wrangle_act

July 11, 2018

In [1]:
```
import pandas as pd
import numpy as np
import requests
import json
import os
import tweepy
```

1 Step 1: Data Gathering

In [2]:
```
#Twitter Authentication

consumer_key = ''
consumer_secret = ''
access_token = ''
access_secret = ''

auth = tweepy.OAuthHandler(consumer_key, consumer_secret)
auth.set_access_token(access_token, access_secret)
api = tweepy.API(auth,wait_on_rate_limit=True)
```

In [3]:
```
#Importing DataFrame 1(twitter_archive from existing file)

twitter_archive=pd.read_csv("twitter-archive-enhanced.csv")

#Importing DataFrame 2(image_predictions from url link)
url='https://d17h27t6h515a5.cloudfront.net/topher/2017/August/599fd2ad_image-predictions
response=requests.get(url)

pred_file_name='image_predictions.tsv'
arch_file_name='twitter-archive-enhanced'

with open (os.path.join(pred_file_name), mode='wb') as filee:
    filee.write(response.content)

image_predictions=pd.read_csv('image_predictions.tsv', sep='\t')
```

In [4]:
```
# Preparing copy of Dataframes (tw_copy,im_test)
```

```
tw_copy=twitter_archive.copy()
im_test=image_predictions.copy()
```

In [6]:
```
#Creating 3rd Data Frame(tweetinfo) from twitter API (Containing Tweet Info like Retweet
# Removing tweets which not found / Deleted

tweetlist=[]
notfoundlist=[]

for id in tw_copy.tweet_id:
    try:
        tweet = api.get_status(id)
        with open('data.txt', 'a') as outfile:
            json.dump(tweet._json, outfile)
        retweet=tweet._json['retweet_count']
        favorite=tweet._json['favorite_count']
        tweetlist.append([id,retweet,favorite])
    except:
        notfoundlist.append(id)
        continue

tweetinfo = pd.DataFrame(tweetlist, columns=('tweet_id', 'retweet_count', 'favorite_coun

print(tweetinfo.shape[0])    #:2344
print(len(notfoundlist))     #:12
```

```
2344
12
```

2 Step 2 :Access Data

In [166]:
```
tweetinfo.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2344 entries, 0 to 2343
Data columns (total 3 columns):
tweet_id          2344 non-null int64
retweet_count     2344 non-null int64
favorite_count    2344 non-null int64
dtypes: int64(3)
memory usage: 55.0 KB
```

In [167]:
```
tw_copy.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2171 entries, 0 to 2355
```

```
Data columns (total 13 columns):
tweet_id         2171 non-null object
source           2171 non-null object
text             2171 non-null object
expanded_urls    2171 non-null object
name             2171 non-null object
url              2171 non-null object
rating           2171 non-null float64
hour             2171 non-null int64
weekday          2171 non-null int64
date             2171 non-null int64
month            2171 non-null int64
year             2171 non-null int64
dog_stage        2171 non-null object
dtypes: float64(1), int64(5), object(7)
memory usage: 237.5+ KB
```

```
In [168]: im_test.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2075 entries, 0 to 2074
Data columns (total 7 columns):
tweet_id          2075 non-null object
jpg_url           2075 non-null object
img_num           2075 non-null int64
breed             2075 non-null category
breed_prob        2075 non-null float64
retweet_count     2075 non-null object
favorite_count    2075 non-null object
dtypes: category(1), float64(1), int64(1), object(4)
memory usage: 121.4+ KB
```

```
In [169]: tweetinfo.head()
```

Out[169]:

	tweet_id	retweet_count	favorite_count
0	892420643555336193	8548	38654
1	892177421306343426	6285	33127
2	891815181378084864	4166	24934
3	891689557279858688	8676	42025
4	891327558926688256	9434	40183

```
In [170]: tw_copy.head()
```

Out[170]:

	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      name  \
0  https://twitter.com/dog_rates/status/892420643...   Phineas
1  https://twitter.com/dog_rates/status/892177421...     Tilly
2  https://twitter.com/dog_rates/status/891815181...    Archie
3  https://twitter.com/dog_rates/status/891689557...     Darla
4  https://twitter.com/dog_rates/status/891327558...  Franklin

                                                 url  rating  hour  weekday  \
0  https://twitter.com/dog_rates/status/892420643...    13.0    16        1
1  https://twitter.com/dog_rates/status/892177421...    13.0     0        1
2  https://twitter.com/dog_rates/status/891815181...    12.0     0        0
3  https://twitter.com/dog_rates/status/891689557...    13.0    15        6
4  https://twitter.com/dog_rates/status/891327558...    12.0    16        5

   date  month  year dog_stage
0     1      8  2017      None
1     1      8  2017      None
2    31      7  2017      None
3    30      7  2017      None
4    29      7  2017      None
```

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

Out[171]:
```
             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  breed_prob retweet_count favorite_count
0        1  Welsh_springer_spaniel    0.465074           517           2564
1        1                redbone    0.506826            47            130
2        1        German_shepherd    0.596461            44            125
3        1     Rhodesian_ridgeback    0.408143           141            299
4        1      miniature_pinscher    0.560311            41            109
```

3 Step 3 :Clean Data

#Data Cleansing Process

Here we will be taking care of below Issues:

Quality Issues: 1.5.Remove All Retweets (Since we needs only Original Tweets) 2.Remove record whole url don't exist or Invalid (Tweet Deleted) 3.Ignore records having Out of bound ratings like: (1776/10 , 960/0), 4.Rationalize all rating Records out of 10 5.Segregated URL, Keep most appropriate One 6.Replace all Faulty Dog names to 'None' 7.Changing Data Type of 'breed' to Category 8.Changing type of retweet_count,favorite_count to int

Tidiness Issues: 1.Segregate Hour,Day,Date,Month,Year from DateTime column 2.Multiple Dog stages into 1 'Dog Stage' 3.Defining 'breed' , 'breed_probablity' columns considering p1_conf,p2_conf,p3_conf to remove excess columns

Handling Quality Issues

```
In [9]: #Defining 'breed' , 'breed_probablity' columns considering p1_conf,p2_conf,p3_conf
        for i in range(im_test.shape[0]):
        #    print(i)
            if im_test.loc[i,'p1_dog']==True:
                im_test.loc[i,'breed']=im_test.loc[i,'p1']
                im_test.loc[i,'breed_prob']=im_test.loc[i,'p1_conf']
            elif im_test.loc[i,'p2_dog']==True:
                im_test.loc[i,'breed']=im_test.loc[i,'p2']
                im_test.loc[i,'breed_prob']=im_test.loc[i,'p2_conf']
            elif im_test.loc[i,'p3_dog']==True:
                im_test.loc[i,'breed']=im_test.loc[i,'p3']
                im_test.loc[i,'breed_prob']=im_test.loc[i,'p3_conf']
            else:
                im_test.loc[i,'breed']='No Dog'
                im_test.loc[i,'breed_prob']=0
```

```
In [11]: #Modifying DataFrame: im_test (Contain Only Dog's data)
         #Removing Extra Columns

         im_test=im_test[['tweet_id','jpg_url','img_num','breed','breed_prob']]
         #dim_final=dim_final[dim_final.breed != 'No Dog'].reset_index()
```

```
In [10]: print(im_test.head())
```

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

   img_num                     p1   p1_conf  p1_dog                 p2  \
0        1  Welsh_springer_spaniel  0.465074    True             collie
1        1                redbone  0.506826    True  miniature_pinscher
```

```
2        1         German_shepherd  0.596461    True            malinois
3        1     Rhodesian_ridgeback  0.408143    True             redbone
4        1      miniature_pinscher  0.560311    True           Rottweiler

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

                    breed  breed_prob
0  Welsh_springer_spaniel    0.465074
1                 redbone    0.506826
2         German_shepherd    0.596461
3     Rhodesian_ridgeback    0.408143
4      miniature_pinscher    0.560311
```

In [13]:
```
#Taking 97.5% confidenece Interval for dog probability (cutting off 2.5 % negative tail
#changing Data Type of 'breed' to Category

Lower_limit=np.percentile(im_test.breed_prob, 2.5)
Upper_limit=np.percentile(im_test.breed_prob, 100)

im_test=im_test[im_test.breed_prob>=Lower_limit]
im_test.breed=im_test.breed.astype('category')

print(im_test.breed.value_counts())
print(Lower_limit,Upper_limit)
```

```
No Dog                          324
golden_retriever                173
Labrador_retriever              113
Pembroke                         96
Chihuahua                        95
pug                              65
toy_poodle                       52
chow                             51
Samoyed                          46
Pomeranian                       42
malamute                         34
cocker_spaniel                   34
French_bulldog                   32
Chesapeake_Bay_retriever         31
miniature_pinscher               26
Cardigan                         23
Eskimo_dog                       22
```

```
Staffordshire_bullterrier       22
German_shepherd                 21
beagle                          21
Siberian_husky                  20
Shih-Tzu                        20
Rottweiler                      19
kuvasz                          19
Lakeland_terrier                19
Shetland_sheepdog               19
Maltese_dog                     19
Italian_greyhound               17
basset                          17
West_Highland_white_terrier     16
                               ...
Rhodesian_ridgeback              4
Saluki                           4
giant_schnauzer                  4
Scottish_deerhound               4
Tibetan_terrier                  4
Weimaraner                       4
Welsh_springer_spaniel           4
Irish_water_spaniel              3
toy_terrier                      3
komondor                         3
curly-coated_retriever           3
Brabancon_griffon                3
cairn                            3
briard                           3
Leonberg                         3
Greater_Swiss_Mountain_dog       3
black-and-tan_coonhound          2
Sussex_spaniel                   2
groenendael                      2
Australian_terrier               2
Appenzeller                      2
wire-haired_fox_terrier          2
Irish_wolfhound                  1
clumber                          1
EntleBucher                      1
Bouvier_des_Flandres             1
Scotch_terrier                   1
Japanese_spaniel                 1
silky_terrier                    1
standard_schnauzer               1
Name: breed, Length: 114, dtype: int64
0.0 0.999956
```

In [14]:
```
#Merging im_test,tweetinfo into im_test
#Changing type of retweet_count,favorite_count to int
#Updating NaN retweet_count,favorite_count to '0' (indicating not found)

im_test=pd.merge(im_test,tweetinfo,on=['tweet_id'],how='left')

im_test.retweet_count=im_test.retweet_count.astype(str).str[:-2]
im_test.retweet_count=im_test.retweet_count.replace('n',0)
im_test.favorite_count=im_test.favorite_count.astype(str).str[:-2]
im_test.favorite_count=im_test.favorite_count.replace('n',0)


print(im_test.head(2))
```

```
             tweet_id                                          jpg_url  \
0  666020888022790149  https://pbs.twimg.com/media/CT4udn0WwAA0aMy.jpg
1  666029285002620928  https://pbs.twimg.com/media/CT42GRgUYAA5iDo.jpg

   img_num                  breed  breed_prob retweet_count favorite_count
0        1  Welsh_springer_spaniel    0.465074           517           2564
1        1                redbone    0.506826            47            130
```

In [15]:
```
# Remove All Retweets (Since we needs only Original Tweets)
print(tw_copy.shape[0])
tw_copy=tw_copy[tw_copy.retweeted_status_id.isnull()]
print(tw_copy.shape[0])
```

```
2356
2175
```

In [16]:
```
# Segregated URL, Keep most appropriate One

tw_copy.expanded_urls=tw_copy.expanded_urls.fillna("No URL")

def urlextract(dfurl):
    dfurl['url']=dfurl['expanded_urls'].split(',')[len(dfurl['expanded_urls'].split(','
    return dfurl['url']

tw_copy['url']=tw_copy.apply(urlextract,axis=1)
```

In [17]:
```
#Rationalize all rating Records out of 10
#Drop Numerator and Denominator retweeted_status_user_id,retweeted_status_timestamp col

tw_copy['rating']=(tw_copy['rating_numerator']/tw_copy['rating_denominator'])*10
tw_copy=tw_copy.drop(['rating_numerator','rating_denominator','retweeted_status_user_id

print(tw_copy.head())
```

```
            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  \
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      name doggo floofer  \
0  https://twitter.com/dog_rates/status/892420643...   Phineas  None    None
1  https://twitter.com/dog_rates/status/892177421...     Tilly  None    None
2  https://twitter.com/dog_rates/status/891815181...    Archie  None    None
3  https://twitter.com/dog_rates/status/891689557...     Darla  None    None
4  https://twitter.com/dog_rates/status/891327558...  Franklin  None    None

  pupper puppo                                                url  rating
0   None  None  https://twitter.com/dog_rates/status/892420643...    13.0
1   None  None  https://twitter.com/dog_rates/status/892177421...    13.0
2   None  None  https://twitter.com/dog_rates/status/891815181...    12.0
3   None  None  https://twitter.com/dog_rates/status/891689557...    13.0
4   None  None  https://twitter.com/dog_rates/status/891327558...    12.0
```

In [18]:
```
#Records Cleasing as per manual observations
#1.Rating for tweet_id:835246439529840640 should be 13/10 (Interpretted from Tweet's Te
#2.Rating for tweet:id:835152434251116546 should be 11/10 (Interpretted from Tweet's Im
#3.Rating for tweet: 786709082849828864: Valid Rating>9.75/10
#4.Remove record with tweet_id: 810984652412424192 (Invalid interpretation of dog ratin
```

```
#5.Remove record with tweet_id: 855862651834028034,855860136149123072,838150277551247360

tw_copy.tweet_id=tw_copy.tweet_id.astype(str)
im_test.tweet_id=im_test.tweet_id.astype(str)

#print(tw_copy[tw_copy.tweet_id=='835246439529840640'])
#print(tw_copy[tw_copy.tweet_id=='835152434251116546'])
#print(tw_copy[tw_copy.tweet_id=='855862651834028034'])
#print(tw_copy[tw_copy.tweet_id=='838150277551247360'])


tw_copy.loc[tw_copy.tweet_id == '835246439529840640','rating']=13
tw_copy.loc[tw_copy.tweet_id == '835152434251116546','rating']=11
tw_copy.loc[tw_copy.tweet_id == '786709082849828864','rating']=9.75
tw_copy=tw_copy[~tw_copy.tweet_id.isin(['855862651834028034','855860136149123072','8381

#print(tw_copy[tw_copy.tweet_id=='835246439529840640'])
#print(tw_copy[tw_copy.tweet_id=='835152434251116546'])
#print(tw_copy[tw_copy.tweet_id=='855862651834028034'])
#print(tw_copy[tw_copy.tweet_id=='838150277551247360'])
```

In [19]:
```
#Replace all Faulty Dog names to 'None'

invalid_names=['a','all','an','by','his','not','O','officially','old','one','quite','su

for invalid in invalid_names:
    tw_copy.loc[tw_copy.name == invalid,'name']='None'
print(tw_copy.name.value_counts())
```

```
None        764
Charlie      11
Lucy         11
Cooper       10
Oliver       10
Penny         9
Tucker        9
Winston       8
Lola          8
Sadie         8
Toby          7
Daisy         7
Bella         6
Stanley       6
Bailey        6
Bo            6
Oscar         6
Koda          6
Jax           6
```

```
Scout         5
Bentley       5
Buddy         5
Dave          5
Rusty         5
Milo          5
Chester       5
Leo           5
Louis         5
Bear          4
Gus           4
            ...
Stella        1
Crimson       1
Mimosa        1
Mollie        1
Al            1
Lacy          1
Kyro          1
Dido          1
Frönq         1
Skittle       1
Dylan         1
Betty         1
Clybe         1
Ebby          1
Tango         1
Fido          1
Butter        1
Maisey        1
Sundance      1
Noah          1
Fynn          1
Herb          1
Jockson       1
Gustav        1
Stubert       1
Cilantro      1
Tito          1
Sora          1
Batdog        1
Lupe          1
Name: name, Length: 941, dtype: int64
```

```
In [20]: #Date Time Column Type conversion to DataTime
         tw_copy.timestamp = pd.to_datetime(tw_copy.timestamp)
```

```
In [21]: #Segregate Hour,Day,Date,Month,Year from DateTime column
```

```
        tw_copy['hour']=tw_copy['timestamp'].dt.hour.astype(int)
        tw_copy['weekday']=tw_copy['timestamp'].dt.dayofweek.astype(int)
        tw_copy['date']=tw_copy['timestamp'].dt.day.astype(int)
        tw_copy['month']=tw_copy['timestamp'].dt.month.astype(int)
        tw_copy['year']=tw_copy['timestamp'].dt.year.astype(int)
        print(tw_copy.head(2))
```

```
             tweet_id  in_reply_to_status_id  in_reply_to_user_id  \
0  892420643555336193                    NaN                  NaN
1  892177421306343426                    NaN                  NaN

            timestamp                                             source  \
0 2017-08-01 16:23:56  <a href="http://twitter.com/download/iphone" r...
1 2017-08-01 00:17:27  <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     name doggo floofer  \
0  https://twitter.com/dog_rates/status/892420643...  Phineas  None    None
1  https://twitter.com/dog_rates/status/892177421...    Tilly  None    None

  pupper puppo                                                url  rating  \
0   None  None  https://twitter.com/dog_rates/status/892420643...    13.0
1   None  None  https://twitter.com/dog_rates/status/892177421...    13.0

   hour  weekday  date  month  year
0    16        1     1      8  2017
1     0        1     1      8  2017
```

In [22]:
```
        #Multiple Dog stages into 1 'Dog Stages'
        tw_copy['dog_stage'] = 'None'

        def dogstagecon(dog):
            stage=[]
            if dog.doggo=='doggo':
                stage.append('doggo')
            if dog.floofer=='floofer':
                stage.append('floofer')
            if dog.pupper=='pupper':
                stage.append('pupper')
            if dog.puppo=='puppo':
                stage.append('puppo')
            if len(stage)<1:
                stage.append('None')
            dog['dog_stage']=','.join(stage)
```

```
            return dog

        tw_copy=tw_copy.apply(dogstagecon,axis=1)

        tw_copy=tw_copy.drop(['doggo','floofer','pupper','puppo'],axis=1)

        print(tw_copy.dog_stage.value_counts())
```

```
None             1827
pupper            224
doggo              75
puppo              24
doggo,pupper       10
floofer             9
doggo,puppo         1
doggo,floofer       1
Name: dog_stage, dtype: int64
```

```
In [25]: # Drop all column which are not needed
         # Count number of Replied Tweets
         replied_tweet_count=tw_copy.in_reply_to_status_id.shape[0]-sum(tw_copy.in_reply_to_stat
         tw_copy=tw_copy.drop(['timestamp','in_reply_to_status_id','in_reply_to_user_id'],axis=1

In [26]: print(replied_tweet_count)
         print(tw_copy.head(32))
```

```
75
             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...
5   891087950875897856  <a href="http://twitter.com/download/iphone" r...
6   890971913173991426  <a href="http://twitter.com/download/iphone" r...
7   890729181411237888  <a href="http://twitter.com/download/iphone" r...
8   890609185150312448  <a href="http://twitter.com/download/iphone" r...
9   890240255349198849  <a href="http://twitter.com/download/iphone" r...
10  890006608113172480  <a href="http://twitter.com/download/iphone" r...
11  889880896479866881  <a href="http://twitter.com/download/iphone" r...
12  889665388333682689  <a href="http://twitter.com/download/iphone" r...
13  889638837579907072  <a href="http://twitter.com/download/iphone" r...
14  889531135344209921  <a href="http://twitter.com/download/iphone" r...
15  889278841981685760  <a href="http://twitter.com/download/iphone" r...
16  888917238123831296  <a href="http://twitter.com/download/iphone" r...
17  888804989199671297  <a href="http://twitter.com/download/iphone" r...
18  888554962724278272  <a href="http://twitter.com/download/iphone" r...
20  888078434458587136  <a href="http://twitter.com/download/iphone" r...
```

```
21  887705289381826560  <a href="http://twitter.com/download/iphone" r...
22  887517139158093824  <a href="http://twitter.com/download/iphone" r...
23  887473957103951883  <a href="http://twitter.com/download/iphone" r...
24  887343217045368832  <a href="http://twitter.com/download/iphone" r...
25  887101392804085760  <a href="http://twitter.com/download/iphone" r...
26  886983233522544640  <a href="http://twitter.com/download/iphone" r...
27  886736880519319552  <a href="http://twitter.com/download/iphone" r...
28  886680336477933568  <a href="http://twitter.com/download/iphone" r...
29  886366144734445568  <a href="http://twitter.com/download/iphone" r...
30  886267009285017600  <a href="http://twitter.com/download/iphone" r...
31  886258384151887873  <a href="http://twitter.com/download/iphone" r...
33  885984800019947520  <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...
5   Here we have a majestic great white breaching ...
6   Meet Jax. He enjoys ice cream so much he gets ...
7   When you watch your owner call another dog a g...
8   This is Zoey. She doesn't want to be one of th...
9   This is Cassie. She is a college pup. Studying...
10  This is Koda. He is a South Australian decksha...
11  This is Bruno. He is a service shark. Only get...
12  Here's a puppo that seems to be on the fence a...
13  This is Ted. He does his best. Sometimes that'...
14  This is Stuart. He's sporting his favorite fan...
15  This is Oliver. You're witnessing one of his m...
16  This is Jim. He found a fren. Taught him how t...
17  This is Zeke. He has a new stick. Very proud o...
18  This is Ralphus. He's powering up. Attempting ...
20  This is Gerald. He was just told he didn't get...
21  This is Jeffrey. He has a monopoly on the pool...
22  I've yet to rate a Venezuelan Hover Wiener. Th...
23  This is Canela. She attempted some fancy porch...
24  You may not have known you needed to see this ...
25  This... is a Jubilant Antarctic House Bear. We...
26  This is Maya. She's very shy. Rarely leaves he...
27  This is Mingus. He's a wonderful father to his...
28  This is Derek. He's late for a dog meeting. 13...
29  This is Roscoe. Another pupper fallen victim t...
30  @NonWhiteHat @MayhewMayhem omg hello tanner yo...
31  This is Waffles. His doggles are pupside down...
33  Viewer discretion advised. This is Jimbo. He w...

                                      expanded_urls      name  \
```

0	https://twitter.com/dog_rates/status/892420643...	Phineas
1	https://twitter.com/dog_rates/status/892177421...	Tilly
2	https://twitter.com/dog_rates/status/891815181...	Archie
3	https://twitter.com/dog_rates/status/891689557...	Darla
4	https://twitter.com/dog_rates/status/891327558...	Franklin
5	https://twitter.com/dog_rates/status/891087950...	None
6	https://gofundme.com/ydvmve-surgery-for-jax,ht...	Jax
7	https://twitter.com/dog_rates/status/890729181...	None
8	https://twitter.com/dog_rates/status/890609185...	Zoey
9	https://twitter.com/dog_rates/status/890240255...	Cassie
10	https://twitter.com/dog_rates/status/890006608...	Koda
11	https://twitter.com/dog_rates/status/889880896...	Bruno
12	https://twitter.com/dog_rates/status/889665388...	None
13	https://twitter.com/dog_rates/status/889638837...	Ted
14	https://twitter.com/dog_rates/status/889531135...	Stuart
15	https://twitter.com/dog_rates/status/889278841...	Oliver
16	https://twitter.com/dog_rates/status/888917238...	Jim
17	https://twitter.com/dog_rates/status/888804989...	Zeke
18	https://twitter.com/dog_rates/status/888554962...	Ralphus
20	https://twitter.com/dog_rates/status/888078434...	Gerald
21	https://twitter.com/dog_rates/status/887705289...	Jeffrey
22	https://twitter.com/dog_rates/status/887517139...	None
23	https://twitter.com/dog_rates/status/887473957...	Canela
24	https://twitter.com/dog_rates/status/887343217...	None
25	https://twitter.com/dog_rates/status/887101392...	None
26	https://twitter.com/dog_rates/status/886983233...	Maya
27	https://www.gofundme.com/mingusneedsus,https:/...	Mingus
28	https://twitter.com/dog_rates/status/886680336...	Derek
29	https://twitter.com/dog_rates/status/886366144...	Roscoe
30	No URL	None
31	https://twitter.com/dog_rates/status/886258384...	Waffles
33	https://twitter.com/dog_rates/status/885984800...	Jimbo

	url	rating	hour	weekday	\
0	https://twitter.com/dog_rates/status/892420643...	13.0	16	1	
1	https://twitter.com/dog_rates/status/892177421...	13.0	0	1	
2	https://twitter.com/dog_rates/status/891815181...	12.0	0	0	
3	https://twitter.com/dog_rates/status/891689557...	13.0	15	6	
4	https://twitter.com/dog_rates/status/891327558...	12.0	16	5	
5	https://twitter.com/dog_rates/status/891087950...	13.0	0	5	
6	https://twitter.com/dog_rates/status/890971913...	13.0	16	4	
7	https://twitter.com/dog_rates/status/890729181...	13.0	0	4	
8	https://twitter.com/dog_rates/status/890609185...	13.0	16	3	
9	https://twitter.com/dog_rates/status/890240255...	14.0	15	2	
10	https://twitter.com/dog_rates/status/890006608...	13.0	0	2	
11	https://twitter.com/dog_rates/status/889880896...	13.0	16	1	
12	https://twitter.com/dog_rates/status/889665388...	13.0	1	1	
13	https://twitter.com/dog_rates/status/889638837...	12.0	0	1	

```
14  https://twitter.com/dog_rates/status/889531135...    13.0    17        0
15  https://twitter.com/dog_rates/status/889278841...    13.0     0        0
16  https://twitter.com/dog_rates/status/888917238...    12.0     0        6
17  https://twitter.com/dog_rates/status/888804989...    13.0    16        5
18  https://twitter.com/dog_rates/status/888554962...    13.0     0        5
20  https://twitter.com/dog_rates/status/888078434...    12.0    16        3
21  https://twitter.com/dog_rates/status/887705289...    13.0    16        2
22  https://twitter.com/dog_rates/status/887517139...    14.0     3        2
23  https://twitter.com/dog_rates/status/887473957...    13.0     0        2
24  https://twitter.com/dog_rates/status/887343217...    13.0    16        1
25  https://twitter.com/dog_rates/status/887101392...    12.0     0        1
26  https://twitter.com/dog_rates/status/886983233...    13.0    16        0
27  https://twitter.com/dog_rates/status/886736880...    13.0    23        6
28  https://twitter.com/dog_rates/status/886680336...    13.0    20        6
29  https://twitter.com/dog_rates/status/886366144...    12.0    23        5
30                                              No URL    12.0    16        5
31  https://twitter.com/dog_rates/status/886258384...    13.0    16        5
33  https://twitter.com/dog_rates/status/885984800...    12.0    22        4

    date  month  year dog_stage
0      1      8  2017      None
1      1      8  2017      None
2     31      7  2017      None
3     30      7  2017      None
4     29      7  2017      None
5     29      7  2017      None
6     28      7  2017      None
7     28      7  2017      None
8     27      7  2017      None
9     26      7  2017     doggo
10    26      7  2017      None
11    25      7  2017      None
12    25      7  2017     puppo
13    25      7  2017      None
14    24      7  2017     puppo
15    24      7  2017      None
16    23      7  2017      None
17    22      7  2017      None
18    22      7  2017      None
20    20      7  2017      None
21    19      7  2017      None
22    19      7  2017      None
23    19      7  2017      None
24    18      7  2017      None
25    18      7  2017      None
26    17      7  2017      None
27    16      7  2017      None
28    16      7  2017      None
```

```
29    15      7  2017    pupper
30    15      7  2017      None
31    15      7  2017      None
33    14      7  2017      None
```

In [38]:
```
#Merging im_test,tw_copy as : clean_df (Dimention Table)
#Replacing Source as Appropriate Source and changing type to categorical variable

clean_df=pd.DataFrame()
clean_df=pd.merge(im_test,tw_copy,on=['tweet_id'],how='left')
clean_df=clean_df.drop(['jpg_url','img_num','url','expanded_urls','text'],axis=1)
clean_df.source=clean_df.source.astype('category')
clean_df.source=clean_df.source.replace(['<a href="http://twitter.com/download/iphone"

clean_df=clean_df[~clean_df.source.isnull()]
```

In [90]:
```
#Changing type of Tear,day,month,year to Int

clean_df['hour']=clean_df['hour'].astype(int)
clean_df['weekday']=clean_df['weekday'].astype(int)
clean_df['date']=clean_df['date'].astype(int)
clean_df['month']=clean_df['month'].astype(int)
clean_df['year']=clean_df['year'].astype(int)
clean_df['retweet_count']=clean_df['retweet_count'].astype(int)
clean_df['favorite_count']=clean_df['favorite_count'].astype(int)

int_day=[0,1,2,3,4,5,6]
str_day=['Monday','Tuesday','Wednesday','Thursday','Friday','Saturday','Sunday']

clean_df.weekday.replace(int_day, str_day, inplace=True)

int_month=[1,2,3,4,5,6,7,8,9,10,11,12]
str_month=['January','February','March','April','May','June','July','August','September

clean_df.month.replace(int_month, str_month, inplace=True)

print(clean_df.tail(10))
print(clean_df.info())
```

```
                tweet_id                     breed  breed_prob retweet_count  \
2065  890240255349198849                 Pembroke    0.511319          7441
2066  890609185150312448             Irish_terrier    0.487574          4277
2067  890729181411237888                Pomeranian    0.566142         18943
2068  890971913173991426              Appenzeller    0.341703          2079
2069  891087950875897856  Chesapeake_Bay_retriever    0.425595          3124
2070  891327558926688256                   basset    0.555712          9434
2071  891689557279858688        Labrador_retriever    0.168086          8676
```

```
2072  891815181378084864                Chihuahua    0.716012          4166
2073  892177421306343426                Chihuahua    0.323581          6285
2074  892420643555336193                   No Dog    0.000000          8548

     favorite_count              source      name  rating  hour    weekday  \
2065          31833  Twitter for iPhone    Cassie    14.0    15  Wednesday
2066          27702  Twitter for iPhone      Zoey    13.0    16   Thursday
2067          65281  Twitter for iPhone      None    13.0     0     Friday
2068          11810  Twitter for iPhone       Jax    13.0    16     Friday
2069          20151  Twitter for iPhone      None    13.0     0   Saturday
2070          40183  Twitter for iPhone  Franklin    12.0    16   Saturday
2071          42025  Twitter for iPhone     Darla    13.0    15     Sunday
2072          24934  Twitter for iPhone    Archie    12.0     0     Monday
2073          33127  Twitter for iPhone     Tilly    13.0     0    Tuesday
2074          38654  Twitter for iPhone   Phineas    13.0    16    Tuesday

      date   month  year dog_stage
2065    26    July  2017     doggo
2066    27    July  2017      None
2067    28    July  2017      None
2068    28    July  2017      None
2069    29    July  2017      None
2070    29    July  2017      None
2071    30    July  2017      None
2072    31    July  2017      None
2073     1  August  2017      None
2074     1  August  2017      None
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1993 entries, 0 to 2074
Data columns (total 14 columns):
tweet_id          1993 non-null object
breed             1993 non-null category
breed_prob        1993 non-null float64
retweet_count     1993 non-null object
favorite_count    1993 non-null object
source            1993 non-null object
name              1993 non-null object
rating            1993 non-null float64
hour              1993 non-null int64
weekday           1993 non-null object
date              1993 non-null int64
month             1993 non-null object
year              1993 non-null int64
dog_stage         1993 non-null object
dtypes: category(1), float64(2), int64(3), object(8)
memory usage: 225.8+ KB
None
```

```
In [91]: #Defining Dataframe :only_dog_clean (Where Breed != 'No Dog')

         only_dog_clean=pd.DataFrame()
         only_dog_clean=clean_df.copy()
         only_dog_clean=only_dog_clean[only_dog_clean.breed!='No Dog']
```

```
In [92]: print(only_dog_clean.info())
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1685 entries, 0 to 2073
Data columns (total 14 columns):
tweet_id          1685 non-null object
breed             1685 non-null category
breed_prob        1685 non-null float64
retweet_count     1685 non-null object
favorite_count    1685 non-null object
source            1685 non-null object
name              1685 non-null object
rating            1685 non-null float64
hour              1685 non-null int64
weekday           1685 non-null object
date              1685 non-null int64
month             1685 non-null object
year              1685 non-null int64
dog_stage         1685 non-null object
dtypes: category(1), float64(2), int64(3), object(8)
memory usage: 191.8+ KB
None
```

4 Data Analysis and Visualization

Most Retweeted Tweet !!

```
In [164]: only_dog_clean.loc[only_dog_clean.retweet_count==only_dog_clean.retweet_count.max(),['
```

Out[164]:

	tweet_id	breed	name	retweet_count
1221	744234799360020481	Labrador_retriever	None	76986

Labrador_retriever with an unknown name recieved 76986 Retweets, which makes Tweet_id:744234799360020481 most retweeted Tweet.

Most Favorite Tweet !!

```
In [165]: only_dog_clean.loc[only_dog_clean.favorite_count==only_dog_clean.favorite_count.max(),
```

Out[165]:

	tweet_id	breed	name	favorite_count
1744	822872901745569793	Lakeland_terrier	None	142803

A Lakeland_terrier made Tweet_id:822872901745569793 most liked tweet, It recieved 142803 likes !

Most Popular Breed !

```
In [107]: only_dog_clean.breed.value_counts()[:5,]

Out[107]: golden_retriever      157
          Labrador_retriever    108
          Pembroke               95
          Chihuahua              91
          pug                    62
          Name: breed, dtype: int64

In [ ]: Retrievers are the most popular choice among dog lovers.
        They are loyal, loving and intelligent breed, hence most popular.
```

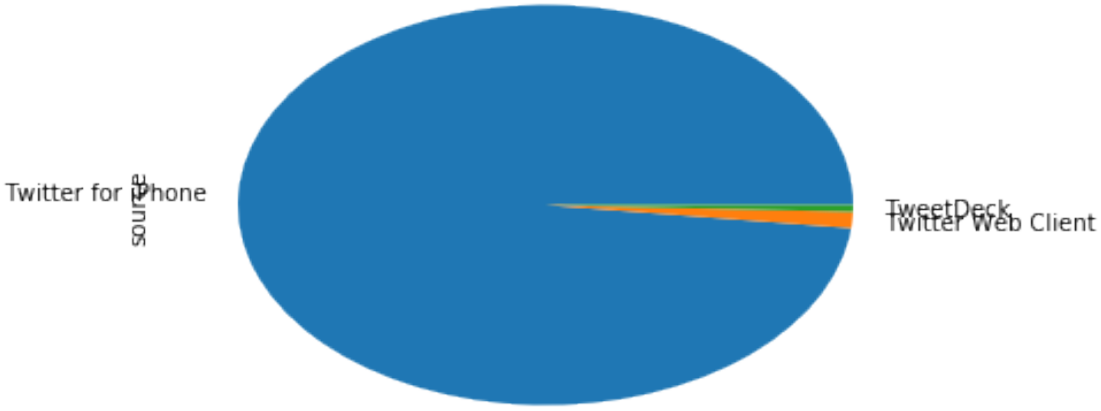
Which is the most common dog ratings ?

```
In [131]: only_dog_clean.rating.value_counts()[:4,]

Out[131]: 12.0    426
          11.0    363
          10.0    362
          13.0    229
          Name: rating, dtype: int64
```

Most Dog have recieved 12 Ratings out of 10 (All raings have been converted with common denominator 10)

Which was the Most popular Source of Tweeting !

```
In [126]: import matplotlib.pyplot as plt
          label=['Iphone','WebAppliaction','TweetDeck']
          only_dog_clean.source.value_counts().plot(kind='pie')
          print(only_dog_clean.source.value_counts()/ len(only_dog_clean) * 100)

Twitter for iPhone    98.160237
Twitter Web Client     1.305638
TweetDeck              0.534125
Name: source, dtype: float64
```

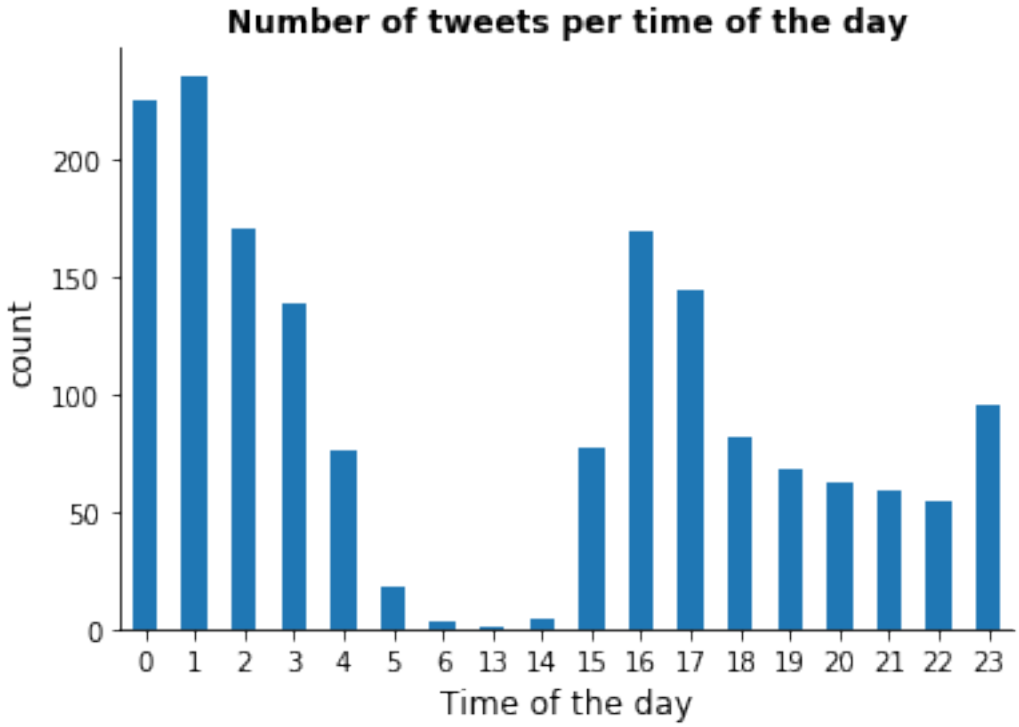


Twitter Handle's operator uses Iphone for tweeting purpose most of the times compared to 'Twitter Web client' and 'TweetDeck' Application.

Most Popular Hour

```
In [110]: only_dog_clean.hour.value_counts()

Out[110]: 1     236
          0     225
          2     171
          16    170
          17    144
          3     139
          23     95
          18     82
          15     77
          4      76
          19     68
          20     62
          21     59
          22     55
          5      18
          14      4
          6       3
          13      1
          Name: hour, dtype: int64

In [130]: fig, ax = plt.subplots()
          only_dog_clean['hour'].value_counts(sort=False).plot(kind='bar')
          ax.set_title('Number of tweets per time of the day', fontweight="bold")
```

```
ax.set_ylabel('count', fontsize=12)
ax.set_xlabel('Time of the day', fontsize=12)
plt.xticks(rotation='horizontal')
ax.spines['right'].set_visible(False)
ax.spines['top'].set_visible(False)
```



There were no tweets fron 7:00 to 13:00 (Sleeping Time) Twitter Account consistently made higher number of tweets during midnight ie: from 23:00 to 03:00

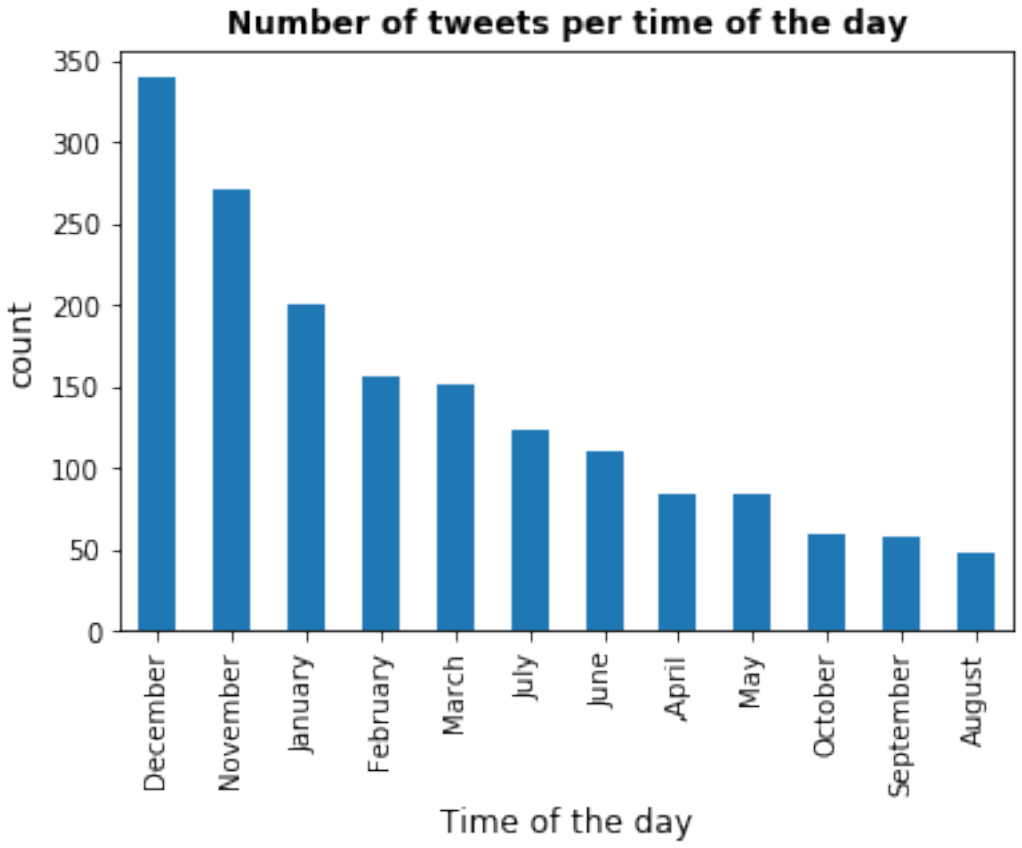
Most Active Month

```
In [93]: only_dog_clean.month.value_counts()

Out[93]: December     340
         November     271
         January      200
         February     156
         March        151
         July         124
         June         110
         ,April        84
         May           84
         October       60
         September     57
```

```
August         48
Name: month, dtype: int64
```

```
In [116]: #Bar Chart

          fig, ax = plt.subplots()
          only_dog_clean['month'].value_counts().plot(kind='bar')

          ax.set_title('Number of tweets per time of the day', fontweight="bold")

          ax.set_ylabel('count', fontsize=12)
          ax.set_xlabel('Time of the day', fontsize=12)

          plt.xticks(rotation='vertical')
```

```
Out[116]: (array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11]),
           <a list of 12 Text xticklabel objects>)
```



This Twitter account was more active in Winters than Summer. 340 Tweets were made in December alone which is more than 10 tweets per day on average !

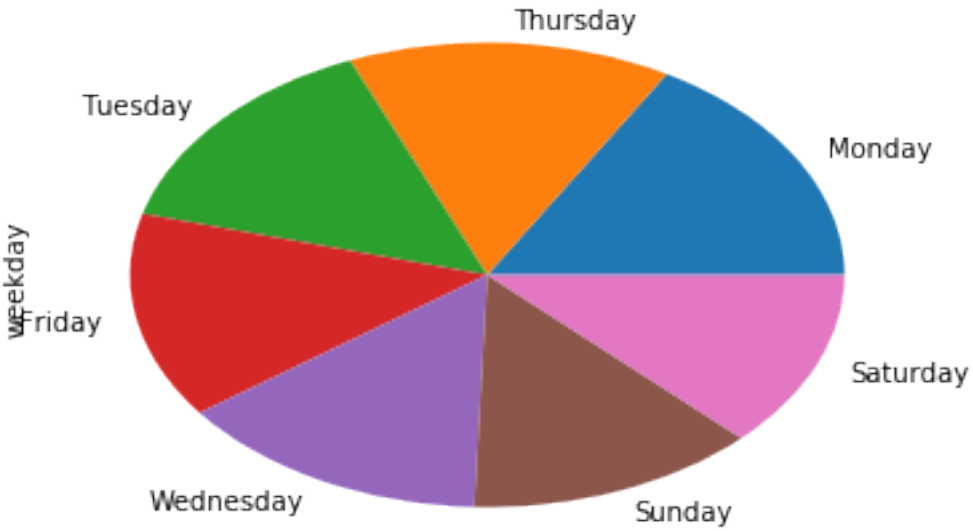
Most Active Day of Week

```
In [96]: only_dog_clean.weekday.value_counts()
```

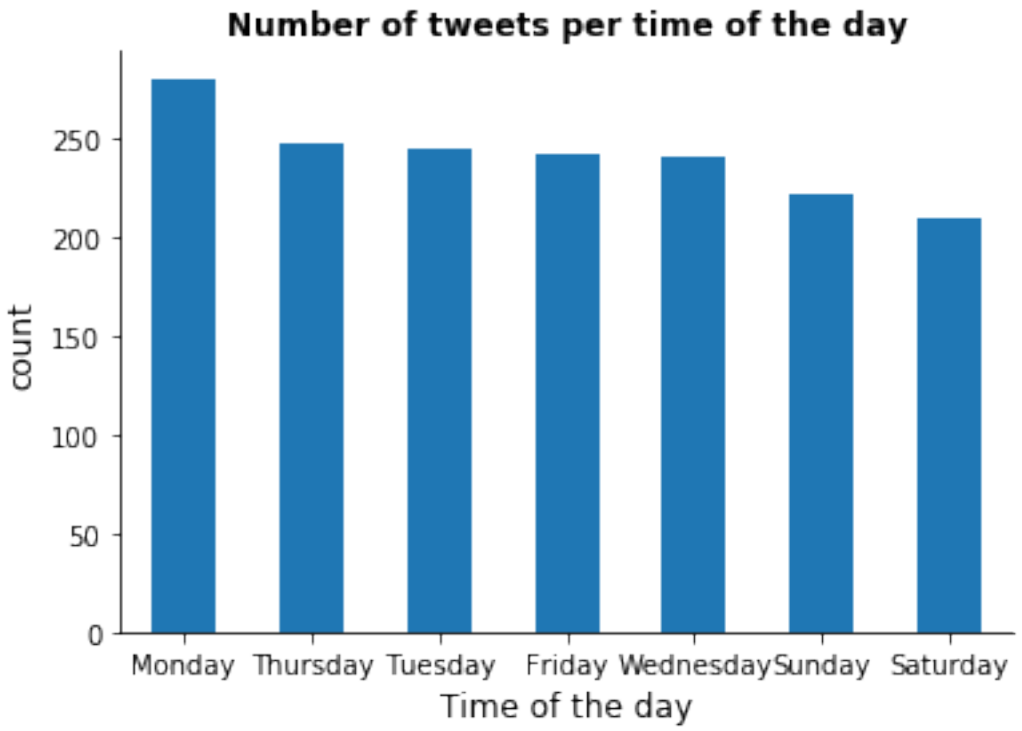
```
Out[96]: Monday       280
         Thursday     247
         Tuesday      244
         Friday       242
         Wednesday    241
         Sunday       222
         Saturday     209
         Name: weekday, dtype: int64
```

```
In [125]: #Pie Chart
          only_dog_clean.weekday.value_counts().plot(kind='pie')
```

```
Out[125]: <matplotlib.axes._subplots.AxesSubplot at 0x7f963d79b630>
```




```
In [128]: #Bar Chart
          fig, ax = plt.subplots()
          only_dog_clean['weekday'].value_counts(sort=True).plot(kind='bar')
          ax.set_title('Number of tweets per time of the day', fontweight="bold")
          ax.set_ylabel('count', fontsize=12)
          ax.set_xlabel('Time of the day', fontsize=12)
          plt.xticks(rotation='horizontal')
          ax.spines['right'].set_visible(False)
          ax.spines['top'].set_visible(False)
```



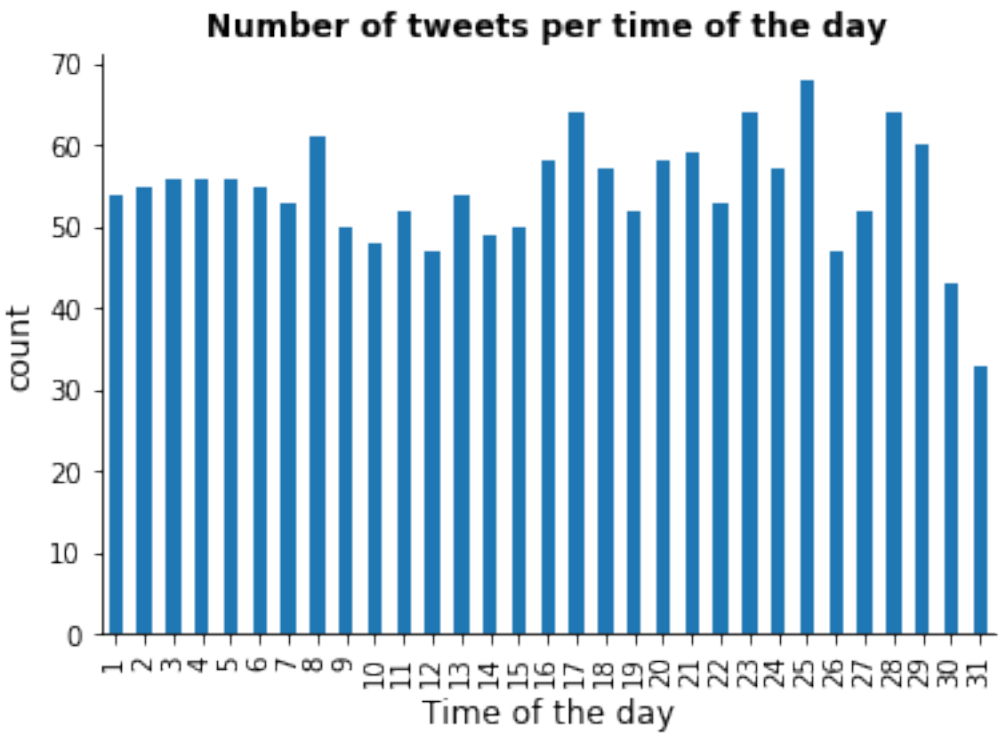
Analysis: Most of the tweets were on Weekdays rather than Weekends.

Most Active Day

```
In [97]: only_dog_clean.date.value_counts()

Out[97]: 25    68
         23    64
         17    64
         28    64
         8     61
         29    60
         21    59
         20    58
         16    58
         24    57
         18    57
         3     56
         4     56
         5     56
         2     55
         6     55
         13    54
         1     54
```

```
7     53
22    53
11    52
19    52
27    52
9     50
15    50
14    49
10    48
12    47
26    47
30    43
31    33
Name: date, dtype: int64
```

In [118]:
```
fig, ax = plt.subplots()
only_dog_clean['date'].value_counts(sort=False).plot(kind='bar')
ax.set_title('Number of tweets per time of the day', fontweight="bold")
ax.set_ylabel('count', fontsize=12)
ax.set_xlabel('Time of the day', fontsize=12)
plt.xticks(rotation='vertical')
ax.spines['right'].set_visible(False)
ax.spines['top'].set_visible(False)
```



Most Popular Dog Stage

```
In [105]: only_dog_clean.dog_stage.value_counts()/len(only_dog_clean)*100
```

```
Out[105]: None             84.569733
          pupper            9.970326
          doggo             3.204748
          puppo             1.246291
          doggo,pupper      0.474777
          floofer           0.415430
          doggo,puppo       0.059347
          doggo,floofer     0.059347
          Name: dog_stage, dtype: float64
```

Although we have 85 percent missing Data for Dog current Stage, As per Available data 10 percent of Dogs are Pupper and seems popular choice.

Most Popular Dog Name

```
In [104]: only_dog_clean.name.value_counts()[1:6,]
```

```
Out[104]: Cooper     10
          Lucy       10
          Charlie    10
          Oliver      9
          Tucker      9
          Name: name, dtype: int64
```

Cooper,Lucy,Charlie are among most popular choices for Dog names. If you want your dog to be different from others Please dont name him Cooper !