SathishKumar_Rajendiran_IST652_HW2

August 24, 2020

[1]:
```
#␣
 ↪***********************************************************************************
#      Python Version check for libraries compatibility
#␣
 ↪***********************************************************************************

from platform import python_version
print(python_version())
```

```
3.7.6
```

```
Name: Sathish Kumar Rajendiran & Prasad Kulkarni
Group : 2
Task: Homework 2: Semistructured Data
Date: 8/5/2020

 Semistructured Data Processing
     The main outline of your assignment is to write a program that will read in JSON formatte
     The program will do some processing to collect data from some of the fields that will answ

Tweets
Retweets
Likes
Direct messages
Favorites
Trends
Media
```

[ ]:
```
#␣
 ↪***********************************************************************************
#      package installation
#␣
 ↪***********************************************************************************

# !pip install tweepy
# !pip install tweet-preprocessor
# !pip install wordcloud
```

[1]:
```
#␣
↪**********************************************************************************
#      import libraries
#␣
↪**********************************************************************************

# standard library
import os
import sys
from datetime import datetime
import time
import re
import timeit

# csv, xls, pandas & json
import pandas as pd
import json
import csv
import xlrd
import numpy as np

#twitter libraries
import tweepy
from tweepy import StreamListener
from tweepy import Stream
import preprocessor as p

# from tweet-preprocessor import clean,tokenize,parse

#MongoDB libraries
import pymongo
from pymongo import MongoClient

#visualization
import matplotlib.pyplot as plt
from wordcloud import WordCloud, STOPWORDS, ImageColorGenerator
from PIL import Image
%matplotlib inline

print('Libraries imported successfully!\n')
os.getcwd()
```

```
Libraries imported successfully!
```

[1]:
```
'/Users/sathishrajendiran/ist652-python/HW2'
```

[2]:
```
#␣
 ↪*****************************************************************************
#       Twitter credentials file
#␣
 ↪*****************************************************************************

# ls *.xls

#create dummy dictionary
di = {}
# define file name
infile = 'tw_credentials.xls'

# Working with file
try:
    df = pd.read_excel(infile, encoding='utf-16')
    di = df.to_dict()
    print("data has been processed \n")
except:
    print("Is the file in correct directory?")
```

```
data has been processed
```

[ ]:
```
# print(di)
```

[3]:
```
#␣
 ↪*****************************************************************************
#       Twitter feeds keywords collection
#␣
 ↪*****************************************************************************



#  words = ['#LA', '#LosAngeles', '#LAtraffic', '#accidents','#hollywood',
#          '#LAFD','#Wildfire','#LAHeatWave','#STREETCLOSURE','#car']

words = ['#LA', '#LosAngeles', '#LAtraffic','#LAFD','#LASTREETCLOSURE']  # key␣
 ↪words

lang=['en']  # language - english

print("search words ready")
```

```
search words ready
```

[4]:
```
#␣
 ↪*****************************************************************************
```

```
#       Define Twitter streaming feed into MongoDB collection
#␣
 ↪********************************************************************************

class TwitterStream(tweepy.StreamListener):

        def on_connect(self):
        # Function called to connect to the Twitter Streaming API
            print('\nTweets follow...')

        def on_status(self,status):
            if status.retweeted_status:
                return
            print(status.text)

        def on_error(self,status_code):
            print('Encounted Streaming error(''',status_code,''')')
            return False

        def on_data(self, data):
            try:

                datajson = json.loads(data)
                tweet_message = datajson['text']
                print('\n',tweet_message)

                tweetscoll.insert(datajson)

            except Exception as e:
                   print(e)
print("streaming api listening...")
```

```
streaming api listening…
```

[5]:
```
#␣
 ↪********************************************************************************
#       Main function to stream Tweets into MongoDB collection
#␣
 ↪********************************************************************************


#main function
if __name__ == "__main__":

        #Twitter connection details

        #assign it to variables
        for key,val in di.items():
            consumer_key = val[0]
            consumer_secret = val[1]
            access_token = val[2]
            access_secret = val[3]

        # test authentication
        try:
            auth = tweepy.OAuthHandler(consumer_key, consumer_secret)
            auth.set_access_token(access_token, access_secret)
            api = tweepy.API(auth, wait_on_rate_limit=True,␣
↪wait_on_rate_limit_notify=True)
            api.verify_credentials()
            print('Authentication OK - You''re now connected to the Twitter API.
↪\n')

        except:
            print('Error during authentication')

        # Connection to Mongo DB
        try:
            client = MongoClient('localhost', 27017)
            print ('Authentication OK - You''re now connected to the MongoDB.
↪\n')

            # use database named usgs or create it if not there already
            twdb = client.tweetsdb
            # create collection named earthquakes or create it if not there␣
↪already
            tweetscoll = twdb.tweets

            print('MongoDB database: ' + str(twdb))
            print('MongoDB collection:' + str(tweetscoll))

        except pymongo.errors.ConnectionFailure as e:
            print ('Could not connect to MongoDB: %s' % e )



        #intialize Stream
        try:
            print('\nStart Streaming...')
            print('Keywords:'  + str(words))
            print('Languages:'  + str(lang))
            listener = TwitterStream(api=tweepy.API(wait_on_rate_limit=True))
            streamer = tweepy.Stream(auth=auth,␣
↪listener=listener,tweet_mode='extended')
```

```
            # print('Date Since:'  + str(date_since))
            streamer.
↪filter(track=words,languages=lang,encoding='utf8',follow=None, )

        except KeyboardInterrupt as e :
            print("\nStopped.")

        finally:
            print('\nDone.')
            streamer.disconnect()
            client.close()
```

```
Authentication OK - Youre now connected to the Twitter API.

Authentication OK - Youre now connected to the MongoDB.

MongoDB database: Database(MongoClient(host=['localhost:27017'],
document_class=dict, tz_aware=False, connect=True), 'tweetsdb')
MongoDB collection:Collection(Database(MongoClient(host=['localhost:27017'],
document_class=dict, tz_aware=False, connect=True), 'tweetsdb'), 'tweets')

Start Streaming…
Keywords:['#LA', '#LosAngeles', '#LAtraffic', '#LAFD', '#LASTREETCLOSURE']
Languages:['en']

Tweets follow…

 RT @IfyNwadiwe: Or I don't know, maybe… just maybe… @MayorOfLA gets off of
his ass, freezes rent, and stops eating the LAPD's ass so ha…

/opt/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:27:
DeprecationWarning: insert is deprecated. Use insert_one or insert_many instead.


Stopped.

Done.
```

[6]:
```
#print the number of docs from db
print('Total Number of Documents: ',tweetscoll.count_documents({}))
```

```
Total Number of Documents:  277284
```

[7]:
```
#search the first item from the collection
tweetscoll.find_one()
```

[7]:
```
{'_id': ObjectId('5f39fe371a3bc61df03bfac4'),
 'created_at': 'Mon Aug 17 03:49:06 +0000 2020',
 'id': 1295205989478731781,
 'id_str': '1295205989478731781',
 'text': 'Hurricane Awareness: Zephyr Insurance \n\nREAD MORE:
https://t.co/SEhxK4bwyi\n\n#Accidents #Claims #DisasterMitigation…
https://t.co/ew7ylyeHCz',
 'display_text_range': [0, 140],
 'source': '<a href="https://www.blog.iammarketingmedia.com"
rel="nofollow">IAMBLOG2TWITTER</a>',
 'truncated': True,
 'in_reply_to_status_id': None,
 'in_reply_to_status_id_str': None,
 'in_reply_to_user_id': None,
 'in_reply_to_user_id_str': None,
 'in_reply_to_screen_name': None,
 'user': {'id': 226310002,
  'id_str': '226310002',
  'name': 'IAM Platform',
  'screen_name': 'IAM__Network',
  'location': 'Worldwide',
  'url': 'https://www.iammarketingmedia.com',
  'description': 'Curation | Tools | Tips | Services\n\nIAM Platform powers IAM
Network:\n\nGO: http://bit.ly/2Ywsbg8\n\nBlog | Social | Podcast | Code Trove',
  'translator_type': 'none',
  'protected': False,
  'verified': False,
  'followers_count': 18016,
  'friends_count': 14938,
  'listed_count': 3290,
  'favourites_count': 65467,
  'statuses_count': 778665,
  'created_at': 'Mon Dec 13 21:24:29 +0000 2010',
  'utc_offset': None,
  'time_zone': None,
  'geo_enabled': False,
  'lang': None,
  'contributors_enabled': False,
  'is_translator': False,
  'profile_background_color': '94D487',
  'profile_background_image_url':
'http://abs.twimg.com/images/themes/theme1/bg.png',
  'profile_background_image_url_https':
'https://abs.twimg.com/images/themes/theme1/bg.png',
  'profile_background_tile': False,
  'profile_link_color': '3366CC',
  'profile_sidebar_border_color': 'FFFFFF',
  'profile_sidebar_fill_color': 'DDEEF6',
  'profile_text_color': '333333',
  'profile_use_background_image': True,
  'profile_image_url':
'http://pbs.twimg.com/profile_images/701708113653669888/Nzm67hhC_normal.png',
  'profile_image_url_https':
'https://pbs.twimg.com/profile_images/701708113653669888/Nzm67hhC_normal.png',
  'profile_banner_url':
'https://pbs.twimg.com/profile_banners/226310002/1584072260',
  'default_profile': False,
  'default_profile_image': False,
  'following': None,
  'follow_request_sent': None,
  'notifications': None},
 'geo': None,
 'coordinates': None,
 'place': None,
 'contributors': None,
 'is_quote_status': False,
 'extended_tweet': {'full_text': 'Hurricane Awareness: Zephyr Insurance \n\nREAD
MORE: https://t.co/SEhxK4bwyi\n\n#Accidents #Claims #DisasterMitigation
#Insurance #InsuranceTechnology #InsurTech #Points #RiskMitigation #Technology~
https://t.co/kCrl2YxHfK',
  'display_text_range': [0, 194],
  'entities': {'hashtags': [{'text': 'Accidents', 'indices': [76, 86]},
    {'text': 'Claims', 'indices': [87, 94]},
    {'text': 'DisasterMitigation', 'indices': [95, 114]},
    {'text': 'Insurance', 'indices': [115, 125]},
    {'text': 'InsuranceTechnology', 'indices': [126, 146]},
    {'text': 'InsurTech', 'indices': [147, 157]},
    {'text': 'Points', 'indices': [158, 165]},
    {'text': 'RiskMitigation', 'indices': [166, 181]},
    {'text': 'Technology', 'indices': [182, 193]}],
   'urls': [{'url': 'https://t.co/SEhxK4bwyi',
     'expanded_url': 'https://blog.iammarketingmedia.com/hurricane-awareness-
zephyr-insurance/?utm_campaign=twitter&utm_medium=twitter&utm_source=twitter',
     'display_url': 'blog.iammarketingmedia.com/hurricane-awar…',
     'indices': [51, 74]}],
   'user_mentions': [],
   'symbols': [],
   'media': [{'id': 1295205987209621505,
     'id_str': '1295205987209621505',
     'indices': [195, 218],
     'media_url': 'http://pbs.twimg.com/media/Efl--6qWsAEpwkT.jpg',
     'media_url_https': 'https://pbs.twimg.com/media/Efl--6qWsAEpwkT.jpg',
     'url': 'https://t.co/kCrl2YxHfK',
     'display_url': 'pic.twitter.com/kCrl2YxHfK',
     'expanded_url':
'https://twitter.com/IAM__Network/status/1295205989478731781/photo/1',
     'type': 'photo',
     'sizes': {'small': {'w': 448, 'h': 252, 'resize': 'fit'},
      'thumb': {'w': 150, 'h': 150, 'resize': 'crop'},
      'medium': {'w': 448, 'h': 252, 'resize': 'fit'},
      'large': {'w': 448, 'h': 252, 'resize': 'fit'}}}]},
  'extended_entities': {'media': [{'id': 1295205987209621505,
     'id_str': '1295205987209621505',
     'indices': [195, 218],
     'media_url': 'http://pbs.twimg.com/media/Efl--6qWsAEpwkT.jpg',
     'media_url_https': 'https://pbs.twimg.com/media/Efl--6qWsAEpwkT.jpg',
     'url': 'https://t.co/kCrl2YxHfK',
     'display_url': 'pic.twitter.com/kCrl2YxHfK',
     'expanded_url':
'https://twitter.com/IAM__Network/status/1295205989478731781/photo/1',
     'type': 'photo',
     'sizes': {'small': {'w': 448, 'h': 252, 'resize': 'fit'},
      'thumb': {'w': 150, 'h': 150, 'resize': 'crop'},
      'medium': {'w': 448, 'h': 252, 'resize': 'fit'},
      'large': {'w': 448, 'h': 252, 'resize': 'fit'}}}]}},
 'quote_count': 0,
 'reply_count': 0,
 'retweet_count': 0,
 'favorite_count': 0,
 'entities': {'hashtags': [{'text': 'Accidents', 'indices': [76, 86]},
   {'text': 'Claims', 'indices': [87, 94]},
   {'text': 'DisasterMitigation', 'indices': [95, 114]}],
  'urls': [{'url': 'https://t.co/SEhxK4bwyi',
    'expanded_url': 'https://blog.iammarketingmedia.com/hurricane-awareness-
zephyr-insurance/?utm_campaign=twitter&utm_medium=twitter&utm_source=twitter',
    'display_url': 'blog.iammarketingmedia.com/hurricane-awar…',
    'indices': [51, 74]},
   {'url': 'https://t.co/ew7ylyeHCz',
    'expanded_url': 'https://twitter.com/i/web/status/1295205989478731781',
    'display_url': 'twitter.com/i/web/status/1…',
    'indices': [116, 139]}],
  'user_mentions': [],
  'symbols': []},
 'favorited': False,
 'retweeted': False,
 'possibly_sensitive': False,
 'filter_level': 'low',
 'lang': 'en',
 'timestamp_ms': '1597636146312'}
```

[ ]:
```
# for doc in tweetscoll.find().limit(2):
#     print(doc)
```

```
[8]: #␣
      ↪*********************************************************************************
     #        load data from MongoDB collection to python list object
     #␣
      ↪*********************************************************************************

     starttime = timeit.default_timer()
     print("The start time is :",starttime)
     tw_list =[]
     # results = tweetscoll.find().limit(5) #limit to 5 items
     results = tweetscoll.find()

     for result in results:
         id = result['id']
         id_str = result['id_str']
         user = result['user']['name']
         source = result['source']
         followers = result['user']['followers_count']
         retweets = result['retweet_count']
         coords = result['coordinates']
         bg_color = result['user']['profile_background_color']
         unix_time_mil = result['timestamp_ms'] # select unix timestamp in␣
      ↪milliseconds
         unix_time = int(unix_time_mil) / 1000     # convert to unix in seconds
         datets = datetime.fromtimestamp(unix_time).strftime('%Y-%m-%d %H:%M:%S')
         if (result['place'] is None):
             place = result['place']
         else:
             place = result['place']['full_name']
         if (result['truncated']==True):
             text = result['extended_tweet']['full_text']
         else:
             text = result['text']
         try:
             sensitivity = result['possibly_sensitive']
         except KeyError:
             sensitivity =''
         tw_list.
      ↪append([id,id_str,user,source,followers,retweets,coords,bg_color,datets,text])

     print('Total Number of Documents Processed: ',len(tw_list))

     print("The time difference is :", timeit.default_timer() - starttime)
```

```
The start time is : 310.994599406
Total Number of Documents Processed:  277284
The time difference is : 64.834117548
```

[10]:
```
#␣
↪*********************************************************************************
#       load data from python list into Pandas Dataframe
#␣
↪*********************************************************************************

#define column names
ColNames =␣
↪['id','id_str','user','source','followers','retweets','coords','bg_color','datets','text']

# Show all columns and do not truncate in the data frame
pd.set_option('display.max_columns', None)
pd.set_option('display.max_colwidth', None)

tweetsDF = pd.DataFrame(tw_list,columns=ColNames)

print('Total Number of rows Processed: ',len(tweetsDF))
```

```
Total Number of rows Processed:  277284
```

[11]:
```
#Analyze Dataframe  - metadata
tweetsDF.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 277284 entries, 0 to 277283
Data columns (total 10 columns):
 #   Column     Non-Null Count   Dtype
---  ------     --------------   -----
 0   id         277284 non-null  int64
 1   id_str     277284 non-null  object
 2   user       277284 non-null  object
 3   source     277284 non-null  object
 4   followers  277284 non-null  int64
 5   retweets   277284 non-null  int64
 6   coords     1189 non-null    object
 7   bg_color   277284 non-null  object
 8   datets     277284 non-null  object
 9   text       277284 non-null  object
dtypes: int64(3), object(7)
memory usage: 21.2+ MB
```

[ ]:
```
#Analyze Dataframe - top 5 rows

tweetsDF.head()
```

[12]:
```
#Analyze Dataframe - shape
tweetsDF.shape
```

```
[12]: (277284, 10)
```

```
[14]: #␣
       ↪***********************************************************************************
      #       Dataframe - Data Type conversion and Creation of Calender fields
      #␣
       ↪***********************************************************************************

      #convert datets values to float
      tweetsDF['datets'] = tweetsDF['datets'].astype('datetime64[ns]')

      #derive other calender items from date.today()
      # tweetsDF['datets'].unique()

      tweetsDF['date'] = tweetsDF['datets'].dt.date
      tweetsDF['year'] = tweetsDF['datets'].dt.year
      tweetsDF['month'] = tweetsDF['datets'].dt.month
      tweetsDF['monthday'] = tweetsDF['datets'].dt.day
      tweetsDF['weekday'] = tweetsDF['datets'].dt.weekday
      tweetsDF['dayname'] = tweetsDF['datets'].dt.day_name()
      tweetsDF['monthname'] = tweetsDF['datets'].dt.month_name()
      tweetsDF['hour'] = tweetsDF['datets'].dt.hour
      tweetsDF['minute'] = tweetsDF['datets'].dt.minute
      tweetsDF['secs'] = tweetsDF['datets'].dt.second

      tweetsDF.head()
```

```
[14]:                  id               id_str                              user  \
      0  1295205989478731781  1295205989478731781                      IAM Platform
      1  1295205997623926784  1295205997623926784  Alison(Ally) Stapf(Freeman, Day)
      2  1295206023523753984  1295206023523753984              DeAndre Jackson Media
      3  1295206235411591168  1295206235411591168                    Louis Valverde
      4  1295206317380874241  1295206317380874241                           Alfredo

      source  \
      0  <a href="https://www.blog.iammarketingmedia.com"
      rel="nofollow">IAMBLOG2TWITTER</a>
      1             <a href="https://mobile.twitter.com" rel="nofollow">Twitter Web
      App</a>
      2                         <a href="http://instagram.com"
      rel="nofollow">Instagram</a>
      3   <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for
      iPhone</a>
      4    <a href="http://twitter.com/#!/download/ipad" rel="nofollow">Twitter for
      iPad</a>

         followers  retweets  \
      0      18016        0
      1        298        0
      2        216        0
      3        743        0
      4        354        0

                                                         coords bg_color  \
      0                                                   None   94D487
      1                                                   None   C0DEED
      2  {'type': 'Point', 'coordinates': [-118.2445, 34.0564]}   9AE4E8
      3                                                   None   000000
      4                                                   None   1A1B1F

                     datets  \
      0 2020-08-16 20:49:06
      1 2020-08-16 20:49:08
      2 2020-08-16 20:49:14
      3 2020-08-16 20:50:04
      4 2020-08-16 20:50:24

       text  \
      0                     Hurricane Awareness: Zephyr Insurance \n\nREAD MORE:
      https://t.co/SEhxK4bwyi\n\n#Accidents #Claims #DisasterMitigation #Insurance
      #InsuranceTechnology #InsurTech #Points #RiskMitigation #Technology~
      https://t.co/kCrl2YxHfK
      1
      RT @abc7chriscristi: I happen to think LAX is uniquely photogenic at night…
      for an airport. #air7hd @abc7 #abc7eyewitness #lax #airport #…
      2  Headshots and portraits, back open for business. DM for bookings.
      \n\n------------------------- •\n•\n•\n\n#sony #modellife #fashionblogger
      #sonyalpha #fashion #losangeles #travelingphotographer #california #newyork…
      https://t.co/CmzuIO1JgK
      3
      RT @abc7chriscristi: I happen to think LAX is uniquely photogenic at night…
      for an airport. #air7hd @abc7 #abc7eyewitness #lax #airport #…
      4
      RT @abc7chriscristi: I happen to think LAX is uniquely photogenic at night…
      for an airport. #air7hd @abc7 #abc7eyewitness #lax #airport #…

               date  year  month  monthday  weekday dayname monthname  hour  minute  \
      0  2020-08-16  2020      8        16        6  Sunday    August    20      49
      1  2020-08-16  2020      8        16        6  Sunday    August    20      49
      2  2020-08-16  2020      8        16        6  Sunday    August    20      49
      3  2020-08-16  2020      8        16        6  Sunday    August    20      50
      4  2020-08-16  2020      8        16        6  Sunday    August    20      50

         secs
```

```
0     6
1     8
2    14
3     4
4    24
```

[ ]:
```
#create a another dataframe for further analysis
# NewtweetsDF = pd.DataFrame()
# NewtweetsDF.info()
# NewtweetsDF=tweetsDF
```

[ ]:
```
#  review the data frame
# NewtweetsDF.info()
# NewtweetsDF.head()
```

[ ]:
```
# la_tweets = NewtweetsDF[NewtweetsDF['text'].str.contains('los␣
 ↪angeles|latraffic|california|fire')]
# la_tweets.shape
```

[ ]:
```
# NewtweetsDF.tail()
```

[ ]:
```
# NewtweetsDF.info()
```

[15]:
```
#data spread- Cleanup tweet and username fields using preprocessor api library
#split the dataframe into two splits for processing

#␣
 ↪***********************************************************************************
#       Dataframe - Pre Processing - Temp1
#␣
 ↪***********************************************************************************

starttime = timeit.default_timer()
print("The start time is :",starttime)
tempDF1 = tweetsDF[tweetsDF['text'].str.startswith('RT')==True]
# retweetsDF.info() #184624
tempDF1 = tempDF1.reset_index()
print("The time difference is :", timeit.default_timer() - starttime)
```

```
The start time is : 766.21777337
The time difference is : 0.596149344999958
```

[ ]:
```
# tempDF1.index
```

[16]:
```
#␣
 ↪***********************************************************************************
#       Dataframe - Cleanup tweet and username words from special words
```

```
#␣
↪***********************************************************************************

starttime = timeit.default_timer()
print("The start time is :",starttime)
tempDF1['tweet']=''
tempDF1['username']=''
for i in tempDF1.index:
    tempDF1['tweet'][i]= p.clean(tempDF1['text'].iloc[i])
    tempDF1['username'][i]= p.clean(tempDF1['user'].iloc[i])
    i += 1
#     print("i", i)
print("items updated already!")
print("The time difference is :", timeit.default_timer() - starttime)
```

```
The start time is : 786.470096723

/opt/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:10:
SettingWithCopyWarning:
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/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  # Remove the CWD from sys.path while we load stuff.
/opt/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:11:
SettingWithCopyWarning:
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/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  # This is added back by InteractiveShellApp.init_path()

items updated already!
The time difference is : 438.9718246599999
```

[17]:
```
#␣
↪***********************************************************************************
#       Dataframe - Pre Processing - Temp2
#␣
↪***********************************************************************************

#data spread- Cleanup tweet and username fields using preprocessor api library
starttime = timeit.default_timer()
print("The start time is :",starttime)
tempDF2 = tweetsDF[tweetsDF['text'].str.startswith('RT')==False]
tempDF2 = tempDF2.reset_index()
print("The time difference is :", timeit.default_timer() - starttime)
```

```
The start time is : 1285.329067655
The time difference is : 0.34198545899994315
```

[20]:
```
tempDF2.index
```

[20]:
```
Int64Index([    0,     1,     2,     3,     4,     5,     6,     7,     8,
                9,
            …
            56211, 56212, 56213, 56214, 56215, 56216, 56217, 56218, 56219,
            56220],
           dtype='int64', length=56221)
```

[19]:
```
# cleanup unwanted entries
tempDF2.drop(tempDF2.index[56221:len(tempDF2.index)],inplace=True)
```

[21]:
```
#data spread- Cleanup tweet and username fields using preprocessor api library
starttime = timeit.default_timer()
print("The start time is :",starttime)
tempDF2['tweet']=''
tempDF2['username']=''
for i in tempDF2.index:
    tempDF2['tweet'][i]= p.clean(tempDF2['text'].iloc[i])
    tempDF2['username'][i]= p.clean(tempDF2['user'].iloc[i])
    i += 1
#      print("i", i)
print("items updated already!")
print("The time difference is :", timeit.default_timer() - starttime)
```

```
The start time is : 1459.974208725

/opt/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:7:
SettingWithCopyWarning:
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/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  import sys
/opt/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:8:
SettingWithCopyWarning:
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/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy


items updated already!
The time difference is : 59.14983893099998
```

```
[ ]: # tempDF2.info()
     # tempDF1.tail(100)
```

```
[22]: #␣
       ↪*********************************************************************************
      #       Create a cleaner dataframe
      #␣
       ↪*********************************************************************************

      NewtweetsDF= pd.concat([tempDF1,tempDF2],ignore_index = True)
      NewtweetsDF = NewtweetsDF.reset_index()
      # NewtweetsDF.info()
```

```
[23]: #␣
       ↪*********************************************************************************
      #       Remove a href & url text from "Source" to collect platform info
      #␣
       ↪*********************************************************************************

      NewtweetsDF['platform'] = NewtweetsDF['source'].str.extract('(>.*(?=</))')
      NewtweetsDF['platform'] = NewtweetsDF['platform'].str.replace('>','')
      NewtweetsDF.head()
```

```
[23]:    level_0  index                   id               id_str  \
      0        0      1  1295205997623926784  1295205997623926784
      1        1      3  1295206235411591168  1295206235411591168
      2        2      4  1295206317380874241  1295206317380874241
      3        3      5  1295206509849137154  1295206509849137154
      4        4      6  1295206523963084801  1295206523963084801

                                   user  \
      0  Alison(Ally) Stapf(Freeman, Day)
      1                    Louis Valverde
      2                           Alfredo
      3                               ava
      4                      RE:AnimeTron

      source  \
      0              <a href="https://mobile.twitter.com" rel="nofollow">Twitter Web
      App</a>
      1  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for
      iPhone</a>
      2   <a href="http://twitter.com/#!/download/ipad" rel="nofollow">Twitter for
      iPad</a>
      3  <a href="http://twitter.com/download/iphone" rel="nofollow">Twitter for
      iPhone</a>
      4              <a href="https://github.com/Xtremilicious"
```

```
rel="nofollow">BotXtreme</a>

   followers  retweets coords bg_color               datets  \
0        298         0   None   C0DEED 2020-08-16 20:49:08
1        743         0   None   000000 2020-08-16 20:50:04
2        354         0   None   1A1B1F 2020-08-16 20:50:24
3        247         0   None   0D18DE 2020-08-16 20:51:10
4       1872         0   None   F5F8FA 2020-08-16 20:51:13

                                                             text  \
0  RT @abc7chriscristi: I happen to think LAX is uniquely photogenic at night…
for an airport. #air7hd @abc7 #abc7eyewitness #lax #airport #…
1  RT @abc7chriscristi: I happen to think LAX is uniquely photogenic at night…
for an airport. #air7hd @abc7 #abc7eyewitness #lax #airport #…
2  RT @abc7chriscristi: I happen to think LAX is uniquely photogenic at night…
for an airport. #air7hd @abc7 #abc7eyewitness #lax #airport #…
3  RT @abc7chriscristi: I happen to think LAX is uniquely photogenic at night…
for an airport. #air7hd @abc7 #abc7eyewitness #lax #airport #…
4  RT @CleMyselfAndI: It’s hot outside! Pop open a can of @Pepsi and cool off
with Cle. The next episode of the podcast is available now on Sp…

         date  year  month  monthday  weekday dayname monthname  hour  minute  \
0  2020-08-16  2020      8        16        6  Sunday    August    20      49
1  2020-08-16  2020      8        16        6  Sunday    August    20      50
2  2020-08-16  2020      8        16        6  Sunday    August    20      50
3  2020-08-16  2020      8        16        6  Sunday    August    20      51
4  2020-08-16  2020      8        16        6  Sunday    August    20      51

   secs  \
0     8
1     4
2    24
3    10
4    13

                                tweet  \
0                                          : I happen to think LAX is uniquely
photogenic at night… for an airport.
1                                          : I happen to think LAX is uniquely
photogenic at night… for an airport.
2                                          : I happen to think LAX is uniquely
photogenic at night… for an airport.
3                                          : I happen to think LAX is uniquely
photogenic at night… for an airport.
4  : Its hot outside! Pop open a can of and cool off with Cle. The next episode
of the podcast is available now on Sp
```

```
                          username           platform
0  Alison(Ally) Stapf(Freeman, Day)     Twitter Web App
1                  Louis Valverde  Twitter for iPhone
2                         Alfredo    Twitter for iPad
3                             ava  Twitter for iPhone
4                    RE:AnimeTron          BotXtreme
```

[24]:
```
#␣
 ↪*******************************************************************************
#       Remove redundant & unwanted columns
#␣
 ↪*******************************************************************************

try:
    delColNames = ['id_str','source','retweet']
    NewtweetsDF.drop(delColNames,axis=1,inplace=True)
    print("items deleted!")
except:
    print("items deleted already!")

# NewtweetsDF.tail()
```

```
items deleted already!
```

[25]:
```
#␣
 ↪*******************************************************************************
#       Rearrange columns
#␣
 ↪*******************************************************************************

#re arrange columns
column_titles = ['id','datets'
                ␣
 ↪,'date','year','month','monthday','hour','minute','secs','monthname','dayname'
                ␣
 ↪,'user','username','followers','platform','text','tweet','coords']

NewtweetsDF = NewtweetsDF.reindex(columns = column_titles)
# NewtweetsDF.head()
```

[26]:
```
#␣
 ↪*******************************************************************************
#       Export to CSV
#␣
 ↪*******************************************************************************
```

```
# Total tweets
print ('Total tweets this period:', len(NewtweetsDF.index), '\n')

#export to csv
NewtweetsDF.to_csv(r'NewtweetsDF_08222020.csv', index = False, header=True)
print('data exported successfully:')

pd.read_csv('NewtweetsDF_08222020.csv').head()
```

```
Total tweets this period: 240846

data exported successfully:

/opt/anaconda3/lib/python3.7/site-
packages/IPython/core/interactiveshell.py:3063: DtypeWarning: Columns (0,17)
have mixed types.Specify dtype option on import or set low_memory=False.
  interactivity=interactivity, compiler=compiler, result=result)
```

[26]:
```
                    id               datets        date    year  month  \
0  1295205997623926784  2020-08-16 20:49:08  2020-08-16  2020.0    8.0
1  1295206235411591168  2020-08-16 20:50:04  2020-08-16  2020.0    8.0
2  1295206317380874241  2020-08-16 20:50:24  2020-08-16  2020.0    8.0
3  1295206509849137154  2020-08-16 20:51:10  2020-08-16  2020.0    8.0
4  1295206523963084801  2020-08-16 20:51:13  2020-08-16  2020.0    8.0

   monthday  hour  minute  secs monthname dayname  \
0      16.0  20.0    49.0   8.0    August  Sunday
1      16.0  20.0    50.0   4.0    August  Sunday
2      16.0  20.0    50.0  24.0    August  Sunday
3      16.0  20.0    51.0  10.0    August  Sunday
4      16.0  20.0    51.0  13.0    August  Sunday

                               user                           username  \
0  Alison(Ally) Stapf(Freeman, Day)  Alison(Ally) Stapf(Freeman, Day)
1                    Louis Valverde                     Louis Valverde
2                           Alfredo                            Alfredo
3                               ava                                ava
4                     RE:AnimeTron                       RE:AnimeTron

   followers            platform  \
0      298.0     Twitter Web App
1      743.0  Twitter for iPhone
2      354.0    Twitter for iPad
3      247.0  Twitter for iPhone
4     1872.0           BotXtreme

                                                                text  \
0  RT @abc7chriscristi: I happen to think LAX is uniquely photogenic at night…
```

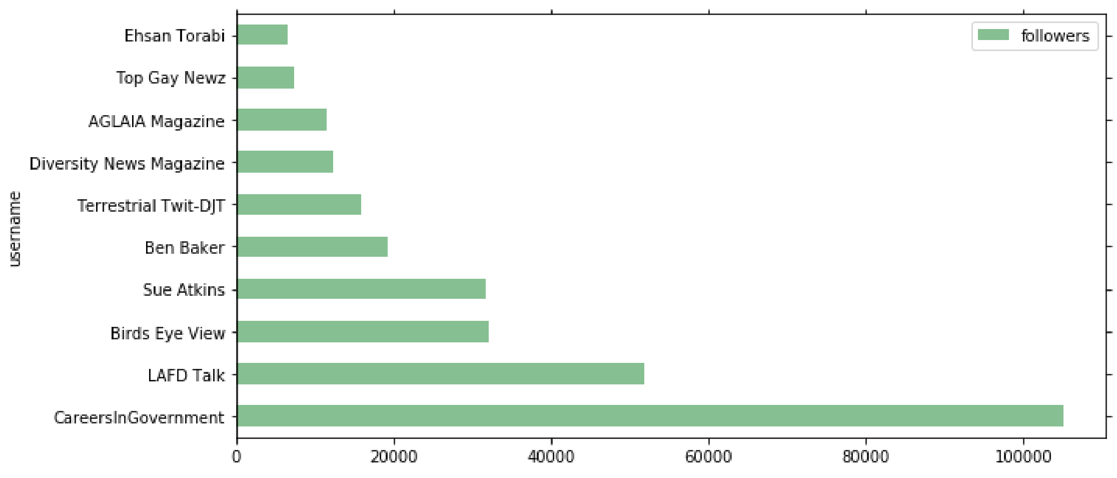
```
for an airport. #air7hd @abc7 #abc7eyewitness #lax #airport #…
1  RT @abc7chriscristi: I happen to think LAX is uniquely photogenic at night…
for an airport. #air7hd @abc7 #abc7eyewitness #lax #airport #…
2  RT @abc7chriscristi: I happen to think LAX is uniquely photogenic at night…
for an airport. #air7hd @abc7 #abc7eyewitness #lax #airport #…
3  RT @abc7chriscristi: I happen to think LAX is uniquely photogenic at night…
for an airport. #air7hd @abc7 #abc7eyewitness #lax #airport #…
4  RT @CleMyselfAndI: It’s hot outside! Pop open a can of @Pepsi and cool off
with Cle. The next episode of the podcast is available now on Sp…

                                 tweet  \
0                                            : I happen to think LAX is uniquely
photogenic at night… for an airport.
1                                            : I happen to think LAX is uniquely
photogenic at night… for an airport.
2                                            : I happen to think LAX is uniquely
photogenic at night… for an airport.
3                                            : I happen to think LAX is uniquely
photogenic at night… for an airport.
4  : Its hot outside! Pop open a can of and cool off with Cle. The next episode
of the podcast is available now on Sp

  coords
0    NaN
1    NaN
2    NaN
3    NaN
4    NaN
```

[27]:
```
#␣
 ↪*********************************************************************************
#       Create a Pandas data frame with filter words keywords to analyze  LA␣
 ↪traffic
#␣
 ↪*********************************************************************************

# create a data frame containing text "las" from tweetsDF
la_tweets = NewtweetsDF[NewtweetsDF['text'].str.contains('los␣
 ↪angeles|latraffic|california|LAFD|LAPD')]

# la_tweets.shape
# la_tweets.head()
```

[30]:
```
#␣
 ↪*********************************************************************************
#       Find users having most followers - Top 10 followers
```

```
#␣
 ↪*********************************************************************************

user_followers = la_tweets[['username','followers']]
#unique UserName
user_followers = user_followers.drop_duplicates().
 ↪sort_values('followers',ascending=False)
user_followers = user_followers.set_index('username')
# print('Top 10 users by followers:')
# user_followers.head(10)

# find users having most followers
user_followers.reset_index(level=0,inplace = True,drop=False)
user_followers.index += 1
print('Top 10 users by followers:\n')
user_followers_top10 = user_followers.head(10)

user_followers_top10.drop_duplicates()

#print('Top 10 users by followers: \n')
for index, row in user_followers_top10.iterrows():
    print(row['username'],': ', '{:,.0f}'.format(row["followers"]))

# Visualization

followers_top10_plot = user_followers_top10.set_index('username')
x = followers_top10_plot.plot(kind='barh', figsize=(10, 5), color='#86bf91',␣
 ↪zorder=2, width=0.5)

x.tick_params(axis="both", which="both", bottom="off", top="off",␣
 ↪labelbottom="on"
               , left="off", right="off", labelleft="on",labelsize = 10)
```

```
Top 10 users by followers:

CareersInGovernment :  105,108
LAFD Talk :  51,768
Birds Eye View :  32,004
Sue Atkins :  31,767
Ben Baker :  19,160
Terrestrial Twit-DJT :  15,833
Diversity News Magazine :  12,288
AGLAIA Magazine :  11,530
Top Gay Newz :  7,424
Ehsan Torabi :  6,535
```



```
[ ]: #adjust display of decimals with comma separators on thousands
     # pd.options.display.float_format = '{:,.2f}'.format
```

```
[31]: #␣
       ↪*********************************************************************************
      #       Find find min,max, average followers
      #␣
       ↪*********************************************************************************

      pd.set_option('display.float_format',lambda x: '%.2f' % x)
      user_followers.describe()

      max_followers = user_followers['followers'].max()
      avg_followers = user_followers['followers'].mean()
      min_followers = user_followers['followers'].min()
      print('Maximum Number of followers: ',max_followers)
      print('Avergage Number of followers: ',round(avg_followers,0))
      print('Minimum Number of followers: ',min_followers)

      pd.reset_option('display.float_format')
```

```
Maximum Number of followers:  105108
Avergage Number of followers:  3029.0
Minimum Number of followers:  0
```

```
[60]: #␣
       ↪*********************************************************************************
      #       Analyze the Retweets Percentage
      #␣
       ↪*********************************************************************************
```

```
#all re-tweets
retweets = la_tweets[la_tweets['text'].str.startswith('RT')==True]
# print('Number of retweets: ',len(retweets))
print('Percentage of retweets {}%'.format(round((len(retweets))/
 ↪len(la_tweets['text'])*100,2)))

#all direct tweets
direct_tweets = la_tweets[la_tweets['text'].str.startswith('RT')==False]
# print('Number of actual tweets: ',len(direct_tweets))
print('Percentage of actual tweets {}%'.format(round((len(direct_tweets))/
 ↪len(la_tweets['text'])*100,2)))
```

```
Percentage of retweets 45.06%
Percentage of actual tweets 54.94%
```

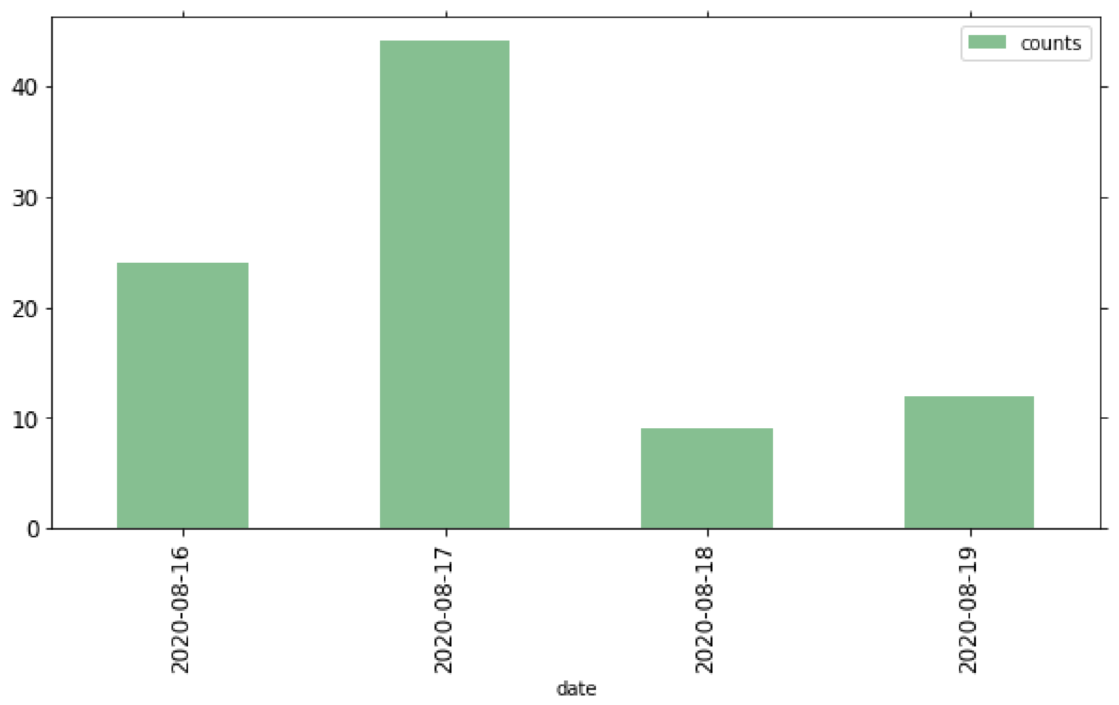
[ ]:

```
```

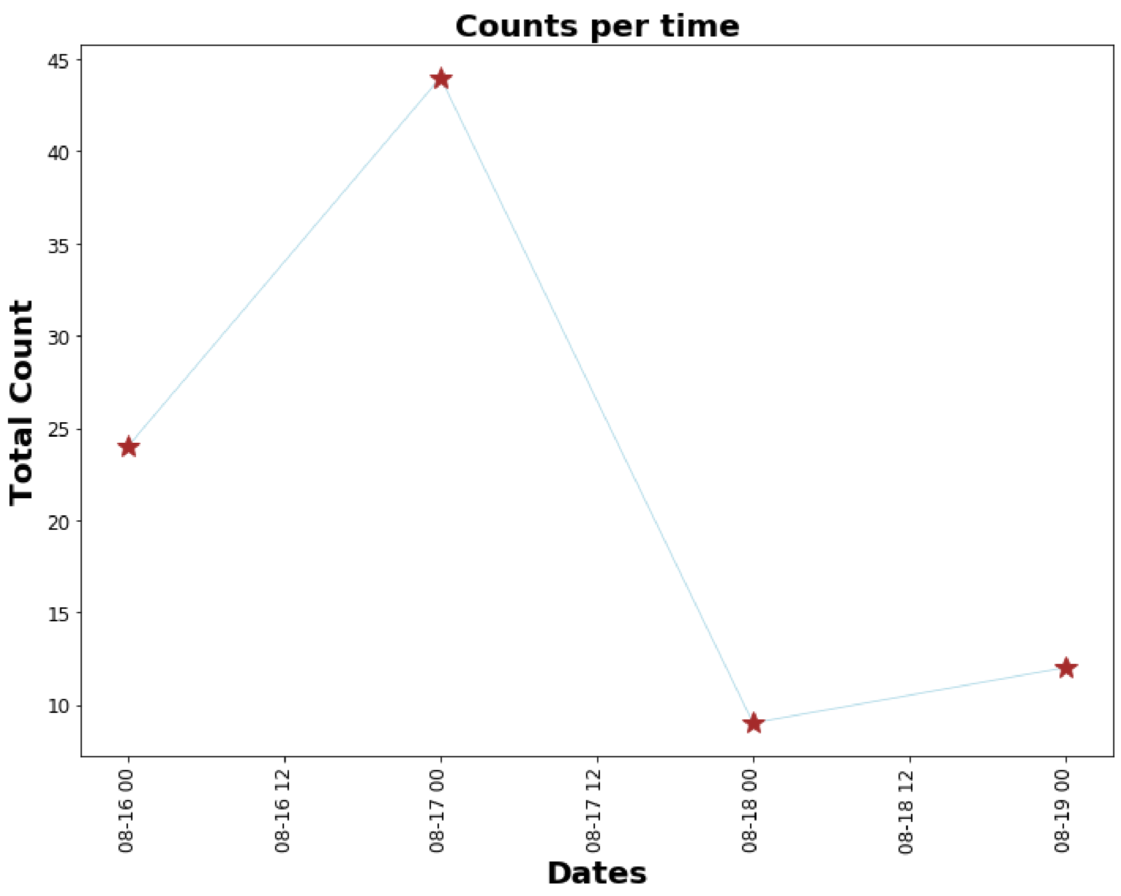
[39]:

```
#␣
 ↪*********************************************************************************
#       Analyze tweets trend
#␣
 ↪*********************************************************************************

by_date = direct_tweets.groupby(['date']).size().reset_index(name='counts')
by_date = by_date.set_index('date')
by_date.reset_index(level=0,inplace = True,drop=False)
by_date.index += 1
print('Tweets by calender date: ')
by_date

#bar chart tweets by calender date
by_date_plot = by_date.set_index('date')
ax = by_date_plot.plot(kind='bar', figsize=(10, 5), color='#86bf91', zorder=2,␣
 ↪width=0.5)
ax.tick_params(axis="both", which="both", bottom="off", top="off",␣
 ↪labelbottom="on"
               , left="off", right="off", labelleft="on",labelsize = 12)
```

```
Tweets by calender date:
```



```
[54]: #line chart - Tweets trend by

plt.figure(figsize=(10,8))
plt.plot(by_date.date, by_date.counts, linewidth=.8, color = 'lightblue')
plt.plot(by_date.date, by_date.counts, '*', markersize=15, color='brown')
plt.xticks(fontsize=12, fontweight='regular',rotation=90)
plt.yticks(fontsize=12, fontweight='regular')
plt.xlabel('Dates',fontsize=20, fontweight='bold')
plt.ylabel('Total Count',fontsize=20, fontweight='bold')
plt.title('Counts per time',fontsize=20, fontweight='bold')
plt.tight_layout()
```



```
[55]: #number of tweets by day
      by_month_by_weekday = direct_tweets.groupby(['monthname','dayname']).size().
       ↪reset_index(name='counts')
      by_month_by_weekday = by_month_by_weekday.set_index('monthname')
      by_month_by_weekday.reset_index(level=0,inplace = True,drop=False)
      by_month_by_weekday.index += 1
      print('Tweets by week day of the Month: ')
      by_month_by_weekday
```

```
Tweets by week day of the Month:
```

```
[55]:   monthname    dayname  counts
      1    August     Monday      44
      2    August     Sunday      24
      3    August    Tuesday       9
      4    August  Wednesday      12
```

```
[58]: #number of tweets by hour of day
```

```
by_day_hour = direct_tweets.groupby(['dayname','hour']).size().
 ↪reset_index(name='counts')
by_day_hour = by_day_hour.set_index('dayname')
by_day_hour.reset_index(level=0,inplace = True,drop=False)
by_day_hour.index += 1
print('Tweets by hour of the day: ')
by_day_hour
```

```
Tweets by hour of the day:
```

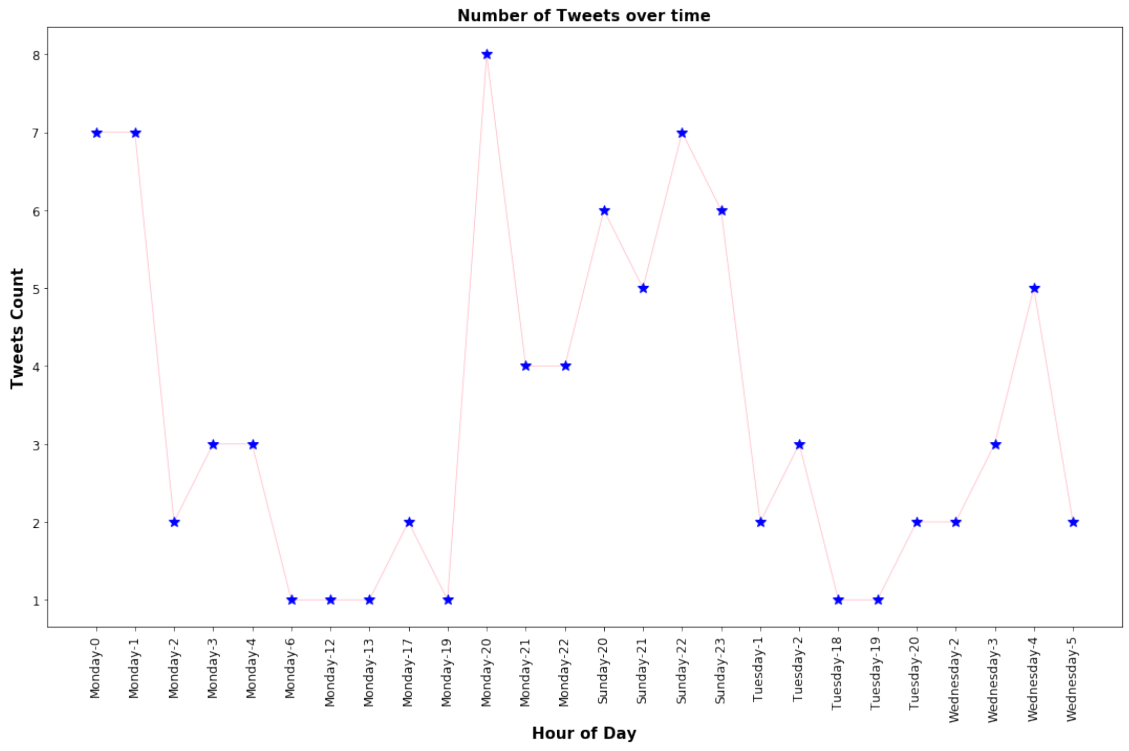
[58]:

```
      dayname  hour  counts
1      Monday     0       7
2      Monday     1       7
3      Monday     2       2
4      Monday     3       3
5      Monday     4       3
6      Monday     6       1
7      Monday    12       1
8      Monday    13       1
9      Monday    17       2
10     Monday    19       1
11     Monday    20       8
12     Monday    21       4
13     Monday    22       4
14     Sunday    20       6
15     Sunday    21       5
16     Sunday    22       7
17     Sunday    23       6
18    Tuesday     1       2
19    Tuesday     2       3
20    Tuesday    18       1
21    Tuesday    19       1
22    Tuesday    20       2
23  Wednesday     2       2
24  Wednesday     3       3
25  Wednesday     4       5
26  Wednesday     5       2
```

[57]:

```
by_day_hour['day_hour'] = by_day_hour['dayname'] + '-'+ by_day_hour['hour'].
 ↪astype('str')
sel_columns =['day_hour','counts']
by_day_hour_df = pd.DataFrame(by_day_hour,columns = sel_columns)
# tweetsDF = pd.DataFrame(tw_list,columns=ColNames)

plt.figure(figsize=(15,10))
plt.plot(by_day_hour_df.day_hour, by_day_hour_df.counts, linewidth=.8, color␣
 ↪='pink')
```

```
plt.plot(by_day_hour_df.day_hour, by_day_hour_df.counts, '*', markersize=10,␣
↪color='blue')
plt.xticks(fontsize=12, fontweight='regular',rotation=90)
plt.yticks(fontsize=12, fontweight='regular')
plt.xlabel('Hour of Day',fontsize=15, fontweight='bold')
plt.ylabel('Tweets Count',fontsize=15, fontweight='bold')
plt.title('Number of Tweets over time',fontsize=15, fontweight='bold')
plt.grid(False)
plt.tight_layout()
```

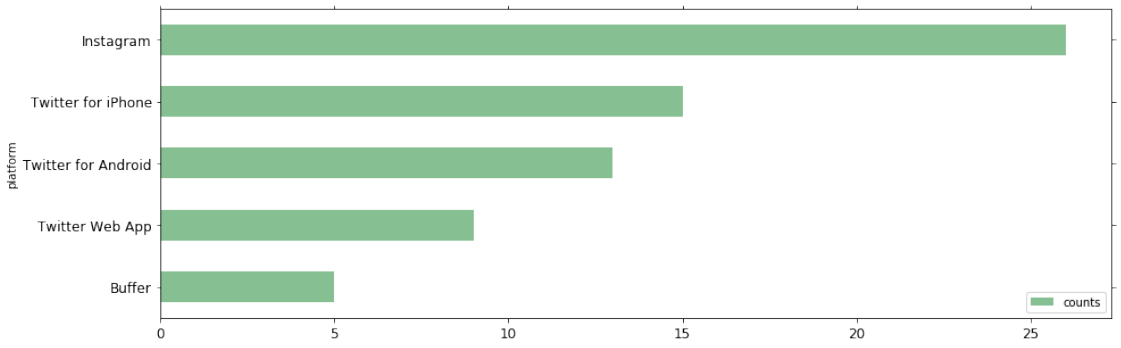


[44]:
```
#number of tweets by hour of day
by_platform = direct_tweets.groupby(['platform']).size().
↪reset_index(name='counts').sort_values('counts',ascending=False)
by_platform = by_platform.set_index('platform')
by_platform.reset_index(level=0,inplace = True,drop=False)
by_platform.index += 1
print('Top 5 Platform by users:')
by_platform_top5 = by_platform.head(5)
by_platform_top5
```

```
Top 5 Platform by users:
```

```
[44]:            platform  counts
      1            Instagram      26
      2    Twitter for iPhone      15
      3   Twitter for Android      13
      4       Twitter Web App       9
      5                Buffer       5
```

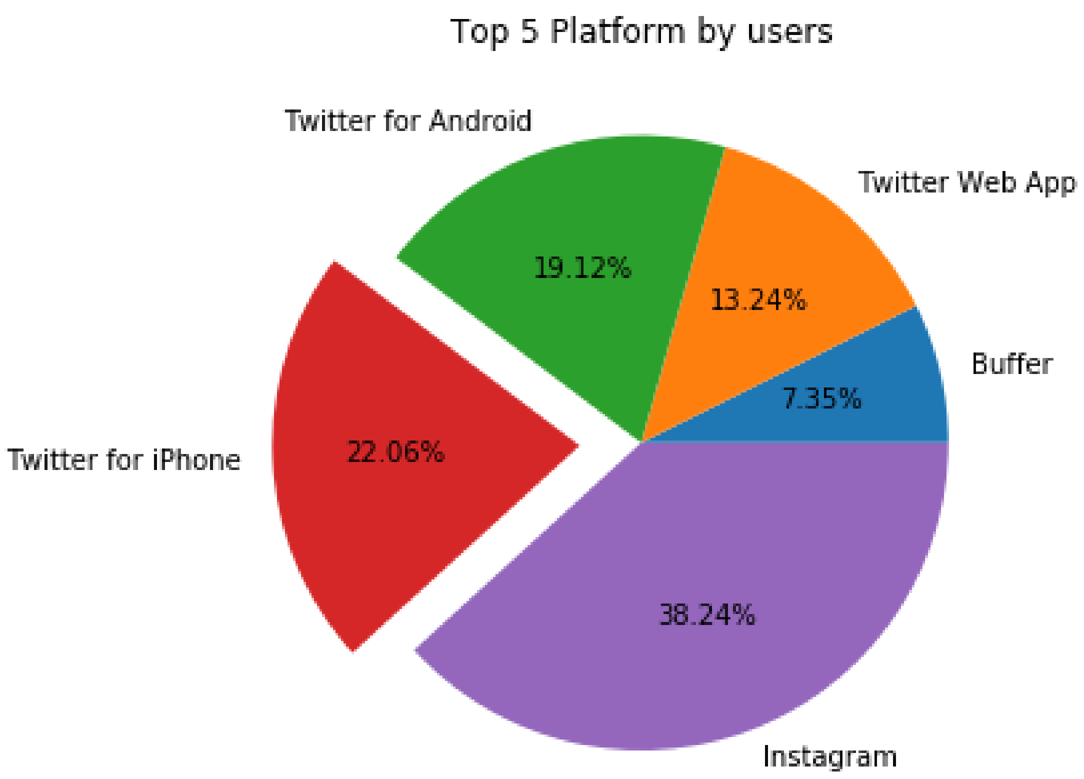
```
[35]: # plt.style.use('fivethirtyeight')
      by_platform_top5 = by_platform.sort_values('counts').tail(5)
      by_platform_top5 = by_platform_top5.set_index('platform')

      ax = by_platform_top5.plot(kind='barh', figsize=(15, 5), color='#86bf91',␣
       ↪zorder=2, width=0.5)
      ax.tick_params(axis="both", which="both", bottom="off", top="off",␣
       ↪labelbottom="on"
                     , left="off", right="off", labelleft="on",labelsize=12)
```



```
[ ]: # by_platform_top5
```

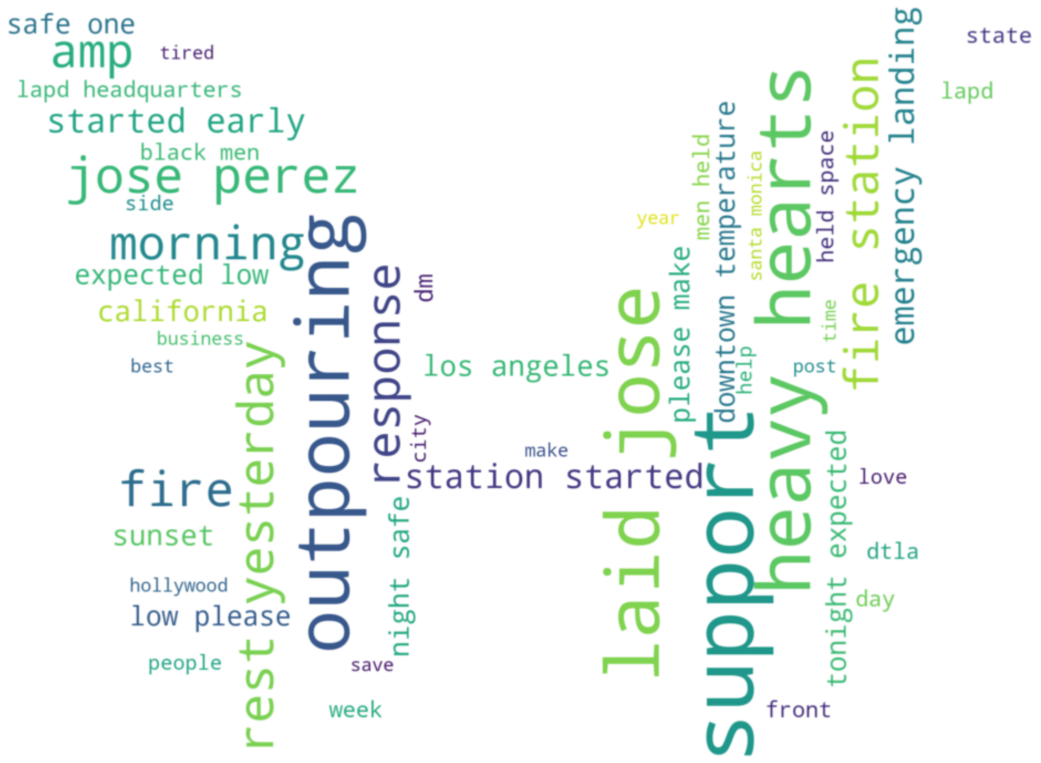
```
[37]: by_platform_top5 = by_platform_top5.reset_index()
```

```
[38]: # Pie chart

      platform = by_platform_top5['platform']
      counts = by_platform_top5['counts']
      fig = plt.figure()
      ax = fig.add_axes([0,0,1,1])
      ax.pie(counts, labels = platform,autopct='%1.2f%%',explode=(0,0,0,0.2,0))
      ax.set_title('Top 5 Platform by users')

      plt.show()
```



```
[ ]: # la_tweets.head()
```

```
[59]: ##Wordcloud
tweets = ''
stopwords = set(STOPWORDS)
# Theme and styles for visuals
plt.rcParams['font.family'] = "calibri" # font
# sns.set_context('talk') # visuals outputted for presentation style
plt.style.use('ggplot')

# iterate through the csv file
for val in la_tweets.tweet:
    # typecaste each val to string
    val = str(val)
#     print('text from tweets: ',len(val),'\n',val)
    # split the value
    tokens = val.split()
    # Converts each token into lowercase
    for i in range(len(tokens)):
        tokens[i] = tokens[i].lower()
    for words in tokens:
        tweets = tweets + words + ' '

# print('\nWordcloud bag of words from tweets: ',len(tokens),'\n',val)

#update stopwords list
stopwords.update(['https', 'rt','hi','co','promo', 'code','thank','th','ht'])

custom_mask = np.array(Image.open("butterfly.png")) #buterfly shape wordcloud

wordcloud = WordCloud(max_words=50,width = 1500, height = 900,
            background_color ='white',mask=custom_mask,
            stopwords = stopwords).generate(tweets)

# plot the WordCloud image
plt.figure(figsize = (15, 10), facecolor = None)
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis("off")
plt.tight_layout(pad = 0)

plt.show()
```



```
[ ]: #list db names
     twdb.list_collection_names()
```

```
[ ]: #drop db
     # twdb.tweets.drop()
```

```
[ ]: # !pip install tweet-preprocessor

     import preprocessor as p
     p.clean('RT @IslamRizza: #RP @slausongirl\n• • • • •\nBlack men held space in␣
      ↪front of the LAPD he \
             adquarters in DTLA in support of @DocMellyMel   It…')

     p.clean('Hurricane Awareness: Zephyr Insurance \n\nREAD MORE: https://t.co/
      ↪SEhxK4bwyi\n\n#Accidents \
                     #Claims #DisasterMitigation #Insurance #InsuranceTechnology␣
      ↪#InsurTech #Points #RiskMitigation #Technology~ https://t.co/kCrl2YxHfK')
```