Udacity – Data Wrangling Project

Data Analyst Nano Degree

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Data Wrangling Report

Introduction

This Project demonstrate the data wrangling process using twitter data on archive called WeRateDogs. In this archive, users are given a dog image and they rate it with their comments. It is worth noting that the setup of the rating system requires that the rating denominator is always higher than 10. In the project, I have used this dataset to practice data wrangling steps through gathering, accessing and cleaning the data inside the archive.

Methodology

The first step of this project was to gather the required datasets:

- WeRateDogs Twitter archive --> this dataset includes rating related information

  → this dataset is available from Udacity

- Dog Image Prediction --> this dataset includes the prediction of dog images

  → this dataset was downloaded programmatically using python codes

- Twitter Data--> this data include retweet counts and likes and others.

  → this dataset was gathered using twitter API by setting up twitter developer account and acquiring the required access credentials.

The second step was to assess the dataset both manually and programmatically to find issues that need to be cleaned. These issues were divided into quality issues and tidiness issues. The quality issue in more concern with content of the data and the tidiness issues was more focused on the structure of the dataset.

This step resulted in finding the following issues:

<u>Quality Issues</u>

twitter_archieve

1- error in datatype (timestamp) --> object instead of datetime
2- according to the rating system, the denominator should be always 10. but it appears that we have other values such as 3, 2 .. etc
3- some values in the numerator is less than the denomnator (10) which is uncorrect according the rating system. [uncleaned]
4- null values in the columns(name, doggo, floofer, pupper, puppo) are not shown because it is written as None
5- There is an html header in the source column
6- False Dogs names like: a, an, the ... ----> written in lower case

image predict Table:

1- There is duplicates in images URL ---> repeated images are not useful to us

Twitter data Table:

1- missing data (2331), according to Udacity file it should be 2356
2- repeated column (text) --> since that they should be merged
3- id column is this table is not consistent with tweet_id in twitter_archieve ---> they should be the same to be merged into one table

Tidiness Issues

Twitter_archieve Table:

1- dog types are separated in different columns(doggo, floofer, pupper, puppo)
2- Columns with no use (in_reply_to_status_id, in_reply_to_user_id)

image predict Table:*

1- Unclear Column names(p1,p2,p3)
2- dog image prediction can be summarized into two columns (dog prediction type, confidence level) instead of the 9 given columns related to prediction

Twitter data Table:

1- The table twitter data and table twitter_archieve contains info about a single tweet. It can be merged into single table. Also, it can be merged with image_predict to combine it with a prediction of a breed

The third step was to start cleaning the data. I did this using the following steps:

- Change the datatype from object to datetime
- Reassign all values in rating denominator to be 10
- Change columns names(p1,p2,p3) to ---> first_pred, second_pred, third_pred
- Change the string None in these columns to null values using replace method and np.nan
- Find the missing data from the twitter data table so it can match the records in twitter archive. This can be done by downloading the complete json file provided by Udacity and append the missing record to our table.
- twitter archive and twitter merged into one table.
- duplicated images with the same URL should be dropped since they are of no use to us
- html tags need to be removed from the source column in full_archive table. This step will be done using regular expression that strips out all html tags from a string.
- Remove one of the two duplicated columns from merging twitter_data and twitter_archive --> text and full_text.
- drop unwanted columns from full_archive table ('in_reply_to_status_id','in_reply_to_user_id','retweeted')
- We have a tidiness issue which is that 4 columns (doggo,floofer,pupper,puppo) represent single feature which is stage. first, we will create a new column called stage which contain a concatenated string of all of these columns. Then we will replace the nan value with empty string to extract the stage name only. Then we will check if there rows with multiple stages and inspect them separately using row index
- We have lots of incorrect dogs names such as a, an, the.., they are all in lower case letters. we suggest to replace it with null values so that we can know that the real dog name is missing.

- Merging image predtion table with full archive using pd.merge on tweet id as the key
- We need to reduce the number of predictions columns into two columns(prediction, confidence level), where prediction will give results only if the image was predicted to be dog

The final cleaned full_archieve set had the following features:

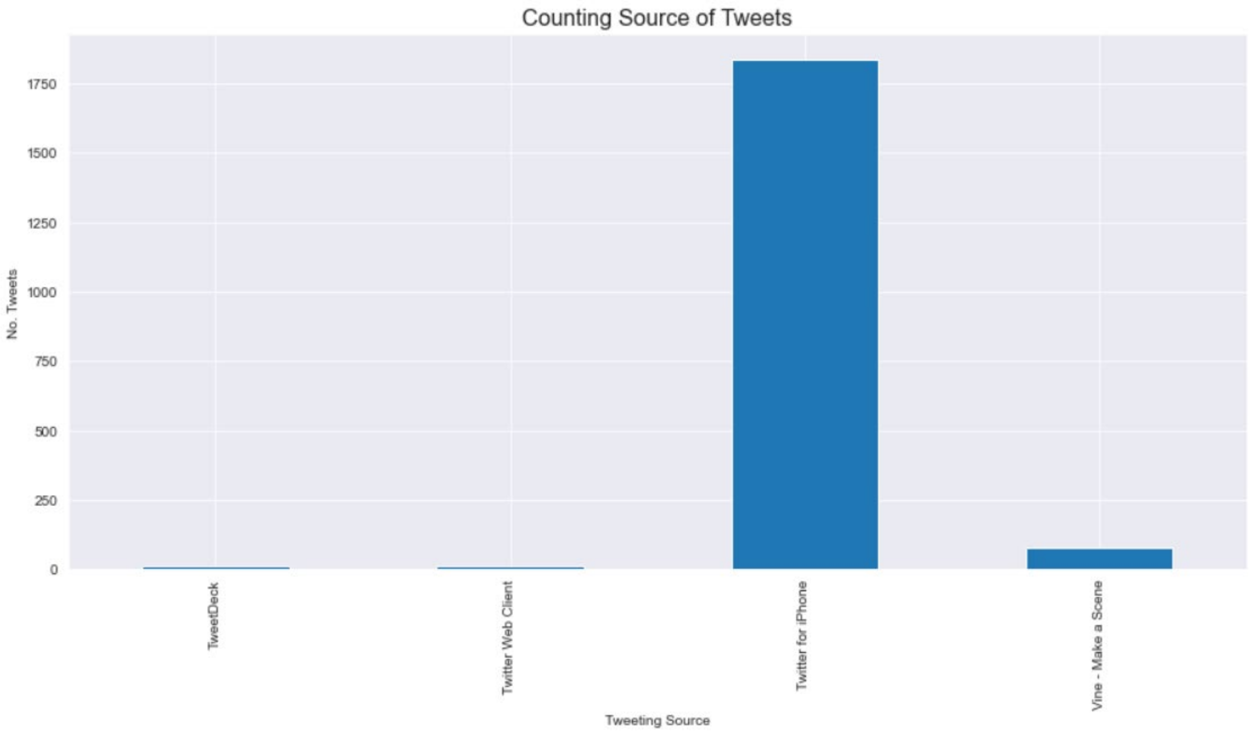
FEATURE NO.	NAME	DATA TYPE
0	tweet_id	String
1	timestamp	Datetime
2	source	String
3	text	String
4	retweeted_status_id	Float
5	retweeted_status_user_id	Float
6	retweeted_status_timestamp	Datetime
7	expanded_urls	String
8	rating_numerator	Integer
9	rating_denominator	Integer
10	name	String
11	retweet_count	Integer
12	favorite_count	Integer
13	stage	String
14	jpg_url	String
15	img_num	Integer
16	Prediction	String
17	Confidence	Float

Exploratory Data Analysis

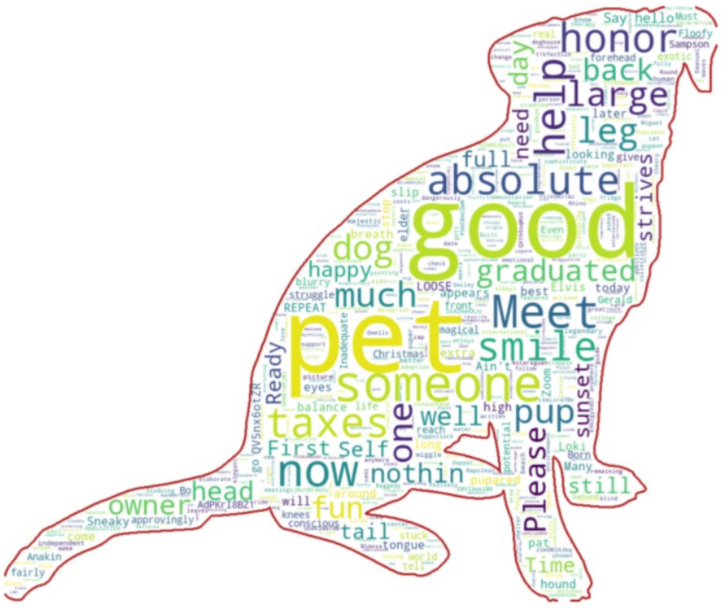
In this section, I aimed to answer some question related to our dataset:

- what is the most used source for rating in WeRateDogs?
- what are the most common words in tweets associated with dogs in doggo stage?
- what is the most common hour of dogs rating tweets?
- What is the stage that got the most average retweet? how about the most favorited one?
- What are the top ten favorited bread? how about the top retweeted?

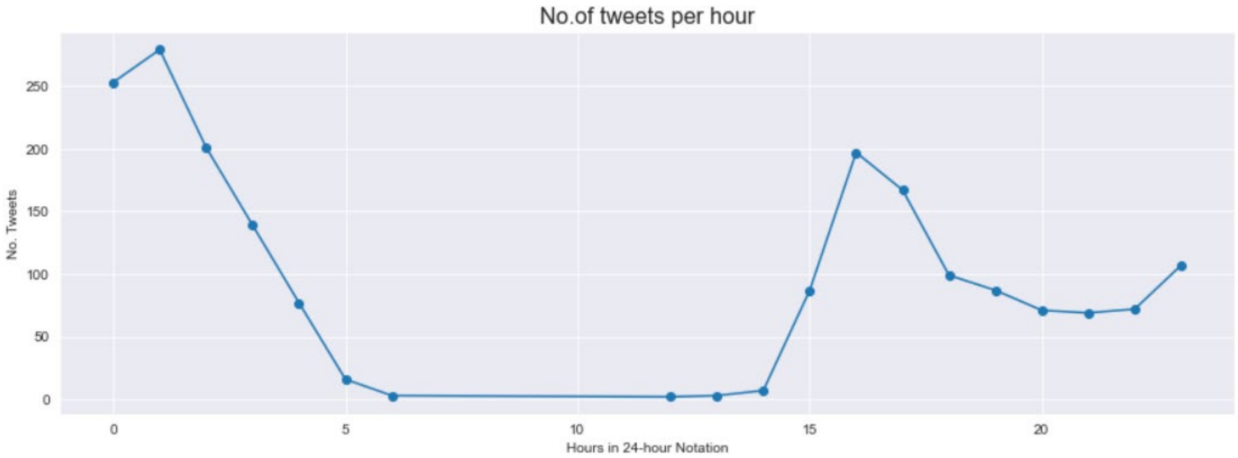
Results:



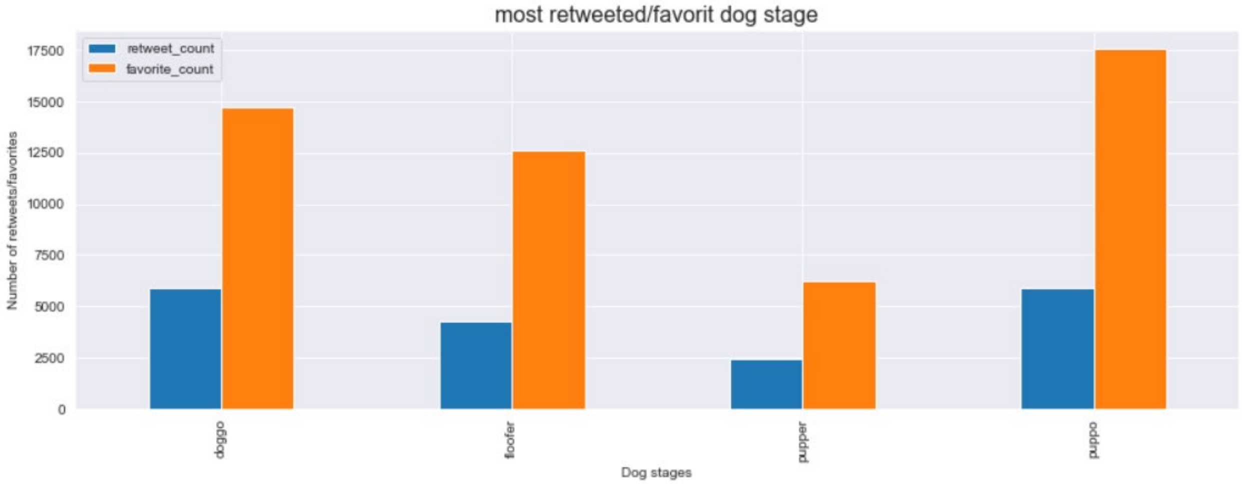
from the figure above, it is clear that twitter for iPhone is the most used application for tweeting in this WeRateDogs followed by Vine



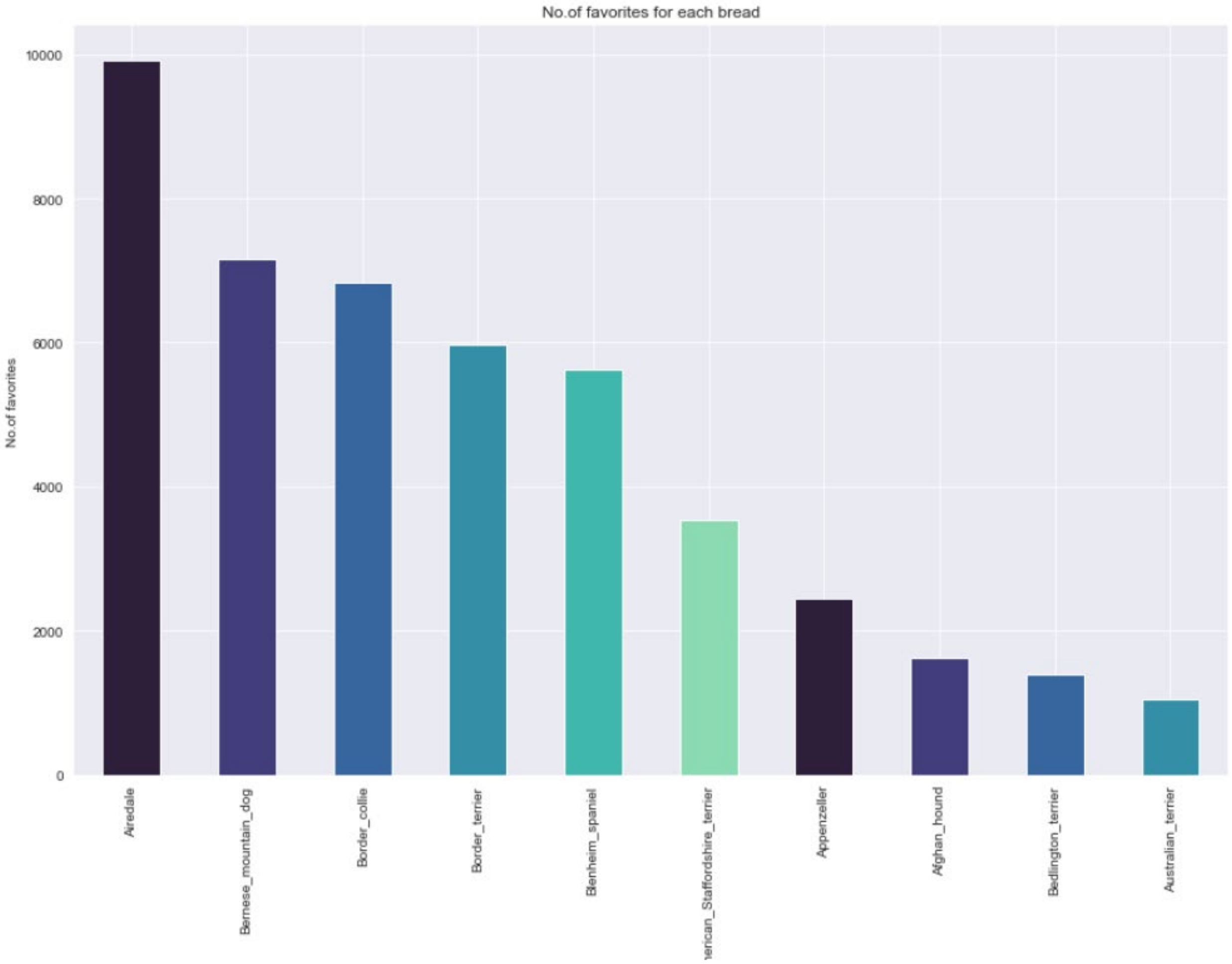
The word cloud generated the most common words associated with the dogs in doggo stage. the words include smile, good, meet, pet and help. which are mostly positive words.



we can see from the above figure that the most common tweeting hour is between 1 am - 2 am



We can see from the above figure that the most retweeted stage is puppo with small difference margin from doggo. In term of favorited tweets, puppo is clearly the highest among the other stages followed by doggo



from the figure, we can see that the top 10 breads in average favorites. On the other hand, the top bread was Airdale followed by Bernese_mountain_dog.

Resources:

https://www.datacamp.com/community/tutorials/wordcloud-python

https://stackoverflow.com/questions/3398852/using-python-remove-html-tags-formatting-from-a-string

https://stackoverflow.com/questions/8209568/how-do-i-draw-a-grid-onto-a-plot-in-python

https://seaborn.pydata.org/tutorial/color_palettes.html

https://pandas.pydata.org/pandas-docs/stable/reference/api/pandas.DataFrame.merge.html

https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html