Wrangle and Analyse data :

Project Topic : Dog rates Data Analysis

Project Outline : Access data from various sources, including Tweepy, twitter API, Assessing and Visualisation of Data.

Questions Posed Prior to Data Analysis :

- In which language most of tweets are written?
- What is the most common names, people give their dogs?
- Considering, accumulated data, Which dogtype has the highest presence in the data set? (Doggo/Floofer/Pupper/Puppo)
- Given the complete data set, What is the avg. ratio of Favorite Count to Retweet Counts?
- Visua;lise and asses the difference in values of these two columns.

Lets Begin :

- Importing all required libraries and creating Dataframes for further Analysis.
- Taking First Glance of given datafram.

In [233]:

```
from wordcloud import WordCloud, STOPWORDS
import matplotlib.pyplot as plt
import pandas as pd
import numpy as np
%matplotlib inline
df = pd.read_csv('/content/drive/MyDrive/Utkarsh doc/twitter-archive-enhanced.csv')
df.head(1)
```

Out[233]:

	tweet_id	in_reply_to_status_id	in_reply_to_user_id	timestamp	
0	892420643555336193	NaN	NaN	2017-08-01 16:23:56 +0000	href="http://twitter.

Programatically accessing and storing provided .tsv file.

In [234]:

```
import requests
url = 'https://d17h27t6h515a5.cloudfront.net/topher/2017/August/599fd2ad_image-predictions/image-predictions.tsv'
response = requests.get(url)

# Save HTML to file

with open("image_predictions.tsv", mode='wb') as file:
    file.write(response.content)
```

In [235]:

```
dfimage = pd.read_csv('/content/image_predictions.tsv', sep='\t')
dfimage.head(1)
```

Out[235]:

	tweet_id	jpg_url	img_num	
0	666020888022790149	https://pbs.twimg.com/media/CT4udn0WwAA0aMy.jpg	1	Welsh_spr

In [236]:

```
df.info()
```

```
<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
```

In [237]:

```
dfimage.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
```

In [238]:

```
df.drop(['in_reply_to_status_id','source', 'in_reply_to_user_id','retweeted_stat
us_id','retweeted_status_user_id','retweeted_status_timestamp','expanded_urls',
'text'], axis = 1, inplace = True)
df.head(1)
```

Out[238]:

	tweet_id	timestamp	rating_numerator	rating_denominator	name	doggo	flo
0	892420643555336193	2017-08-01 16:23:56 +0000	13	10	Phineas	None	N

In [239]:

```
dfimage.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
```

In [240]:

```
#creating new df by merging these two dataframes on tweet id
newdf = pd.merge(df, dfimage, on="tweet_id")
newdf.head()
```

Out[240]:

	tweet_id	timestamp	rating_numerator	rating_denominator	name	doggo	flo
0	892420643555336193	2017-08-01 16:23:56 +0000	13	10	Phineas	None	N
1	892177421306343426	2017-08-01 00:17:27 +0000	13	10	Tilly	None	N
2	891815181378084864	2017-07-31 00:18:03 +0000	12	10	Archie	None	N
3	891689557279858688	2017-07-30 15:58:51 +0000	13	10	Darla	None	N
4	891327558926688256	2017-07-29 16:00:24 +0000	12	10	Franklin	None	N

In [241]:

```
newdf.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2075 entries, 0 to 2074
Data columns (total 20 columns):
 #   Column              Non-Null Count  Dtype  
---  ------              --------------  -----  
 0   tweet_id            2075 non-null   int64  
 1   timestamp           2075 non-null   object 
 2   rating_numerator    2075 non-null   int64  
 3   rating_denominator  2075 non-null   int64  
 4   name                2075 non-null   object 
 5   doggo               2075 non-null   object 
 6   floofer             2075 non-null   object 
 7   pupper              2075 non-null   object 
 8   puppo               2075 non-null   object 
 9   jpg_url             2075 non-null   object 
 10  img_num             2075 non-null   int64  
 11  p1                  2075 non-null   object 
 12  p1_conf             2075 non-null   float64
 13  p1_dog              2075 non-null   bool   
 14  p2                  2075 non-null   object 
 15  p2_conf             2075 non-null   float64
 16  p2_dog              2075 non-null   bool   
 17  p3                  2075 non-null   object 
 18  p3_conf             2075 non-null   float64
 19  p3_dog              2075 non-null   bool   
dtypes: bool(3), float64(3), int64(4), object(10)
memory usage: 297.9+ KB
```

In [242]:

```
#checking for duplicate elements in new df.
sum(newdf.duplicated())
```

Out[242]:

```
0
```

In [243]:

```
#checking for NULL / NAN values in the complete dataset.
newdf.isnull().sum()
```

Out[243]:

```
tweet_id              0
timestamp             0
rating_numerator      0
rating_denominator    0
name                  0
doggo                 0
floofer               0
pupper                0
puppo                 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
```

Cleaning Complete.

Merging all Dog Types into a common category.

Dog Type = Doggo + Floofer + Pupper + Puppo.

In [244]:

```
newdf['dogtype']= newdf['doggo'] + newdf['floofer'] + newdf['pupper'] + newdf['puppo']
```

In [245]:

```
newdf.head(1)
```

Out[245]:

	tweet_id	timestamp	rating_numerator	rating_denominator	name	doggo	flo
0	892420643555336193	2017-08-01 16:23:56 +0000	13	10	Phineas	None	N

Cleaning this new column formed.

In [246]:

```
count = 0
for i,r in enumerate(newdf.dogtype):

    if r == "NoneNoneNoneNone":
      count = count+1
print(count)
```

```
1754
```

In [247]:

```
for i,r in enumerate(newdf.dogtype):

    if r == "NoneNoneNoneNone":
      newdf.dogtype[i]= "undefined"
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:4: Sett
ingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pand
as-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-co
py
  after removing the cwd from sys.path.
```

In [248]:

```
newdf.head(1)
```

Out[248]:

o	floofer	pupper	puppo	jpg_url	img_num	p1	p1_conf	p1_
ıe	None	None	None	https://pbs.twimg.com/media/DGKD1-bXoAAIAUK.jpg	1	orange	0.097049	F

In [249]:

```
for i,r in enumerate(newdf['dogtype']):
  if 'None' in r:
    newdf.dogtype[i] = newdf.dogtype[i].replace('None', '')
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:3: Sett
ingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pand
as-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-co
py
  This is separate from the ipykernel package so we can avoid doing
imports until
```

In [250]:

```
newdf.head(1)
```

Out[250]:

o	floofer	pupper	puppo	jpg_url	img_num	p1	p1_conf	p1_
ie	None	None	None	https://pbs.twimg.com/media/DGKD1-bXoAAIAUK.jpg	1	orange	0.097049	F

Generating Visualisations on 'Dogtype'

Following Visualisation, we can also find exact number of dogs, falling into each category

In [251]:

```
stopwords = set(STOPWORDS)
wordcloud = WordCloud(width = 800, height = 800,
                background_color ='white',
                stopwords = stopwords,
                min_font_size = 10).generate(' '.join(newdf['name']))

# plot the WordCloud image
plt.figure(figsize = (10, 6), facecolor = None)
plt.imshow(wordcloud)
plt.axis("off")
plt.tight_layout(pad = 0)

plt.show()
```

here we can say bigger percentage of our dog names have 'None' , so we drop it from our word cloud, giving us a better view of names in word cloud.

In [252]:

```
stopwords = set(STOPWORDS)
wordcloud = WordCloud(width = 800, height = 800,
                background_color ='white',
                stopwords = ['None'],
                min_font_size = 10).generate(' '.join(newdf['name']))

# plot the WordCloud image
plt.figure(figsize = (10, 6), facecolor = None)
plt.imshow(wordcloud)
plt.axis("off")
plt.tight_layout(pad = 0)

plt.show()
```

Here we go,

I see Charlie, Oliver, Cooper, Penny and Lucy are few of the most common names given in our dataframe. (rest all other names are present in word cloud that have less frequency.)

In [253]:

```
newdf.groupby('dogtype').count()
```

Out[253]:

dogtype	tweet_id	timestamp	rating_numerator	rating_denominator	name	doggo	floof
doggo	67	67	67	67	67	67	
doggofloofer	1	1	1	1	1	1	
doggopupper	11	11	11	11	11	11	
doggopuppo	1	1	1	1	1	1	
floofer	7	7	7	7	7	7	
pupper	211	211	211	211	211	211	2
puppo	23	23	23	23	23	23	
undefined	1754	1754	1754	1754	1754	1754	17

Accessing data from gathered tweepy json file and storing into dataframe 'dftweet'

In [254]:

```
dftweet = pd.read_json('/content/drive/MyDrive/Utkarsh doc/tweet.json', lines=True)
dftweet.head(1)
```

Out[254]:

	created_at	id	id_str	full_text	truncated	display_text_
0	2017-08-01 16:23:56+00:00	892420643555336193	892420643555336192	This is Phineas. He's a mystical boy. Only eve...	False	

In [255]:

```
dftweet.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2354 entries, 0 to 2353
Data columns (total 31 columns):
 #   Column                         Non-Null Count  Dtype
---  ------                         --------------  -----
 0   created_at                     2354 non-null   datetime64[ns, U
TC]
 1   id                             2354 non-null   int64
 2   id_str                         2354 non-null   int64
 3   full_text                      2354 non-null   object
 4   truncated                      2354 non-null   bool
 5   display_text_range             2354 non-null   object
 6   entities                       2354 non-null   object
 7   extended_entities              2073 non-null   object
 8   source                         2354 non-null   object
 9   in_reply_to_status_id          78 non-null     float64
 10  in_reply_to_status_id_str      78 non-null     float64
 11  in_reply_to_user_id            78 non-null     float64
 12  in_reply_to_user_id_str        78 non-null     float64
 13  in_reply_to_screen_name        78 non-null     object
 14  user                           2354 non-null   object
 15  geo                            0 non-null      float64
 16  coordinates                    0 non-null      float64
 17  place                          1 non-null      object
 18  contributors                   0 non-null      float64
 19  is_quote_status                2354 non-null   bool
 20  retweet_count                  2354 non-null   int64
 21  favorite_count                 2354 non-null   int64
 22  favorited                      2354 non-null   bool
 23  retweeted                      2354 non-null   bool
 24  possibly_sensitive             2211 non-null   float64
 25  possibly_sensitive_appealable  2211 non-null   float64
 26  lang                           2354 non-null   object
 27  retweeted_status               179 non-null    object
 28  quoted_status_id               29 non-null     float64
 29  quoted_status_id_str           29 non-null     float64
 30  quoted_status                  28 non-null     object
dtypes: bool(4), datetime64[ns, UTC](1), float64(11), int64(4), obje
ct(11)
memory usage: 505.9+ KB
```

Cleaning and Engineering newly acquired dataframe : 'dftweet'

In [256]:

```
#id column of new data has different name, so we rename it to 'tweet_id'
dftweet.rename(columns = {'id':'tweet_id'}, inplace = True)
dftweet.drop(['id_str','full_text','truncated','display_text_range','place','con
tributors','entities','extended_entities','source','in_reply_to_status_id','in_r
eply_to_status_id_str','in_reply_to_user_id','in_reply_to_user_id_str','in_reply
_to_screen_name','user','geo','coordinates','is_quote_status','favorited','retwe
eted','possibly_sensitive_appealable','retweeted_status','quoted_status_id','quo
ted_status_id_str','quoted_status'], axis=1 , inplace=True)
```

merging previous engineered df 'newdf' with 'dftweet' on 'tweet_id' for better approach and accessebility

In [257]:

```
newdf = pd.merge(newdf, dftweet, on="tweet_id")
newdf.head(1)
```

Out[257]:

	tweet_id	timestamp	rating_numerator	rating_denominator	name	doggo	flo
0	892420643555336193	2017-08-01 16:23:56 +0000	13	10	Phineas	None	N

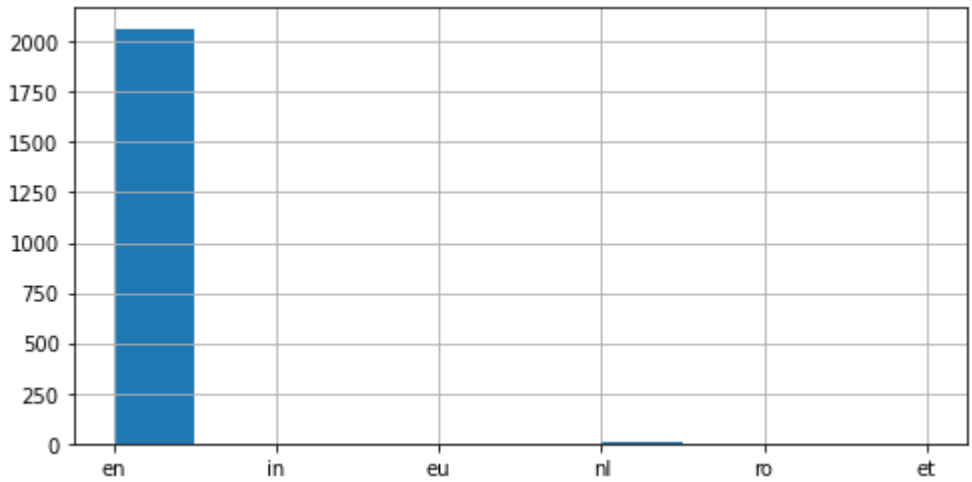
plotting histogram to find frequency of languages of the tweets

In [258]:

```
plt.figure(figsize = (8,4), facecolor = None)
newdf['lang'].hist()
```

Out[258]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f7a3bf687d0>
```



Conclusion

From above histogram plot we can clearly infer that, majority of our tweets (close to 99%) are in 'en', which stands for 'English' language.

In [259]:

```
newdf['rating_numerator'].mean()
```

Out[259]:

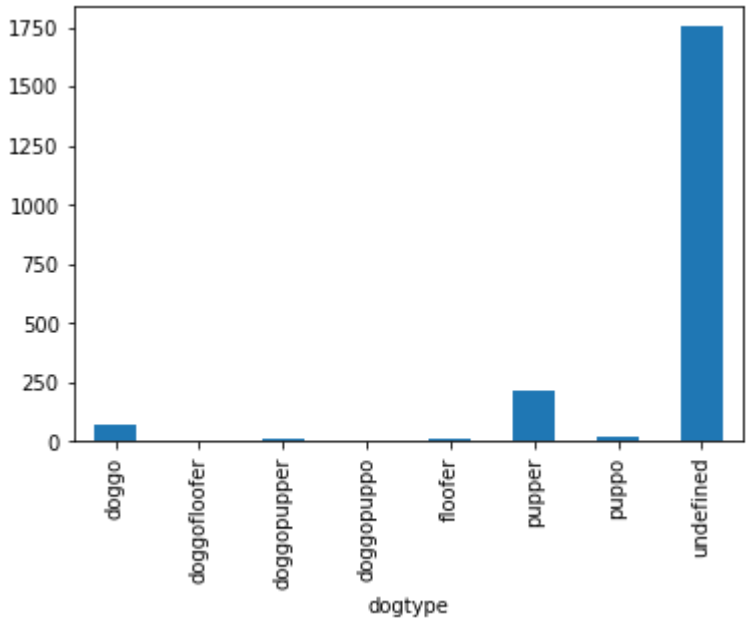
```
12.26579835986493
```

In [260]:

```
newdf.groupby(['dogtype']).size().plot(kind = "bar")
```

Out[260]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f7a3b5e73d0>
```



It is clear, major percent of our dogs do not have any defined dog type. So performing calculations on this factor can easily affect the dignity of our datafrae. Hence I have created a separated df of dogtypes with legit values :

In [261]:

```
a = newdf.loc[newdf['dogtype'] !="undefined"]
a.head(1)
```

Out[261]:

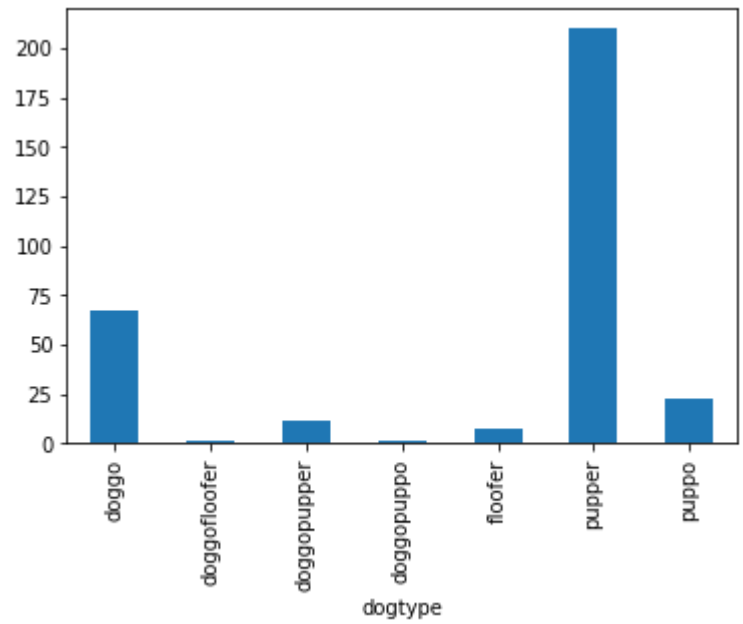
	jpg_url	img_num	p1	p1_conf	p1_dog	p2	p2_conf	p2_dog
ı/media/DFrEyVuW0AAO3t9.jpg		1	Pembroke	0.511319	True	Cardigan	0.451038	True

In [262]:

```
a.groupby(['dogtype']).size().plot(kind = "bar")
```

Out[262]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f7a3bf41bd0>
```



Concluding from bar chart above:

- Most of dogs with defined type are : 'pupper'.
- Followed by : 'doggo' and 'puppo'

In [263]:

```
rmean = newdf['retweet_count'].mean()
fmean = newdf['favorite_count'].mean()
print (rmean,fmean,fmean/rmean)
```

```
2976.0892426435116 8556.718282682103 2.875155139864555
```

Mean and Ratio of Favorite Counts to that of Retweet Counts. :

- Mean Retweet Count = 2976.089(approz)
- Mean Favorite Count = 8556.71(approz)

Ratio of Mean Favorite Count to Retweet count = 2.87 (approx)

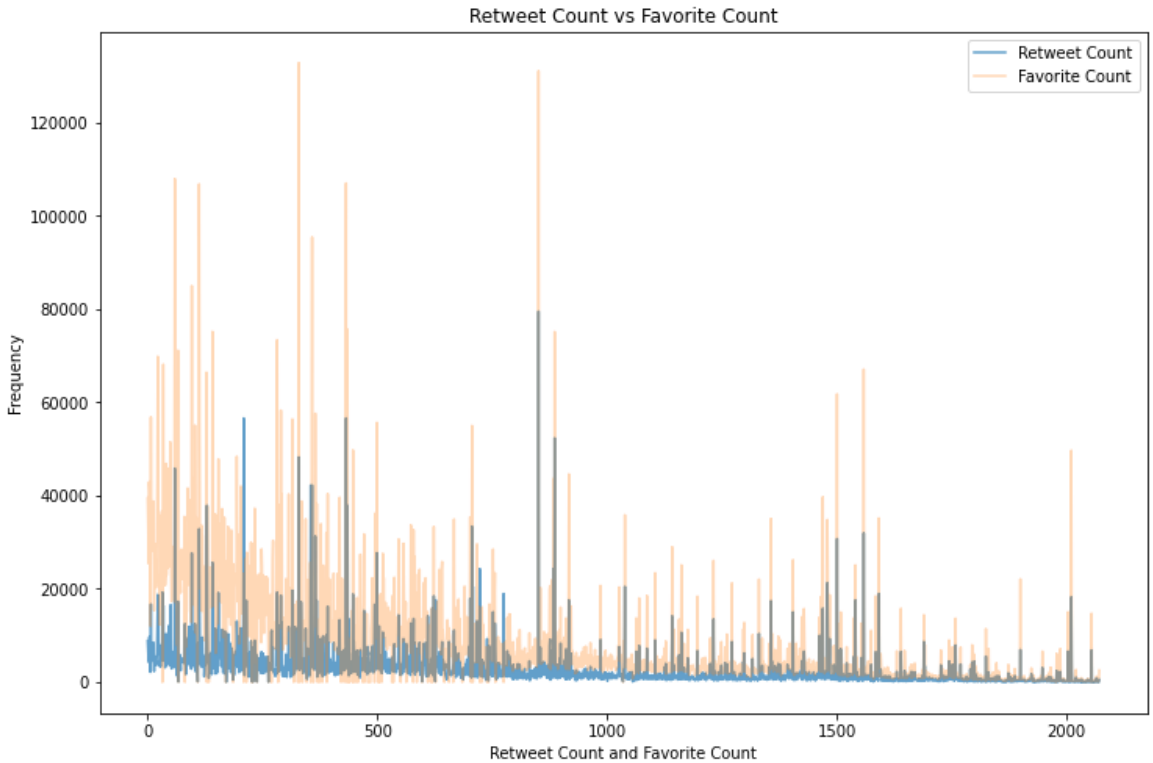
This indicates user tendency of adding tweets more to their **Favorite** than **Retweeting** a tweet.

In [265]:

```
plt.figure(figsize = (12,8), facecolor= None)
plt.plot(newdf['retweet_count'],alpha=0.7)
plt.plot(newdf['favorite_count'],alpha=0.3)
plt.xlabel("Retweet Count and Favorite Count")
plt.ylabel("Frequency")
plt.title ("Retweet Count vs Favorite Count")
plt.legend(['Retweet Count', 'Favorite Count'])
```

Out[265]:

```
<matplotlib.legend.Legend at 0x7f7a3aa035d0>
```



Infering from line graph above:

We can clearly understand the trends followed by these two entities:

- People tend more to add a tweet to their favorites than retweeting a tweet.
- Mean of Favorite Count > Retweet Count.
- Max value of Favorite Count > Retweet Count.

Analysis Conclusion :

- Charlie, Oliver, Cooper, Penny and Lucy are few of the most common names given to dogs in our dataframe.
- We can clearly infer that, majority of our tweets (close to 99%) are in 'en', which stands for 'English' language.
- Most of dogs with defined type are : 'pupper'. Followed by : 'doggo' and 'puppo'
- Now Finally after analysing required last two columns : Favorite Count and Retweet Count we Clear find the following observations:
  - Favorite Count has higher Maximum Value, close to 15000(approx), while Retweet count remains maxed out at 7800 (approx)
  - People tend to add a tweet to their favorite than retweeting a certain tweet.
  - Mean value of Favorite Count > Retweet Count. ('**2976.0892426435116**' and '**8556.718282682103**' respectively)
  - Ratio shared between these two entities (Favorite Count : Retweet Count) = 2.875155139864555 : 1 .

Data Quality issues found during Analysis.

- Data provided by Tweepy API had redundent data, ie; most of its columns has None or NAN values stored and needed to be cleaned before analysis.
- Data provided regarding DogType is inediquate as most of tweets do not have type mentioned instead, have 'None' values filled.
- Unnecessary/ Irrelevant data provided in form various columns such as : ['id_str','full_text','truncated','display_text_range','place','contributors','entities','extended_entities'..... etc, which had to be dropped.
- English being major language of almost all the tweets provided(99%), lang column could not be used for analysis purposes.
- Column Possible Senstivity has '0.0' as common value for every row through out data frame, defying its relevance in dataframe.

Concluding Statement : The conclusions provided do not showcase the complete scenario, as due to reasons such as unavailability of data, we here may have infered biased resuls.