WhatsApp Chat Analysis with Python

Before starting with the task of WhatsApp Chat analysis with Python you need to extract your WhatsApp data from your smartphone which is a very easy task. To extract your WhatsApp chats, just open any chat with a person or a group and follow the steps mentioned below:

1. If you are having an iPhone then tap on the Contact Name or the Group Name. In case you are having an Android smartphone then tap on the 3 dots above.
2. Then scroll to the bottom and top on Export Chat.
3. Then select without media for simplicity if it asks you whether you want your chats with or without media.
4. Then email this chat to yourself and download it to your system.

Import Python Libraries

In [1]:

```
! pip install emoji
```

```
Requirement already satisfied: emoji in c:\users\arvind\anaconda3\lib\site-p
ackages (1.2.0)
```

In [2]:

```
import regex
import pandas as pd
import numpy as np
import emoji
from collections import Counter
import matplotlib.pyplot as plt
from wordcloud import WordCloud, STOPWORDS, ImageColorGenerator
print('Libraries Imported')
```

```
Libraries Imported
```

Prepare the data

In [3]:

```
def date_time(s):
    pattern = '^([0-9]+)(\/)([0-9]+)(\/)([0-9]+), ([0-9]+):([0-9]+)[ ]?(AM|PM|am|pm)? -'
    result = regex.match(pattern, s)
    if result:
        return True
    return False

def find_author(s):
    s = s.split(":")
    if len(s)==2:
        return True
    else:
        return False

def getDatapoint(line):
    splitline = line.split(' - ')
    dateTime = splitline[0]
    date, time = dateTime.split(", ")
    message = " ".join(splitline[1:])
    if find_author(message):
        splitmessage = message.split(": ")
        author = splitmessage[0]
        message = " ".join(splitmessage[1:])
    else:
        author= None
    return date, time, author, message
```

Import the data

In [4]:

```
data = []
conversation = 'C:/Users/Arvind/Desktop/WhatsApp Chat Analysis/Dataset/WhatsApp Chat with F
with open(conversation, encoding="utf-8") as fp:
    fp.readline()
    messageBuffer = []
    date, time, author = None, None, None
    while True:
        line = fp.readline()
        if not line:
            break
        line = line.strip()
        if date_time(line):
            if len(messageBuffer) > 0:
                data.append([date, time, author, ' '.join(messageBuffer)])
            messageBuffer.clear()
            date, time, author, message = getDatapoint(line)
            messageBuffer.append(message)
        else:
            messageBuffer.append(line)
```

Our dataset is completely ready now for the task of WhatsApp chat analysis with Python. Now let's have a look at the last 20 messages and some other insights from the data:

In [5]:

```
df = pd.DataFrame(data, columns=["Date", 'Time', 'Author', 'Message'])
df['Date'] = pd.to_datetime(df['Date'])
print(df.tail(20))
print(df.info())
print(df.Author.unique())
```

```
            Date      Time           Author  \
25603 2021-05-18  11:23 AM  +91 93992 13229
25604 2021-05-18  11:24 AM  +91 93992 13229
25605 2021-05-18  11:24 AM  +91 93401 84470
25606 2021-05-18  11:24 AM  +91 93401 84470
25607 2021-05-18  11:24 AM  +91 93992 13229
25608 2021-05-18  11:24 AM  +91 93401 84470
25609 2021-05-18  11:24 AM  +91 93992 13229
25610 2021-05-18  11:25 AM  +91 93401 84470
25611 2021-05-18  11:25 AM  +91 93401 84470
25612 2021-05-18  11:25 AM  +91 93401 84470
25613 2021-05-18  11:25 AM  +91 93401 84470
25614 2021-05-18  11:25 AM  +91 93401 84470
25615 2021-05-18  11:27 AM  +91 93992 13229
25616 2021-05-18   1:53 PM  +91 88390 50511
25617 2021-05-18   1:53 PM  +91 88390 50511
25618 2021-05-18   1:53 PM  +91 88390 50511
25619 2021-05-18   1:58 PM  +91 89891 22110
25620 2021-05-18   2:03 PM  +91 93401 84470
25621 2021-05-18   2:04 PM  +91 70499 93434
25622 2021-05-18   2:05 PM  +91 93401 84470

                                                 Message
25603                                       Paid BC 😂😂😂
25604                                            1250/-
25605                             ha bc 300 rupay to gst he
25606                                           included
25607                 Itne toh cases aarahe Indore me 😂😂😂😂
25608                                                lol
25609  Saturday ko naya stock aaya hai, sab covishiel...
25610                                                ha
25611                                     ek covi ka dose
25612                                      aur ek sputnik
25613                                                ka
25614                                                😂😂
25615                                     <Media omitted>
25616                                     <Media omitted>
25617                                     <Media omitted>
25618                                     <Media omitted>
25619                               This message was deleted
25620  mkc sab hi fascist he is country me inki mkc ,...
25621            Bkc inki ishlie nhi jeet te chutiye log
25622                     the so called secular party😂😂😂
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 25623 entries, 0 to 25622
Data columns (total 4 columns):
 #   Column   Non-Null Count  Dtype
---  ------   --------------  -----
 0   Date     25623 non-null  datetime64[ns]
 1   Time     25623 non-null  object
 2   Author   25040 non-null  object
 3   Message  25623 non-null  object
```

```
dtypes: datetime64[ns](1), object(3)
memory usage: 800.8+ KB
None
[None '+91 88786 89656' '+91 70499 93434' '+91 95843 22247'
 'Sameer Bhaiya' '+91 97525 43500' 'Ankit Bhaiya' '+91 99770 81757'
 '+91 98276 19108' '+91 94245 83278' '+91 93401 84470' '+91 98268 25373'
 '+91 88394 27577' '+91 98260 33004' '+91 93402 43800' '+91 88390 50511'
 '+91 93992 13229' 'DND' '+91 94259 99992' '+91 99819 37827'
 '+91 81039 99679' '+91 99775 85052' '+91 80850 79978' '+91 77709 82814'
 '+91 79993 19630' '+91 91115 51116' '+91 74703 88167'
 'Yash Sharma(2nd Year Footballer)' '+91 91791 72464' 'Sachin Murkute'
 '+91 70000 68140' '+91 86020 39496' '+91 94066 66754' '+91 82250 17488'
 '+91 88898 74446' 'Vishal Patidar' '+91 82696 51050' '+91 93998 22949'
 '+91 79996 28080' '+91 89826 11640' '+91 90091 36555' '+91 77568 63222'
 '+91 82260 61616' '+91 99812 84007' '+91 89821 15770' '+91 73894 99207'
 '+91 6266 215 916' '+91 88188 00414' '+91 94798 68553' '+91 88714 02404'
 '+91 99078 77677' '+91 91110 15551' '+91 96307 62219' '+91 77228 76305'
 '+91 73898 19845' '+91 99779 65599' '+91 87208 26422' '+91 96733 36087'
 '+91 89628 12199' '+91 89891 22110' '+91 83195 18705' '+91 98938 24874'
 '+91 88399 55906']
```

Now let's have a look at the total number of messages between this WhatsApp chat:

In [6]:

```
total_messages = df.shape[0]
print(total_messages)
```

```
25623
```

Now let's have a look at the total number of media messages present in this chat:

In [7]:

```
media_messages = df[df["Message"]=='<Media omitted>'].shape[0]
print(media_messages)
```

```
5459
```

Now let's extract the emojis present in between the chats and have a look at the emojis present in this chat:

In [8]:

```
def split_count(text):
    emoji_list = []
    data = regex.findall(r"\X", text)
    for word in data:
        if any(char in emoji.UNICODE_EMOJI for char in word):
            emoji_list.append(word)
    return emoji_list

df["emoji"] = df["Message"].apply(split_count)

emojis = sum(df["emoji"].str.len())
print(emojis)
```

```
0
```

Now let's extract the URLs present in this chat and have a look at the final insights:

In [9]:

```
URLPATTERN = r'(https?://\S+)'
df['urlcount'] = df.Message.apply(lambda x: regex.findall(URLPATTERN, x)).str.len()
links = np.sum(df.urlcount)

print("Chats between Football Freaks")
print("Total Messages: ", total_messages)
print("Number of Media Shared: ", media_messages)
print("Number of Emojis Shared", emojis)
print("Number of Links Shared", links)
```

```
Chats between Football Freaks
Total Messages:  25623
Number of Media Shared:  5459
Number of Emojis Shared 0
Number of Links Shared 355
```

Now let's prepare this data to get more insights to analyze all the messages sent in this chat in more detail:

In [10]:

```
media_messages_df = df[df['Message'] == '<Media omitted>']
messages_df = df.drop(media_messages_df.index)
messages_df['Letter_Count'] = messages_df['Message'].apply(lambda s : len(s))
messages_df['Word_Count'] = messages_df['Message'].apply(lambda s : len(s.split(' ')))
messages_df["MessageCount"]=1

l = ['+91 88786 89656','+91 70499 93434','+91 95843 22247','Sameer Bhaiya','+91 97525 43500
     '+91 99770 81757','+91 98276 19108','+91 94245 83278','+91 93401 84470','+91 98268 253
     '+91 88394 27577','+91 98260 33004','+91 93402 43800','+91 88390 50511','+91 93992 132
     'DND','+91 94259 99992','+91 99819 37827','+91 81039 99679','+91 99775 85052','+91 808
     '+91 77709 82814','+91 79993 19630','+91 91115 51116','+91 74703 88167','Yash Sharma(2
     '+91 91791 72464','Sachin Murkute','+91 70000 68140','+91 86020 39496','+91 94066 6675
     '+91 88898 74446','Vishal Patidar','+91 82696 51050','+91 93998 22949','+91 79996 2808
     '+91 90091 36555','+91 77568 63222','+91 82260 61616','+91 99812 84007','+91 89821 157
     '+91 6266 215 916','+91 88188 00414','+91 94798 68553','+91 88714 02404','+91 99078 77
     '+91 96307 62219','+91 77228 76305','+91 73898 19845','+91 99779 65599','+91 87208 264
     '+91 89628 12199','+91 89891 22110','+91 83195 18705','+91 98938 24874','+91 88399 559
for i in range(len(l)):
    # Filtering out messages of particular user
    req_df= messages_df[messages_df["Author"] == l[i]]
    # req_df will contain messages of only one particular user
    print(f'Stats of {l[i]} -')
    # shape will print number of rows which indirectly means the number of messages
    print('Messages Sent', req_df.shape[0])
    #Word_Count contains of total words in one message. Sum of all words/ Total Messages wi
    words_per_message = (np.sum(req_df['Word_Count']))/req_df.shape[0]
    print('Average Words per message', words_per_message)
    #media conists of media messages
    media = media_messages_df[media_messages_df['Author'] == l[i]].shape[0]
    print('Media Messages Sent', media)
    # emojis conists of total emojis
    emojis = sum(req_df['emoji'].str.len())
    print('Emojis Sent', emojis)
    #links consist of total links
    links = sum(req_df["urlcount"])
    print('Links Sent', links)
    print('\n')
```

```
Messages Sent 1364
Average Words per message 3.9010263929618767
Media Messages Sent 688
Emojis Sent 0
Links Sent 5


Stats of DND -
Messages Sent 288
Average Words per message 5.017361111111111
Media Messages Sent 74
Emojis Sent 0
Links Sent 6


Stats of +91 94259 99992 -
Messages Sent 214
Average Words per message 6.163551401869159
Media Messages Sent 5
Emojis Sent 0
```

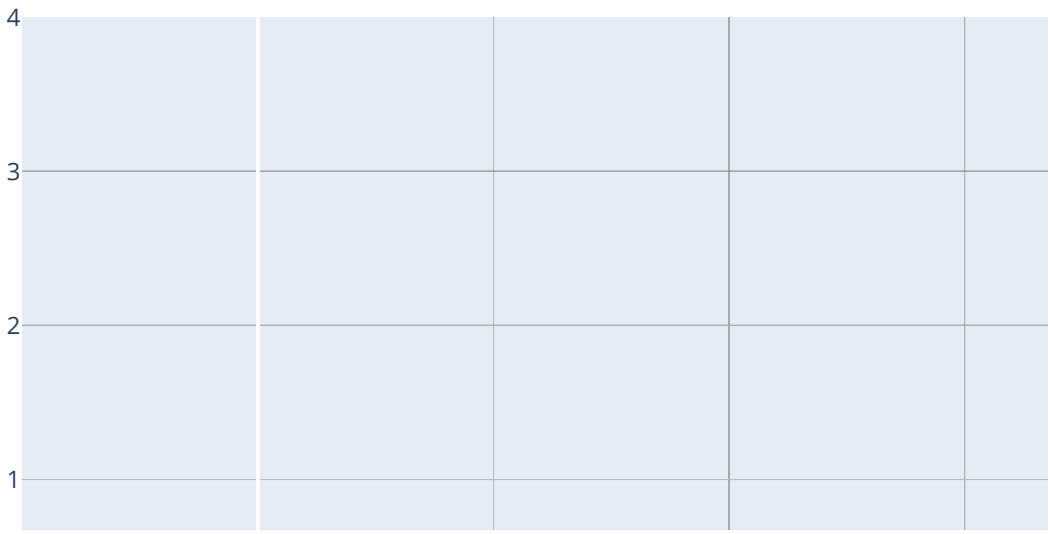
Now let's prepare a visualization of the total emojis present in the chat and the type of emojis sent between the two people. It will help in understanding the relationship between both the people:

In [11]:

```
total_emojis_list = list(set([a for b in messages_df.emoji for a in b]))
total_emojis = len(total_emojis_list)

total_emojis_list = list([a for b in messages_df.emoji for a in b])
emoji_dict = dict(Counter(total_emojis_list))
emoji_dict = sorted(emoji_dict.items(), key=lambda x: x[1], reverse=True)
for i in emoji_dict:
  print(i)

emoji_df = pd.DataFrame(emoji_dict, columns=['emoji', 'count'])
import plotly.express as px
fig = px.pie(emoji_df, values='count', names='emoji')
fig.update_traces(textposition='inside', textinfo='percent+label')
fig.show()
```



Now let's have a look at the most used words in this WhatsApp chat by visualizing a word cloud:

In [12]:

```
text = " ".join(review for review in messages_df.Message)
print ("There are {} words in all the messages.".format(len(text)))
stopwords = set(STOPWORDS)
# Generate a word cloud image
wordcloud = WordCloud(stopwords=stopwords, background_color="white").generate(text)
# Display the generated image:
# the matplotlib way:
plt.figure( figsize=(10,5))
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis("off")
plt.show()
```

```
There are 602168 words in all the messages.
```

Now let's have a look at the most used words by each person by visualizing two different word clouds:

In [13]:

```
l = ['+91 88786 89656','+91 70499 93434','+91 95843 22247','Sameer Bhaiya','+91 97525 43500
     '+91 99770 81757','+91 98276 19108','+91 94245 83278','+91 93401 84470','+91 98268 253
     '+91 88394 27577','+91 98260 33004','+91 93402 43800','+91 88390 50511','+91 93992 132
     'DND','+91 94259 99992','+91 99819 37827','+91 81039 99679','+91 99775 85052','+91 808
     '+91 77709 82814','+91 79993 19630','+91 74703 88167','Yash Sharma(2nd Year Footballer
     '+91 91791 72464','Sachin Murkute','+91 70000 68140','+91 86020 39496','+91 94066 6675
     '+91 88898 74446','Vishal Patidar','+91 82696 51050','+91 93998 22949','+91 79996 2808
     '+91 90091 36555','+91 77568 63222','+91 82260 61616','+91 99812 84007','+91 89821 157
     '+91 6266 215 916','+91 88188 00414','+91 94798 68553','+91 88714 02404','+91 99078 77
     '+91 96307 62219','+91 77228 76305','+91 73898 19845','+91 99779 65599','+91 87208 264
     '+91 89628 12199','+91 89891 22110','+91 83195 18705','+91 98938 24874','+91 88399 559
for i in range(len(l)):
  dummy_df = messages_df[messages_df['Author'] == l[i]]
  text = " ".join(review for review in dummy_df.Message)
  stopwords = set(STOPWORDS)
  #Generate a word cloud image
  print('Author name',l[i])
  wordcloud = WordCloud(stopwords=stopwords, background_color="white").generate(text)
  #Display the generated image
  plt.figure( figsize=(10,5))
  plt.imshow(wordcloud, interpolation='bilinear')
  plt.axis("off")
  plt.show()
```

Author name +91 98268 25373

Summary

So this is how we can easily analyze any WhatsApp chat between you and your friend, customer, or even a group of people. You can further use this data for many other tasks of natural language processing.