

exploring-food-comments

October 31, 2018

0.1 Who doesn't love food? : Consuming APIs and utilizing Sentiment Analysis

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The following notebook is an introduction tutorial presented as part of a wider course Data Warehousing and Data Mining. While the notebook does provide sample constructs and resources. The author only intends to presents the concepts and does not indicate ownership of the resources presented.

NB. This notebook is accompanied by a discussion

0.1.1 Topics:

- Restful APIs
- Wordclouds
- Correlation
- Sentiment Analysis

0.1.2 Aim: To retrieve comments from a food related API (restful) and perform sentiment analysis on the data set

```
In [1]: # import the necessary libraries
```

```
import pandas as pd # data processing
import matplotlib.pyplot as plt # plotting
import seaborn as sns # visualizations
```

0.2 The Food API

We will be consuming/retrieving data from a [restful api](#) provided by [VegGuide.org](#).

You may learn more about the API and how to access it here :
<https://www.vegguide.org/site/api-docs>

You may test and explore the api here : <https://www.vegguide.org/api-explorer/>

```
In [2]: # storing or settings to access the API in variables
api_base_url = 'https://www.vegguide.org'
region_id = 2 # we can retrieve reviews from different regions
resource_path='/entry/{0}/reviews'.format(region_id)
api_comments_url = api_base_url+resource_path #actual url that will be used
```

```

In [3]: import requests # importing the requests library to perform http requests the api

In [4]: # perform a http GET request to the URL specified earlier with custom HTTP headers
req = requests.get(api_comments_url, headers={
    'User-Agent': 'SampleApi/0.01',
    'Accept': 'application/json'})

In [5]: #extract the data from the http response
data = req.json()

In [6]: data # just viewing the data

Out[6]: [{'body': {'text/html': '<p>I got the dolmas and tabouli salad which were decent, but I
    'text/vnd.vegguide.org-wikitext': 'I got the dolmas and tabouli salad which were dece
    'last_modified_datetime': '2010-09-07T19:28:18Z',
    'rating': 2,
    'user': {'name': 'Emme',
    'uri': 'https://www.vegguide.org/user/1101',
    'veg_level': 4,
    'veg_level_description': 'vegan'}}},
{'body': {'text/html': "<p>This Kurdish restaurant has great atmosphere and offers a la
    'text/vnd.vegguide.org-wikitext': "This Kurdish restaurant has great atmosphere and o
    'last_modified_datetime': '2009-08-27T23:26:55Z',
    'rating': 4,
    'user': {'image': {'files': [{'height': '30',
    'uri': 'https://www.vegguide.org/cdac61/user-images/5516-small.jpg',
    'width': '40'}],
    {'height': '75',
    'uri': 'https://www.vegguide.org/cdac61/user-images/5516-large.jpg',
    'width': '100'}]},
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    'veg_level': 0,
    'veg_level_description': 'not telling'}}},
{'body': {'text/html': "<p>You MUST order the Niskena. It may not sound good to you, bu
    'text/vnd.vegguide.org-wikitext': "You MUST order the Niskena. It may not sound good
    'last_modified_datetime': '2009-07-27T04:19:21Z',
    'rating': 4,
    'user': {'name': 'Capelli',
    'uri': 'https://www.vegguide.org/user/644',
    'veg_level': 0,
    'veg_level_description': 'not telling'}}},
{'body': {'text/html': "<p>Babani's is a quaint, friendly place with simple, light Midd
    'text/vnd.vegguide.org-wikitext': 'Babani\'s is a quaint, friendly place with simple,
    'last_modified_datetime': '2009-07-23T07:03:32Z',
    'rating': 3,
    'user': {'bio': {'text/html': "<p>I was born and raised in Illinois and lived in beaut
    'text/vnd.vegguide.org-wikitext': 'I was born and raised in Illinois and lived in be

```

```

    'image': {'files': [{'height': '40',
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        'uri': 'https://www.vegguide.org/cdac61/user-images/4795-large.jpg',
        'width': '75'}]},
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    'name': 'conde.kedar',
    'uri': 'https://www.vegguide.org/user/4795',
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    'veg_level_description': 'vegan',
    'website': 'http://www.exploreveg.org'}},
{'body': {'text/html': '<p>This restaurant is great! The tiny seating area allows a vi
    'text/vnd.vegguide.org-wikitext': 'This restaurant is great! The tiny seating area a
    'last_modified_datetime': '2007-03-20T03:50:08Z',
    'rating': 5,
    'user': {'name': 'snowbunny87',
        'uri': 'https://www.vegguide.org/user/3782',
        'veg_level': 0,
        'veg_level_description': 'not telling'}}},
{'body': {'text/html': "<p>I've eaten here several times, and I've been impressed with
    'text/vnd.vegguide.org-wikitext': "I've eaten here several times, and I've been impre
    'last_modified_datetime': '2007-02-23T17:21:46Z',
    'rating': 4,
    'user': {'bio': {'text/html': "<p>I live in Minneapolis, Minnesota and I enjoy cooking
        'text/vnd.vegguide.org-wikitext': "I live in Minneapolis, Minnesota and I enjoy cook
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        'website': 'http://www.exploreveg.org'}},
    'body': {'text/html': "<p>I really enjoyed my visit to Babani's. </p>\n<p>I tried the
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        'user': {'bio': {'text/html': '<p>I love food! I love checking out restaurants - both
            'text/vnd.vegguide.org-wikitext': 'I love food! I love checking out restaurants - b
            'name': 'hungry_coconut',
            'uri': 'https://www.vegguide.org/user/2022',
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```

```

    'website': 'http://thesaucycoconut.blogspot.com'}}},
{'body': {'text/html': "<p>I wish I had more good things to say about this restaurant,
    'text/vnd.vegguide.org-wikitext': 'I wish I had more good things to say about this re
    'last_modified_datetime': '2005-10-26T01:18:13Z',
    'rating': 2,
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    'veg_level': 0,
    'veg_level_description': 'not telling'}}},
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    'text/vnd.vegguide.org-wikitext': 'Yes, the vegan soup and the bread are excellent.
    'last_modified_datetime': '2005-04-18T04:04:17Z',
    'rating': 3,
    'user': {'bio': {'text/html': "<p>I live in Portland, OR. I am a philosophy professor
    'text/vnd.vegguide.org-wikitext': 'I live in Portland, OR. I am a philosophy profess
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    'uri': 'https://www.vegguide.org/cdac61/user-images/88-large.jpg',
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    'uri': 'https://www.vegguide.org/user/88',
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    'veg_level_description': 'vegan',
    'website': 'http://www.ExploreVeg.org'}}},
{'body': {'text/html': "<p>The soup everyone is raving about it really good - and the s
    'text/vnd.vegguide.org-wikitext': 'The soup everyone is raving about it really good -
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    'rating': 3,
    'user': {'name': 'v.e.g.a.n.',
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    'veg_level_description': 'not telling'}}},
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    'text/vnd.vegguide.org-wikitext': 'The Niskena soup is awesome and that bread is also
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    'veg_level_description': 'not telling',
    'website': 'http://waste.org/~danger'}}},
{'body': {'text/html': "<p>No one has mentioned the Kurdish lemonade, which is absolute
    'text/vnd.vegguide.org-wikitext': 'No one has mentioned the Kurdish lemonade, which i
    'last_modified_datetime': '2004-06-09T18:57:56Z',
    'rating': 4,

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    'user': {'name': 'Robin Garwood',
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      'text/vnd.vegguide.org-wikitext': "They have a number of vegetarian dishes but I have
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        'text/vnd.vegguide.org-wikitext': 'I like the niskena soup, too. Most of the entrees
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        'rating': 3,
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          'text/vnd.vegguide.org-wikitext': "I'm happily vegetarian since 2002. Amelia is the
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          'uri': 'https://www.vegguide.org/user/379',
          'veg_level': 3,
          'veg_level_description': 'vegetarian'}},
          {'body': {'text/html': "<p>I once drove all the way to Babani's from minneapolis in a n
            'text/vnd.vegguide.org-wikitext': "I once drove all the way to Babani's from minneapo
            'last_modified_datetime': '2003-03-27T23:12:43Z',
            'rating': 4,
            'user': {'name': 'Missy',
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              'veg_level': 0,
              'veg_level_description': 'not telling'}},
              {'body': {'text/html': '<p>The Kurdish bread and niskeena soup are excellent, as are th
                'text/vnd.vegguide.org-wikitext': 'The Kurdish bread and niskeena soup are excellent,
                'last_modified_datetime': '2002-10-26T00:52:43Z',
                'rating': 4,
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                  'veg_level': 4,
                  'veg_level_description': 'vegan',
                  'website': 'http://www.selenic.com'}}},
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                    'veg_level_description': 'not telling'}},
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                        'text/vnd.vegguide.org-wikitext': "I'm the guy who created this site, with help and
                        'image': {'files': [{'height': '30',

```

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        'uri': 'https://www.vegguide.org/cdac61/user-images/3-small.jpg',
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    'veg_level': 4,
    'veg_level_description': 'vegan',
    'website': 'http://blog.urth.org'}},
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          'veg_level_description': 'not telling'}}},
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          'veg_level': 0,
          'veg_level_description': 'not telling'}}},
{'rating': 4,
 'user': {'bio': {'text/html': '<p>I have been a vegetarian since 2001. My husband, son
    'text/vnd.vegguide.org-wikitext': 'I have been a vegetarian since 2001. My husband,
    'name': 'Math Girl',
    'uri': 'https://www.vegguide.org/user/5139',
    'veg_level': 3,
    'veg_level_description': 'vegetarian',
    'website': 'http://www.AmeliaDemulling.com'}}},
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          'uri': 'https://www.vegguide.org/user/28',
          'veg_level': 0,
          'veg_level_description': 'not telling'}}},
{'rating': 4,
 'user': {'bio': {'text/html': '<p>A single vegan mother / photographer / writer / web
    'text/vnd.vegguide.org-wikitext': 'A single vegan mother / photographer / writer / w
    'image': {'files': [{'height': '30',
        'uri': 'https://www.vegguide.org/cdac61/user-images/23-small.jpg',
        'width': '40'},
        {'height': '75',
        'uri': 'https://www.vegguide.org/cdac61/user-images/23-large.jpg',
        'width': '100'}]},
    'uri': 'https://www.vegguide.org/cdac61/user-images/23-small.jpg',
    'width': '40'},
    {'height': '75',
     'uri': 'https://www.vegguide.org/cdac61/user-images/23-large.jpg',
     'width': '100'}]},

```

```

    'mime_type': 'image/jpeg'},
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    'veg_level_description': 'vegan',
    'website': 'http://www.massdistraction.org'}}},
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  'uri': 'https://www.vegguide.org/user/7',
  'veg_level': 0,
  'veg_level_description': 'not telling'}}},
{'rating': 3,
 'user': {'image': {'files': [{'height': '40',
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  {'height': '100',
  'uri': 'https://www.vegguide.org/cdac61/user-images/29-large.jpg',
  'width': '74'}]},
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  'name': 'Gregory',
  'uri': 'https://www.vegguide.org/user/29',
  'veg_level': 4,
  'veg_level_description': 'vegan',
  'website': 'http://www.exploreveg.org'}}},
{'rating': 3,
 'user': {'bio': {'text/html': '<p>I like to eat.</p>\n',
  'text/vnd.vegguide.org-wikitext': 'I like to eat.'},
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  'width': '40'},
  {'height': '66',
  'uri': 'https://www.vegguide.org/cdac61/user-images/225-large.jpg',
  'width': '100'}]},
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  'uri': 'https://www.vegguide.org/user/225',
  'veg_level': 4,
  'veg_level_description': 'vegan',
  'website': 'http://jarrin.net'}}},
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  {'height': '64',
  'uri': 'https://www.vegguide.org/cdac61/user-images/5-large.png',
  'width': '64'}]},
  'mime_type': 'image/png'},
  'name': 'jello',

```

```
In [7]: # How many rows/records
print('We have {0} rows/records in the retrieved dataset'.format(len(data)))
```

```
In [8]: # What does one row/record look like?
data[0]
```

```
In [9]: # What keys/entries/columns are available in json row?
data[0].keys()
```

```
Out[10]: {'text/html': '<p>I got the dolmas and tabouli salad which were decent, but I was not o  
'text/vnd.vegguide.org-wikitext': 'I got the dolmas and tabouli salad which were decen
```

```
In [12]: # This cell has an error, only kept for discussion purposes
```

8


```
In [13]: # This cell has an error, only kept for discussion purposes
```

```
#data_rows=[]
#for index in range(0,len(data)):
#    row = data[index]
#    print(index)
#    print(row.keys())
#    data_rows.append({
#        'comment':row['body']['text/vnd.vegguide.org-wikitext'],
#        'date':row['last_modified_datetime'],
#        'user_veg_level_num':row['user']['veg_level'],
#        'user_veg_level_desc':row['user']['veg_level_description'],
#        'user_name':row['user']['name'],
#        'rating':row['rating']
#    })
#data_rows
```

```
In [14]: #extracting the data as flat records to be added to a list `data_rows`
```

```
data_rows=[] # create a list to store all records
for index in range(0,len(data)): # iterate for each row in dataset
    row = data[index] #temporary variable to store row
    data_rows.append({ # extracting data from json document and creating dictionary and
        'comment':row['body']['text/vnd.vegguide.org-wikitext'] if 'body' in row else ' ',
        'date':row['last_modified_datetime'] if 'last_modified_datetime' in row else ' ',
        'user_veg_level_num':row['user']['veg_level'],
        'user_veg_level_desc':row['user']['veg_level_description'],
        'user_name':row['user']['name'],
        'rating':row['rating']
    })
data_rows #previewing results
```

```
Out[14]: [{'comment': 'I got the dolmas and tabouli salad which were decent, but I was not overlo',
  'date': '2010-09-07T19:28:18Z',
  'rating': 2,
  'user_name': 'Emme',
  'user_veg_level_desc': 'vegan',
  'user_veg_level_num': 4},
 {'comment': "This Kurdish restaurant has great atmosphere and offers a large variety o",
  'date': '2009-08-27T23:26:55Z',
  'rating': 4,
  'user_name': 'qster',
  'user_veg_level_desc': 'not telling',
  'user_veg_level_num': 0},
 {'comment': "You MUST order the Niskena. It may not sound good to you, but it's the be",
  'date': '2009-07-27T04:19:21Z',
  'rating': 4,
  'user_name': 'Capelli',
```

```

    'user_veg_level_desc': 'not telling',
    'user_veg_level_num': 0},
{'comment': 'Babani\'s is a quaint, friendly place with simple, light Middle Eastern f
  'date': '2009-07-23T07:03:32Z',
  'rating': 3,
  'user_name': 'conde.kedar',
  'user_veg_level_desc': 'vegan',
  'user_veg_level_num': 4},
{'comment': 'This restaurant is great! The tiny seating area allows a view of the kit
  'date': '2007-03-20T03:50:08Z',
  'rating': 5,
  'user_name': 'snowbunny87',
  'user_veg_level_desc': 'not telling',
  'user_veg_level_num': 0},
{'comment': "I've eaten here several times, and I've been impressed with everything I'
  'date': '2007-02-23T17:21:46Z',
  'rating': 4,
  'user_name': 'Unny Nambudiripad',
  'user_veg_level_desc': 'vegan',
  'user_veg_level_num': 4},
{'comment': "I really enjoyed my visit to Babani's. \n\nI tried the Biryani, which is
  'date': '2006-04-20T01:42:01Z',
  'rating': 4,
  'user_name': 'hungry_coconut',
  'user_veg_level_desc': 'vegan',
  'user_veg_level_num': 4},
{'comment': "I wish I had more good things to say about this restaurant, especially si
  'date': '2005-10-26T01:18:13Z',
  'rating': 2,
  'user_name': 'Ellen Weinstock',
  'user_veg_level_desc': 'not telling',
  'user_veg_level_num': 0},
{'comment': "Yes, the vegan soup and the bread are excellent. I also really liked the
  'date': '2005-04-18T04:04:17Z',
  'rating': 3,
  'user_name': 'Ramona',
  'user_veg_level_desc': 'vegan',
  'user_veg_level_num': 4},
{'comment': "The soup everyone is raving about it really good - and the servings are l
  'date': '2004-11-06T18:10:24Z',
  'rating': 3,
  'user_name': 'v.e.g.a.n.',
  'user_veg_level_desc': 'not telling',
  'user_veg_level_num': 0},
{'comment': "The Niskena soup is awesome and that bread is also really great. and the
  'date': '2004-08-05T21:31:26Z',
  'rating': 4,
  'user_name': 'Danger D. Hotrod',

```

```

    'user_veg_level_desc': 'not telling',
    'user_veg_level_num': 0},
{'comment': "No one has mentioned the Kurdish lemonade, which is absolutely fan-flippi
'date': '2004-06-09T18:57:56Z',
'rating': 4,
'user_name': 'Robin Garwood',
'user_veg_level_desc': 'not telling',
'user_veg_level_num': 0},
{'comment': "They have a number of vegetarian dishes but I have never been impressed b
'date': '2004-05-18T22:05:42Z',
'rating': 2,
'user_name': 'dan',
'user_veg_level_desc': 'not telling',
'user_veg_level_num': 0},
{'comment': 'I like the niskena soup, too. Most of the entrees are what I call "simpl
'date': '2004-04-01T19:36:05Z',
'rating': 3,
'user_name': 'Armed with a Banana',
'user_veg_level_desc': 'vegetarian',
'user_veg_level_num': 3},
{'comment': "I once drove all the way to Babani's from minneapolis in a nasty snowstor
'date': '2003-03-27T23:12:43Z',
'rating': 4,
'user_name': 'Missy',
'user_veg_level_desc': 'not telling',
'user_veg_level_num': 0},
{'comment': 'The Kurdish bread and niskeena soup are excellent, as are the dolmas',
'date': '2002-10-26T00:52:43Z',
'rating': 4,
'user_name': 'Matt Mackall',
'user_veg_level_desc': 'vegan',
'user_veg_level_num': 4},
{'comment': '',
'date': None,
'rating': 4,
'user_name': 'bclintonk',
'user_veg_level_desc': 'not telling',
'user_veg_level_num': 0},
{'comment': '',
'date': None,
'rating': 4,
'user_name': 'Dave Rolsky',
'user_veg_level_desc': 'vegan',
'user_veg_level_num': 4},
{'comment': '',
'date': None,
'rating': 4,
'user_name': 'Huey-Ling Chen',

```

```

    'user_veg_level_desc': 'not telling',
    'user_veg_level_num': 0},
{'comment': '',
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 'rating': 4,
 'user_name': 'kmf',
 'user_veg_level_desc': 'not telling',
 'user_veg_level_num': 0},
{'comment': '',
 'date': None,
 'rating': 4,
 'user_name': "Let's Eat!",
 'user_veg_level_desc': 'not telling',
 'user_veg_level_num': 0},
{'comment': '',
 'date': None,
 'rating': 4,
 'user_name': 'Math Girl',
 'user_veg_level_desc': 'vegetarian',
 'user_veg_level_num': 3},
{'comment': '',
 'date': None,
 'rating': 4,
 'user_name': 'S4',
 'user_veg_level_desc': 'not telling',
 'user_veg_level_num': 0},
{'comment': '',
 'date': None,
 'rating': 4,
 'user_name': 'Sharyn Morrow',
 'user_veg_level_desc': 'vegan',
 'user_veg_level_num': 4},
{'comment': '',
 'date': None,
 'rating': 4,
 'user_name': 'starfive',
 'user_veg_level_desc': 'not telling',
 'user_veg_level_num': 0},
{'comment': '',
 'date': None,
 'rating': 3,
 'user_name': 'Gregory',
 'user_veg_level_desc': 'vegan',
 'user_veg_level_num': 4},
{'comment': '',
 'date': None,
 'rating': 3,
 'user_name': 'vaxjo',

```

```

        'user_veg_level_desc': 'vegan',
        'user_veg_level_num': 4},
{'comment': '',
 'date': None,
 'rating': 2,
 'user_name': 'jello',
 'user_veg_level_desc': 'vegan',
 'user_veg_level_num': 4}]

```

```

In [15]: data2 = pd.DataFrame(data_rows) # transform results as dataframe
data2.head() #preview dataframe

```

```

Out[15]:

```

		comment	date \
0	I got the dolmas and tabouli salad which were ...		2010-09-07T19:28:18Z
1	This Kurdish restaurant has great atmosphere a...		2009-08-27T23:26:55Z
2	You MUST order the Niskena. It may not sound g...		2009-07-27T04:19:21Z
3	Babani's is a quaint, friendly place with simp...		2009-07-23T07:03:32Z
4	This restaurant is great! The tiny seating ar...		2007-03-20T03:50:08Z

	rating	user_name	user_veg_level_desc	user_veg_level_num
0	2	Emme	vegan	4
1	4	qster	not telling	0
2	4	Capelli	not telling	0
3	3	conde.kedar	vegan	4
4	5	snowbunny87	not telling	0

```

In [18]: #utiliy method to draw a wordcloud from list/series
#modified
def wordcloud_draw(data, color = 'black'):
    """
        Draws a wordcloud

        params:
            data : list/series - set of sentences to include

        requires ``wordcloud`` package
    """
    from wordcloud import WordCloud, STOPWORDS
    words = ' '.join(data)
    cleaned_word = " ".join([word for word in words.split()
                              if 'http' not in word
                              and not word.startswith('@')
                              and not word.startswith('#')
                              and word != 'RT'
                              ])
    wordcloud = WordCloud(stopwords=STOPWORDS,
                          background_color=color,
                          width=2500,

```

```
In [19]: #visualize what everyone is saying
wordcloud_draw(data2['comment'])
```



0.3.1 How to use this implementation?

```
In [23]: # let us extract ONE (1) senetence
test_sentence = data2['comment'][0]
# analyze that sentence
sentiment_result = analyzer.polarity_scores(test_sentence)
# it returns a python dictionary of values
sentiment_result
```

```
Out[23]: {'compound': -0.5157, 'neg': 0.105, 'neu': 0.841, 'pos': 0.054}
```

```
In [24]: # we could analyze each row in our data set using the apply method
data2['comment'].apply(analyzer.polarity_scores)
```

```
Out[24]: 0      {'pos': 0.054, 'compound': -0.5157, 'neu': 0.8...
1      {'pos': 0.238, 'compound': 0.9847, 'neu': 0.76...
2      {'pos': 0.154, 'compound': 0.4848, 'neu': 0.71...
3      {'pos': 0.111, 'compound': 0.968, 'neu': 0.878...
4      {'pos': 0.116, 'compound': 0.7087, 'neu': 0.84...
5      {'pos': 0.156, 'compound': 0.7402, 'neu': 0.84...
6      {'pos': 0.208, 'compound': 0.9686, 'neu': 0.79...
7      {'pos': 0.19, 'compound': 0.8918, 'neu': 0.787...
8      {'pos': 0.342, 'compound': 0.9796, 'neu': 0.64...
9      {'pos': 0.174, 'compound': 0.9106, 'neu': 0.82...
10     {'pos': 0.27, 'compound': 0.8588, 'neu': 0.73,...
11     {'pos': 0.159, 'compound': 0.799, 'neu': 0.785...
12     {'pos': 0.121, 'compound': 0.1702, 'neu': 0.79...
13     {'pos': 0.224, 'compound': 0.95, 'neu': 0.721,...
14     {'pos': 0.256, 'compound': 0.4767, 'neu': 0.57...
15     {'pos': 0.252, 'compound': 0.5719, 'neu': 0.74...
16     {'pos': 0.0, 'compound': 0.0, 'neu': 0.0, 'neg...
17     {'pos': 0.0, 'compound': 0.0, 'neu': 0.0, 'neg...
18     {'pos': 0.0, 'compound': 0.0, 'neu': 0.0, 'neg...
19     {'pos': 0.0, 'compound': 0.0, 'neu': 0.0, 'neg...
20     {'pos': 0.0, 'compound': 0.0, 'neu': 0.0, 'neg...
21     {'pos': 0.0, 'compound': 0.0, 'neu': 0.0, 'neg...
22     {'pos': 0.0, 'compound': 0.0, 'neu': 0.0, 'neg...
23     {'pos': 0.0, 'compound': 0.0, 'neu': 0.0, 'neg...
24     {'pos': 0.0, 'compound': 0.0, 'neu': 0.0, 'neg...
25     {'pos': 0.0, 'compound': 0.0, 'neu': 0.0, 'neg...
26     {'pos': 0.0, 'compound': 0.0, 'neu': 0.0, 'neg...
27     {'pos': 0.0, 'compound': 0.0, 'neu': 0.0, 'neg...
Name: comment, dtype: object
```

```
In [25]: # let us define a function to analyze one sentence and return the compound value
def get_how_positive(sentence):
    return analyzer.polarity_scores(sentence)['compound']
```

```
In [26]: # testing the application of the method
data2['comment'].apply(get_how_positive)
```

```

Out[26]: 0    -0.5157
         1     0.9847
         2     0.4848
         3     0.9680
         4     0.7087
         5     0.7402
         6     0.9686
         7     0.8918
         8     0.9796
         9     0.9106
        10     0.8588
        11     0.7990
        12     0.1702
        13     0.9500
        14     0.4767
        15     0.5719
        16     0.0000
        17     0.0000
        18     0.0000
        19     0.0000
        20     0.0000
        21     0.0000
        22     0.0000
        23     0.0000
        24     0.0000
        25     0.0000
        26     0.0000
        27     0.0000
        Name: comment, dtype: float64

```

```

In [27]: # creating a new column in our data set to store the sentiment value
data2['sentiment'] = data2['comment'].apply(get_how_positive)
# previewing updates
data2.head(10)

```

```

Out[27]:
          comment                                     date \
0  I got the dolmas and tabouli salad which were ...  2010-09-07T19:28:18Z
1  This Kurdish restaurant has great atmosphere a...  2009-08-27T23:26:55Z
2  You MUST order the Niskena. It may not sound g...  2009-07-27T04:19:21Z
3  Babani's is a quaint, friendly place with simp...  2009-07-23T07:03:32Z
4  This restaurant is great! The tiny seating ar...  2007-03-20T03:50:08Z
5  I've eaten here several times, and I've been i...  2007-02-23T17:21:46Z
6  I really enjoyed my visit to Babani's. \n\nI t...  2006-04-20T01:42:01Z
7  I wish I had more good things to say about thi...  2005-10-26T01:18:13Z
8  Yes, the vegan soup and the bread are excellen...  2005-04-18T04:04:17Z
9  The soup everyone is raving about it really go...  2004-11-06T18:10:24Z

rating      user_name user_veg_level_desc  user_veg_level_num \

```


0	2	Emme	vegan	4
1	4	qster	not telling	0
2	4	Capelli	not telling	0
3	3	conde.kedar	vegan	4
4	5	snowbunny87	not telling	0
5	4	Unny Nambudiripad	vegan	4
6	4	hungry_coconut	vegan	4
7	2	Ellen Weinstock	not telling	0
8	3	Ramona	vegan	4
9	3	v.e.g.a.n.	not telling	0

	sentiment
0	-0.5157
1	0.9847
2	0.4848
3	0.9680
4	0.7087
5	0.7402
6	0.9686
7	0.8918
8	0.9796
9	0.9106

```
In [28]: # Deterimining the correlation between the sentiment values and existing ratings
print("Correlation")
data2[['rating', 'sentiment']].corr()
```

Correlation

```
Out[28]:
```

	rating	sentiment
rating	1.000000	0.091718
sentiment	0.091718	1.000000

```
In [29]: # Visualizing the correlation on a heatmap
sns.heatmap(data2[['rating', 'sentiment']].corr())
```

```
Out[29]: <matplotlib.axes._subplots.AxesSubplot at 0x7fb6721f8a90>
```



0.4 Questions?