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CS5542 Big Data Apps and Analytics

In Class Programming –3
11th September 2020

Submit ICP Feedback in Class. : Lnik to Feed back Form

NLP:

Use the same data (that we obtained by in source code
`Data = pd.read_csv('https://raw.githubusercontent.com/dD2405/Twitter_Sentiment_Analysis/master/train.csv')` **) and perform the sentiment analysis task on this data using one of the scikit learn classifier for text.**

ICP Requirements:

1) Data cleaning and preprocessing (at minimum have the following: Removing unnecessary columns or data, Removing Twitter Handles(@user), Removing punctuation, numbers, special characters, Removing stop words, Tokenization, and Stemming, TFIDF vectors, POS tagging, checking for missing values , train/test split of data). (70 points)
2) Data Visualization and analysis for critical steps (WordCloud, Bar plots, etc) (10 points)
3) Model building and successfully executing the model to make prediction. (10 points)
4) Code quality, Pdf Report quality, video explanation (10 points)

Submission Guidelines:

Same as ICP 2.

ICP Report:

What I learned in the ICP:

I learned more about Data Frames and how need to think differently with dealing with immutable data. I continue to learn more about lambda function, but I feel I need to spend some time and focus on them because of how they are leveraged with transforming the RDDs. I learn some about Natural Language processing and some of the libraries that are available for Python.

Description of what task I was performing:

Use the given input file and perform tasks for cleaning analyzing the data.

Challenges I faced:

Had to figure out how to make the Bag of Words without crashing CoLab.

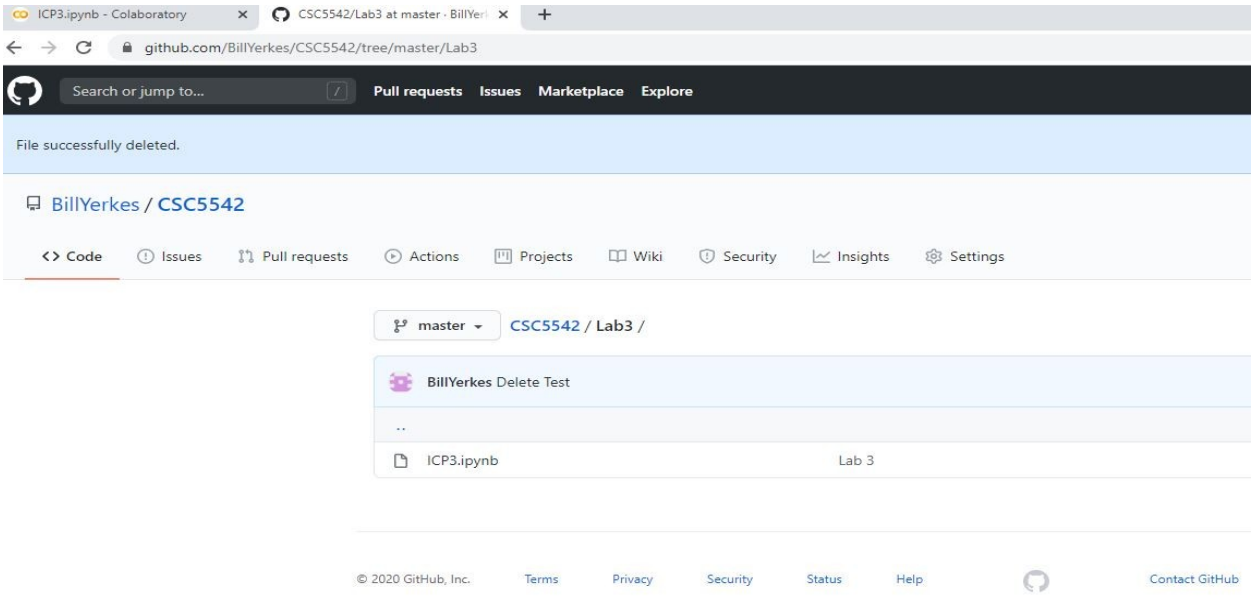
Figuring out how to update the Data Frame after cleaning up the data.

Figuring out how to clean the data so as to reduce the size of the Bag of Words.

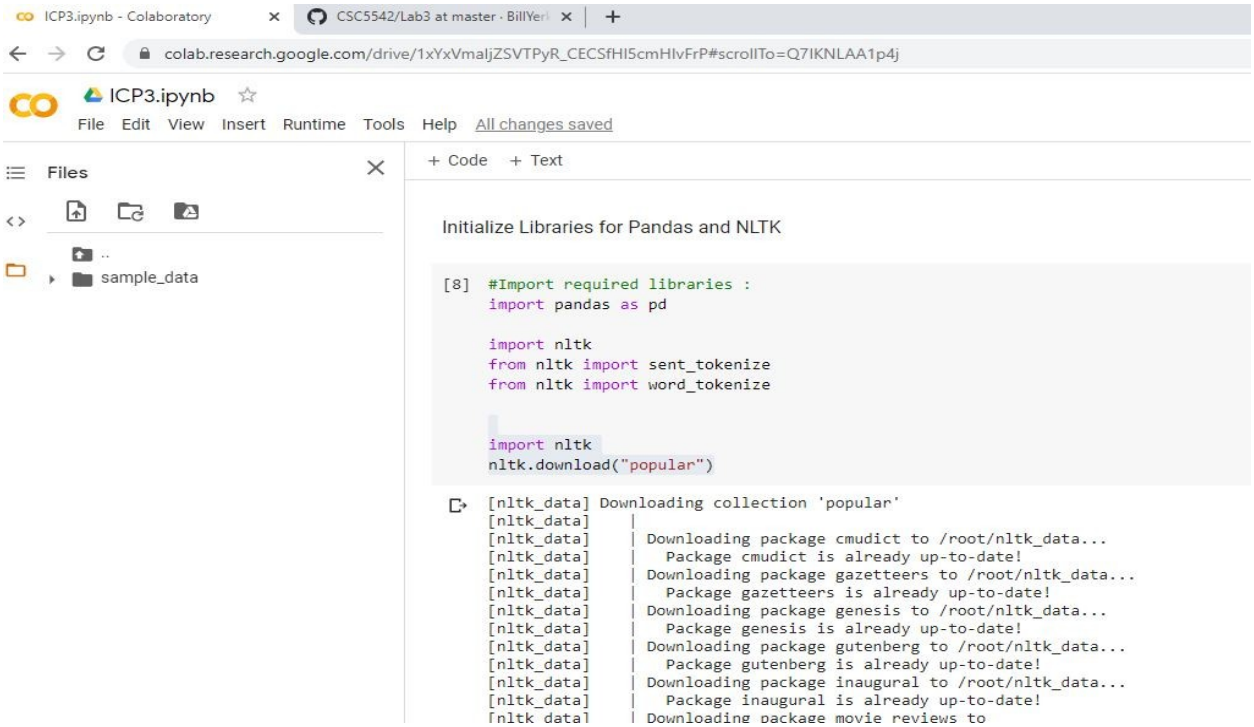
Figuring out how to get the Word Cloud to work, re-watching the lecture was a big help.

Screen Shots

[GitHub Repository]



Initialize Libraries for Pandas and NLTK



Init DataFrame

Read the CSV file with the Data from the Cloud

Reduce the size of the Dataframe, because of the issue with running out of RAM.

DataFrame Properties

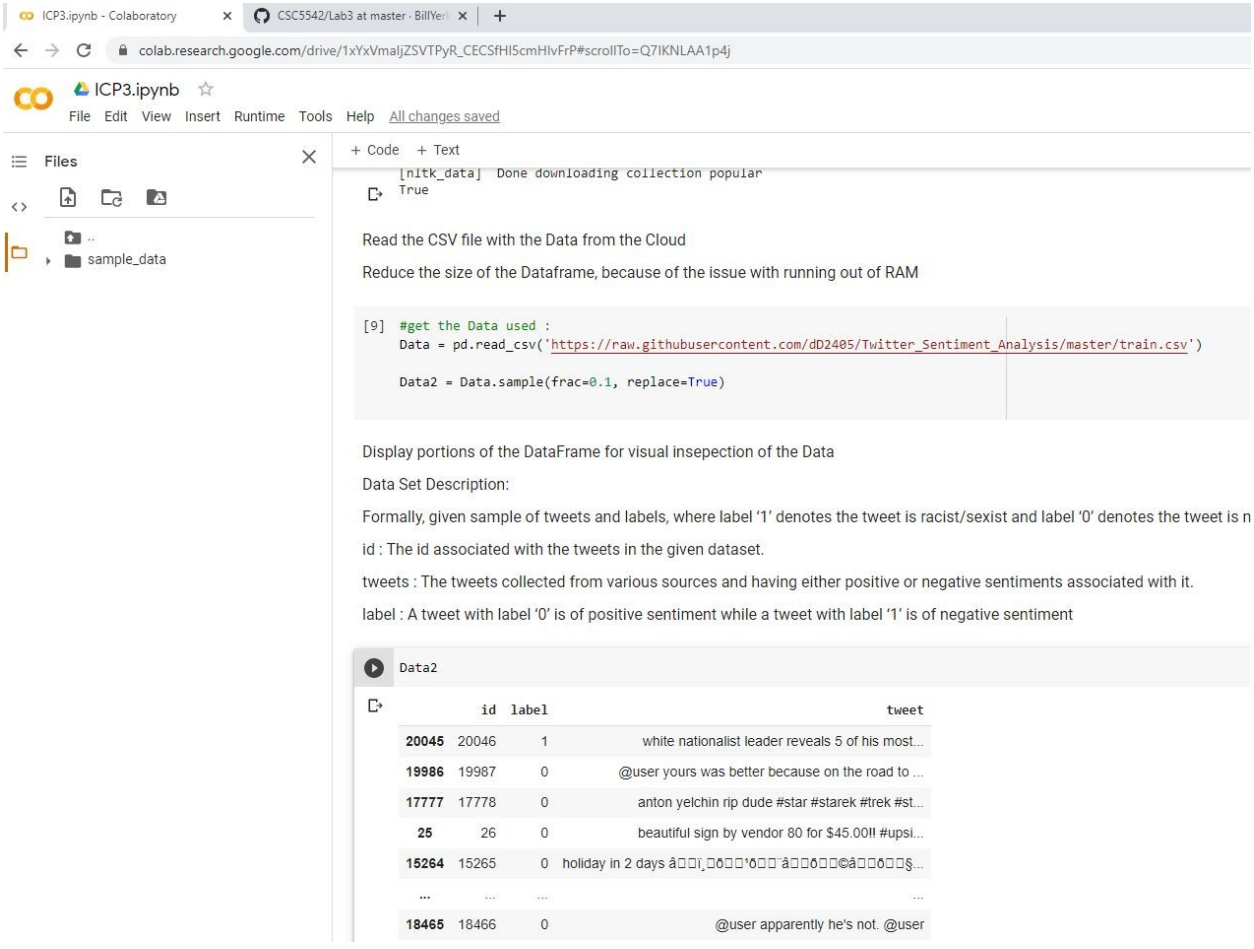
Display portions of the DataFrame for visual insepection of the Data

Formally, given sample of tweets and labels, where label ‘1’ denotes the tweet is racist/sexist and label ‘0’ denotes the tweet is not racist/sexist.

id : The id associated with the tweets in the given dataset.

tweets : The tweets collected from various sources and having either positive or negative sentiments associated with it.

label : A tweet with label ‘0’ is of positive sentiment while a tweet with label ‘1’ is of negative sentiment



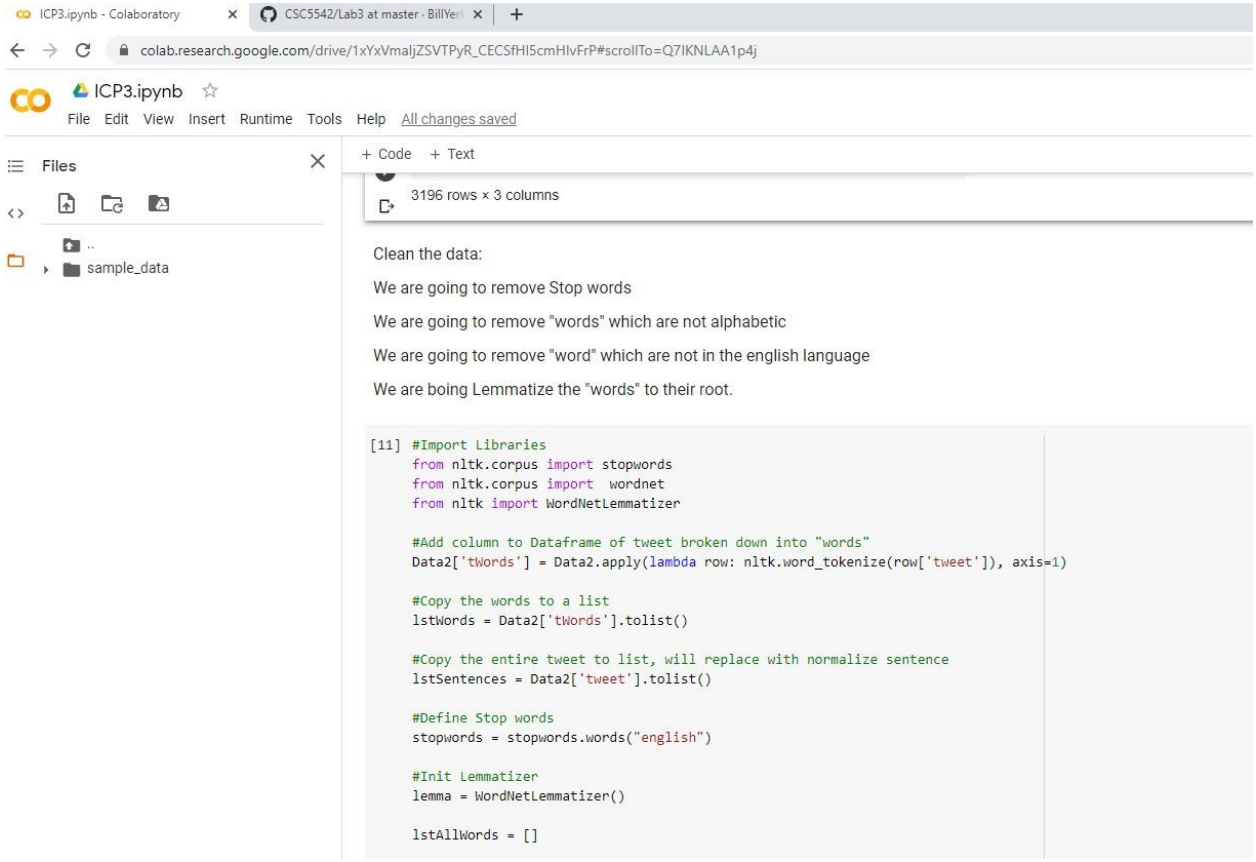
Clean the data:

We are going to remove Stop words

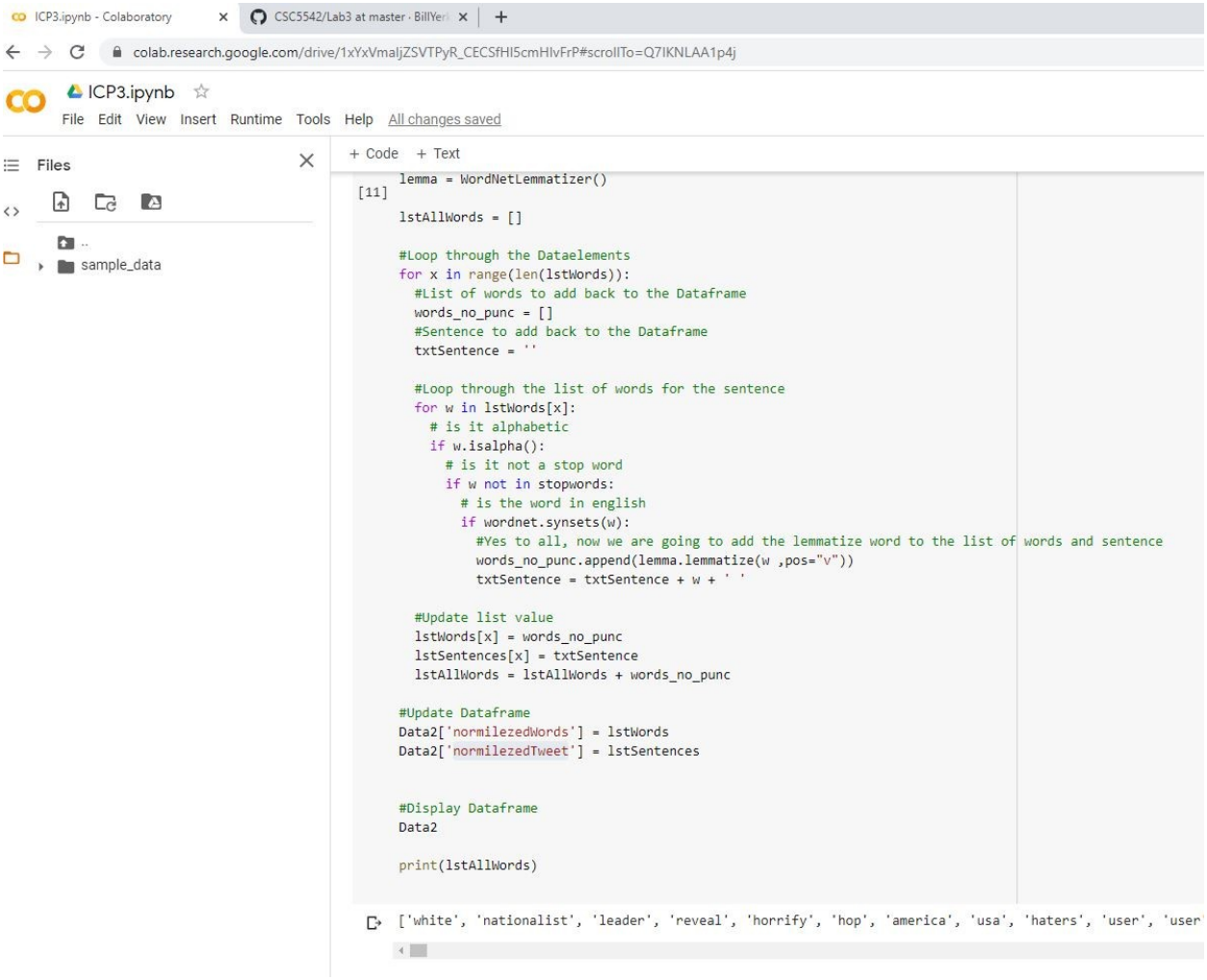
We are going to remove "words" which are not alphabetic

We are going to remove "word" which are not in the english language

We are boing Lemmatize the "words" to their root.



Looping through the Data and cleaning it



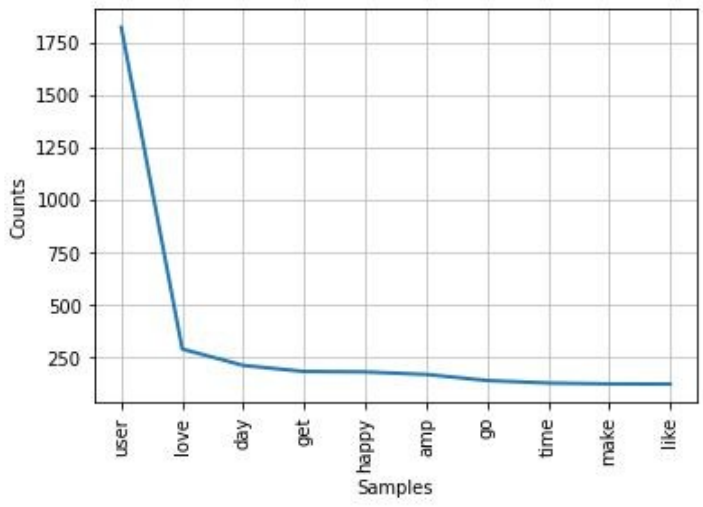
Show the distribution of the 10 most common words

Show the distribution of the 10 most common words

```
[14] #Import required libraries :
     from nltk.probability import FreqDist

     #Find the frequency :
     fdist = FreqDist(lstAllWords)

     #Print 10 most common words :
     fdist.most_common(10)
```

```
[('user', 1821),
 ('love', 287),
 ('day', 209),
 ('get', 180),
 ('happy', 178),
 ('amp', 166),
 ('go', 137),
 ('time', 125),
 ('make', 121),
 ('like', 120)]
```

```
fdist.plot(10)
```

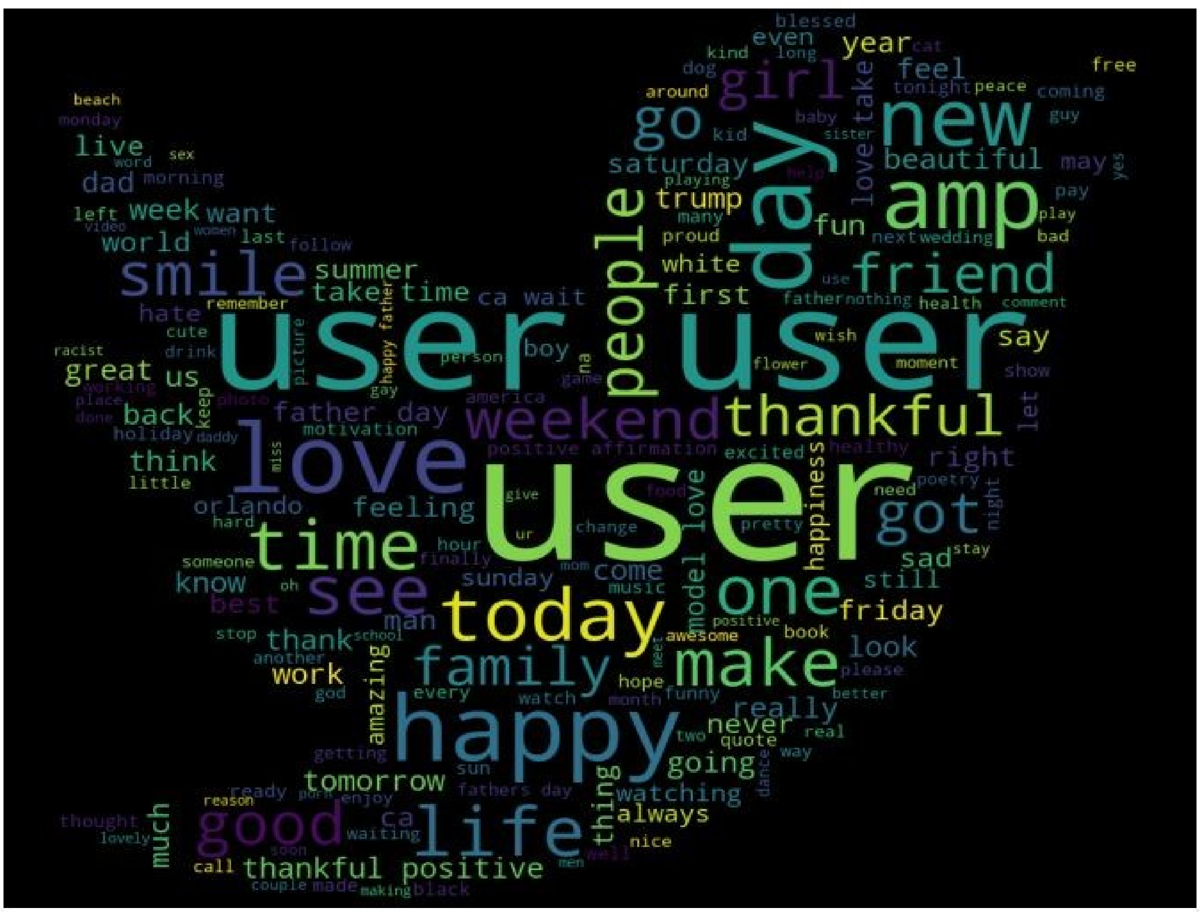


Make a Word Cloud

Make A word cloud

```
[18] #Library to form wordcloud :
     import numpy as np
     from wordcloud import WordCloud, ImageColorGenerator
     import requests
     from PIL import *

     #Library to plot the wordcloud :
     import matplotlib.pyplot as plt

     # combining the image with the dataset
     Mask = np.array(Image.open(requests.get('http://clipart-library.com/image_gallery2/Twitter-PNG-Image.png', stream=True).raw))

     # We use the ImageColorGenerator library from Wordcloud
     # Here we take the color of the image and impose it over our wordcloud
     image_colors = ImageColorGenerator(Mask)

     text = pd.Series(Data2.normilezedTweet).to_string()

     #Generating the wordcloud :
     wordcloud = WordCloud(background_color='black', height=1500, width=4000,mask=Mask).generate(text)

     #Plot the wordcloud :
     plt.figure(figsize = (12, 12))
     plt.imshow(wordcloud)

     #To remove the axis value :
     plt.axis("off")
     plt.show()
```

Word Cloud



Make a Bag of Words

Make Bag of Words

This part here is memory intensive and will consume all of the RAM if the data set is too large and crash Co Lab.

```
[20] from sklearn.feature_extraction.text import CountVectorizer


     #Text for analysis :

     sentences = Data2['normilezedTweet'].tolist()

     #Create an object :
     cv = CountVectorizer()

     #Generating output for Bag of Words :
     B_O_W = cv.fit_transform(sentences).toarray()
```

Run the Test on the Data

Run the Test on the Data

```
[21] #Import svm model
     from sklearn.model_selection import train_test_split
     from sklearn import svm


     X_train, X_test, y_train, y_test = train_test_split(B_O_W, Data2.label, test_size=0.3,random_state=109) # 70% training and 30% test

     #Create a svm Classifier
     clf = svm.SVC(kernel='linear') # Linear Kernel

     #Train the model using the training sets
     clf.fit(X_train, y_train)

     #Predict the response for test dataset
     y_pred = clf.predict(X_test)

     #Import scikit-learn metrics module for accuracy calculation
     from sklearn import metrics

     # Model Accuracy: how often is the classifier correct?
     print("Accuracy:",metrics.accuracy_score(y_test, y_pred))
```

```
Accuracy: 0.9395203336809176
```

[Video Link]

Any in site about the data or the ICP in general

Data consisted of Tweet text, with the text being categorized as racist or not racist.

CoLab is great. The Python libraries for NLP seem very powerful.

The code did not run as fast as expected and was taken by surprised by running out of RAM while trying to figure out the lab.