02:06 PM		10,540,363 tweet_json.txt
10/12/2020	01:45 PM		10,609,234 tweet-json
10/12/2020	01:43 PM		10,609,234 tweet-json.txt
10/12/2020	01:46 PM		614,603 tweet-json.zip
10/12/2020	01:42 PM		1,764 twitter-api.py
10/12/2020	02:44 PM		915,692 twitter-archive-enhanced.csv
10/16/2020	03:21 PM		863,974 wrangle_act.html
10/16/2020	03:26 PM		355,700 wrangle_act.ipynb
10/16/2020	02:41 PM		227,479 wrangle_act.pdf
		15 File(s)	36,565,326 bytes
		4 Dir(s)	566,286,606,336 bytes free

1 1- Gathering Data for this Project

1.0.1 I- Read twitter-archive-enhanced as pandas dataframe and quick check to view structure

```
[5]: archive = pd.read_csv("twitter-archive-enhanced.csv")
archive.set_index('tweet_id')
archive.head(3)
```

```

[5]:      tweet_id  in_reply_to_status_id  in_reply_to_user_id  \
0  892420643555336193                NaN                NaN
1  892177421306343426                NaN                NaN
2  891815181378084864                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

      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...

      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

      retweeted_status_user_id  retweeted_status_timestamp  \
0                NaN                NaN
1                NaN                NaN
2                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

      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

```

1.0.2 II- Download tweet image predictions TSV using the Requests library and write it to image_predictions.tsv

```

[6]: url = 'https://d17h27t6h515a5.cloudfront.net/topher/2017/August/
      ↪599fd2ad_image-predictions/image-predictions.tsv'
response = requests.get(url)
with open('image_predictions.tsv', mode='wb') as file:
    file.write(response.content)

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

```

```
image.head(3)
```

```
[6]:          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

   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

   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
```

1.0.3 III- Query Twitter API for each tweet in the Twitter archive and save JSON in a text file

```
[7]: # These are hidden to comply with Twitter's API terms and conditions
consumer_key = '#####' #'HIDDEN replace #####...with_
↳consumer_key'
consumer_secret = '#####' #'HIDDEN replace #####...
↳with_access_token'
access_token = '#####' #'HIDDEN replace #####...with_
↳consumer_secret '
access_secret = '#####' #'HIDDEN replace #####...with_
↳access_secret'

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

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

print ("ACCESS Twitter's API")
```

ACCESS Twitter's API

```
[8]: tweet_ids = archive tweet_id.values
len(tweet_ids)
```

[8]: 2356

```
[40]: # Query Twitter's API for JSON data for each tweet ID in the Twitter archive
count = 0
fails_dict = {}
start = timer()
```

```

# Save each tweet's returned JSON as a new line in a .txt file
with open('tweet_json.txt', 'w') as outfile:
    # This loop will likely take 20-30 minutes to run because of Twitter's rate_
    ↪ limit
    for tweet_id in tweet_ids:
        count += 1
        print(str(count) + ": " + str(tweet_id))
        try:
            tweet = api.get_status(tweet_id, tweet_mode='extended')
            print("Success")
            json.dump(tweet._json, outfile)
            outfile.write('\n')
        except tweepy.TweepError as e:
            print("Fail")
            fails_dict[tweet_id] = e
            pass
end = timer()
print(end - start)
print(fails_dict)

```

```

1: 892420643555336193
Success
2: 892177421306343426
Success
3: 891815181378084864
Success
4: 891689557279858688
Success
5: 891327558926688256
Success
6: 891087950875897856
Success
7: 890971913173991426
Success
8: 890729181411237888
Success
9: 890609185150312448
Success
10: 890240255349198849
Success
11: 890006608113172480
Success
12: 889880896479866881
Success
13: 889665388333682689
Success
14: 889638837579907072
Success

```

15: 889531135344209921
Success
16: 889278841981685760
Success
17: 888917238123831296
Success
18: 888804989199671297
Success
19: 888554962724278272
Success
20: 888202515573088257
Fail
21: 888078434458587136
Success
22: 887705289381826560
Success
23: 887517139158093824
Success
24: 887473957103951883
Success
25: 887343217045368832
Success
26: 887101392804085760
Success
27: 886983233522544640
Success
28: 886736880519319552
Success
29: 886680336477933568
Success
30: 886366144734445568
Success
31: 886267009285017600
Success
32: 886258384151887873
Success
33: 886054160059072513
Success
34: 885984800019947520
Success
35: 885528943205470208
Success
36: 885518971528720385
Success
37: 885311592912609280
Success
38: 885167619883638784
Success

39: 884925521741709313
Success
40: 884876753390489601
Success
41: 884562892145688576
Success
42: 884441805382717440
Success
43: 884247878851493888
Success
44: 884162670584377345
Success
45: 883838122936631299
Success
46: 883482846933004288
Success
47: 883360690899218434
Success
48: 883117836046086144
Success
49: 882992080364220416
Success
50: 882762694511734784
Success
51: 882627270321602560
Success
52: 882268110199369728
Success
53: 882045870035918850
Success
54: 881906580714921986
Success
55: 881666595344535552
Success
56: 881633300179243008
Success
57: 881536004380872706
Success
58: 881268444196462592
Success
59: 880935762899988482
Success
60: 880872448815771648
Success
61: 880465832366813184
Success
62: 880221127280381952
Success

63: 880095782870896641
Success
64: 879862464715927552
Success
65: 879674319642796034
Success
66: 879492040517615616
Success
67: 879415818425184262
Success
68: 879376492567855104
Success
69: 879130579576475649
Success
70: 879050749262655488
Success
71: 879008229531029506
Success
72: 878776093423087618
Success
73: 878604707211726852
Success
74: 878404777348136964
Success
75: 878316110768087041
Success
76: 878281511006478336
Success
77: 878057613040115712
Success
78: 877736472329191424
Success
79: 877611172832227328
Success
80: 877556246731214848
Success
81: 877316821321428993
Success
82: 877201837425926144
Success
83: 876838120628539392
Success
84: 876537666061221889
Success
85: 876484053909872640
Success
86: 876120275196170240
Success

87: 875747767867523072
Success
88: 875144289856114688
Success
89: 875097192612077568
Success
90: 875021211251597312
Success
91: 874680097055178752
Success
92: 874434818259525634
Success
93: 874296783580663808
Success
94: 874057562936811520
Success
95: 874012996292530176
Success
96: 873697596434513921
Fail
97: 873580283840344065
Success
98: 873337748698140672
Success
99: 873213775632977920
Success
100: 872967104147763200
Success
101: 872820683541237760
Success
102: 872668790621863937
Fail
103: 872620804844003328
Success
104: 872486979161796608
Success
105: 872261713294495745
Fail
106: 872122724285648897
Success
107: 871879754684805121
Success
108: 871762521631449091
Success
109: 871515927908634625
Success
110: 871166179821445120
Success

111: 871102520638267392
Success
112: 871032628920680449
Success
113: 870804317367881728
Success
114: 870726314365509632
Success
115: 870656317836468226
Success
116: 870374049280663552
Success
117: 870308999962521604
Success
118: 870063196459192321
Success
119: 869988702071779329
Fail
120: 869772420881756160
Success
121: 869702957897576449
Success
122: 869596645499047938
Success
123: 869227993411051520
Success
124: 868880397819494401
Success
125: 868639477480148993
Success
126: 868622495443632128
Success
127: 868552278524837888
Success
128: 867900495410671616
Success
129: 867774946302451713
Success
130: 867421006826221569
Success
131: 867072653475098625
Success
132: 867051520902168576
Success
133: 866816280283807744
Fail
134: 866720684873056260
Success

135: 866686824827068416
Success
136: 866450705531457537
Success
137: 866334964761202691
Success
138: 866094527597207552
Success
139: 865718153858494464
Success
140: 865359393868664832
Success
141: 865006731092295680
Success
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143: 864279568663928832
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144: 864197398364647424
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148: 863432100342583297
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153: 862722525377298433
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154: 862457590147678208
Success
155: 862096992088072192
Success
156: 861769973181624320
Fail
157: 861383897657036800
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Success

159: 861005113778896900
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161: 860924035999428608
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163: 860524505164394496
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164: 860276583193509888
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166: 860177593139703809
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169: 859607811541651456
Success
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Success
171: 859074603037188101
Success
172: 858860390427611136
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173: 858843525470990336
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176: 857989990357356544
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177: 857746408056729600
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178: 857393404942143489
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179: 857263160327368704
Success
180: 857214891891077121
Success
181: 857062103051644929
Success
182: 857029823797047296
Success

183: 856602993587888130
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246: 845812042753855489
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248: 845459076796616705
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255: 844580511645339650
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283: 839239871831150596
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Success
285: 838921590096166913
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286: 838916489579200512
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287: 838831947270979586
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288: 838561493054533637
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289: 838476387338051585
Success
290: 838201503651401729
Success
291: 838150277551247360
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292: 838085839343206401
Success
293: 838083903487373313
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294: 837820167694528512
Success
295: 837482249356513284
Success
296: 837471256429613056
Success
297: 837366284874571778
Fail
298: 837110210464448512
Success
299: 837012587749474308
Fail
300: 836989968035819520
Success
301: 836753516572119041
Success
302: 836677758902222849
Success

303: 836648853927522308
Success
304: 836397794269200385
Success
305: 836380477523124226
Success
306: 836260088725786625
Success
307: 836001077879255040
Success
308: 835685285446955009
Success
309: 835574547218894849
Success
310: 835536468978302976
Success
311: 835309094223372289
Success
312: 835297930240217089
Success
313: 835264098648616962
Success
314: 835246439529840640
Success
315: 835172783151792128
Success
316: 835152434251116546
Success
317: 834931633769889797
Success
318: 834786237630337024
Success
319: 834574053763584002
Success
320: 834477809192075265
Success
321: 834458053273591808
Success
322: 834209720923721728
Success
323: 834167344700198914
Success
324: 834089966724603904
Success
325: 834086379323871233
Success
326: 833863086058651648
Success

327: 833826103416520705
Success
328: 833732339549220864
Success
329: 833722901757046785
Success
330: 833479644947025920
Success
331: 833124694597443584
Success
332: 832998151111966721
Success
333: 832769181346996225
Success
334: 832757312314028032
Success
335: 832682457690300417
Success
336: 832645525019123713
Success
337: 832636094638288896
Success
338: 832397543355072512
Success
339: 832369877331693569
Success
340: 832273440279240704
Success
341: 832215909146226688
Success
342: 832215726631055365
Success
343: 832088576586297345
Success
344: 832040443403784192
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Success
346: 831939777352105988
Success
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Success
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Success
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Success
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353: 831315979191906304
Success
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355: 831262627380748289
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356: 830956169170665475
Success
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Success
358: 830173239259324417
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359: 830097400375152640
Success
360: 829878982036299777
Success
361: 829861396166877184
Success
362: 829501995190984704
Success
363: 829449946868879360
Success
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```
[9]: ## read json file to a list array and strip new line charactor
lines = [line.rstrip('\n') for line in open('tweet_json.txt')]
# read one tweet into a temp file to examine its content
# load the tweet into a json format for easier extraction of information
temp = json.loads(lines[0])
```

```
[10]: temp
```

```
[10]: {'created_at': 'Tue Aug 01 16:23:56 +0000 2017',
'id': 892420643555336193,
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hole of a donut. 13/10 https://t.co/MgUWQ76dJU",
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'media_url_https': 'https://pbs.twimg.com/media/DGKD1-bXoAAIAUK.jpg',
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'display_url': 'pic.twitter.com/MgUWQ76dJU',
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'extended_entities': {'media': [{'id': 892420639486877696,
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  'indices': [86, 109],
  'media_url': 'http://pbs.twimg.com/media/DGKD1-bXoAAIAUK.jpg',
  'media_url_https': 'https://pbs.twimg.com/media/DGKD1-bXoAAIAUK.jpg',
  'url': 'https://t.co/MgUWQ76dJU',
  'display_url': 'pic.twitter.com/MgUWQ76dJU',
  'expanded_url':
'https://twitter.com/dog_rates/status/892420643555336193/photo/1',
  'type': 'photo',
  'sizes': {'thumb': {'w': 150, 'h': 150, 'resize': 'crop'},
    'medium': {'w': 540, 'h': 528, 'resize': 'fit'},
    'small': {'w': 540, 'h': 528, 'resize': 'fit'},
    'large': {'w': 540, 'h': 528, 'resize': 'fit'}}}],
'source': '<a href="http://twitter.com/download/iphone" rel="nofollow">Twitter
for iPhone</a>',
'in_reply_to_status_id': None,
'in_reply_to_status_id_str': None,
'in_reply_to_user_id': None,
'in_reply_to_user_id_str': None,
'in_reply_to_screen_name': None,
'user': {'id': 4196983835,
  'id_str': '4196983835',
  'name': 'WeRateDogs@',
  'screen_name': 'dog_rates',
  'location': 'Adoptable Dogs ',
  'description': 'Your Only Source For Professional Dog Ratings Instagram and
Facebook WeRateDogs partnerships@weratedogs.com ',
  'url': 'https://t.co/4W7xbIw5dg',
  'entities': {'url': {'urls': [{'url': 'https://t.co/4W7xbIw5dg',
    'expanded_url': 'https://campsite.bio/weratedogs',
    'display_url': 'campsite.bio/weratedogs',
    'indices': [0, 23]}]},
  'description': {'urls': []}},
  'protected': False,
  'followers_count': 8869667,
  'friends_count': 18,
  'listed_count': 5915,
  'created_at': 'Sun Nov 15 21:41:29 +0000 2015',
  'favourites_count': 145994,
  'utc_offset': None,
  'time_zone': None,
  'geo_enabled': True,
  'verified': True,
  'statuses_count': 12955,
  'lang': None,
  'contributors_enabled': False,

```

```

    'is_translator': False,
    'is_translation_enabled': False,
    'profile_background_color': '000000',
    'profile_background_image_url':
'http://abs.twimg.com/images/themes/theme1/bg.png',
    'profile_background_image_url_https':
'https://abs.twimg.com/images/themes/theme1/bg.png',
    'profile_background_tile': False,
    'profile_image_url':
'http://pbs.twimg.com/profile_images/1311690208509747200/KngeU109_normal.jpg',
    'profile_image_url_https':
'https://pbs.twimg.com/profile_images/1311690208509747200/KngeU109_normal.jpg',
    'profile_banner_url':
'https://pbs.twimg.com/profile_banners/4196983835/1591077312',
    'profile_link_color': 'F5ABB5',
    'profile_sidebar_border_color': '000000',
    'profile_sidebar_fill_color': '000000',
    'profile_text_color': '000000',
    'profile_use_background_image': False,
    'has_extended_profile': False,
    'default_profile': False,
    'default_profile_image': False,
    'following': True,
    'follow_request_sent': False,
    'notifications': False,
    'translator_type': 'none'},
    'geo': None,
    'coordinates': None,
    'place': None,
    'contributors': None,
    'is_quote_status': False,
    'retweet_count': 7510,
    'favorite_count': 35521,
    'favorited': False,
    'retweeted': False,
    'possibly_sensitive': False,
    'possibly_sensitive_appealable': False,
    'lang': 'en'}

```

```

[11]: # List of dictionaries to read tweet's JSON data line by line and later convert
      ↪to a DataFrame
df_list = []
with open('tweet_json.txt', 'r') as json_file:
    for line in json_file:
        tweet_df = json.loads(line)

        # Append to list of dictionaries

```

```

df_list.append({'tweet_id': tweet_df['id'],
                'retweet_count': tweet_df['retweet_count'],
                'favorite_count': tweet_df['favorite_count'],
                'display_text_range': tweet_df['display_text_range'],
                'place': tweet_df['place'],
                'created_at': tweet_df['created_at']}

            })

# Create a DataFrame with tweet ID, retweet count, favorite count and
↳ display_text_range
tweet_df = pd.DataFrame(df_list, columns =
↳ ['created_at', 'tweet_id', 'place', 'retweet_count', 'favorite_count',
↳ 'display_text_range'])

```

```
[12]: tweet_df.head(2)
```

```

[12]:
      created_at      tweet_id place  retweet_count \
0  Tue Aug 01 16:23:56 +0000 2017 892420643555336193  None          7510
1  Tue Aug 01 00:17:27 +0000 2017 892177421306343426  None          5574

      favorite_count display_text_range
0              35521          [0, 85]
1              30744          [0, 138]

```

```

[13]: tweet_df.rename(columns={'created_at': 'timestamp'}, inplace=True)
      tweet_df.set_index('tweet_id')
      tweet_df.head(2)

```

```

[13]:
      timestamp      tweet_id place  retweet_count \
0  Tue Aug 01 16:23:56 +0000 2017 892420643555336193  None          7510
1  Tue Aug 01 00:17:27 +0000 2017 892177421306343426  None          5574

      favorite_count display_text_range
0              35521          [0, 85]
1              30744          [0, 138]

```

2 2-Assessing Data for this Project

```
[14]: image.info()
```

```

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2075 entries, 0 to 2074
Data columns (total 12 columns):
#   Column      Non-Null Count  Dtype
---  ---
0   tweet_id    2075 non-null   int64

```

```

1  jpg_url    2075 non-null    object
2  img_num    2075 non-null    int64
3  p1         2075 non-null    object
4  p1_conf    2075 non-null    float64
5  p1_dog     2075 non-null    bool
6  p2         2075 non-null    object
7  p2_conf    2075 non-null    float64
8  p2_dog     2075 non-null    bool
9  p3         2075 non-null    object
10 p3_conf    2075 non-null    float64
11 p3_dog     2075 non-null    bool
dtypes: bool(3), float64(3), int64(2), object(4)
memory usage: 152.1+ KB

```

2.0.1 Quality Issues

```
[15]: tweet_df.info()    #1-place column almost empty
```

```

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2331 entries, 0 to 2330
Data columns (total 6 columns):
#   Column                Non-Null Count  Dtype
---  -
0   timestamp              2331 non-null   object
1   tweet_id               2331 non-null   int64
2   place                  1 non-null      object
3   retweet_count          2331 non-null   int64
4   favorite_count         2331 non-null   int64
5   display_text_range     2331 non-null   object
dtypes: int64(3), object(3)
memory usage: 109.4+ KB

```

```
[16]: tweet_df.tweet_id .duplicated    # 2-there is no duplicate in tweeter data frame
```

```

[16]: <bound method Series.duplicated of 0      892420643555336193
1      892177421306343426
2      891815181378084864
3      891689557279858688
4      891327558926688256
...
2326   666049248165822465
2327   666044226329800704
2328   666033412701032449
2329   666029285002620928
2330   666020888022790149
Name: tweet_id, Length: 2331, dtype: int64>

```

```
[17]: tweet_df.dtypes
```

```
[17]: timestamp          object
      tweet_id           int64
      place             object
      retweet_count      int64
      favorite_count     int64
      display_text_range object
      dtype: object
```

```
[18]: archive.info() #3-many column have null value
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2356 entries, 0 to 2355
Data columns (total 17 columns):
#   Column                                Non-Null Count  Dtype
---  -
0   tweet_id                             2356 non-null   int64
1   in_reply_to_status_id                78 non-null     float64
2   in_reply_to_user_id                 78 non-null     float64
3   timestamp                           2356 non-null   object
4   source                              2356 non-null   object
5   text                                2356 non-null   object
6   retweeted_status_id                 181 non-null     float64
7   retweeted_status_user_id            181 non-null     float64
8   retweeted_status_timestamp           181 non-null     object
9   expanded_urls                       2297 non-null   object
10  rating_numerator                     2356 non-null   int64
11  rating_denominator                   2356 non-null   int64
12  name                                 2356 non-null   object
13  doggo                               2356 non-null   object
14  floofer                             2356 non-null   object
15  pupper                              2356 non-null   object
16  puppo                               2356 non-null   object
dtypes: float64(4), int64(3), object(10)
memory usage: 313.0+ KB
```

```
[19]: name_count=archive.name.value_counts() #4-there name with just a letter
      print(name_count.unique())
```

```
<bound method Series.unique of None          745
a              55
Charlie        12
Lucy           11
Cooper         11
...
Tedrick        1
Shikha         1
Lolo            1
Marty          1
```

```
Shooter      1
Name: name, Length: 957, dtype: int64>
```

```
[20]: archive.columns
```

```
[20]: Index(['tweet_id', 'in_reply_to_status_id', 'in_reply_to_user_id', 'timestamp',
        'source', 'text', 'retweeted_status_id', 'retweeted_status_user_id',
        'retweeted_status_timestamp', 'expanded_urls', 'rating_numerator',
        'rating_denominator', 'name', 'doggo', 'floofer', 'pupper', 'puppo'],
        dtype='object')
```

```
[21]: archive.dtypes
```

```
[21]: tweet_id                int64
in_reply_to_status_id      float64
in_reply_to_user_id        float64
timestamp                  object
source                    object
text                      object
retweeted_status_id        float64
retweeted_status_user_id    float64
retweeted_status_timestamp  object
expanded_urls              object
rating_numerator            int64
rating_denominator          int64
name                      object
doggo                     object
floofer                   object
pupper                    object
puppo                     object
dtype: object
```

```
[22]: archive.rating_denominator .value_counts() #5-there is number not in the rating
↳range(0-10)
```

```
[22]: 10      2333
      11       3
      50       3
      80       2
      20       2
       2       1
      16       1
      40       1
      70       1
      15       1
      90       1
     110       1
     120       1
```

```

130      1
150      1
170      1
7        1
0        1
Name: rating_denominator, dtype: int64

```

3 3-Cleaning Data for this Project:

```

[23]: #copy of the dataframe:
tweet_df_clean=tweet_df.copy()
archive_df_clean=archive.copy()
image_df_clean=image.copy()

```

```

[24]: tweet_df_clean.head(1)

```

```

[24]:
          timestamp          tweet_id place  retweet_count \
0  Tue Aug 01 16:23:56 +0000 2017 892420643555336193  None          7510

      favorite_count display_text_range
0              35521             [0, 85]

```

```

[25]: image_df_clean.head(1)

```

```

[25]:
          tweet_id          jpg_url \
0  666020888022790149  https://pbs.twimg.com/media/CT4udn0WwAA0aMy.jpg

      img_num          p1  p1_conf  p1_dog          p2  p2_conf \
0           1  Welsh_springer_spaniel  0.465074      True  collie  0.156665

      p2_dog          p3  p3_conf  p3_dog
0      True  Shetland_sheepdog  0.061428      True

```

```

[26]: archive_df_clean.head(1)

```

```

[26]:
          tweet_id  in_reply_to_status_id  in_reply_to_user_id \
0  892420643555336193                NaN                NaN

          timestamp \
0  2017-08-01 16:23:56 +0000

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

          text  retweeted_status_id \
0  This is Phineas. He's a mystical boy. Only eve...                NaN

```

```

retweeted_status_user_id retweeted_status_timestamp \
0 NaN NaN

expanded_urls rating_numerator \
0 https://twitter.com/dog_rates/status/892420643... 13

rating_denominator name doggo floofer pupper puppo
0 10 Phineas None None None None

```

3.1 Drop Rows with Missing Values

```
[27]: # Dropping column with missing value
tweet_df_clean.drop(['place'], axis=1, inplace=True)
```

```
[28]: #view missing value count for tweet_df
tweet_df_clean.isnull().sum()
```

```
[28]: timestamp      0
tweet_id           0
retweet_count      0
favorite_count     0
display_text_range 0
dtype: int64
```

```
[29]: # explore data with name a
archive_df_clean_v2=archive_df_clean.loc[archive_df_clean['name'] == 'a']
archive_df_clean_v2
```

```
[29]:
      tweet_id  in_reply_to_status_id  in_reply_to_user_id \
56   881536004380872706              NaN              NaN
649  792913359805018113              NaN              NaN
801   772581559778025472              NaN              NaN
1002  747885874273214464              NaN              NaN
1004  747816857231626240              NaN              NaN
1017  746872823977771008              NaN              NaN
1049  743222593470234624              NaN              NaN
1193  717537687239008257              NaN              NaN
1207  715733265223708672              NaN              NaN
1340  704859558691414016              NaN              NaN
1351  704054845121142784              NaN              NaN
1361  703079050210877440              NaN              NaN
1368  702539513671897089              NaN              NaN
1382  700864154249383937              NaN              NaN
1499  692187005137076224              NaN              NaN
1737  679530280114372609              NaN              NaN
1785  677644091929329666              NaN              NaN
1853  675706639471788032              NaN              NaN

```


1854	675534494439489536	NaN	NaN
1877	675109292475830276	NaN	NaN
1878	675047298674663426	NaN	NaN
1923	674082852460433408	NaN	NaN
1941	673715861853720576	NaN	NaN
1955	673636718965334016	NaN	NaN
1994	672604026190569472	NaN	NaN
2034	671743150407421952	NaN	NaN
2066	671147085991960577	NaN	NaN
2116	670427002554466305	NaN	NaN
2125	670361874861563904	NaN	NaN
2128	670303360680108032	NaN	NaN
2146	669923323644657664	NaN	NaN
2153	669661792646373376	NaN	NaN
2161	669564461267722241	NaN	NaN
2191	668955713004314625	NaN	NaN
2198	668815180734689280	NaN	NaN
2211	668614819948453888	NaN	NaN
2218	668507509523615744	NaN	NaN
2222	668466899341221888	NaN	NaN
2235	668171859951755264	NaN	NaN
2249	667861340749471744	NaN	NaN
2255	667773195014021121	NaN	NaN
2264	667538891197542400	NaN	NaN
2273	667470559035432960	NaN	NaN
2287	667177989038297088	NaN	NaN
2304	666983947667116034	NaN	NaN
2311	666781792255496192	NaN	NaN
2314	666701168228331520	NaN	NaN
2327	666407126856765440	NaN	NaN
2334	666293911632134144	NaN	NaN
2347	666057090499244032	NaN	NaN
2348	666055525042405380	NaN	NaN
2350	666050758794694657	NaN	NaN
2352	666044226329800704	NaN	NaN
2353	666033412701032449	NaN	NaN
2354	666029285002620928	NaN	NaN

	timestamp \
56	2017-07-02 15:32:16 +0000
649	2016-10-31 02:17:31 +0000
801	2016-09-04 23:46:12 +0000
1002	2016-06-28 20:14:22 +0000
1004	2016-06-28 15:40:07 +0000
1017	2016-06-26 01:08:52 +0000
1049	2016-06-15 23:24:09 +0000
1193	2016-04-06 02:21:30 +0000

1207	2016-04-01	02:51:22	+0000
1340	2016-03-02	02:43:09	+0000
1351	2016-02-28	21:25:30	+0000
1361	2016-02-26	04:48:02	+0000
1368	2016-02-24	17:04:07	+0000
1382	2016-02-20	02:06:50	+0000
1499	2016-01-27	03:26:56	+0000
1737	2015-12-23	05:13:38	+0000
1785	2015-12-18	00:18:36	+0000
1853	2015-12-12	15:59:51	+0000
1854	2015-12-12	04:35:48	+0000
1877	2015-12-11	00:26:12	+0000
1878	2015-12-10	20:19:52	+0000
1923	2015-12-08	04:27:30	+0000
1941	2015-12-07	04:09:13	+0000
1955	2015-12-06	22:54:44	+0000
1994	2015-12-04	02:31:10	+0000
2034	2015-12-01	17:30:22	+0000
2066	2015-11-30	02:01:49	+0000
2116	2015-11-28	02:20:27	+0000
2125	2015-11-27	22:01:40	+0000
2128	2015-11-27	18:09:09	+0000
2146	2015-11-26	16:59:01	+0000
2153	2015-11-25	23:39:47	+0000
2161	2015-11-25	17:13:02	+0000
2191	2015-11-24	00:54:05	+0000
2198	2015-11-23	15:35:39	+0000
2211	2015-11-23	02:19:29	+0000
2218	2015-11-22	19:13:05	+0000
2222	2015-11-22	16:31:42	+0000
2235	2015-11-21	20:59:20	+0000
2249	2015-11-21	00:25:26	+0000
2255	2015-11-20	18:35:10	+0000
2264	2015-11-20	03:04:08	+0000
2273	2015-11-19	22:32:36	+0000
2287	2015-11-19	03:10:02	+0000
2304	2015-11-18	14:18:59	+0000
2311	2015-11-18	00:55:42	+0000
2314	2015-11-17	19:35:19	+0000
2327	2015-11-17	00:06:54	+0000
2334	2015-11-16	16:37:02	+0000
2347	2015-11-16	00:55:59	+0000
2348	2015-11-16	00:49:46	+0000
2350	2015-11-16	00:30:50	+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

```

source \
56    <a href="http://twitter.com/download/iphone" r...
649   <a href="http://twitter.com/download/iphone" r...
801   <a href="http://twitter.com/download/iphone" r...
1002  <a href="http://twitter.com/download/iphone" r...
1004  <a href="http://twitter.com/download/iphone" r...
1017  <a href="http://twitter.com/download/iphone" r...
1049  <a href="http://twitter.com/download/iphone" r...
1193  <a href="http://twitter.com/download/iphone" r...
1207  <a href="http://twitter.com/download/iphone" r...
1340  <a href="http://twitter.com/download/iphone" r...
1351  <a href="http://twitter.com/download/iphone" r...
1361  <a href="http://twitter.com/download/iphone" r...
1368  <a href="http://twitter.com/download/iphone" r...
1382  <a href="http://twitter.com/download/iphone" r...
1499  <a href="http://twitter.com/download/iphone" r...
1737  <a href="http://twitter.com/download/iphone" r...
1785  <a href="http://twitter.com/download/iphone" r...
1853  <a href="http://twitter.com/download/iphone" r...
1854  <a href="http://twitter.com/download/iphone" r...
1877  <a href="http://twitter.com/download/iphone" r...
1878  <a href="http://twitter.com/download/iphone" r...
1923  <a href="http://twitter.com/download/iphone" r...
1941  <a href="http://twitter.com/download/iphone" r...
1955  <a href="http://twitter.com/download/iphone" r...
1994  <a href="http://twitter.com/download/iphone" r...
2034  <a href="http://twitter.com/download/iphone" r...
2066  <a href="http://twitter.com/download/iphone" r...
2116  <a href="http://twitter.com/download/iphone" r...
2125  <a href="http://twitter.com/download/iphone" r...
2128  <a href="http://twitter.com/download/iphone" r...
2146  <a href="http://twitter.com/download/iphone" r...
2153  <a href="http://twitter.com/download/iphone" r...
2161  <a href="http://twitter.com/download/iphone" r...
2191  <a href="http://twitter.com/download/iphone" r...
2198  <a href="http://twitter.com/download/iphone" r...
2211  <a href="http://twitter.com/download/iphone" r...
2218  <a href="http://twitter.com/download/iphone" r...
2222  <a href="http://twitter.com/download/iphone" r...
2235  <a href="http://twitter.com/download/iphone" r...
2249  <a href="http://twitter.com/download/iphone" r...
2255  <a href="http://twitter.com" rel="nofollow">Tw...
2264  <a href="http://twitter.com" rel="nofollow">Tw...
2273  <a href="http://twitter.com" rel="nofollow">Tw...
2287  <a href="http://twitter.com/download/iphone" r...
2304  <a href="http://twitter.com/download/iphone" r...

```

2311 <a href="http://twitter.com/download/iphone" r...
 2314 <a href="http://twitter.com/download/iphone" r...
 2327 <a href="http://twitter.com/download/iphone" r...
 2334 <a href="http://twitter.com/download/iphone" r...
 2347 <a href="http://twitter.com/download/iphone" r...
 2348 <a href="http://twitter.com/download/iphone" r...
 2350 <a href="http://twitter.com/download/iphone" r...
 2352 <a href="http://twitter.com/download/iphone" r...
 2353 <a href="http://twitter.com/download/iphone" r...
 2354 <a href="http://twitter.com/download/iphone" r...

	text	retweeted_status_id \
56	Here is a pupper approaching maximum borkdrive...	NaN
649	Here is a perfect example of someone who has t...	NaN
801	Guys this is getting so out of hand. We only r...	NaN
1002	This is a mighty rare blue-tailed hammer sherk...	NaN
1004	Viewer discretion is advised. This is a terrib...	NaN
1017	This is a carrot. We only rate dogs. Please on...	NaN
1049	This is a very rare Great Alaskan Bush Pupper...	NaN
1193	People please. This is a Deadly Mediterranean ...	NaN
1207	This is a taco. We only rate dogs. Please only...	NaN
1340	Here is a heartbreaking scene of an incredible...	NaN
1351	Here is a whole flock of puppies. 60/50 I'll ...	NaN
1361	This is a Butternut Cumberfloof. It's not wind...	NaN
1368	This is a Wild Tuscan Poofwiggle. Careful not ...	NaN
1382	"Pupper is a present to world. Here is a bow f...	NaN
1499	This is a rare Arctic Wubberfloof. Unamused by...	NaN
1737	Guys this really needs to stop. We've been ove...	NaN
1785	This is a dog swinging. I really enjoyed it so...	NaN
1853	This is a Sizzlin Menorah spaniel from Brookly...	NaN
1854	Seriously guys?! Only send in dogs. I only rat...	NaN
1877	C'mon guys. We've been over this. We only rate...	NaN
1878	This is a fluffy albino Bacardi Columbia mix. ...	NaN
1923	This is a Sagitariot Baklava mix. Loves her ne...	NaN
1941	This is a heavily opinionated dog. Loves walls...	NaN
1955	This is a Lofted Aphrodisiac Terrier named Kip...	NaN
1994	This is a baby Rand Paul. Curls for days. 11/1...	NaN
2034	This is a Tuscaloosa Alcatraz named Jacob (Yac...	NaN
2066	This is a Helvetica Listerine named Rufus. Thi...	NaN
2116	This is a Deciduous Trimester mix named Spork...	NaN
2125	This is a Rich Mahogany Seltzer named Cherokee...	NaN
2128	This is a Speckled Cauliflower Yosemite named ...	NaN
2146	This is a spotted Lipitor Rumpelstiltskin name...	NaN
2153	This is a brave dog. Excellent free climber. T...	NaN
2161	This is a Coriander Baton Rouge named Alfredo...	NaN
2191	This is a Slovakian Helter Skelter Feta named ...	NaN
2198	This is a wild Toblerone from Papua New Guinea...	NaN

2211	Here is a horned dog. Much grace. Can jump ove...	NaN
2218	This is a Birmingham Quagmire named Chuk. Love...	NaN
2222	Here is a mother dog caring for her pups. Snaz...	NaN
2235	This is a Trans Siberian Kellogg named Alfonso...	NaN
2249	This is a Shotokon Macadamia mix named Cheryl...	NaN
2255	This is a rare Hungarian Pinot named Jessiga. ...	NaN
2264	This is a southwest Coriander named Klint. Hat...	NaN
2273	This is a northern Wahoo named Kohl. He runs t...	NaN
2287	This is a Dasani Kingfisher from Maine. His na...	NaN
2304	This is a curly Ticonderoga named Pepe. No fee...	NaN
2311	This is a purebred Bacardi named Octaviath. Ca...	NaN
2314	This is a golden Buckminsterfullerene named Jo...	NaN
2327	This is a southern Vesuvius bumblegruff. Can d...	NaN
2334	This is a funny dog. Weird toes. Won't come do...	NaN
2347	My oh my. This is a rare blond Canadian terrie...	NaN
2348	Here is a Siberian heavily armored polar bear ...	NaN
2350	This is a truly beautiful English Wilson Staff...	NaN
2352	This is a purebred Piers Morgan. Loves to Netf...	NaN
2353	Here is a very happy pup. Big fan of well-main...	NaN
2354	This is a western brown Mitsubishi terrier. Up...	NaN

	retweeted_status_user_id	retweeted_status_timestamp \
56	NaN	NaN
649	NaN	NaN
801	NaN	NaN
1002	NaN	NaN
1004	NaN	NaN
1017	NaN	NaN
1049	NaN	NaN
1193	NaN	NaN
1207	NaN	NaN
1340	NaN	NaN
1351	NaN	NaN
1361	NaN	NaN
1368	NaN	NaN
1382	NaN	NaN
1499	NaN	NaN
1737	NaN	NaN
1785	NaN	NaN
1853	NaN	NaN
1854	NaN	NaN
1877	NaN	NaN
1878	NaN	NaN
1923	NaN	NaN
1941	NaN	NaN
1955	NaN	NaN
1994	NaN	NaN

2034	NaN	NaN
2066	NaN	NaN
2116	NaN	NaN
2125	NaN	NaN
2128	NaN	NaN
2146	NaN	NaN
2153	NaN	NaN
2161	NaN	NaN
2191	NaN	NaN
2198	NaN	NaN
2211	NaN	NaN
2218	NaN	NaN
2222	NaN	NaN
2235	NaN	NaN
2249	NaN	NaN
2255	NaN	NaN
2264	NaN	NaN
2273	NaN	NaN
2287	NaN	NaN
2304	NaN	NaN
2311	NaN	NaN
2314	NaN	NaN
2327	NaN	NaN
2334	NaN	NaN
2347	NaN	NaN
2348	NaN	NaN
2350	NaN	NaN
2352	NaN	NaN
2353	NaN	NaN
2354	NaN	NaN

	expanded_urls	rating_numerator	\
56	https://twitter.com/dog_rates/status/881536004...	14	
649	https://twitter.com/dog_rates/status/792913359...	13	
801	https://twitter.com/dog_rates/status/772581559...	10	
1002	https://twitter.com/dog_rates/status/747885874...	8	
1004	https://twitter.com/dog_rates/status/747816857...	4	
1017	https://twitter.com/dog_rates/status/746872823...	11	
1049	https://twitter.com/dog_rates/status/743222593...	12	
1193	https://twitter.com/dog_rates/status/717537687...	11	
1207	https://twitter.com/dog_rates/status/715733265...	10	
1340	https://twitter.com/dog_rates/status/704859558...	10	
1351	https://twitter.com/dog_rates/status/704054845...	60	
1361	https://twitter.com/dog_rates/status/703079050...	11	
1368	https://twitter.com/dog_rates/status/702539513...	12	
1382	https://twitter.com/dog_rates/status/700864154...	12	
1499	https://twitter.com/dog_rates/status/692187005...	12	

1737	https://twitter.com/dog_rates/status/679530280...	7
1785	https://twitter.com/dog_rates/status/677644091...	11
1853	https://twitter.com/dog_rates/status/675706639...	10
1854	https://twitter.com/dog_rates/status/675534494...	11
1877	https://twitter.com/dog_rates/status/675109292...	9
1878	https://twitter.com/dog_rates/status/675047298...	11
1923	https://twitter.com/dog_rates/status/674082852...	11
1941	https://twitter.com/dog_rates/status/673715861...	4
1955	https://twitter.com/dog_rates/status/673636718...	10
1994	https://twitter.com/dog_rates/status/672604026...	11
2034	https://twitter.com/dog_rates/status/671743150...	11
2066	https://twitter.com/dog_rates/status/671147085...	9
2116	https://twitter.com/dog_rates/status/670427002...	9
2125	https://twitter.com/dog_rates/status/670361874...	9
2128	https://twitter.com/dog_rates/status/670303360...	9
2146	https://twitter.com/dog_rates/status/669923323...	10
2153	https://twitter.com/dog_rates/status/669661792...	5
2161	https://twitter.com/dog_rates/status/669564461...	10
2191	https://twitter.com/dog_rates/status/668955713...	10
2198	https://twitter.com/dog_rates/status/668815180...	7
2211	https://twitter.com/dog_rates/status/668614819...	7
2218	https://twitter.com/dog_rates/status/668507509...	10
2222	https://twitter.com/dog_rates/status/668466899...	4
2235	https://twitter.com/dog_rates/status/668171859...	7
2249	https://twitter.com/dog_rates/status/667861340...	9
2255	https://twitter.com/dog_rates/status/667773195...	8
2264	https://twitter.com/dog_rates/status/667538891...	9
2273	https://twitter.com/dog_rates/status/667470559...	11
2287	https://twitter.com/dog_rates/status/667177989...	8
2304	https://twitter.com/dog_rates/status/666983947...	11
2311	https://twitter.com/dog_rates/status/666781792...	10
2314	https://twitter.com/dog_rates/status/666701168...	8
2327	https://twitter.com/dog_rates/status/666407126...	7
2334	https://twitter.com/dog_rates/status/666293911...	3
2347	https://twitter.com/dog_rates/status/666057090...	9
2348	https://twitter.com/dog_rates/status/666055525...	10
2350	https://twitter.com/dog_rates/status/666050758...	10
2352	https://twitter.com/dog_rates/status/666044226...	6
2353	https://twitter.com/dog_rates/status/666033412...	9
2354	https://twitter.com/dog_rates/status/666029285...	7

	rating_denominator	name	doggo	floofer	pupper	puppo
56	10	a	None	None	pupper	None
649	10	a	None	None	None	None
801	10	a	None	None	None	None
1002	10	a	None	None	None	None
1004	10	a	None	None	None	None

1017	10	a	None	None	None	None
1049	10	a	None	None	pupper	None
1193	10	a	None	None	None	None
1207	10	a	None	None	None	None
1340	10	a	None	None	pupper	None
1351	50	a	None	None	None	None
1361	10	a	None	None	None	None
1368	10	a	None	None	None	None
1382	10	a	None	None	pupper	None
1499	10	a	None	None	None	None
1737	10	a	None	None	None	None
1785	10	a	None	None	None	None
1853	10	a	None	None	None	None
1854	10	a	None	None	None	None
1877	10	a	None	None	None	None
1878	10	a	None	None	None	None
1923	10	a	None	None	None	None
1941	10	a	None	None	None	None
1955	10	a	None	None	None	None
1994	10	a	None	None	None	None
2034	10	a	None	None	None	None
2066	10	a	None	None	None	None
2116	10	a	None	None	None	None
2125	10	a	None	None	None	None
2128	10	a	None	None	None	None
2146	10	a	None	None	None	None
2153	10	a	None	None	None	None
2161	10	a	None	None	None	None
2191	10	a	None	None	None	None
2198	10	a	None	None	None	None
2211	10	a	None	None	None	None
2218	10	a	None	None	None	None
2222	10	a	None	None	None	None
2235	10	a	None	None	None	None
2249	10	a	None	None	None	None
2255	10	a	None	None	None	None
2264	10	a	None	None	None	None
2273	10	a	None	None	None	None
2287	10	a	None	None	None	None
2304	10	a	None	None	None	None
2311	10	a	None	None	None	None
2314	10	a	None	None	None	None
2327	10	a	None	None	None	None
2334	10	a	None	None	None	None
2347	10	a	None	None	None	None
2348	10	a	None	None	None	None
2350	10	a	None	None	None	None

2352	10	a	None	None	None	None
2353	10	a	None	None	None	None
2354	10	a	None	None	None	None

```
[30]: #replace a with name "apple" so we not lost much more data
archive_df_clean.loc[archive_df_clean['name'] == 'a', 'name'] = 'APPLE'
archive_df_clean.head()
```

```
[30]:          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

```
[31]: name_count=archive_df_clean.name.value_counts() #6-after replace "a"with "apple"
      print(name_count.unique)
```

```
<bound method Series.unique of None          745
APPLE          55
Charlie        12
Lucy           11
Cooper         11
...
Ginger         1
Rudy           1
Sparky         1
Buddah         1
Shooter        1
Name: name, Length: 957, dtype: int64>
```

```
[32]: # view missing value count for archive
      archive_df_clean.isnull().sum()
```

```
[32]: 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
```

```
[33]: archive_df_clean.drop(['retweeted_status_id'], axis=1, inplace=True)    #7-drop
      ↪ empty column
      archive_df_clean.drop(['retweeted_status_user_id' ], axis=1, inplace=True)
      archive_df_clean.drop(['retweeted_status_timestamp'], axis=1, inplace=True)
      archive_df_clean.drop(['in_reply_to_status_id'], axis=1, inplace=True)
      archive_df_clean.drop(['in_reply_to_user_id'], axis=1, inplace=True)
```

```
[34]: # view missing value count for archive
      archive_df_clean.isnull().sum()
```

```
[34]: tweet_id          0
      timestamp        0
      source           0
      text             0
      expanded_urls    59
      rating_numerator  0
      rating_denominator 0
      name             0
      doggo            0
      floofer          0
      pupper           0
      puppo            0
      dtype: int64
```

```
[35]: archive.describe()
```

```
[35]:
```

	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

```

```
[36]: archive_df_clean.describe() # 8 -data for
      ↳rating_numerator      rating_denominator didnt change after cleaning
```

```
[36]:
      tweet_id  rating_numerator  rating_denominator
count  2.356000e+03      2356.000000      2356.000000
mean   7.427716e+17      13.126486      10.455433
std    6.856705e+16      45.876648      6.745237
min    6.660209e+17      0.000000      0.000000
25%    6.783989e+17      10.000000      10.000000
50%    7.196279e+17      11.000000      10.000000
75%    7.993373e+17      12.000000      10.000000
max    8.924206e+17     1776.000000     170.000000

```

```
[37]: #explore expanded_urls value
      archive_df_clean.expanded_urls.unique()
```

```
[37]: array(['https://twitter.com/dog_rates/status/892420643555336193/photo/1',
      'https://twitter.com/dog_rates/status/892177421306343426/photo/1',
      'https://twitter.com/dog_rates/status/891815181378084864/photo/1',
      ...,
      'https://twitter.com/dog_rates/status/666033412701032449/photo/1',
      'https://twitter.com/dog_rates/status/666029285002620928/photo/1',
      'https://twitter.com/dog_rates/status/666020888022790149/photo/1'],
      dtype=object)
```

```
[38]: # view missing value count for image
      image_df_clean.isnull().sum()
```

```
[38]: tweet_id    0
      jpg_url    0
      img_num    0
      p1         0
      p1_conf    0
      p1_dog     0
      p2         0
      p2_conf    0
      p2_dog     0
      p3         0

```

```
p3_conf      0
p3_dog       0
dtype: int64
```

```
[39]: image_df_clean.value_counts
```

```
[39]: <bound method DataFrame.value_counts of          tweet_id
jpg_url \
0      666020888022790149  https://pbs.twimg.com/media/CT4udn0WwAAOaMy.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
...
2070   891327558926688256  https://pbs.twimg.com/media/DF6hr6BUMAAzZgT.jpg
2071   891689557279858688  https://pbs.twimg.com/media/DF_q7IAWsAEuuN8.jpg
2072   891815181378084864  https://pbs.twimg.com/media/DGBdLU1WsAANxJ9.jpg
2073   892177421306343426  https://pbs.twimg.com/media/DGGmoV4XsAAUL6n.jpg
2074   892420643555336193  https://pbs.twimg.com/media/DGKD1-bXoAAIAUK.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
...
2070      2          basset  0.555712      True  English_springer
2071      1      paper_towel  0.170278     False  Labrador_retriever
2072      1      Chihuahua  0.716012      True      malamute
2073      1      Chihuahua  0.323581      True      Pekinese
2074      1          orange  0.097049     False          bagel

      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
...
2070  0.225770      True  German_short-haired_pointer  0.175219      True
2071  0.168086      True          spatula  0.040836     False
2072  0.078253      True          kelpie  0.031379      True
2073  0.090647      True      papillon  0.068957      True
2074  0.085851     False          banana  0.076110     False
```

```
[2075 rows x 12 columns]>
```

3.1.1 tidiness issues

```
[40]: archive_df_clean.shape
```

```
[40]: (2356, 12)
```

```
[41]: archive_df_clean.columns
```

```
[41]: Index(['tweet_id', 'timestamp', 'source', 'text', 'expanded_urls',  
        'rating_numerator', 'rating_denominator', 'name', 'doggo', 'floofer',  
        'pupper', 'puppo'],  
        dtype='object')
```

```
[42]: tweet_df_clean.shape
```

```
[42]: (2331, 5)
```

```
[43]: tweet_df_clean.columns
```

```
[43]: Index(['timestamp', 'tweet_id', 'retweet_count', 'favorite_count',  
        'display_text_range'],  
        dtype='object')
```

```
[44]: archive_df_clean.drop(['timestamp'], axis=1, inplace=True)  
archive_df_clean.head()
```

```
[44]:
```

	tweet_id	source	\
0	892420643555336193	<a href="http://twitter.com/download/iphone" r...	
1	892177421306343426	<a href="http://twitter.com/download/iphone" r...	
2	891815181378084864	<a href="http://twitter.com/download/iphone" r...	
3	891689557279858688	<a href="http://twitter.com/download/iphone" r...	
4	891327558926688256	<a href="http://twitter.com/download/iphone" r...	

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

	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

```
[45]: # marge tweet_df_clean and archive_df_clean
tweet_df_merge = pd.merge(archive_df_clean, tweet_df_clean ,on='tweet_id')
tweet_df_merge.set_index('tweet_id')
tweet_df_merge.head(1)
```

```
[45]:          tweet_id          source \
0  892420643555336193  <a href="http://twitter.com/download/iphone" r...

          text \
0  This is Phineas. He's a mystical boy. Only eve...

          expanded_urls  rating_numerator \
0  https://twitter.com/dog_rates/status/892420643...          13

          rating_denominator  name doggo floofer pupper puppo \
0          10 Phineas  None  None  None  None

          timestamp  retweet_count  favorite_count \
0  Tue Aug 01 16:23:56 +0000 2017          7510          35521

          display_text_range
0          [0, 85]
```

```
[46]: tweet_df_merge.shape
```

```
[46]: (2331, 15)
```

```
[47]: tweet_df_merge.describe()
```

```
[47]:          tweet_id  rating_numerator  rating_denominator  retweet_count \
count  2.331000e+03          2331.000000          2331.000000          2331.000000
mean    7.419079e+17          13.134706          10.459888          2642.187044
std     6.823170e+16          46.121847          6.781159          4468.239152
min     6.660209e+17          0.000000          0.000000           1.000000
25%     6.782670e+17          10.000000          10.000000           536.000000
50%     7.182469e+17          11.000000          10.000000          1236.000000
75%     7.986692e+17          12.000000          10.000000          3067.000000
max     8.924206e+17          1776.000000          170.000000         75918.000000

          favorite_count
count          2331.000000
```

```

mean      7423.742600
std       11527.811718
min        0.000000
25%       1291.000000
50%       3223.000000
75%       9081.500000
max       153240.000000

```

```
[48]: tweet_df_merge.tweet_id .duplicated
```

```

[48]: <bound method Series.duplicated of 0      892420643555336193
1      892177421306343426
2      891815181378084864
3      891689557279858688
4      891327558926688256
...
2326   666049248165822465
2327   666044226329800704
2328   666033412701032449
2329   666029285002620928
2330   666020888022790149
Name: tweet_id, Length: 2331, dtype: int64>

```

```
[49]: tweet_df_merge.doggo.value_counts()
```

```

[49]: None      2237
doggo      94
Name: doggo, dtype: int64

```

```
[50]: tweet_df_merge.floofer.value_counts()
```

```

[50]: None      2321
floofer      10
Name: floofer, dtype: int64

```

```
[51]: tweet_df_merge.pupper.value_counts()
```

```

[51]: None      2076
pupper      255
Name: pupper, dtype: int64

```

```
[52]: tweet_df_merge.puppo.value_counts()
```

```

[52]: None      2301
puppo      30
Name: puppo, dtype: int64

```



```
[53]: cols = ['doggo', 'floofer', 'pupper', 'puppo']
tweet_df_merge['stages_of_dog'] = tweet_df_merge[cols].apply(lambda row: '_'.
    ↪join(row.values.astype(str)), axis=1)
tweet_df_merge.drop(['doggo'], axis=1, inplace=True)
tweet_df_merge.drop(['floofer'], axis=1, inplace=True)
tweet_df_merge.drop(['pupper'], axis=1, inplace=True)
tweet_df_merge.drop(['puppo'], axis=1, inplace=True)

tweet_df_merge.head(2)
```

```
[53]:
```

	tweet_id	source \
0	892420643555336193	<a href="http://twitter.com/download/iphone" r...
1	892177421306343426	<a href="http://twitter.com/download/iphone" r...

	text \
0	This is Phineas. He's a mystical boy. Only eve...
1	This is Tilly. She's just checking pup on you...

	expanded_urls	rating_numerator \
0	https://twitter.com/dog_rates/status/892420643...	13
1	https://twitter.com/dog_rates/status/892177421...	13

	rating_denominator	name	timestamp	retweet_count \
0	10	Phineas	Tue Aug 01 16:23:56 +0000 2017	7510
1	10	Tilly	Tue Aug 01 00:17:27 +0000 2017	5574

	favorite_count	display_text_range	stages_of_dog
0	35521	[0, 85]	None_None_None_None
1	30744	[0, 138]	None_None_None_None

```
[54]: tweet_df_merge.stages_of_dog.value_counts()
```

```
[54]: None_None_None_None      1956
None_None_pupper_None       243
doggo_None_None_None        80
None_None_None_puppo        29
doggo_None_pupper_None      12
None_floofer_None_None       9
doggo_floofer_None_None       1
doggo_None_None_puppo        1
Name: stages_of_dog, dtype: int64
```

```
[55]: #replace None_None_None_None with stages_of_dog ""
tweet_df_mergev2=tweet_df_merge.copy()
tweet_df_mergev2.loc[tweet_df_mergev2['stages_of_dog'] ==_
    ↪'None_None_None_None', 'stages_of_dog'] = ''
```

```

tweet_df_mergev2.loc[tweet_df_mergev2['stages_of_dog'] ==
↳ 'doggo_None_None_None', 'stages_of_dog'] = 'doggo'
tweet_df_mergev2.loc[tweet_df_mergev2['stages_of_dog'] ==
↳ 'None_None_pupper_None', 'stages_of_dog'] = 'pupper'
tweet_df_mergev2.loc[tweet_df_mergev2['stages_of_dog'] ==
↳ 'doggo_None_pupper_None', 'stages_of_dog'] = 'pupper' #choose the oldest
tweet_df_mergev2.loc[tweet_df_mergev2['stages_of_dog'] ==
↳ 'None_None_None_puppo', 'stages_of_dog'] = 'puppo'
tweet_df_mergev2.loc[tweet_df_mergev2['stages_of_dog'] ==
↳ 'doggo_None_None_puppo', 'stages_of_dog'] = 'puppo'
tweet_df_mergev2.loc[tweet_df_mergev2['stages_of_dog'] ==
↳ 'None_floofer_None_None', 'stages_of_dog'] = 'floofer'
tweet_df_mergev2.loc[tweet_df_mergev2['stages_of_dog'] ==
↳ 'doggo_floofer_None_None', 'stages_of_dog'] = 'floofer'

tweet_df_mergev2.stages_of_dog.value_counts()

```

```

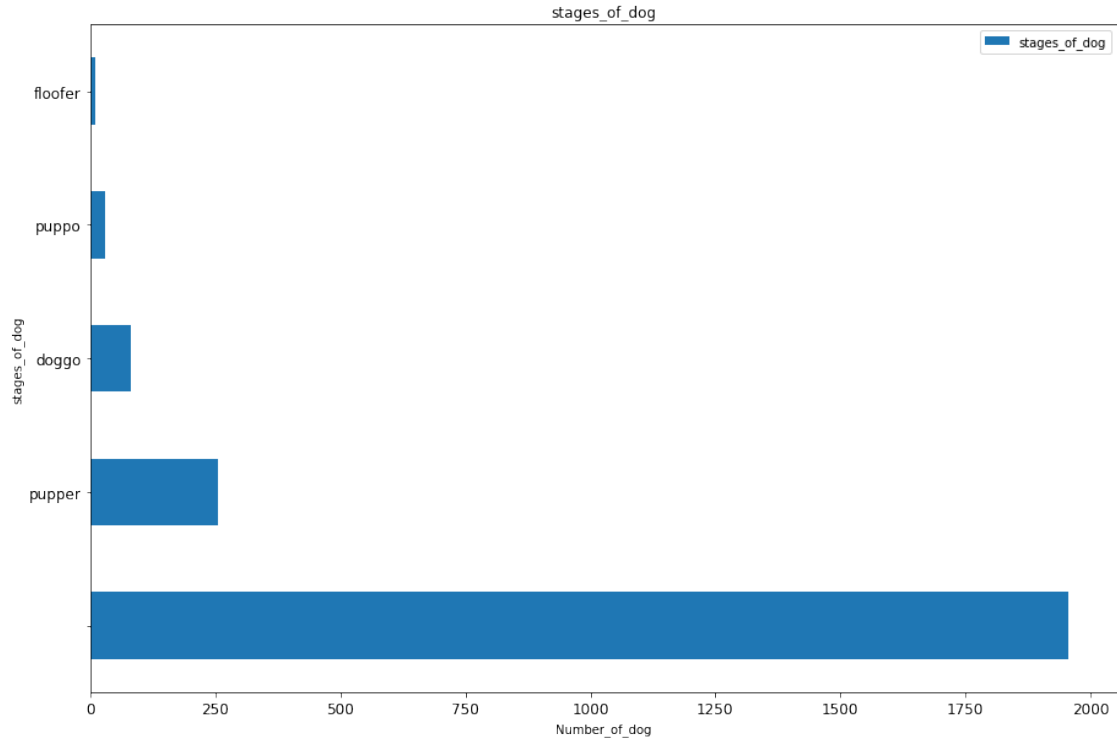
[55]:
pupper      1956
doggo        80
puppo        30
floofer      10
Name: stages_of_dog, dtype: int64

```

```

[57]: # plot stages_of_dog
stages=tweet_df_mergev2['stages_of_dog'].value_counts().plot(kind='barh',
↳ figsize=(15,10), legend=True, fontsize=12)
stages.set_ylabel("stages_of_dog")
stages.set_xlabel("Number_of_dog")
plt.IndexLocator
plt.title(("stages_of_dog"))
plt.show()

```



```
[58]: tweet_df_mergev2.head(2)
```

```
[58]:
```

	tweet_id	source \	text \	expanded_urls	rating_numerator \	rating_denominator	name	timestamp	retweet_count \	favorite_count	display_text_range	stages_of_dog
0	892420643555336193	<a href="http://twitter.com/download/iphone" r...	This is Phineas. He's a mystical boy. Only eve...	https://twitter.com/dog_rates/status/892420643...	13	10	Phineas	Tue Aug 01 16:23:56 +0000 2017	7510	35521	[0, 85]	
1	892177421306343426	<a href="http://twitter.com/download/iphone" r...	This is Tilly. She's just checking pup on you...	https://twitter.com/dog_rates/status/892177421...	13	10	Tilly	Tue Aug 01 00:17:27 +0000 2017	5574	30744	[0, 138]	

```
[59]: tweet_df_mergev2.timestamp.value_counts
```

```
[59]: <bound method IndexOpsMixin.value_counts of 0          Tue Aug 01 16:23:56 +0000
2017
1      Tue Aug 01 00:17:27 +0000 2017
2      Mon Jul 31 00:18:03 +0000 2017
3      Sun Jul 30 15:58:51 +0000 2017
4      Sat Jul 29 16:00:24 +0000 2017
...
2326   Mon Nov 16 00:24:50 +0000 2015
2327   Mon Nov 16 00:04:52 +0000 2015
2328   Sun Nov 15 23:21:54 +0000 2015
2329   Sun Nov 15 23:05:30 +0000 2015
2330   Sun Nov 15 22:32:08 +0000 2015
Name: timestamp, Length: 2331, dtype: object>
```

```
[60]: # merge tweet_df_merge and image_df_clean
tweet_df_main = pd.merge(tweet_df_mergev2, image_df_clean ,on='tweet_id')
tweet_df_main.set_index('tweet_id')
tweet_df_main.columns
```

```
[60]: Index(['tweet_id', 'source', 'text', 'expanded_urls', 'rating_numerator',
'rating_denominator', 'name', 'timestamp', 'retweet_count',
'favorite_count', 'display_text_range', 'stages_of_dog', 'jpg_url',
'img_num', 'p1', 'p1_conf', 'p1_dog', 'p2', 'p2_conf', 'p2_dog', 'p3',
'p3_conf', 'p3_dog'],
dtype='object')
```

```
[61]: tweet_df_main.shape # deling with one database
```

```
[61]: (2059, 23)
```

```
[62]: tweet_df_main.source.value_counts()
```

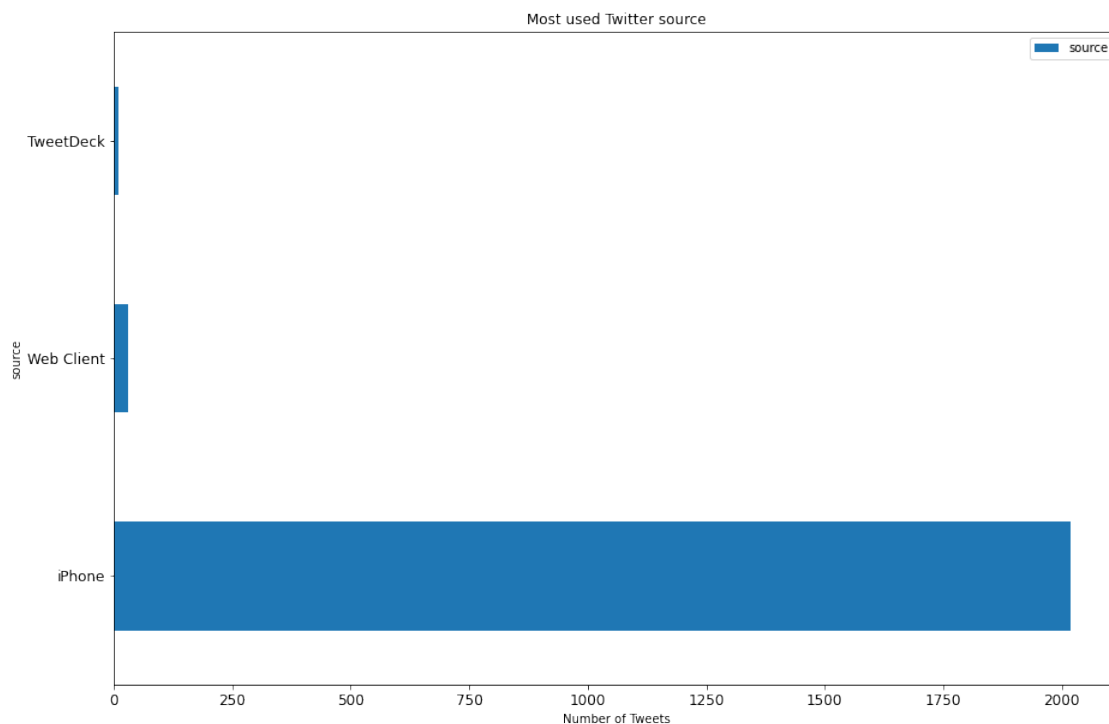
```
[62]: <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for
iPhone</a>          2019
<a href="http://twitter.com" rel="nofollow">Twitter Web Client</a>
30
<a href="https://about.twitter.com/products/tweetdeck"
rel="nofollow">TweetDeck</a>          10
Name: source, dtype: int64
```

```
[63]: #replace None_None_None_None with stages_of_dog ""
tweet_df_mainv2=tweet_df_main.copy()
tweet_df_mainv2.loc[tweet_df_mainv2['source'] == '<a href="http://twitter.com/
↳download/iphone" rel="nofollow">Twitter for iPhone</a>', 'source'] = 'iPhone'
tweet_df_mainv2.loc[tweet_df_mainv2['source'] == '<a href="http://twitter.com"
↳rel="nofollow">Twitter Web Client</a>', 'source'] = 'Web Client'
```

```
tweet_df_mainv2.loc[tweet_df_mainv2['source'] == '<a href="https://about.
↳twitter.com/products/tweetdeck" rel="nofollow">TweetDeck</a>', 'source'] =
↳'TweetDeck'
tweet_df_mainv2.source.value_counts()
```

```
[63]: iPhone          2019
      Web Client       30
      TweetDeck        10
      Name: source, dtype: int64
```

```
[64]: # plot Most used Twitter source
      Twitter_source=tweet_df_mainv2['source'].value_counts().plot(kind='barh',
↳figsize=(15,10), legend=True, fontsize=12)
      Twitter_source.set_ylabel("source")
      Twitter_source.set_xlabel("Number of Tweets")
      plt.title(("Most used Twitter source"))
      plt.show()
```



```
[65]: # save new datasets
      tweet_df_mainv2.to_csv('main_df.csv', index=False)
      main_df=pd.read_csv('main_df.csv')
      main_df.columns
```

```
[65]: Index(['tweet_id', 'source', 'text', 'expanded_urls', 'rating_numerator',
          'rating_denominator', 'name', 'timestamp', 'retweet_count',
          'favorite_count', 'display_text_range', 'stages_of_dog', 'jpg_url',
          'img_num', 'p1', 'p1_conf', 'p1_dog', 'p2', 'p2_conf', 'p2_dog', 'p3',
          'p3_conf', 'p3_dog'],
          dtype='object')
```

3.2 Resource

Tweepy Documentation <http://docs.tweepy.org/en/latest/index.html>

Select & Replace Values in Column based on Condition
<https://datatofish.com/select-rows-pandas-dataframe/>
<https://pythonexamples.org/pandas-dataframe-replace-values-in-column-based-on-condition/>
<https://www.codegrepper.com/code-examples/python/pandas+replace+values+in+column+based+on+condition>
<https://thispointer.com/python-pandas-select-rows-in-dataframe-by-conditions-on-multiple-columns/>

concatenate multiple column <https://stackoverflow.com/questions/39291499/how-to-concatenate-multiple-column-values-into-a-single-column-in-panda-datafram>

Convert Text file to JSON in Python <https://www.geeksforgeeks.org/convert-text-file-to-json-in-python/>
<https://www.marsja.se/how-to-read-and-write-json-files-using-python-and-pandas/>
<https://amitshankar.github.io/analyzing-twitter-feed-part-1-wrangling-code.htm>
https://github.com/vprusso/youtube_tutorials/tree/master/twitter_python
<https://github.com/gouravaich/wrangle-analyze-weratedogs-twitter>

How to Convert Jupyter Notebooks into PDFs <https://towardsdatascience.com/how-to-convert-jupyter-notebooks-into-pdf-5accaef3758>
<https://nbconvert.readthedocs.io/en/latest/>
<https://pandoc.org/getting-started.html>
<https://github.com/pyppeteer/pyppeteer>
<https://www.latex-project.org/>

Past project <https://github.com/abdelrazekrizk/IBM-Data-Science-by-IBM-on-Coursera-Capstone/blob/master/Capstone%20Project/Business%20Consulting%20Making%20Decisions.ipynb>

4 Fun_Out_Project

4.1 My_Signature

```
[66]: api=tweepy.API(auth) # 30 Days of Python - Day 21 - Twitter API with Tweepy - Python TUTORIAL
```

```
[67]: me=api.me()
```

```
[68]: # get to know my followers
print(me.screen_name)
for friend in me.friends():
```

```
print(friend.screen_name)
```

```
RizkAbdelrazek  
HL7  
MS_ITProCA  
TwitterDev  
dog_rates  
VisualStudio  
windowsdev  
amyklobuchar  
crpietschmann  
MSVirtAcademy  
stevenborg  
FirelyTeam  
IntelHealth  
IBMWatsonHealth  
Health_IT  
Build5Nines  
AzureSQL  
SenRonJohnson  
AzureDataStudio  
eltaeboficial  
chadwickboseman
```

```
[69]: print("followers_count :",me.followers_count)  
      print("Signature")  
  
      print (me.screen_name)
```

```
followers_count : 52  
Signature  
RizkAbdelrazek
```