# Twitter Analysis of Social Distancing

In this project we will use the spacy and sklearn libraries to do some n_gram analysis along with some sentiment analysis of Twitter regarding social distancing. Due to the limitations of the twitter API, we have chosen a relatively small sample size to use for this purpose.

The code, along with the files necessary and versions of packages in this instance can be found on this repo: https://github.com/Benjamin-Siebold/MSDS-682-Text-Analytics (https://github.com/Benjamin-Siebold/MSDS-682-Text-Analytics)

In [152]:

```
from afinn import Afinn
import spacy
import nltk
#nlp = spacy.load('en_core_web_lg')

from wordcloud import WordCloud
from PIL import Image

import pandas as pd
import numpy as np
from collections import OrderedDict
import matplotlib.pyplot as plt

from sklearn.feature_extraction.text import CountVectorizer, TfidfVectorizer
```

## 1 - Dig into data

The first step in this analysis is to load the data into jupyter, and get a general understanding of the data to see if there are any duplicate rows, and duplicate tweets from retweets.

In [2]:

```
tweets = pd.read_json('tweet_text.json',lines=True)
```

In [8]:

```
tweets['id'].nunique()
```

Out[8]:

```
2476
```

In [11]:
```
tweets
```

Out[11]:

| | contributors | coordinates | created_at | entities | extended_entities | favorite |
|---|---|---|---|---|---|---|
| **0** | NaN | None | 2020-06-14 17:36:40 | {'hashtags': [], 'symbols': [], 'user_mentions... | None | |
| **1** | NaN | None | 2020-06-14 17:36:39 | {'hashtags': [], 'symbols': [], 'user_mentions... | None | |
| **2** | NaN | None | 2020-06-14 17:36:39 | {'hashtags': [], 'symbols': [], 'user_mentions... | None | |
| **3** | NaN | None | 2020-06-14 17:36:38 | {'hashtags': [], 'symbols': [], 'user_mentions... | None | |
| **4** | NaN | None | 2020-06-14 17:36:37 | {'hashtags': [], 'symbols': [], 'user_mentions... | None | |

In [111]:
```
tweet_text = pd.DataFrame(tweets['text'])
tweet_text.count()
```

Out[111]:
```
text    2500
dtype: int64
```

In [26]:
```
unique_tweets = pd.DataFrame(tweets['text'].unique(), columns=['tweets'])
unique_tweets.count()
```

Out[26]:
```
tweets    1054
dtype: int64
```

In [43]:
```
joined_tweets = ' '.join(unique_tweets['text'].to_list())
```

## 2 - Apply n_gram analysis

Now that the data has been investigated, we see that although all of the tweets are unique in ids, there are less than half of unique tweets, which is due to retweets. In the tweet collection, we had the type set to recent, which was getting the most recent tweets. Conclusions could be made that a few individuals were influencers and had a larger following retweeting their tweets causing the retweet spam. The next step is to create an n_gram of both two and three, along with a wordcloud and sorted dictionary.

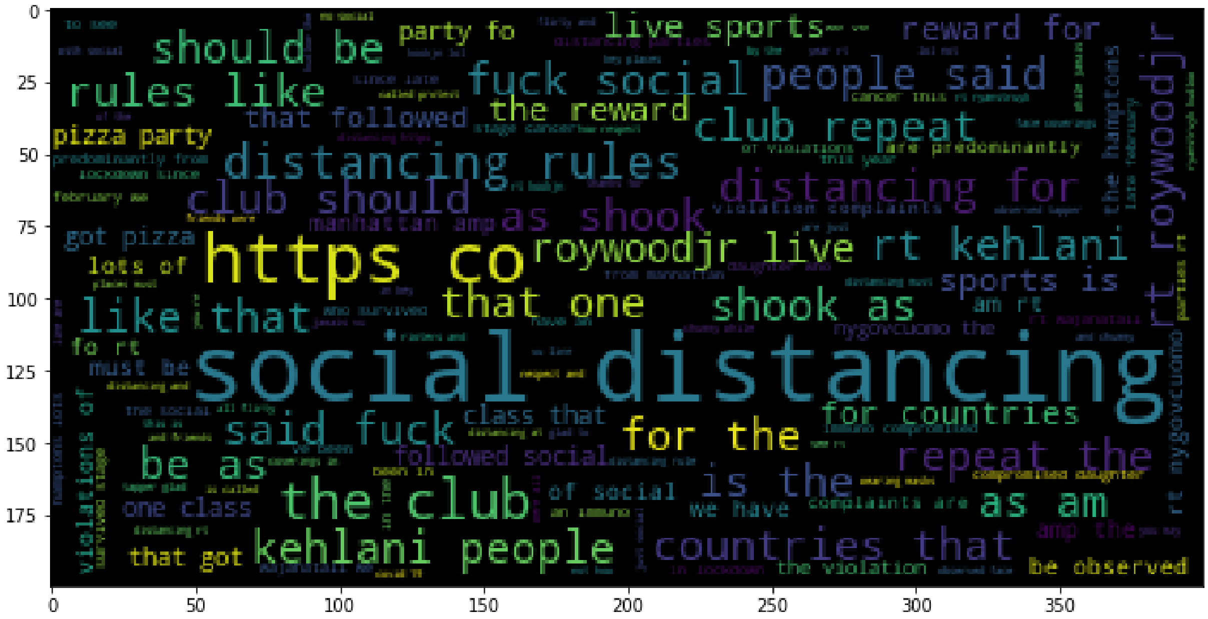
In [142]:
```
vectorizer_2 = CountVectorizer(ngram_range = (2,2))
vectorizer_3 = CountVectorizer(ngram_range = (3,3))
```

In [149]:
```
ngram_2_counts = vectorizer_2.fit_transform([joined_tweets])
tweets_2_counts = np.array(ngram_2_counts.todense()).flatten()
ngram_3_counts = vectorizer_3.fit_transform([joined_tweets])
tweets_3_counts = np.array(ngram_3_counts.todense()).flatten()
```

In [150]:
```
tweets_frequency = {}
for v, i in vectorizer_2.vocabulary_.items():
    tweets_frequency[v] = tweets_2_counts[i]
tf3 = {}
for v, i in vectorizer_3.vocabulary_.items():
    tf3[v] = tweets_3_counts[i]
```

In [52]:
```
fig = plt.figure(figsize=(12, 12))
wc = WordCloud()
plt.imshow(wc.generate_from_frequencies(tweets_frequency))
```

Out[52]:
```
<matplotlib.image.AxesImage at 0x24f84e582e8>
```



In [155]:
```
sorted_tf_3 = OrderedDict(sorted(tf3.items(), key=lambda kv: kv[1],  reverse=Tru
sorted_tf_3
```

Out[155]:
```
OrderedDict([('social distancing rules', 280),
             ('social distancing for', 229),
             ('fuck social distancing', 227),
             ('said fuck social', 225),
             ('rt kehlani people', 223),
             ('kehlani people said', 223),
             ('people said fuck', 223),
             ('distancing for the', 223),
             ('for the club', 223),
             ('the club repeat', 223),
             ('club repeat the', 223),
             ('repeat the club', 223),
             ('the club should', 223),
             ('club should be', 223),
             ('should be as', 223),
             ('be as shook', 223),
             ('as shook as', 223),
             ('shook as am', 223),
             ('distancing rules like', 213),
```

## 3 - Setniment Analysis

From above, we can see social distancing is the most common two gram combo, and in the three grame we see a lot of negative connotation around the social distancing, along with who one of the prodominant retweets were coming from. "social distancing rules" and "fuck social distancing" both indicate people are not in favor of the social distancing, and "rt kehlani people" tells us many of the retweets were the same tweet.

The next step in the analysis is to do sentiment analysis both of the population of tweets, as well as removing retweets to get individual thoughts.

In [64]:

```
afinn = Afinn()
```

In [65]:

```
afinn.score(joined_tweets)
```

Out[65]:

```
-921.0
```

In [67]:

```
afinn.score(' '.join(unique_tweets['tweets'].to_list()))
```

Out[67]:

```
-169.0
```

In [102]:

```
scores = []
for tweet in tweet_text['text']:
    scores.append(afinn.score(tweet))
```

In [120]:

```
tweet_score = {'tweets': tweet_text['text'].to_list(), 'score': scores}
tweet_scores_df = pd.DataFrame(tweet_score)
```

In [104]:

```
tweet_scores_df.mean()
```

Out[104]:

```
score   -0.3684
dtype: float64
```

In [122]:

```
score_count = tweet_scores_df.groupby(['tweets']).count().sort_values(by='score'
```

```
unique_scores = []
for tweet in unique_tweets['tweets']:
    unique_scores.append(afinn.score(tweet))
```

In [107]:

```
unique_tweet_score = {'tweets': unique_tweets['tweets'].to_list(), 'score': uniq
unique_tweet_scores_df = pd.DataFrame(unique_tweet_score).sort_values(by='score'
```

In [108]:

```
unique_tweet_scores_df.mean()
```

Out[108]:

```
score   -0.160342
dtype: float64
```

In [125]:
```
pd.merge(score_count, unique_tweet_scores_df, on='tweets').sort_values(by='score_
```

Out[125]:

| | tweets | score_x | score_y |
|---|---|---|---|
| **50** | RT @jack_naylor16: Anti protesters (i.e. Racis... | 4 | -12.0 |
| **142** | RT @Francis_Hoar: No lockdown. No masks. No ‘s... | 2 | -12.0 |
| **545** | RT @shawngorlando: Reminder.\n\nPeople go to w... | 1 | -10.0 |
| **740** | @LewdSpeedy Social distancing is boring, he li... | 1 | -9.0 |
| **82** | RT @JolyonRubs: Last Saturday: \n“Social dista... | 3 | -9.0 |
| **55** | RT @Johnhodg10: OMG she actually said the prev... | 4 | -8.0 |
| **325** | WTF is happening to our country?! \nWhat the H... | 1 | -8.0 |
| **243** | RT @Majid_PSF: The wrong decisions of incompet... | 1 | -8.0 |
| **286** | RT @SalmonKromeDome: Purveyors of anti-racism ... | 1 | -8.0 |
| **1039** | Go to hell Commi RT @NYGovCuomo: The violatio... | 1 | -8.0 |
| **41** | RT @eddysmam: Just found out that one of my ye... | 5 | -7.0 |

In [158]:

```
no_RT = tweets[~tweets['text'].astype(str).str.startswith('RT')]
no_RT['text']
```

Out[158]:

```
2       Cuomo threatens Manhattan, Hamptons shutdown o...
4       @NYGovCuomo What about a protesters not social...
11             Social Distancing. https://t.co/Z0lCqbvjea (https://t.co/Z0lCq
bvjea)
14      @DHSCgovuk @PHE_uk Face coverings should be wo...
24      @jkwan_md @HeatherChwasti Exactly. How much? I...
25      @mullymt @corinne_perkins @ComfortablySmug @Je...
30      @letusgraduate Thanks for the tag. Check the B...
31      Social distancing should have been a thing way...
46      @NYGovCuomo Get off your power trip...there we...
51      Well said! I fear their solution to this will ...
63      Getting closer! Keep social distancing, wearin...
64      It’s all so “not surprising” that in today’s w...
65      @IngrahamAngle The WHO said social distancing ...
66      @Shaheensloan98 @wendymo94921768 @julesserkin ...
67      @rukiakuchiki50 No, that would violate social ...
77          @ErebusRC Social distancing off to an art 👌
81      i’ll also be social distancing more than 6 fee...
84      @ottawanag @WholeFoods We’ve been pretty good ...
87      @lees1969 There is no update on the 2m distanc...
95      The city of Simi Valley won't be helping to pu...
108     Social distancing, ima need my space ✨🖤 https:... (https:...)
109                     @maudjpeg sorry im social distancing
111     @CNN So during the protesting against #BlackLi...
112     Watching how people treat the social distancin...
113     @nypost As soon as he and De Blasio allowed th...
116     Customers coming right in front of me to compl...
125     @sahar_ashfaq Enforcing lockdown isn’t the onl...
130     @FLhomegrown @ChidiNwatu @GOPChairwoman @realD...
131     Boris Johnson: 'potential' to revise 2m social...
132     Scientists report flaws in WHO-funded study on...
                              ...
2377    Coronavirus outbreak\nScientists report flaws ...
2378    Whilst our front door will be open again from ...
2381    WAnt to see if someone is near you in the ware...
2390    To maintain social distancing during an appoin...
2394    Boris Johnson has suggested there will be no r...
2397    @NYGovCuomo So demonstration are not enforcing...
2398    Coronavirus: Consumers 'should shop with confi...
2399    Not easy to keep to social distancing rules wh...
2400    Not easy to keep to social distancing rules wh...
2401    What does support look like in a #remotework e...
2405    @hrenee80 Can’t wait til Hollywood starts to n...
2406    @AlbertMacGloan No social distancing - No mask...
2407    ICYMI: An art gallery in Paris has introduced ...
2409    @LisaWar93308805 Seurat, bathers ........ Mone...
2420    @DeAnna4Congress People who ignore or question...
2426    We are social distancing waiting for sunday fu...
2432    Yes, that's Champions of Midgard.\n\nMy wife a...
2435    @RBKingston @TheKingstonAca @tiffingirls_sch H...
2441    @2termstrump @MikeLevin You know how there’s a...
2448    I really cut everyone off and started distanci...
2450    @_CharlesMurphy In the U.K., non essential sho...
2464    @radioMel0 We’re these people not social dista...
```

```
2472    @maeday05 I'm coming to your house for dinner....
2473    @roundabout111 @TheSteveTheCat @atrupar You gi...
2477    @NAPLIC @Laura_Pettifar I think you’re right L...
2479    @BBCNews Social distancing? The government has...
2482    @hvngry_eyes This is a lie! I remember an inte...
2491    Social distancing IOW Festival from home @abso...
2496    @Reuters Ok social distancing under review. Bu...
2498    You all out there, please remember that the SA...
Name: text, Length: 579, dtype: object
```

In [130]:

```
afinn.score(' '.join(no_RT['text'].to_list()))
```

Out[130]:

```
-183.0
```

In [140]:

```
no_RT_scores = []
for tweet in no_RT['text']:
    no_RT_scores.append(afinn.score(tweet))
```

In [141]:

```
no_RT_score = {'tweets': no_RT['text'].to_list(), 'score': no_RT_scores}
no_RT_score_df = pd.DataFrame(no_RT_score).sort_values(by='score')
no_RT_score_df.mean()
```

Out[141]:

```
score   -0.316062
dtype: float64
```

## Sentiment Summary

From above we can see when the population is looked at, the overall sentiment score of the entire text is 9 times worse than that of the unique tweets. This is most likely the cause of many retweets causing inflation in the negative direction, the mean sentiment of tweets are also quite a bit different from eachother. What is interesting is when retweets are completely taken out, the mean sentiment of the tweets falls more in line with the total population analysis, and not the unique tweets. This directly contradicts the total sentiment scores of the tweets. What could be the cause of this is unique tweets include the retweets a single time, thus if there are positive retweets that are included they could cause a shift; however, the no retweets suggests the general mentality towards social distancing is negative.